Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	GN Docket No. 12-268
	)	
	)	

REPORT AND ORDER

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By the Commission:

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I. INTRODUCTION

1. This Order adopts rules to implement the broadcast television spectrum incentive auction. The incentive auction is a new tool authorized by Congress to help the Commission meet the Nation's accelerating spectrum needs.[1] Broadcasters will have the unique financial opportunity in the "reverse

[1] *See* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, §§ 6402 (codified at 47 U.S.C. § 309(j)(8)(G)), 6403 (codified at 47 U.S.C. § 1452), 126 Stat. 156 (2012) (Spectrum Act); *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12368, paras. 25-26 (2012) (*NPRM*). The *NPRM* provided an overview of broadcast television and other services that occupy the broadcast television bands, the Commission's historical efforts to meet America's spectrum needs and Congress's call for more broadband spectrum in the Spectrum Act, as well as the statute's incentive auction provisions. *See id.* at 12362-72, paras. 11-34.

auction" phase of the incentive auction to return some or all of their broadcast spectrum usage rights in exchange for incentive payments.[2] By facilitating the voluntary return of spectrum usage rights and reorganizing the broadcast television bands, we can recover a portion of ultra-high frequency ("UHF") spectrum for a "forward auction" of new, flexible-use licenses suitable for providing mobile broadband services.[3] Payments to broadcasters that participate in the reverse auction can strengthen broadcasting by funding new content, services, and delivery mechanisms. And by making more spectrum available for mobile broadband use, the incentive auction will benefit consumers by easing congestion on the Nation's airwaves, expediting the development of new, more robust wireless services and applications, and spurring job creation and economic growth.

2. Our central objective in designing this incentive auction is to harness the economics of demand for spectrum in order to allow market forces to determine its highest and best use. We are also mindful of the other directives that Congress established for the auction, including making all reasonable efforts to preserve, as of the date of the passage of the Spectrum Act, the coverage area and population served of remaining broadcast licensees.[4] The auction affords a unique opportunity for broadcasters who wish to relinquish some or all of their spectrum rights, but we emphasize that a broadcaster's decision to participate in the reverse auction is wholly voluntary. We are committed to removing barriers to this voluntary participation. In particular, the reverse auction in which broadcasters will have the opportunity to return spectrum rights will be transparent and easy to participate in.[5] In the descending clock auction format we choose, for example, a broadcaster need only decide whether it is willing to accept one or more prices offered to it as the reverse auction proceeds; if at any point the broadcaster decides a price is too low, it may drop out of the reverse auction.[6] No station will be compensated less than the total price that it indicates it is willing to accept.[7]

3. The auction presents a once-in-a-lifetime opportunity for broadcasters, and we are committed to providing them with information about both our process and the financial opportunity the auction represents to enable them to make informed business decisions about whether and how to participate. We have conducted numerous workshops and other direct outreach efforts.[8] We also have developed the Learn Everything About Reverse Auctions Now ("LEARN") program to provide useful

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[2] Spectrum Act § 6403(a)(1) (mandating "a reverse auction to determine the amount of compensation that each broadcast television licensee would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights in order to make spectrum available for assignment through a system of competitive bidding under subparagraph (G) of section 309(j)(8) of the Communications Act of 1934, as added by section 6402."); *see* § IV.B (Reverse Auction).

[3] Spectrum Act § 6403(c)(1) (A) (requiring the FCC to conduct a "forward auction" to assign licenses for the use of spectrum reallocated from broadcast television as part of the incentive auction); *see* § IV.C (Forward Auction).

[4] Spectrum Act § 6403(b)(2).

[5] *See* § IV.B (Reverse Auction).

[6] *See* § III.B.1 (Repacking Process Overview); Spectrum Act § 6403(b).

[7] *See* para. 453.

[8] *See, e.g., FCC Announces Panelists for September 30, 2013, Workshop on Issues Surrounding the Reassignment of TV Stations After the Incentive Auction*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 13805 (2013); *FCC Announces Details for June 25, 2012 TV Broadcaster Relocation Fund Workshop*, GN Docket No. 12-268, News Release, 2012 WL 1965368 (rel. June 1, 2012); *FCC Announces Details for May 22, 2012 Channel Sharing Workshop*, GN Docket No. 12-268, News Release, 2012 WL 1524622 (rel. May 1, 2012). In addition, the Media Bureau conducted a series of webinars regarding the incentive auction for State Broadcasters Associations in 2011 and 2012. Moreover, representatives of the Media Bureau have spoken at a number of conferences about the incentive auction since the enactment of Spectrum Act, including, among others, National Association of Broadcasters (NAB) Shows, Association of Public Television Stations (APTS) Public Media Summits, and National Alliance of State Broadcasters Associations (NASBA) Winter Meetings.

information and resources.[9] We anticipate offering demonstrations of the auction bidding system, interactive tutorials, and other opportunities for broadcasters to familiarize themselves with the reverse auction application and bidding processes in advance of the reverse auction. We also recognize the importance of broadcasters that choose not to participate in the reverse auction. To free up a portion of the UHF spectrum band for new, flexible uses, Congress authorized the Commission to reorganize the broadcast television spectrum so that the stations that remain on the air after the incentive auction occupy a smaller portion of the UHF band.[10] The reorganization (or "repacking") approach we adopt will avoid unnecessary disruption to broadcasters and consumers and ensure the continued availability of free, over-the-air television service.

4. Ultimately, our actions will benefit consumers of telecommunications services. While minimizing disruption to broadcast television service, we seek to rearrange the UHF spectrum in order to increase its potential to support the changing needs of 21st Century consumers. We recognize that the same individuals may be consumers of television, mobile broadband—using both licensed and unlicensed spectrum—and other telecommunications services. To benefit such consumers, and consistent with the framework of the Spectrum Act, we have strived for balance in our decision-making process between television and wireless services, and between licensed and unlicensed spectrum uses.

5. We adopt a "600 MHz Band Plan" for new services in the reorganized UHF spectrum. By maximizing the spectrum's value to potential bidders through features such as paired five megahertz "building blocks," the Band Plan will help to ensure a successful auction. By accommodating variation in the amount of spectrum we recover in different areas, which depends on broadcaster participation and other factors, the Band Plan will ensure that the repurposing of spectrum for the benefit of most consumers nationwide is not limited by constraints in particular markets.[11] The Band Plan will promote competition and innovation by creating opportunities for multiple license winners and for future as well as current wireless technologies. Because it is composed of a single band of paired spectrum blocks only, our Band Plan also simplifies the forward auction design. We adopt for new licensees flexible-use service rules, and technical rules similar to those governing the adjacent 700 MHz Band, an approach that should speed deployment in the 600 MHz Band. Devices will be required to be interoperable across the entire new 600 MHz Band.

6. Our repacking methodology will ensure an efficient television channel assignment scheme while avoiding unnecessary disruption to broadcasters and consumers. Repacking presents a complex engineering problem that must be solved repeatedly during the course of the reverse auction bidding process: namely, how to determine which channels to assign to stations that will stay on the air, consistent with statutory requirements, as well as the technical requirements that we establish.[12] For the incentive auction to succeed, we need a methodology capable of solving the problem quickly and with certainty as the reverse auction bidding proceeds. Our repacking methodology will address these needs by simplifying the problem. During the reverse auction bidding process, provisional channel assignments that satisfy applicable requirements will be identified, ensuring that a feasible channel is available for every station that remains on the air. After the reverse auction bidding ends, final channel assignments will be optimized to strive for additional goals, such as minimizing relocation costs for broadcasters

[9] *See* http://www.fcc.gov/learn.

[10] *See* Spectrum Act § 6403(b)(1) (requiring the FCC, in order to "mak[e] available spectrum to carry out the forward auction," to "evaluate the broadcast television spectrum," and authorizing it, "subject to international coordination . . . ," to "make such reassignments of television channels as the Commission considers appropriate" and "reallocate such portions of such spectrum as the Commission determines are available").

[11] Under this framework, we can generally make available for new uses the amount of spectrum we recover in most top markets, while offering different amounts in constrained markets (such as those that border Canada and Mexico) where we may recover less spectrum. *See* § III.A.2.d (Market Variation).

[12] *See* § III.B.1 (Repacking Process Overview).

assigned to new channels. This approach will meet the practical requirements of conducting a successful auction without sacrificing other objectives.

7. Our repacking approach will also fulfill Congress's mandate to use "all reasonable efforts to preserve," as of the date of the passage of the Spectrum Act, the coverage area and population served of each remaining broadcast licensee.[13] In particular, our approach will ensure that each station serves essentially the same viewers that it served before the incentive auction, and that no station causes more than a minimal (0.5 percent) amount of new interference to another station.[14] The statutory mandate covers facilities operating as of February 22, 2012, but we will extend the same protection to certain facilities authorized after that date, having determined that the benefits of doing so outweigh the potential costs to our flexibility in reorganizing the broadcast television spectrum.[15]

8. In addition to repurposing UHF spectrum for new licensed uses, the rules we adopt in this Order will make a significant amount of spectrum available for unlicensed use, a large portion of it on a nationwide basis.[16] Unlicensed devices complement licensed services, serve a wide range of consumer needs, and contribute tens of billions of dollars to our economy annually. To prevent harmful interference between licensed services, our 600 MHz Band Plan includes a number of guard bands, which we intend to make available for use by unlicensed devices. Moreover, we will allow unlicensed use of channel 37, and allow television white space ("TVWS") devices as well as wireless microphones to operate on any unused television channels following the incentive auction. We also intend to designate one unused channel in each area following the repacking process for shared use by wireless microphones and TVWS devices.

9. To facilitate broadcaster participation, we are striving for simplicity in designing the reverse auction. Broadcasters will be able to participate online through an easy-to-use computer interface. They will have several bid options, including relinquishing their licenses, moving to a lower band, and sharing a channel. The descending clock format to collect bids will enable broadcasters to gain information during the bidding, and will not require them to reveal how much compensation they ultimately would accept; they need indicate only whether they accept the opening price and—if so—any subsequent prices. If at any point a broadcaster decides prices are too low, it may drop out of the auction. No station will be compensated less than the total price that it indicates it is willing to accept. We will evaluate and select bids in conjunction with the repacking process, based on their potential impact on the recovery of spectrum and other factors. We will keep the identity of broadcasters that participate confidential, and that period of confidentiality will extend for two years after the incentive auction, except for winning bidders.[17]

10. For the incentive auction to succeed, the reverse auction and the repacking process must work seamlessly with the forward auction of new, flexible-use 600 MHz Band licenses. We are designing the forward auction for speed, so that reverse auction participants need not await its outcome for weeks or months. In particular, by conducting bidding for generic or interchangeable spectrum blocks rather than specific frequencies, we can condense the time required for bidding significantly. We establish a final stage rule to assure that the forward auction raises enough proceeds to satisfy the minimum proceeds

[13] *See* Spectrum Act § 6403(b)(2) (requiring "all reasonable efforts to preserve, as of the date of the enactment of this Act, the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69").

[14] *See* § III.B.2 (Implementing the Statutory Preservation Mandate).

[15] *See* § III.B.3 (Facilities to Be Protected); Spectrum Act § 6403(b)(2).

[16] *See* § III.C (Unlicensed Operations).

[17] *See* § IV.B.1 (Reverse Auction Pre-Auction Process); Spectrum Act § 6403(a)(3) (requiring "all reasonable steps necessary to protect the confidentiality of Commission-held data of a licensee participating in the reverse auction . . . , including withholding the identity of such licensee until the [spectrum] reassignments and reallocations (if any) . . . become effective").

requirements that we establish, but bidding will continue as long as demand for wireless licenses in any area exceeds the number available in that area.[18] In the *Mobile Spectrum Holdings Report and Order* adopted today, we establish a market-based spectrum reserve in the forward auction designed to ensure against excessive concentration in holdings of low-band spectrum, and we adopt certain secondary markets limitations regarding 600 MHz Band licenses.[19]

11. Following the conclusion of the incentive auction, the transition to the reorganized UHF band will be as rapid as possible without causing unnecessary disruption. Television stations that voluntarily turn in their licenses or agree to channel share must transition from their pre-auction channels within three months of receiving their reverse auction payments.[20] The time required for stations reassigned to a new channel to modify their facilities will vary, so we will tailor their construction deadlines to their situations.[21] This approach will ensure that stations transition as quickly as their circumstances allow, and allow coordination of deadlines where, for example, one station must vacate a channel before another can begin operating on its new channel. No station will be allowed to operate on a channel that has been reassigned or repurposed more than 39 months after the repacking process becomes effective.[22] In other words, the repurposed spectrum will be cleared no later than 39 months after the effective date. Most new licensees should have access to 600 MHz spectrum well before then. Consistent with Congress's mandate, we also establish procedures to reimburse costs reasonably incurred by stations that are reassigned to new channels, as well as by multichannel video programming distributors to continue to carry such stations.[23]

12. As Congress recognized, the incentive auction and the transition that follows require coordination with our cross-border neighbors, Canada and Mexico.[24] Because of these common borders, the Commission has established processes and agreements to protect television and wireless operations in border areas from harmful interference. The FCC staff has used these processes to fully inform Canadian and Mexican officials regarding the incentive auction and, beginning in 2013, formed technical groups to meet routinely to plan for harmonious use of the reorganized UHF band following the incentive auction. Commission leadership has supplemented these efforts, meeting with their Canadian and Mexican counterparts to emphasize the need for and mutual benefits of harmonization. We are confident that the long and successful history of close cooperation with Canada and Mexico regarding the use of radio spectrum along our common borders will continue before, during, and after the incentive auction.

13. We intend to conduct the broadcast television spectrum incentive auction as soon as possible. We must proceed deliberately, however, as the auction will be the first of its kind. We also are committed to an open, transparent process with meaningful public input. The Commissioners and staff have engaged in significant public discourse throughout the course of this proceeding. In addition to the

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[18] *See* § IV.C.2 (Forward Auction Bidding Process).

[19] *See Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269, Report and Order, FCC 14-63 (adopted May 15, 2014) (*MSH Report and Order*).

[20] *See* § V.C.2.b (Transition Procedures for Winning License Relinquishment and Channel Sharing Bidders).

[21] *See* § V.C.2.a (Construction Period for Stations with New Channel Assignments). We note that no broadcaster will be required to relocate its transmission facilities. Stations that are reassigned to new channels will have to modify their facilities to operate on the new channels, however.

[22] *See id*. Thirty-nine months includes the thirty-six month construction period provided under current FCC rules, plus three months between the effective date—when the repacking process results are announced—and the deadline for stations to file construction permit applications to modify their facilities.

[23] *See* Spectrum Act § 6403(b)(4)(A); § V.C.5 (Reimbursement of Relocation Costs).

[24] *See* Spectrum Act § 6403(b)(authorizing such reassignments of television channels as the Commission considers appropriate, and reallocation of such spectrum as it determines is available for reallocation, subject to international coordination along the border with Mexico and Canada).

usual comment and reply process, the record reflects more than 400 *ex parte* meetings, numerous public notices and workshops on specific incentive auction-related issues, and a series of Incentive Auction Task Force presentations at Commission open meetings, which have provided critical input for the decisions we make today. These decisions provide the essential framework for the incentive auction. But they will not, by themselves, enable us to implement the incentive auction. Based on the framework we establish today, we will develop the detailed procedures necessary to govern the auction process, which will be based on additional record input on the remaining, narrower set of important issues, such as auction design and issues arising from our decision to accommodate market variation in the 600 MHz Band Plan.[25]

14. Our experience with spectrum auctions over the past 20 years supports our conclusion that the public interest is best served by acting now to establish the basic framework for the incentive auction, and thereafter resolving discrete outstanding issues and adopting final auction procedures, through a process that allows additional public input and concludes well in advance of the auction itself. The Commission's past practice has been to first establish general rules governing spectrum license auctions in reports and orders, and then specific requirements through public notices that provide the opportunity for comment by interested parties, including on critical matters such as bid collection, assignment, and payment procedures and final stage rule. This approach has worked well, and a similar one is all the more necessary for the incentive auction due to its novelty and complexity. Consistent with this approach, today's Order determines many of the significant elements of the incentive auction, which are set forth in the following Executive Summary.

15. In the coming months, the Commission will solicit public input on final auction procedures by Public Notice ("*Incentive Auction Comment PN*" or "*Comment PN*"). This Public Notice will include specific proposals on crucial auction design issues such as opening prices, factors for setting reverse auction prices, and how much market variation to accommodate in the 600 MHz Band Plan. Well in advance of the auction, also by Public Notice, the Commission will resolve these implementation issues, and provide detailed explanations and instructions for potential auction participants ("*Incentive Auction Procedures PN*" or "*Procedures PN*").[26] We do not modify the Wireless Telecommunications Bureau's ("WTB" or "Wireless Bureau") well-established authority to adopt final auction procedures through a pre-auction public notice process.[27] Compared to our typical spectrum auctions, many aspects of the broadcast television spectrum incentive auction are unique, and in this proceeding we intend to establish certain procedures by Commission vote. The WTB may continue to establish final auction procedures in this proceeding concerning those matters that it typically handles under existing delegations of authority.

16. The Commission will resolve outstanding issues that fall outside the rubric of the *Comment PN* and the *Procedures PN*, including a methodology for preventing co- and adjacent channel interference between television and wireless services in certain areas, and proposals for an aggregate cap on interference to television stations in the repacking process,[28] through a separate process that will conclude in advance of decisions on the final auction procedures. The discussion that follows identifies such issues that are not being resolved in this Order and, where appropriate, delegates authority to one or more of the Commission's Bureaus and Offices to resolve those issues in accordance with our decisions.

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[25] *See* §§ III.A.2.d (Market Variation), IV.A (Overview and Integration of the Reverse and Forward Auctions), IV.B.2 (Reverse Auction Bidding Process), IV.C.2 (Forward Auction Bidding Process).

[26] We refer generally to the "pre-auction process" in this Order, which includes the *Comment PN* and *Procedures PN*. We may seek comment on, and/or resolve, certain final auction procedures in separate public notices if doing so better conduces to the proper dispatch of business. *See* 47 U.S.C. § 154(j). Any such public notices will be released during the pre-auction process and well in advance of the auction.

[27] *See* 47 C.F.R. § 0.131(c).

[28] See § III.B.2.d (Preserving Population Served).

II. EXECUTIVE SUMMARY

17. *600 MHz Band Plan*. We adopt a 600 MHz Band Plan with specific paired uplink and downlink bands, comprised of five megahertz "building blocks." We find that specific uplink and downlink bands that support Frequency Division Duplex ("FDD") technologies are best suited for the new 600 MHz Band at the present time in light of current technology, the Band's propagation characteristics, and potential interference issues present in the Band; and that offering paired spectrum blocks will best facilitate the rapid deployment of networks, including by smaller carriers and new entrants. The uplink portion of the Band will begin at channel 51 (698 MHz) and expand downward, followed by a duplex gap and then the downlink portion of the Band. The Band Plan can accommodate variation in the amount of spectrum recovered in different geographic areas in order to prevent the "least common denominator market" from limiting the quantity of spectrum we can offer generally across the nation.[29]

18. In addition, the Band Plan we adopt incorporates technically reasonable guard bands, including the duplex gap, to prevent harmful interference between licensed services.[30] We adopt Partial Economic Areas ("PEAs") as the service area for the 600 MHz Band, finding that PEAs permit entry by providers that contemplate offering wireless broadband service on a localized basis, yet may be easily aggregated by carriers that plan to provide service on a larger geographic scale. Consistent with the Spectrum Act's directives, we also adopt "flexible use" service rules for the 600 MHz Band.[31]

19. *Repacking the Broadcast Television Bands.* In reorganizing the television bands to make spectrum available to carry out the forward auction, the FCC must "make all reasonable efforts to preserve, as of [February 22, 2012], the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69 of the Commission's Office of Engineering and Technology" ("OET-69").[32] We interpret this mandate to require that we strive to preserve full power and Class A stations' existing service as of that date without sacrificing the objectives of the incentive auction. While we will use the methodology described in OET-69 to determine the coverage area and population served of each station, we must update the computer software and input values used to implement that methodology. Among other things, doing so will ensure that our software is capable of the rapid, complex calculations necessary to support the reverse auction and the repacking process, and that we are relying on the most accurate population and other data available. We will protect full power stations' coverage areas based on their "service areas,"[33] and protect the coverage areas of Class A stations, which do not have "service areas" under FCC rules or OET-69, based on their "protected contours."[34] Rather than merely attempting to preserve the same total population served by each station, we will make all reasonable efforts to preserve the same specific viewers it served as of

[29] If the 600 MHz Band Plan could not accommodate some market variation, we would be forced to limit the amount of spectrum offered across the nation to what is available in the most constrained market (the "least common denominator"), even if more spectrum could be made available in the vast majority of the country. *See* § III.A.2.d (Market Variation).

[30] *See* § III.A.2.e (Guard Bands). The size of the guard band between 600 MHz downlink and television depends on how much spectrum is repurposed through the incentive auction. The duplex gap will be 11 megahertz, and the potential size of the guard band between 600 MHz downlink and television is seven to 11 megahertz. If 84 megahertz or more is repurposed, there will be a three-megahertz guard band or bands between 600 MHz operations and channel 37. *See id.*; § III.D.1 (Channel 37 Services).

[31] *See* § VI.B.2 (600 MHz Band Service Rules); Spectrum Act § 6402 (granting incentive auction authority "to permit the assignment of new initial licenses subject to flexible-use service rules").

[32] Spectrum Act § 6403(b)(2).

[33] *See* § III.B.2.c (Preserving Coverage Area); 47 C.F.R. § 73.622(e); OET-69 at 1.

[34] *See* § III.B.2.c (Preserving Coverage Area); 47 C.F.R. § 73.6010.

February 22, 2012. We will not allow any channel assignments that, considered on a station-to-station basis, would reduce a station's population served by more than a *de minimis* (0.5 percent) amount.[35]

20. *Television Facilities to Be Protected in the Repacking Process.* As Congress required, we will protect full power and Class A facilities that already were operating pursuant to a license (or a pending application for a license to cover a construction permit) on February 22, 2012.[36] We also exercise our discretion to protect facilities in addition to those the statute requires us to protect, based on consideration of the potential impact on our flexibility in the repacking process and our auction goals, whether failing to protect would strand investment by broadcasters licensed on a primary basis, the loss of service to existing viewers, and the potential impact on the Class A service's digital transition. In particular, we will protect:

- the small number of new full power television stations that were authorized, but not constructed or licensed, as of February 22, 2012;
- full power facilities authorized in construction permits issued to effectuate a channel substitution for a licensed station;
- modified facilities of full power and Class A stations that were authorized by construction permits granted on or before April 5, 2013, the date the Media Bureau issued a freeze on the processing of certain applications; and
- minor change facilities authorized to implement Class A stations' mandated transition to digital operations.[37]

21. Except in very limited circumstances, we will limit discretionary protection to the above categories. We conclude that protecting other categories of facilities, including low power television ("LTPV") stations and television translator ("TV translator") stations, which are secondary in nature and are not entitled to protection from primary services under our current rules, would unduly constrain our flexibility in the repacking process and undermine the likelihood of meeting our objectives for the incentive auction. To help preserve the important services provided by LPTV and TV translator stations, we will open a special filing window for such stations that are displaced to select a new channel and will amend our rules to expedite the process for displaced stations to relocate. We also intend to initiate a rulemaking proceeding after the release of this Order to consider additional means to mitigate the potential impact of the incentive auction and the repacking process on LPTV and TV translator stations.

22. *Unlicensed Operations.* We will make the 600 MHz Band guard bands available for unlicensed use, thereby making spectrum available for unlicensed devices nationwide. Depending on the amount of spectrum repurposed through the incentive auction, we will make a total of 14 to 28 megahertz of guard band spectrum available for unlicensed use. In addition, we will make an additional six megahertz of spectrum available by allowing unlicensed use of channel 37 at locations where it is not in use by channel 37 incumbents, subject to the development of the appropriate technical parameters to protect the incumbent Wireless Medical Telemetry Service ("WMTS") and Radio Astronomy Service ("RAS") from harmful interference.[38] Following the incentive auction and the post-auction transition,

[35] We will resolve proposals for an additional, aggregate cap on interference to television stations through a separate process that will conclude in advance of decisions on the final auction procedures. *See* § III.B.2.d (Preserving Population Served).

[36] *See* § III.B.3 (Facilities to Be Protected); Spectrum Act § 6403(b)(2).

[37] *See* § III.B.3 (Facilities to Be Protected); In order to ensure that we have a largely static view of the facilities that will be protected in advance of the repacking process, we generally will limit our discretionary protection to facilities constructed and licensed on or before a Pre-Auction Licensing Deadline to be announced by the Media Bureau. We anticipate that the Public Notice will give stations at least 90 days prior notice of this deadline.

[38] *See* § III.C (Unlicensed Operations). We will initiate a separate rulemaking proceeding to establish technical rules for unlicensed operations in the guard bands and on channel 37.

TVWS devices may continue to operate on channels allocated and assigned for primary television services, consistent with our current rules.[39] We anticipate that there will be at least one channel not assigned to a television station in all areas at the end of the repacking process,[40] and we intend, after additional notice and opportunity for public input, to designate one such channel in each area for shared use by wireless microphones and TVWS devices. We expect a significant amount of spectrum to be available for continued TVWS use, particularly outside of the central urban areas of the largest television markets.[41] Any other unused television channels in a market following the incentive auction will also be available for TVWS device as well as wireless microphone use. We will initiate a rulemaking proceeding after the release of this Order to consider changes to our existing Part 15 rules to facilitate unlicensed use of the television bands, 600 MHz Band guard bands and channel 37.

23. *Other Services.* We will not relocate the WMTS or the RAS from channel 37. To protect these incumbent services from harmful interference, in the 600 MHz Band Plan we adopt guard bands between such services and any new wireless broadband services that may be deployed adjacent to channel 37. Furthermore, we will require coordination with existing RAS facilities so that any new wireless systems can be deployed to cover the broadest area possible with minimal impact to RAS observatories. We will continue to license fixed broadcast auxiliary service ("BAS") operations on a secondary basis in the post-auction TV bands.

24. We adopt measures to facilitate wireless microphone use of available spectrum in the reorganized UHF band. With regard to the 600 MHz Band guard bands, we will allow broadcasters and cable programming networks to operate licensed wireless microphones in a portion of the duplex gap, and permit users generally to operate wireless microphones in the guard bands on an unlicensed basis.[42] We will initiate a proceeding to adopt technical standards to govern these uses.[43] With regard to the remaining television spectrum, while there may no longer be two unused channels for wireless microphones in markets where those channels are currently used for that purpose, as noted above we intend to designate one unused channel in each area following the auction for use by wireless microphones and TVWS devices. We also revise our rules for co-channel operations in the post-auction television bands to expand the areas where wireless microphones may operate. We will continue to permit wireless microphone users of unused television channels to register to obtain needed protection from unlicensed TVWS devices on such channels through the TV bands database registration system, which we plan to improve to make protection more timely and effective. In a companion item that we adopt today, we extend to certain unlicensed wireless microphone users the rights of licensed wireless microphone users.[44] We will also initiate a proceeding in the near future to find additional spectrum for wireless microphone users in other spectrum bands in order to help address their long-term needs.

25. *Incentive Auction Process: Integration of the Reverse and Forward Auctions.* The reverse and forward auctions will be integrated in a series of stages. Each stage will consist of a reverse auction and a forward auction bidding process, and additional stages will be run if necessary. Prior to the

[39] *See generally* 47 C.F.R. Part 15; § III.C (Unlicensed Operations).

[40] *See* III.C (Unlicensed Operations). For engineering reasons, there may be a few areas with no spectrum available in the television bands for unlicensed devices and wireless microphones to share.

[41] TVWS devices may continue to operate in portions of the UHF band that will be repurposed until a 600 MHz Band licensee commences operations, and in portions designated for guard band use.

[42] *See* § III.D.3 (Low Power Auxiliary Stations and Unlciensed Wireless Microphones). Wireless microphones may operate throughout the 600 MHz Band during the Post-Auction Transition Period. *See* § V.D.4 (Transition Procedures for Low Power Auxiliary Stations (LPAS) and Unlicensed Wireless Microphones).

[43] *See* § III.C (Unlicensed Operations).

[44] *Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band*, WT Docket No. 08-166, WT Docket No. 08-167, ET Docket No. 10-24, Second Report and Order, __ FCC Rcd __ (2014) (adopted May 15, 2014) (*Wireless Microphones Second Report and Order*).

first stage, the initial spectrum clearing target will be determined. Broadcasters will indicate through the pre-auction application process their willingness to relinquish spectrum usage rights at the opening prices. Based on broadcasters' collective willingness, the initial spectrum clearing target will be set. Then the reverse auction bidding process will be run to determine the total amount of incentive payments to broadcasters required to clear that amount of spectrum. The forward auction bidding process will follow the reverse auction bidding process. If the final stage rule is satisfied, the forward auction bidding will continue until there is no excess demand, and then the incentive auction will close. If the final stage rule is not satisfied, additional stages will be run, with progressively lower spectrum targets in the reverse auction and less spectrum for licenses available in the forward auction, until the rule is satisfied.

26. The final stage rule is a reserve price with two components, both of which must be satisfied. The first component requires that the average price per MHz-pop[45] for licenses in the forward auction meets or exceeds a certain price per MHz-pop benchmark. Alternatively, if the spectrum clearing target at a particular stage is greater than a spectrum clearing benchmark, then the first component will be met if the total proceeds of the forward auction exceed the product of the same price benchmark, the spectrum clearing benchmark, and the total number of pops for those licenses.[46] This alternative formulation will allow the auction to close if the incentive auction repurposes a relatively large amount of spectrum for wireless uses, even if the price per-MHz-pop is less than the benchmark price. The price and spectrum clearing benchmarks will be established by the Commission in the *Procedures PN*, after an opportunity for additional comment. The second component of the final stage rule requires that the proceeds of the forward auction be sufficient to meet mandatory expenses set forth in the Spectrum Act[47] and any Public Safety Trust Fund amounts needed in connection with FirstNet. If the requirements of both components of the reserve price are met, then the final stage rule is satisfied.[48]

27. *Reverse Auction Eligibility and Bid Options.* Full power and Class A station licensees will be eligible to participate in the reverse auction. They may bid to voluntarily relinquish the spectrum usage rights associated with station facilities that are eligible for protection in the repacking process. Licensees with pending enforcement matters whose bids may result in their holding no broadcast licenses may participate under a streamlined escrow approach that is consistent with current practice in the sales context. Bidders will have the three bid options specified by the Spectrum Act: (1) license relinquishment; (2) reassignment from a UHF to a VHF channel; and (3) channel sharing. UHF-to-VHF bidders may limit their bids to a high (channels 7 to 13) or low (channels 2 to 6) VHF channel. We will favorably consider post-auction waiver requests involving winning UHF-to-VHF and high-VHF-to-low-VHF bidders' technical operations. Bidders will have the additional option to bid for reassignment from a high VHF channel to a low VHF channel. Channel sharing bidders may propose licensed community changes if they cannot satisfy signal coverage requirements from their new transmitter sites, provided that the new communities meet the same allotment priorities as the current ones and are located in the same Designated Market Areas ("DMAs").[49]

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[45] The term "MHz-pop" is defined as the product derived from multiplying the number of megahertz associated with a license by the population of the license's service area.

[46] The operation of the final stage rule, including the alternative formulation of the first component, is explained in detail below in § IV.A (Overview and Integration of the Reverse and Forward Auctions). In the pre-auction process, we will consider whether to apply the final stage rule solely to "major markets" and, if so, how to identify such markets. This approach could significantly speed up the determination of whether the final stage rule is satisfied.

[47] The Spectrum Act requires that the forward auction generate proceeds sufficient to pay winning bidders in the reverse auction and cover relevant administrative costs of the auction and an estimate of relocation costs subject to reimbursement. *See* Spectrum Act § 6403(c)(2).

[48] We note that the first and second components are not cumulative: the auction need not raise sufficient proceeds to satisfy the first *plus* the second.

[49] The Commission's television allotment priorities implement the policy goals of § 307(b) of the Communications Act. 47 U.S.C. § 307(b). *See* § IV.B.1.b.iii (Bid Options/Channel Sharing Bid).

28. *Reverse Auction Pre-Auction Process.* Potential bidders will have to submit certified applications.[50] Consistent with the Spectrum Act, we will protect the identity of licensees that apply to participate in the reverse auction.[51] Specifically, we will maintain the confidentiality of information submitted by all licensees that apply to participate until the results of the reverse auction and the repacking process are announced. We will maintain the confidentiality of information on non-winning bids for an additional two years. Confidential information will include licensees' names, channels, call signs, facility identification numbers, network affiliations, and any other information necessary to protect licensees' identities.

29. Between the short-form application filing deadline and the announcement of the results of the reverse auction and the repacking process, all full power and Class A licensees will be prohibited from communicating directly or indirectly any reverse or forward auction applicant's bids or bidding strategies to any other full power or Class A licensee or forward auction applicant.[52] Recognizing that many broadcasters are not familiar with auction processes, we intend to make education regarding the pre-auction application process, including the scope of the prohibition of certain communications, an important part of our broadcaster outreach efforts.

30. *Reverse Auction Bidding Process.* We adopt a descending clock format for the reverse auction. In each bidding round, stations will be offered prices for one or more bid options and will indicate their choices at these prices. The prices offered to each station for options will be adjusted downward as the rounds progress in a way that accounts for the availability of television channels in different bands in the repacking process.[53] "Intra-round bidding" will enable bidders to indicate price levels (between the opening- and closing prices in a round) at which they would like to either choose different bid options or drop out of the auction and remain in their home bands. A station will continue to be offered prices for bid options until the station's voluntary relinquishment of rights becomes needed to meet the current spectrum clearing target. When all remaining active bidders are needed in this way, the reverse auction for the stage will end. If the final stage rule is satisfied in that stage, then the active bidders are winning bidders, and the price paid to each will be at least as high as the last price it agreed to accept.

31. *Forward Auction Pre-Auction Process.* At this time we adopt the same size-based bidding credits for the forward auction as the Commission applied in auctioning 700 MHz Band spectrum: 15 percent for small businesses (defined as entities with average annual gross revenues for the preceding three years not exceeding $40 million) and 25 percent for very small businesses (defined as entities with average annual gross revenues for the preceding three years not exceeding $15 million).[54] Soon we will initiate a separate proceeding to review our Part 1 designated entity rules. As part of that

[50] Potential channel sharers need not submit applications (only sharees), but must certify regarding their channel sharing agreements. "Sharer" refers to a licensee that agrees to share its channel with another licensee, but does not bid to relinquish spectrum usage rights to its channel in the reverse auction. "Sharee" refers to a licensee that bids to relinquish spectrum usage rights to its channel in the auction to share a different channel with another licensee.

[51] *See* Spectrum Act § 6403(a)(3) ("The Commission shall take all reasonable steps necessary to protect the confidentiality of Commission-held data of a licensee participating in the reverse auction . . . , including withholding the identity of such licensee until [the repacking process has] become effective . . . .").

[52] The prohibition will apply to all controlling interest holders in the licensee, and all directors and officers of the licensee. The prohibition will not apply to communications between (a) licensees that share a common controlling interest, director or officer (and between a licensee and a forward auction applicant that have similar overlapping interests) and (b) parties to a channel sharing agreement that is disclosed on a reverse auction application. *See* § IV.B.1.c (Confidentiality and Prohibition on Certain Communications).

[53] The more potential for interference a station has, the more assigning it a channel is likely to limit the availability of channels for other stations, increasing the likely value of its bid to voluntarily relinquish spectrum usage rights.

[54] *See* § IV.C.1.b (Bidding Credits).

proceeding, we will consider whether any revisions made to the rules should apply to the incentive auction. Forward auction applicants will be subject to our existing Part 1 competitive bidding rules, with modifications we adopt today that, among other things, provide for the selection of generic licenses and prohibit communications with full power and Class A licensees during the auction process.

32. *Forward Auction Bidding Process.* We adopt an ascending clock auction format for the forward auction. Bidders will be able to bid for generic licenses in one or more categories. Intra-round bidding will be allowed. There will be a separate clock price for each category in each geographic area, and bidders will indicate the number of licenses that they demand at the current prices. The prices generally will rise from round to round, as long as the demand for licenses exceeds their availability. Bidders still demanding licenses when the clock prices stop rising in every license category in every area will become winners of those licenses, provided the final stage rule is satisfied. If the rule is not satisfied, those bidders will have an opportunity to make additional bids in an extended bidding round. Once the rule is satisfied, winners may indicate their preferences for frequency-specific licenses in an assignment round or a series of separate bidding rounds. Final license prices will reflect the winning bid amounts from the clock bidding rounds as well as any adjustments from the extended bidding and assignment rounds.[55]

33. *Completion and Effective Dates/Processing of Bid Payments.* Reverse and forward auction "completion," required for the repacking process to become effective,[56] will occur when the Commission publicly announces that the incentive auction has ended.[57] The repacking process will be "effective," triggering Commission authority to borrow up to $1 billion from the U.S. Treasury to use toward the payment of relocation costs, when the results of the reverse and forward auctions and the repacking process are announced. We anticipate that the completion and effectiveness announcements will occur simultaneously. As soon as the auction is complete and the repacking process effective, we anticipate borrowing some or all of the available $1 billion from the Treasury for reimbursement of relocation costs. We will share forward auction proceeds with licensees that relinquish rights in the reverse auction as soon as practicable following the successful conclusion of the incentive auction.[58]

34. *Post-Auction Transition*. A public notice will mark the effective date of channel reassignments based on the repacking process and specify any specific channel assignments for television stations that will continue to broadcast. Reassigned stations will have three months to file construction permit applications for any minor changes to their facilities necessary to operate on their new channels. Stations also may request alternate channels or expanded facilities on their new channels. Following the three-month application filing deadline, stations will have up to 36 months to transition to their new channels. Stations will be assigned deadlines within that period tailored to their individual circumstances. Stations may request extensions of time to construct their new facilities, but no station will be allowed to continue operating on a reassigned or reallocated channel more than 39 months after the repacking process becomes effective. Licensees that successfully bid to turn in their licenses or to share a channel will have three months from their receipt of auction proceeds to cease operations on their pre-auction channels. We also adopt transition requirements for LPTV and TV translator stations, BAS operations, wireless microphones and related services.[59]

35. *Reimbursement of Relocation Costs.* We adopt procedures to reimburse costs reasonably incurred by television stations that are reassigned to new channels in the repacking process, as well as by MVPDs to continue to carry such stations, from the $1.75 billion Reimbursement Fund established by

[55] *See* § IV.C.2 (Forward Auction Bidding Process).

[56] Spectrum Act § 6403(f)(2).

[57] *See* § V.A (Auction Completion and Effective Date of the Repacking Process).

[58] *See* § V.B (Processing of Bid Payments). We will distribute auction proceeds as they become available.

[59] *See* § V.D (Transition Procedures for Other Services and Unlicensed Operations).

Congress for that purpose.[60] Under these procedures, we intend to issue eligible stations and MVPDs an initial allocation of funds, in designated individual accounts in the United States Treasury, to cover the majority of their estimated costs. The funds will be available for draw down as expenses are incurred. Additional funds will be allocated as necessary prior to the three-year statutory deadline for all reimbursements. We delegate authority to the Media Bureau to establish a list of eligible expenses and estimated costs, and to calculate the amount of the allocations to eligible entities.[61] We adopt measures to minimize administrative burdens and to prevent waste, fraud, and abuse in the reimbursement process.

36. *Post-Auction Broadcast Regulatory Issues*. We will grandfather existing broadcast station combinations that otherwise would no longer comply with the media ownership rules as a result of the reverse auction. We concur with commenters that we should conduct extensive outreach to broadcasters, including minority- and female-owned broadcasters, to ensure that they are fully informed about the incentive auction. The Commission already has made significant efforts to inform broadcasters about the process, and we intend to continue and expand those efforts. To provide guidance to licensees interested in channel sharing and to promote certainty regarding channel sharing relationships following the incentive auction, we will require that channel sharing agreements include certain key provisions regarding licensee rights and responsibilities.[62]

37. *600 MHz Band Technical and Service Rules.* We adopt for new 600 MHz Band licensees flexible use service rules under Part 27 of our rules, and technical rules similar to those governing the adjacent 700 MHz Band in order to speed deployment while protecting incumbent 700 MHz Band licensees from harmful interference. We will require mobile devices to be interoperable across the entire 600 MHz Band. We will require new 600 MHz Band licensees to build out to 40 percent of the population in their service areas within six years and to 75 percent of the population by the end of their initial license terms of 12 years.[63] Subsequent license terms will be 10 years.

III. THE REORGANIZED UHF BAND

38. The current UHF band consists of 228 megahertz of spectrum divided into 38 six megahertz channels that are primarily licensed to broadcast television service.[64] In the Spectrum Act, Congress authorized the Commission to reorganize the UHF band so that the television stations that will remain on the air after the incentive auction occupy a smaller portion of the band, thereby freeing up a portion of the band for new wireless uses.[65] The amount of repurposed spectrum depends on the outcome of the incentive auction. To carry out the auction, however, we must first establish a plan for licensing the repurposed spectrum. We have tailored our 600 MHz Band Plan to the unique challenges of the

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[60] *See* Spectrum Act § 6403(b)(4)(A); § V.C.5 (Reimbursement of Relocation Costs).

[61] In lieu of reimbursement, stations also may request service rule waivers to make flexible use of their spectrum in order to provide non-broadcast services, as long as they continue to broadcast at least one TV program stream. *See* Spectrum Act § 6403(b)(4)(B); *see* § V.C.5.e (Service Rule Waiver in Lieu of Reimbursement).

[62] *See* § VI.A.2 (Channel Sharing Operating Rules). We also address in § VI.A.2 termination and assignment or transfer of channel sharing licenses, sharing by stations operating on channels reserved for NCE operations, sharing between full power and Class A stations, the carriage rights of sharing stations, and other issues related to channel sharing relationships.

[63] If a licensee fails to meet its interim build-out benchmark, its initial license term will be shortened to 10 years. *See* § VI.B.2 (License Term, Performance Requirements, Renewal Criteria, and Permanent Discontinuance of Operations).

[64] *See NPRM*, 27 FCC Rcd at 12362-66, paras. 12-22.

[65] *See* Spectrum Act § 6403(b)(1) (requiring the FCC, in order to "mak[e] available spectrum to carry out the forward auction," to "evaluate the broadcast television spectrum," and authorizing it, "subject to international coordination . . . ," to "make such reassignments of television channels as the Commission considers appropriate" and "reallocate such portions of such spectrum as the Commission determines are available").

incentive auction and have made it flexible enough to work with a variety of different spectrum recovery scenarios.

39. In this Section, we begin by addressing in detail the 600 MHz Band Plan we adopt for licensing new wireless services in the reorganized UHF band.[66] We then address how we will reorganize or "repack" the spectrum that will continue to be used for broadcast television service. We also address the actions we are taking to make spectrum available for unlicensed devices in the reorganized UHF band. We then address other services in the reorganized band, including the incumbent services on channel 37, broadcast auxiliary service operations, and wireless microphones. Finally, we address the changes to the Table of Allocations that are necessary to implement the UHF band reorganization.

A. Band Plan for the New 600 MHz Band

1. Background

40. In the *NPRM*, the Commission recognized the unique challenges associated with creating a band plan from repurposed spectrum. In particular, neither the amount of spectrum available for assignment nor the specific frequencies available in each geographic area will be known in advance of the incentive auction.[67] Due to these challenges, the Commission did not propose a traditional band plan with designated frequencies and locations. Rather, it proposed a flexible band plan in which the uplink band would begin at channel 51 (698 MHz) and expand downward based on the amount of spectrum available to carry out the forward auction, and the downlink band would begin at channel 36 (608 MHz) and likewise expand downward ("Down from 51 and 36").[68] The Commission also sought comment on a number of alternative band plans, including the "Down from 51," "In from 51 and 21," and "Down from 51 TDD" band plans, that might address the challenges associated with creating a band plan, and invited commenters to propose their own plans.[69] The Commission proposed to incorporate a number of features into whichever band plan it adopted, such as licensing in five megahertz "building blocks" and offering licenses that accommodate both uplink and downlink operations.[70] The Commission also sought comment on the location of the specific band(s) under any of the plans proposed.[71]

41. The Commission identified five key policy goals that would guide the choice of a wireless band plan: utility, certainty, interchangeability, quantity and interoperability.[72] It proposed to achieve these goals by making spectrum blocks as technically and functionally interchangeable as possible without limiting the Commission to offering the same amount of spectrum nationwide.[73] It proposed to retain the flexibility to accommodate "market variation," i.e., offering different amounts of spectrum in different geographic areas, to avoid the "least common denominator problem": limiting the amount of wireless spectrum available in most markets to the quantity that is available in constrained

[66] The technical and service rules for the 600 MHz Band are addressed below in § VI.B.

[67] *NPRM*, 27 FCC Rcd at 12401, para. 123.

[68] *NPRM*, 27 FCC Rcd at 12402, para. 126. The uplink band is a set of frequencies used for communication from a user device to the network. The downlink band is a set of frequencies used for communication from the network to a user device. Collectively, these are referred to as the "pass bands."

[69] *NPRM*, 27 FCC Rcd at 12420-23, paras. 177-84; *see also Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 7414, 7418-19 (2013) (*Band Plan PN*).

[70] *See NPRM*, 27 FCC Rcd at 12403-4, 12405, paras. 128, 131.

[71] *NPRM*, 27 FCC Rcd at 12406, para. 135.

[72] *NPRM*, 27 FCC Rcd at 12401-02, para. 125.

[73] *NPRM*, 27 FCC Rcd at 12401-02, paras. 123-26; *see also NPRM*, 27 FCC Rcd at 12406, para. 136.

markets.[74]

42. The comments filed in response to the *NPRM* reflect strong support for a number of band plan features proposed in the *NPRM*. These include licensing in five megahertz building blocks;[75] offering paired blocks wherever possible;[76] auctioning "generic" rather than specific frequency blocks;[77] establishing guard bands that are technically reasonable to prevent harmful interference;[78] and offering blocks designated specifically for uplink and for downlink operations.[79] As explained further below, the 600 MHz Band Plan that we adopt in this Order incorporates all of these features. The comments reflect a lack of consensus on other band plan features, however, including on how and where to configure the uplink and downlink blocks, based on a number of technical concerns. These technical concerns include placing television stations between the 600 MHz uplink and downlink bands and the potential for intermodulation interference, the pass band[80] size that mobile device filters can support, mobile antenna bandwidth, and the potential for both harmonic interference and co-channel interference.[81]

43. On May 3, 2013, the FCC hosted a public workshop regarding these technical issues and the trade-offs associated with the various proposed band plans.[82] Many stakeholders expressed their support for a "Down from 51" band plan in which the uplink band would begin at channel 51 (698 MHz),

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[74] *NPRM*, 27 FCC Rcd at 12406, para. 136.

[75] *See, e.g.*, CEA Comments at 18 ("[C]arriers have chosen to deploy networks using spectrum blocks that are multiples of 5 MHz in size even when their licenses encompass larger amounts of spectrum, because current standards contemplate the use of blocks that are a multiple of 5 MHz in size."); MetroPCS Comments at 19 ("MetroPCS strongly supports the use of 'building block' sized spectrum blocks . . . .").

[76] *See, e.g.*, CCA *Band Plan PN* Comments at 15 ("[T]he Commission should seek to maximize the amount of paired spectrum."); US Cellular *Band Plan PN* Reply at 15 ("[T]he Commission must strive to formulate a 600 MHz band plan that best maximizes the number of paired spectrum blocks made available in the forward auction.").

[77] *See, e.g.*, Ericsson Reply at 4 (the FCC should adopt fungible spectrum "building blocks" to ensure that specific bands are not more desirable than others); Mobile Future Reply at 5 ("[T]he Commission should auction 'generic' 5 MHz spectrum blocks . . . ."). In referring to "generic licenses" or "generic blocks" we are not referring to the actual licenses that will be assigned to winning bidders, but to standardized blocks of spectrum which will be used to represent quantities of licenses for a time during the bidding process. We emphasize that licensees will ultimately be assigned a license with a specific frequency assignment. *See* § IV.C.2.b (Bid Assignment Procedures: Determining Winning Bidders and Assigning Frequency-Specific Licenses).

[78] *See, e.g.*, Alcatel-Lucent Comments at 20 ("[I]t is necessary as a legal and practical matter that the Commission provide sufficient guard bands to ensure that licensed operations adjacent to those guard bands are not disadvantaged compared to licensed operations further away."); Comcast Comments at 21 ("[T]he Commission must adopt robust guard bands that ensure continued protection for licensees (both broadcast and wireless broadband) in the adjacent bands.").

[79] The vast majority of commenters support band plan proposals, such as the Down from 51 band plan, that use FDD technologies and designate specific spectrum bands for uplink and downlink operations. *See, e.g.*, AT&T Reply at 15-20; Ericsson Reply at 16; Motorola *Band Plan PN* Comments at 4; T-Mobile Reply at 37.

[80] As described above, the pass band comprises the uplink band and the downlink band.

[81] *See Federal Communications Commission Provides Additional Details about Workshop to Discuss the 600 MHz Band Plan*, GN Docket No 12-268, Public Notice, 28 FCC Rcd 5269 (2013). For a more comprehensive discussion of the technical issues raised in the record with respect to the band plan, *see* § VI.B.1 (Technical Rules) and the Technical Appendix.

[82] At the workshop, a panel of FCC experts led a day-long roundtable discussion with stakeholders on how best to achieve the Commission's five policy goals in crafting a 600 MHz Band Plan. Interested parties discussed how best to address the technical challenges associated with creating a band plan, and compared various band plans. A transcript of the 600 MHz Band Plan Workshop is available at http://apps.fcc.gov/ecfs/document/view?id=7022421551 (*600 MHz Band Plan Workshop Transcript*). In addition, a video of the workshop is available at: www.fcc.gov/events/learn-workshop-600-mhz-band-plan.

followed by a duplex gap, and then the downlink band, but continued to express significant disagreement regarding critical features of such a band plan.[83] The Down from 51 proposals advocated by various commenters and workshop participants also raised questions about how to best accommodate market variation.[84] To address such questions, the Wireless Bureau issued a Public Notice seeking to supplement the record on how certain Down from 51 band plan variations can best accommodate market variation.[85] Commenters responding to this Public Notice remain divided on how best to accommodate market variation.[86] Although they continue to agree generally on a "Down from 51" band plan, they express a wide range of views[87] on critical features of the band plan, such as whether to place television stations between the downlink and the uplink pass bands to accommodate market variation,[88] the size of the pass bands,[89] and how much paired spectrum to offer.[90]

2. Discussion

44. We conclude that the 600 MHz Band Plan we adopt best supports our central goal of allowing market forces to determine the highest and best use of spectrum, as well as our other policy goals for the incentive auction, including the Commission's five key policy goals for selecting a band

[83] Such features included the size of the pass band, the utility of supplemental downlink spectrum, and the feasibility of placing TV in the duplex gap. *See generally 600 MHz Band Plan Workshop Transcript.*

[84] *Band Plan PN*, 28 FCC Rcd at 7415.

[85] *Band Plan PN*, 28 FCC Rcd at 7416-17.

[86] *Compare* NAB *Band Plan PN* Comments at 2 (". . . NAB favors the 'Down from 51 Reversed' proposal, which does not exacerbate the inherent challenges that accompany variability to the same degree as the alternate proposals.") *with* US Cellular *Band Plan PN* Reply at 3 ("Although some commenters have expressed interference concerns related to broadcasters operating within the uplink pass band in spectrum-constrained markets, the record reveals a general consensus that this interference potential could be successfully mitigated through technical and band plan solutions.") *with* Harris Broadcast *Band Plan PN* Reply at 5 (the Commission should "establish a uniform national band plan . . . [which is the] simplest way to avoid co-channel interference") *with* C Spire *Band Plan PN* Reply at 8 ("A TDD band plan provides the necessary flexibility the Commission will require and is the primary reason TDD, and not an FDD-based plan, should be used.").

[87] Parties have submitted no less than ten different "Down from 51" band plans into the record, which contain fundamental differences regarding the design of the 600 MHz Band Plan. *See* Alcatel-Lucent Comments at 12-18; AT&T Comments at 31-38; Ericsson Reply at 16-22; Intel Reply at 4-6; NCTA Reply, Att. at 25-30; Qualcomm Comments at 4-20; RIM *Band Plan PN* Comments at 11-14; Sprint Comments at 21-26; T-Mobile Comments at 10-13; Verizon Comments at 7-14. In addition, a number of commenters express support for a Down from 51 band plan, but propose significant modifications to the Down from 51 proposal in the *NPRM*. *See, e.g.*, Letter from Matt Larsen, FCC Committee Chair for WISPA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 2 (filed Jul. 11, 2013) (seeking 36 megahertz of contiguous white space spectrum).

[88] *Compare* T-Mobile *Band Plan PN* Comments at 3 ("[T]he technical concerns associated with accommodating broadcast operations . . . [between the downlink pass band and the uplink pass band] are, in our view, entirely manageable.") *with* CEA *Band Plan PN* Comments at 6-7 ("[A]llowing TV broadcast operations within the duplex gap will result in intermodulation products that will cause harmful interference to both broadcast and mobile wireless operations.").

[89] *Compare* Samsung *Band Plan PN* Reply at 3 ("If the pass band is larger than 25 MHz in the 600 MHz band, multiple duplexers may be needed. However, multiple duplexers will result in additional 1.2-1.7 dB implementation loss due to the switch between each duplexer.") *with* T-Mobile Reply at 18 ("[C]arriers can use the same antenna that supports a 25x25 MHz configuration to support a 35x35 MHz configuration with little or no performance degradation and few if any additional costs.").

[90] If we can repurpose 120 megahertz of spectrum, Ericsson proposes pairing 90 megahertz of spectrum while Verizon advocates for only 70 megahertz of paired spectrum. *Compare* Ericsson Reply at 18-21 *with* Verizon Comments at 7-11.

plan.[91] The Band Plan enhances the economic value and utility of the repurposed spectrum by enabling two-way (paired) transmissions throughout this well-propagating "coverage band."[92] This approach also simplifies auction design by offering only a single configuration—paired blocks—which allows for maximum interchangeability of blocks, and enables limited market variation, thus avoiding a "least common denominator" problem.[93] It also provides certainty about the operating environment for forward auction bidders by establishing guard bands between television and wireless services in order to create spectrum blocks that are reasonably designed to protect against harmful interference. Further, the 600 MHz Band Plan promotes competition. By offering only paired blocks in a single band, and by licensing on a Partial Economic Area ("PEA") basis, the 600 MHz Band Plan will promote participation by both larger and smaller wireless providers, including rural providers, and encourage new entrants. Finally, the 600 MHz Band Plan, composed of a single, paired band, promotes interoperability and international harmonization.

45. The 600 MHz Band Plan we adopt consists of paired uplink and downlink bands offered in 5+5 megahertz blocks. The uplink band will begin at channel 51 (698 MHz), followed by a duplex gap, and then the downlink band. We will license the 600 MHz Band on a geographic area license basis, using PEAs. Further, we will accommodate market variation: specifically, we will use the 600 MHz Band Plan in all areas where sufficient spectrum is available; and in constrained markets where less spectrum is available, we may offer fewer blocks, or impaired blocks,[94] than what we offer generally in the 600 MHz Band Plan.[95] Finally, we establish technically reasonable guard bands to prevent harmful interference and to ensure that the spectrum blocks are as interchangeable as possible.[96]

46. Because we will not know the exact number of blocks licensed or their frequencies until the incentive auction concludes, the 600 MHz Band Plan we adopt today represents a framework for how to license the repurposed spectrum. The Technical Appendix sets forth each of the specific 600 MHz Band Plan scenarios based on the number of television channels cleared;[97] ultimately, the repurposed spectrum will be licensed according to one of these scenarios. We do not create a scenario for fewer than two sets of paired blocks or more than 12 sets of paired blocks. With respect to the former, the costs outweigh the benefits of offering only one set of paired blocks, given that we would need to clear five

[91] *NPRM*, 27 FCC Rcd at 12401-02, para. 125.

[92] Many commenters mention that the superior propagation characteristics of the 600 MHz Band make it an ideal "coverage band," i.e., a band in which a wireless provider can use fewer base stations to cover its service area. *See, e.g.*, RIM Comments at 8; CCA Comments at 7. In contrast, higher band frequencies have relatively poor propagation, making them less suitable for providing coverage but offer advantages to carriers seeking to expand capacity because many radio components, such as filters and antenna, can support larger absolute bandwidths at higher frequencies. *See, e.g.*, Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Jul. 17, 2013)(discussing propagation characteristics of higher frequency bands).

[93] *See* § III.A.2.d (Market Variation).

[94] Impaired blocks are blocks in which, due to remaining broadcast TV stations that may need to be protected against harmful interference in parts of the licensee's service area, the licensees may not be able to use the entire license area. *See* § III.A.2.d (Market Variation).

[95] As discussed below, we intend to determine the threshold at which a "near nationwide amount" is sufficient to trigger a specific band plan scenario in the pre-auction process that follows this Order. In that pre-auction process, we will determine not only the threshold but how to measure the "near nationwide amount," e.g., by percentage of total population or geographic markets. *See* § III.A.2.d (Market Variation).

[96] As discussed in § IV.C.2.b (Forward Auction – Bid Assignment Procedures: Determining Winning Bidders and Assigning Frequency-Specific Licenses), although we plan to conduct bidding for generic blocks in the forward auction, we will assign specific frequencies in the assignment round. Further, we may offer different categories of paired licenses to reflect any license impairments.

[97] *See* Technical Appendix § III (Band Plan).

television channels in this scenario. We also decline to create scenarios for more than 12 sets of paired blocks, i.e., using more than a 144 megahertz clearing target.[98]

47. Further, we emphasize that we may not offer each scenario listed in the Technical Appendix in the forward auction, depending on the spectrum clearing targets we employ as part of the incentive auction.[99] We plan to address in further detail the scenarios associated with specific clearing targets (i.e., number of spectrum blocks offered at each stage) and how we will determine which specific scenarios to offer in the forward auction in the *Comment PN* and *Procedures PN*.[100] We show below two examples of the 600 MHz Band Plan scenarios set forth in the Technical Appendix.[101]

Figure 1. 84 megahertz scenario

Figure 2. 126 megahertz scenario

48. In the first example, 84 megahertz of television spectrum is repurposed. A total of seven 5+5 megahertz paired blocks are licensed for new, flexible use. An 11 megahertz guard band or "duplex gap" protects against harmful interference between 600 MHz uplink and downlink services, and a three megahertz guard band protects against harmful interference between 600 MHz downlink services and channel 37. Channel 37 itself, along with the three megahertz guard band, serves as a guard band between 600 MHz downlink services and television services, which occupy the UHF spectrum down from channel 36 down. In the second example, 126 megahertz of television spectrum is repurposed. Ten 5+5 megahertz paired blocks are licensed for new, flexible use. The duplex gap is 11 megahertz, there are three megahertz guard bands on either side of channel 37, and a nine megahertz guard band between 600 MHz downlink services and television services, which occupy the UHF spectrum from channel 29 down.

a. All-Paired, Down From 51 Band Plan

49. *Background*. In the *NPRM*, the Commission proposed to establish specific uplink and downlink bands that would generally be paired[102] to reduce potential interference with adjacent operations and to minimize interference between wireless operations.[103] The Commission sought comment on band plans that fall into two categories: (1) "split" band plans, in which the uplink and downlink bands are separated by other services in addition to the duplex gap;[104] and (2) a contiguous "Down from 51" band plan, in which contiguous spectrum would be repurposed starting at channel 51 and expanding

[98] In fact, commenters generally focus on band plans of 120 megahertz or less. *See, e.g.*, Ericsson Reply at 18-21.

[99] *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[100] *See* § I (Introduction).

[101] *See* Technical Appendix §§ III.B.6 (Seven Sets of Paired Blocks (84 megahertz repurposed)), III.b.9 (Ten Sets of Paired Blocks (126 megahertz repurposed)).

[102] The Commission contemplated using downlink only blocks to accommodate market variation in its original band plan proposal. *See NPRM*, 27 FCC Rcd at 12407-09, paras. 138-143.

[103] *NPRM*, 27 FCC Rcd at 12406, para. 135.

[104] The split band plans include the "Down from 51 and 36" and "In from 51 and 21" band plans. *NPRM*, 27 FCC Rcd at 12402, 12422-23, paras. 126, 181. Under these "split" band plans, the uplink and downlink bands would not be adjacent to one another (separated by a duplex gap) unless we could repurpose at least 168 megahertz of spectrum.

downward.[105] It also invited commenters to propose their own band plans.[106]

50. In the *Band Plan PN*, the Wireless Bureau sought additional feedback on the band plans, and in particular, how to implement certain variations of the Down from 51 band plan in order to accommodate market variation in constrained markets.[107] Under the "Down from 51 Reversed" band plan, the downlink band would begin after a guard band at channel 51 (698 MHz), followed by a duplex gap, and then the uplink band.[108] Under the "Down from 51 with TV in the Duplex Gap" variation, the uplink band would start at channel 51, followed by a duplex gap, and then the downlink band. Some television stations would be placed adjacent to the uplink band (and the duplex gap) in geographic areas where less spectrum is available (i.e., in constrained markets).[109] The Commission also sought further comment on whether it should permit Time Division Duplex ("TDD") operations in the repurposed spectrum.[110]

51. *Discussion.* We adopt the 600 MHz Band Plan with paired uplink and downlink bands, which will enhance the value of the 600 MHz Band, consistent with our central goal for the incentive auction. Commenters overwhelmingly support this approach.[111] The few commenters who oppose using paired spectrum blocks support adopting a TDD-only band plan, which does not require separate uplink and downlink spectrum bands.[112] We are unpersuaded that the benefits these commenters assert for allowing TDD technology in the 600 MHz Band—broad global adoption,[113] improved spectrum efficiency,[114] and more dynamic use of communications channels[115]—are sufficiently advantageous to adopt an unpaired, TDD framework for the 600 MHz Band. For example, although TDD operations do not require a duplex gap, TDD operations use five to 10 percent of their spectrum capacity as overhead

[105] Under the "Down from 51" band plan, the uplink band would begin at channel 51, followed by a duplex gap, and then the downlink band. *NPRM*, 27 FCC Rcd at 12421, para. 178. Depending on the quantity of repurposed spectrum, the downlink band could be situated on both sides of channel 37. The TDD variation of the Down from 51 band plan requires no duplex gap. *See Band Plan PN*, 28 FCC Rcd at 7418-19.

[106] *NPRM*, 27 FCC Rcd at 12420, para. 177. In response, numerous commenters submitted their own band plan proposals, many of which are variations on these general frameworks. *See, e.g.*, Alcatel-Lucent Comments at 12-18; AT&T Comments at 31-40; Ericsson Reply at 16-29; Intel Reply at 4-6; NCTA Reply, Att. at 25-30; Qualcomm Comments at 4-20; RIM *Band Plan PN* Comments at 11-14; Sprint Comments at 21-26; T-Mobile Comments at 10-13; Verizon Comments at 7-14.

[107] *Band Plan PN*, 28 FCC Rcd at 7415-16.

[108] *Id.* at 7416.

[109] *Id.* at 7418. This variation differs from some commenter-proposed "Down from 51" band plans, which accommodate constrained markets by limiting the location of full power TV stations in channels 38-51. *See, e.g.*, Qualcomm Comments at 18 n.28 (recommends that only LPTV stations operate in the duplex gap).

[110] *Band Plan PN*, 28 FCC Rcd at 7418-19; *see also NPRM*, 27 FCC Rcd at 12423, paras. 183-84.

[111] *See, e.g.*, AT&T Comments at 18-19, Exh. A at 26; CCA Comments at 13; CEA Comments at 20; C Spire Comments at 6-7; Ericsson Reply at 17; Google/Microsoft Comments 32-34; Leap Comments at 5-6; MetroPCS Comments at 21; Mobile Future Reply at 5; Motorola Comments at 10; RIM Comments at 8; US Cellular Reply at 17-19; Verizon Comments at 6.

[112] *See* Sprint Comments at 22; C Spire *Band Plan PN* Comments at 3-8.

[113] Sprint Comments at 18. Sprint asserts that "significantly more bidirectional traffic is transmitted worldwide via TDD than via paired spectrum allocations." *But see* AT&T *Band Plan PN* Comments at 10 (stating that there is a "paucity of current TDD operations in the United States").

[114] C Spire *Band Plan PN* Comments at 7.

[115] Clearwire Comments at 6-8.

for time domain duplex guard time intervals,[116] and therefore, are not necessarily more efficient than FDD operations.[117] Further, T-Mobile states that TDD has link budget constraints,[118] resulting in less uplink coverage at the cell edge than an FDD system.[119] Based on our examination of the record, FDD is better suited for the 600 MHz Band at the present time in light of current technology, the Band's propagation characteristics, and potential interference issues present in the Band. Therefore, we decline to adopt a TDD-based band plan.

52. We also decline to allow a mix of TDD and FDD use in the 600 MHz Band, because, as several commenters indicate, allowing both FDD and TDD operations in the 600 MHz Band would require additional guard bands and increase the potential for harmful interference both within and outside the Band.[120] We emphasize that our determination regarding the suitability of an unpaired, TDD framework is limited to the decision before us. Different characteristics of other bands, or advances in technology, may make an unpaired, TDD-compatible framework appropriate in other circumstances.

53. Although most commenters support our decision to offer paired spectrum blocks,[121] the record diverges on how to offer spectrum blocks if we can repurpose more than 84 megahertz, i.e., how to offer 600 MHz licenses below channel 37. Some commenters suggest that it would be beneficial to offer downlink-only blocks[122] because of the asymmetrical nature of broadband traffic patterns.[123] Other commenters note that offering downlink-only blocks creates an easy way to accommodate market

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[116] RIM *Band Plan PN* Comments at 9-10 ("In a typical TDD system, transmit and receive intervals must be isolated by an amount of time equivalent to the transit time of radio signals for the largest cell size used by the system. This is the functional equivalent of the duplex gap in the FDD frequency space and represents a similarly unusable portion of the spectrum resource.").

[117] Further, although the duplex gap will not be used for licensed services under the 600 MHz Band Plan that we adopt, unlicensed operations will be permitted in the duplex gap so the spectrum will not lie fallow. *See* § III.C.2.b (Guard Bands). In addition, although TDD allows for tailored use of the communications channel, coordination and synchronization is required (unlike for FDD, which has dedicated uplink and downlink channels), which could delay deployment of service in the 600 MHz Band. T-Mobile Reply at 38.

[118] Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, at 1 (filed Sept. 23, 2013) (T-Mobile Sept. 23, 2013 *Ex Parte* Letter).

[119] T-Mobile Sept. 23, 2013 *Ex Parte* Letter, Att. at 4. T-Mobile argues that TDD is better suited for a band used primarily for capacity rather than the 600 MHz Band, which may be valued for coverage due to its propagation characteristics. *See also id*. at 2 (Explaining that the "greatest benefit of 600 MHz is its coverage characteristics" while TD-LTE is a better option in "capacity limited environments").

[120] *See, e.g.*, AT&T Comments at 19; Ericsson Reply at 16; Motorola *Band Plan PN* Comments at 4; T-Mobile Reply at 37. Indeed, even those commenters supporting TDD would prefer an all-paired FDD approach over a mixed FDD/TDD approach, given these complexities. *See* Letter from Richard B. Engelman. Director – Spectrum Resources, Government Affairs for Sprint, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3-4 (filed Jan. 7, 2014) (Sprint Jan. 7, 2014 *Ex Parte* Letter).

[121] *See, e.g.*, AT&T Comments at 18-19, Exh. A at 26; CCA Comments at 13; CEA Comments at 20; C Spire Comments at 6-7; Ericsson Reply at 17; Google/Microsoft Comments at 32-34; Leap Comments at 5-6; MetroPCS Comments at 21; Mobile Future Reply at 5; Motorola Comments at 10; RIM Comments at 8; US Cellular Reply at 17-19; Verizon Comments at 6.

[122] Downlink-only blocks consist of unpaired spectrum blocks in which a licensee can operate using that spectrum only pursuant to the technical requirements specified for downlink operations. Commenters in the record refer to these "downlink-only" blocks as "supplemental downlink." In the *NPRM*, the Commission proposed to offer unpaired downlink spectrum that could serve as supplemental downlink expansion for FDD operations. *NPRM*, 27 FCC Rcd at 12405, para. 133.

[123] *See, e.g.*, Alcatel-Lucent Comments at 25-27; CEA Comments at 20; Qualcomm *Band Plan PN* Comments at 9-11.

variation by varying the amount of downlink offered in a given market.[124] Although we recognize that broadband traffic patterns are currently asymmetrical and offering downlink-only blocks is one way to accommodate market variation,[125] we agree with other commenters that the benefits of offering paired spectrum blocks are greater than the benefits of offering downlink-only blocks in the 600 MHz Band.[126] Further, although some argue that offering downlink-only blocks would mitigate antenna performance issues by creating two separate bands, such an approach would reduce the overall spectrum utility as a result of the necessary frequency separation.[127]

54. In order to repurpose this spectrum, we must enhance the spectrum's value to potential bidders, as well as serve the public interest, and we find that offering paired blocks rather than downlink-only blocks best achieves these goals. To effectively use 600 MHz downlink-only blocks, a provider must not only have available uplink spectrum to pair it with, but that spectrum ideally should be below 1 GHz in order to take advantage of the superior propagation characteristics of the 600 MHz Band that allow for increased coverage.[128] At the same time, some commenters state that aggregating 600 MHz spectrum with another band below 1 GHz presents technical challenges; consequently, in practice, wireless providers may choose to aggregate 600 MHz downlink-only blocks with a high spectrum band, thus negating some of the coverage benefits of the 600 MHz Band that would be realized from using paired 600 MHz blocks.[129] Further, we agree with commenters that argue that paired blocks are more valuable than downlink-only blocks to new entrants.[130] Recent auctions also suggest that paired spectrum is more valuable to bidders than unpaired blocks.[131]

55. We also agree with commenters that assert that offering downlink-only blocks in the 600 MHz auction may undermine competition. Because providers must pair downlink-only blocks with

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[124] Samsung *Band Plan PN* Reply at 3. *See also* AT&T Comments at 49-51; Qualcomm Comments at 16-18; T-Mobile Comments at 12. In addition, AT&T argues that by keeping uplink spectrum closer to the 700 MHz Band and using the lower portion of the 600 MHz Band for supplemental downlink reduces many interference risks. AT&T Reply at 15-16.

[125] As described in the Market Variation Section, we will determine precisely how we will accommodate market variation in a subsequent item after an additional opportunity for public input. *See* § III.A.2.d (Market Variation). Depending on how we choose to repack remaining television stations in the 600 MHz Band, we may offer impaired 600 MHz licenses that limit a licensee's use of either the uplink or downlink block, or both, in a specific license.

[126] *See, e.g.*, CCA *Band Plan PN* Comments at 15; CEA Comments at 20.

[127] *See* Technical Appendix § II.B (Mobile Antenna Considerations).

[128] *See, e.g.*, DISH *Band Plan PN* Reply at 3 ("Designating a portion of the 600 MHz band exclusively as SDL is an inefficient use of the spectrum given that it needs to be paired with other low-band uplink spectrum in order to fully utilize the 600 MHz spectrum's superior propagation characteristics."); *see also* T-Mobile *Band Plan PN* Reply at 10 (noting the "favorable propagation characteristics at 600 MHz . . . allow base stations to be separated farther apart"); Sprint Jan. 7, 2014 *Ex Parte* Letter at 1-2 ("Similarly, Sprint has opposed band plans that would result in large amounts of supplemental downlink (SDL), as that outcome would likely depress spectrum values and thus prospective auction revenue, while unduly advantaging carriers that have spectrally-proximate low-band spectrum to pair with it."). Many commenters mention that the superior propagation characteristics of the 600 MHz Band make it an ideal coverage band. *See, e.g.*, CCA Comments at 7.

[129] *600 MHz Band Plan Workshop Transcript* at 226-30.

[130] *See, e.g.*, T-Mobile Reply at 5; US Cellular *Band Plan PN* Reply at 13-15.

[131] *See Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73*, Public Notice, 23 FCC Rcd 4572 (2008) (where paired, 700 MHz Lower A Block licenses garnered more than three times the revenue of unpaired, 700 MHz Lower E Block licenses). Results from recent international auctions also support this view. *See also* Industry Canada: 700 MHz Spectrum Auction-Process and Results (available at http://news.gc.ca/web/article-en.do?nid=816869) (last visited Apr. 10, 2014); Ofcom (UK) 4G Auction Results (available at http://consumers.ofcom.org.uk/4g-auction/) (last visited Apr. 10, 2014).

existing spectrum holdings, new entrants would not be able to use downlink-only blocks, thus limiting their utility.[132] In contrast, offering paired spectrum blocks will benefit all potential 600 MHz Band licensees. We also agree with commenters that assert that paired blocks will facilitate the deployment of networks by smaller carriers and new entrants by allowing them to obtain much-needed low frequency, paired spectrum.[133]

56. Further, offering downlink-only blocks would further complicate the auction design without a commensurate benefit. As explained above, downlink-only blocks are less valuable than paired blocks to bidders, and offering both paired and unpaired blocks would introduce additional differences among licenses in the forward auction and increase the amount of time the auction takes to close. As discussed in the *NPRM*, the Commission expressed the desire to offer generic blocks in order to reduce the time and, therefore, the cost, of bidder participation.[134]

57. Finally, our all-paired band plan generally has nationally consistent blocks and guard bands,[135] which will promote interoperability.[136] In contrast, offering downlink-only blocks could exacerbate interoperability concerns by separating the 600 MHz Band into two bands. If we license both unpaired and paired blocks, we would expect that the industry standards body would create separate bands for the paired blocks and unpaired blocks, as it has done previously.[137] If the 600 MHz Band were split into two separate bands, then some devices could support part, but not all, of the Band. Further, US Cellular raises concerns over the potential for wireless carriers using downlink-only blocks to configure their networks so as to create barriers to roaming.[138] Limiting the auction to paired blocks will help to ameliorate these concerns. It will also promote international harmonization, and in particular, should help to address cross-border issues with Canada and Mexico.[139]

58. *"Down from 51" Approach.* We conclude that the "Down from 51" approach we adopt, with contiguous uplink and downlink bands starting at channel 51, will provide greater technical certainty because of its technical advantages over other options and, therefore, will enhance the value of the 600 MHz Band for bidders and serve the public interest. In particular, a contiguous band plan will reduce the

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[132] US Cellular *Band Plan PN* Reply at 13-15; Clearwire *Band Plan PN* Comments at 5-6.

[133] As MetroPCS explains: "[a]s a new entrant, having both uplink and downlink spectrum is an obvious necessity, and auctioning spectrum in unpaired blocks risks discouraging new entrants from bidding in the auction, lest they become stranded with a lone block of uplink or downlink spectrum." MetroPCS Comments at 21. *See also* C Spire Comments at 6-7; T-Mobile Reply at 5.

[134] *NPRM*, 27 FCC Rcd at 12378, para. 61.

[135] As discussed further in the § III.A.2.d (Market Variation), we will determine precisely how to offer licenses in constrained markets in the pre-auction process that follows the Order.

[136] In addition, uniform nationwide guard bands that are generally consistent across markets will allow for the most robust deployment of unlicensed networks and products. *See, e.g.*, CCIA Comments at 7 ("the U.S. economy needs the substantial, uniform, and nationwide allocation of spectrum for unlicensed use"); Google/Microsoft Comments at 31 ("the NPRM wisely proposes to design the 600 MHz band plan to make a substantial amount of spectrum available for unlicensed uses, including a significant portion that would be available on a uniform nationwide basis."); WISPA Comments at 29 ("With a nationwide footprint [for unlicensed use], there will be even greater incentive for entrepreneurs and companies to create new products, services and applications that will fuel innovation and competition and benefit the economy, objectives that are consistent with the public interest.").

[137] 3GPP has adopted standards for paired and unpaired blocks but has not combined the two. *See* 3GPP TS 36.101 V12.3.0 (*3GPP RF UE Standard*) at 23 (Table 5.5-1), *available at* http://www.3gpp.org/ftp/Specs/archive/36_series/36.101/36101-c30.zip (last visited Apr. 23, 2014).

[138] Letter from Leighton T. Brown, Counsel for US Cellular, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Jan. 6, 2014).

[139] *See* § III.B.4 (International Coordination).

antenna bandwidth[140] for 600 MHz devices, which in turn will reduce the cost and complexity of such devices.[141] As a result, we decline to adopt any of the band plans in which the uplink and downlink bands are "split" because the antenna bandwidth would be much greater.[142]

59. Further, by placing the 600 MHz uplink band next to the 700 MHz uplink band and adopting generally consistent technical rules for the 600 MHz and 700 MHz Bands, we improve spectrum efficiency.[143] This continuity should also speed deployment of the 600 MHz Band and make it easier to develop devices for it.[144] Further, placing the uplink pass band at the upper end of the 600 MHz Band limits the potential effects of both harmonic interference and intermodulation interference.[145] Starting the 600 MHz uplink band at channel 51 also clears television operations out of channel 51, which should help spur deployment of the 700 MHz lower A Block.[146] This approach will provide greater certainty to WMTS operators regarding their operating environment as well,[147] and will likely result in greater spectrum efficiency than placing uplink operations adjacent to channel 37.[148] This approach also simplifies the incentive auction design, which is critical to its overall success. We therefore adopt the "Down from 51" approach and decline to adopt the "Down from 51 Reversed" band plan.[149]

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[140] The antenna bandwidth is the frequency separation between the highest and lowest frequencies over which the antenna meets a given performance threshold.

[141] As discussed in the Technical Appendix § II.B (Mobile Antenna Considerations), reducing the antenna bandwidth will reduce the cost and complexity of developing 600 MHz Band devices. If we repurpose a large amount of spectrum, however, the mobile antenna design issues will not prevent wireless providers from utilizing all of the repurposed spectrum.

[142] *See NPRM*, 27 FCC Rcd at 12422, para. 181.

[143] As described in § III.A.2.e (Guard Bands), no guard band is required between the 600 MHz uplink band and the 700 MHz uplink band, thus improving spectrum efficiency. Commenters generally oppose the Down from 51 Reversed plan because it requires an extra guard band between the 600 and 700 MHz Bands. *See, e.g.*, CEA *Band Plan PN* Comments at 4; Mobile Future *Band Plan PN* Comments at 3-4.

[144] *See, e.g.*, Qualcomm *Band Plan PN* Comments at 2 ("the straight DF51 band plan can be successfully and most readily integrated into existing smartphone and tablet form factors").

[145] Commenters argue that keeping the uplink farther up in the 600 MHz Band and will limit the possibility of harmonics interference. *See, e.g.*, AT&T *Band Plan PN* Comments at 7; Qualcomm *Band Plan PN* Comments at 4-7. *See* Technical Appendix § II.D (Harmonic Interference).

[146] Some Lower 700 MHz A Block licensees are unable to fully deploy wireless networks throughout their service area because they must protect incumbent television broadcast operations on channel 51. *See Promoting Interoperability in the 700 MHz Commercial Spectrum*, WT Docket 12-69, Report and Order and Order of Proposed Modification, 28 FCC Rcd 15122, 15152, para. 65 (2013) (*700 MHz Interoperability R&O*).

[147] As discussed in the Technical Appendix, although mobile handsets transmit at a lower power than mobile base stations and DTV broadcast towers, they may operate anywhere, including inside healthcare facilities, very close to WMTS equipment. The resulting in-hospital field strength of the mobile handsets could be greater than that of DTV broadcast facilities or a wireless base station, thus causing interference to WMTS equipment. *See* Technical Appendix § II.E.2 (Potential for Interference between 600 MHz Downlink and WMTS). In addition, as mobile handsets vary their distance from WMTS equipment, their field strength is also likely to vary, which would increase the complexity of operating a WMTS system.

[148] Either broadcast television or wireless base stations (rather than mobile operations) will operate adjacent to channel 37. *See* Technical Appendix § III.B (Specific Band Plan Scenarios). We note that Ericsson asserts that the minimum guard band size necessary to protect WMTS "would be at least 6 MHz wide on either side of Channel 37 . . . wherever uplink mobile operation is present." Ericsson *Band Plan PN* Comments at 8.

[149] We also recognize the concerns of commenters that the Down from 51 Reversed band plan potentially creates some more challenging interference scenarios. Alcatel-Lucent *Band Plan PN* Comments at 4-6; AT&T *Band Plan PN* Comments at 3-4, 7-10; Ericsson *Band Plan PN* Comments at 4-11; NCTA *Band Plan PN* Comments at 4-6; Verizon *Band Plan PN* Comments at 4-6.

60. Very few commenters criticize the Down from 51 approach that we adopt in our 600 MHz Band Plan.[150] DISH complains that the Down from 51 band plans that commenters propose limit paired spectrum to the portion of the 600 MHz Band above channel 37, thereby restricting "the amount of spectrum realistically available for smaller operators."[151] The approach we are adopting, however, involves paired spectrum only, including below channel 37, so it increases the amount of spectrum available for all wireless providers. We decline to adopt J. Pavlica's proposal to first license to wireless broadband providers the VHF channels in the 54-72 MHz and the 174-216 MHz bands (channels 2, 3, 4, 7, 8, 9, 10, 11, 12, and 13).[152] UHF spectrum above 300 MHz is better suited for wireless broadband service because of its propagation characteristics as well as its shorter wavelengths, which allow for smaller radio components including antennas and filters.[153] In addition, the Spectrum Act limits the Commission's ability to repack the VHF channels,[154] which would hamper our ability to repack efficiently if we were to adopt Pavlica's band plan.[155]

b. 5+5 MHz, Interchangeable Spectrum Blocks

61. *Background*. In the *NPRM*, the Commission proposed to license the 600 MHz spectrum in five megahertz "building blocks."[156] Recognizing that licensing wireless spectrum in five megahertz blocks repurposed from six megahertz television channels might lead to "remainder" spectrum,[157] the Commission proposed to incorporate any remainder spectrum into the guard bands.[158] It also sought comment on alternative ways to make use of the remainder spectrum.[159] In addition, the Commission sought comment on licensing in six megahertz increments (the size of television channels).[160] The Commission proposed auctioning interchangeable blocks of equal size to allow for enhanced substitutability among building blocks and to provide more flexibility in its auction design choices.[161] The Commission also sought comment on auction design options that would facilitate the aggregation of larger contiguous blocks composed of multiple five megahertz building blocks.[162]

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[150] *But see* DISH Reply at 2; J. Pavlica Comments at 3.

[151] DISH Reply at 2.

[152] J. Pavlica Comments at 3.

[153] *See* U.S. Gov't Accountability Office, GAO-11-352, Spectrum Management: NTIA Planning and Processes Need Strengthening to Promote the Efficient Use of Spectrum by Federal Agencies at 2 (2011), available at http://www.gao.gov/assets/320/318264.pdf ("The spectrum most highly valued generally consists of frequencies between 300 megahertz (MHz) and 3 gigahertz (GHz), as these frequencies have properties well suited to many important wireless technologies, such as mobile phones, radio, and television broadcasting.").

[154] *See* Spectrum Act § 6403(g).

[155] We also note that the bands J. Pavlica identifies consist of only 60 megahertz of spectrum. Therefore, we would potentially need to dedicate three different spectrum bands to wireless broadband service if we could repurpose more than 60 megahertz of spectrum, significantly complicating design of a new band plan.

[156] *NPRM*, 27 FCC Rcd at 12403-04, paras. 127-30.

[157] Because we are converting six megahertz broadcast channels into paired five + five megahertz wireless broadband channels, a certain amount of spectrum may be left over. Any leftover spectrum that cannot be grouped into a paired five + five megahertz block is called "remainder" spectrum. *NPRM*, 27 FCC Rcd at 12419-20, para. 175.

[158] *NPRM*, 27 FCC Rcd at 12419, para. 175. Specifically, zero to five megahertz of spectrum may remain in a given geographic market. *See* § III.A.2.e (Guard Bands).

[159] *NPRM*, 27 FCC Rcd at 12419-20, paras. 175-76.

[160] *NPRM*, 27 FCC Rcd at 12404, para. 129.

[161] *NPRM*, 27 FCC Rcd at 12419, para. 175.

[162] *NPRM*, 27 FCC Rcd at 12404, para. 130.

62. *Discussion.* We adopt the proposal to license in five megahertz blocks, which commenters overwhelmingly support, because these "building blocks" will allow for the greatest amount of flexibility and efficiency in the 600 MHz Band Plan. Specifically, we find that five megahertz blocks: (1) are the most compatible with current and emerging technologies;[163] (2) may be easily aggregated to form larger blocks;[164] (3) will maximize the number of licensed blocks in each market;[165] and (4) will allow for diverse participation in the auction.[166]

63. We agree with commenters that five megahertz building blocks are most compatible with current wireless technologies.[167] For example, numerous commenters state that five megahertz building blocks are most compatible with several current and emerging wireless broadband technologies, including LTE, LTE-Advanced, High Speed Packet Access + ("HSPA+"), and W-CDMA.[168] Further, because many current wireless broadband technologies operate with five megahertz blocks or blocks that are multiples of five megahertz, this block size facilitates aggregation.[169] Commenters also support our view that five megahertz building blocks will maximize the number of licensed blocks in each market.[170] Finally, licensing in five megahertz building blocks will allow auction participation by small, midsize, regional, and national carriers.[171] As Leap notes, using the smaller five megahertz bandwidth blocks will promote flexibility and allow auction participation by diverse carriers, particularly smaller carriers who may not need such large swaths of spectrum.[172]

64. We decline to license the 600 MHz spectrum using six megahertz blocks, a proposal which no commenters support, and which several commenters oppose.[173] Using six megahertz blocks would strand spectrum and reduce the number of new 600 MHz licenses because most FDD technologies support five megahertz blocks.[174] Similarly, using six megahertz blocks might lead to inefficient use of the spectrum as each six megahertz block would typically accommodate only one active five megahertz LTE channel.[175] Converting six megahertz channels into 5+5 megahertz 600 MHz licenses could, in

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[163] *See, e.g.*, C Spire Comments at 6; Leap Comments at 5; RIM Comments at 6; Verizon Comments at 15.

[164] *See, e.g.*, Motorola Comments at 13; RIM Comments at 7; Verizon Comments at 16.

[165] *See, e.g.*, C Spire Comments at 6; Mobile Future Reply at 5; RIM Comments at 6-7.

[166] *See, e.g.*, Leap Comments at 5; MetroPCS Comments at 17; US Cellular Reply at 17.

[167] *See, e.g.*, CCA Comments at 12; CTIA Comments at 20; MetroPCS Comments at 20; T-Mobile Comments at 14-15.

[168] *See, e.g.*, AT&T Comments at 18 n.6; CEA Comments at 18; Mobile Future Reply at 5. *But see* Letter from Peter D. Keisler, Counsel for AT&T, to Marlene Dortch, Secretary, FCC, GN Docket No. 12-268, WT Docket No. 12-269 at 2 (filed May 7, 2014) (asserting that "a 10 x 10 MHz block of spectrum is the minimum amount necessary to take full advantage of the performance characteristics of modern LTE wireless technology.").

[169] *See, e.g.*, Motorola Comments at 13; RIM Comments at 6.

[170] *See, e.g.*, Leap Comments at 5; MetroPCS Comments at 20 (MetroPCS explains that five megahertz blocks will result in issuing more licenses than six megahertz building blocks would because "[f]or each 30 megahertz of spectrum reclaimed from broadcasters, the Commission can auction six licenses, as opposed to merely five."). *See also* CCA Comments at 12.

[171] 47 U.S.C. § 309(j)(3)(B). *See, e.g.*, MetroPCS Comments at 19; Leap Comments at 5.

[172] Leap Comments at 5.

[173] *See, e.g.*, CTIA Comments at 20; MetroPCS Comments at 20; RIM Comments at 6; Verizon Comments at 15.

[174] *See, e.g.*, Verizon Comments at 15; CTIA Comments at 20 (confirms the Commission's assertions in the *NPRM* that six megahertz blocks do not precisely map onto the channel size used for most wireless broadband technologies currently in the market, and as a result, could reduce the number of blocks auctioned).

[175] RIM Comments at 5.

contrast, create extra blocks to license.[176] As explained further below, because we adopt a 600 MHz Band Plan with paired uplink and downlink bands, we also decline to adopt Sprint's proposal to license the spectrum using ten megahertz blocks to accommodate its band plan proposal for TDD operations.[177]

65. We also adopt the proposal to incorporate "remainder" spectrum, i.e., any excess spectrum remaining after converting six megahertz television channels to paired, 5+5 megahertz 600 MHz licenses, into the 600 MHz Band guard bands to help prevent harmful interference between licensed services.[178] A majority of commenters supports this approach.[179] As discussed below, we find that including these remainders in the guard bands is the best approach to support a straightforward auction design and help bolster innovation and investment by unlicensed devices in the guard band spectrum.[180] We agree with Google and Microsoft that "[s]oliciting separate bids for the remaining small spectrum slivers in the simultaneous forward and reverse auction will introduce needless complexity to the auction process."[181]

66. In our 600 MHz Band Plan, we create interchangeable, "generic" categories of spectrum blocks by establishing guard bands and technical rules to ensure a like operating environment among different blocks. Creating spectrum blocks that are as functionally and technically interchangeable as possible enhances substitutability among blocks. Offering interchangeable spectrum blocks allows us to conduct bidding for generic blocks, assigning specific frequencies later, which will speed up the forward auction bidding process.[182] Commenters generally support the proposal to offer interchangeable blocks but emphasize the importance of making them truly interchangeable.[183] Some commenters suggest that we group the spectrum blocks into different classes and treat each class as a separate category.[184] As explained below, we adopt rules that will allow us to group generic blocks into separate categories of licenses for purposes of the forward auction bidding.[185]

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[176] *See NPRM*, 27 FCC Rcd at 12404, para. 129 n.207.

[177] Sprint Comments at 22.

[178] *See* § III.A.2.e (Guard Bands).

[179] *See, e.g.*, CCIA Comments at 2 (strongly supports proposal to add remainder spectrum to the guard band); Google Reply at 7-8 (argues that adding the remaindered spectrum to the guard band is a technically reasonable approach to avoiding harmful interference and will "enable unlicensed technologies to increase the utility of this otherwise hard-to-use spectrum."). Other commenters support this approach provided it comports with the Spectrum Act's requirements and maximizes the amount of paired spectrum auctioned. *See, e.g.*, MetroPCS Comments at 21; TIA Comments at 9-10.

[180] *See* § III.A.2.e (Guard Bands). We also find that adding these remainders to the guard bands results in a guard band size that is technically reasonable to prevent harmful interference. *Id.*

[181] Google/Microsoft Comments at 43.

[182] In referring to "generic licenses" we are not referring to the actual licenses that will be assigned to winning bidders, but to standardized blocks of spectrum which will be used to represent quantities of licenses for a time during the bidding process. We emphasize that licensees will ultimately be assigned a license with a specific frequency assignment, and to the extent that bidders desire a specific frequency to meet their particular business plans, winning bidders will have the opportunity to bid for specific frequency blocks before they are assigned their licenses. *See* § IV.C.2.b (Forward Auction – Assignment Procedures: Determining Winning Bidders and Assigning Frequency-Specific Licenses).

[183] *See, e.g.*, AT&T Reply at 54; Qualcomm Comments at 5.

[184] For example, Alcatel-Lucent and AT&T support different classes to account for the differences between paired spectrum blocks and downlink only spectrum blocks. Alcatel-Lucent Comments at 18-19; AT&T Comments at 42-43.

[185] *See* § IV.C.2.a (Forward Auction – Bid Collection Procedures: Auction Format, Generic License Categories, Etc.).

67. We also conclude that it is important for wireless providers to be able to aggregate 600 MHz Band spectrum blocks. The ability to aggregate spectrum by obtaining multiple spectrum blocks in the same service area, or licenses in multiple service areas, affords potential bidders significant flexibility to meet their coverage and capacity needs in accordance with their business plans. Commenters overwhelmingly support allowing licensees to aggregate spectrum blocks.[186] Specifically, they encourage us to create an auction process that allows bidders to aggregate contiguous frequency blocks within a service area[187] or across geographic areas[188] using a variety of auction design mechanisms, such as assignment round rules.[189] Under our rules, licensees will be able to aggregate 600 MHz Band spectrum in the forward auction,[190] as well as after the auction.[191] As a result of these rules, wireless providers have the ability to aggregate spectrum to meet their business needs.

c. Geographic Area Licensing

68. *Background*. In the *NPRM*, the Commission proposed to license the 600 MHz Band using a geographic area licensing approach.[192] Specifically, it proposed licensing this spectrum using Economic Areas ("EAs"),[193] delineated by the Regional Economic Analysis Division, Bureau of Economic Analysis, U.S. Department of Commerce and extended by the Commission.[194] The Commission also noted the statutory requirement to consider assigning licenses using a variety of different geographic size service areas, and sought comment on how it should take account of this directive.[195] Further, it sought comment on whether and how to license areas outside of the continental United States, including the Gulf of Mexico.[196]

69. In response to the *NPRM*, commenters are split between those supporting EAs and those

[186] *See, e.g.*, CCA Comments at 12 (The Commission "should enable carriers to bid on multiple blocks in a market in order to obtain larger amounts of spectrum.").

[187] *See, e.g.*, Leap Comments at 5 ("the Commission should enable carriers to bid on multiple licenses in a market"); Verizon Comments at 46 ("winners of more than one 5 MHz generic block within an EA should be assigned contiguous spectrum within that EA").

[188] *See, e.g.*, CEA Comments at 19 (supports allowing carriers to bid on a package of licenses spanning several geographic areas).

[189] *See, e.g.*, AT&T Comments Exh. A at 34-36 (the Commission should establish clear rules so that winning bidders of multiple spectrum blocks will be licensed contiguous spectrum); Verizon *PEAs PN* Comments at 4-7 (advocates for packages). *See also* § IV.C.2 (Bidding Process).

[190] *See* § IV.C.2 (Bidding Process).

[191] *See* § VI.B.2.d (Secondary Markets). *But see MSH Report and Order* at § V.B.5 (setting forth limitations on the assignment, transfer, or leasing of 600 MHz Band licenses under certain conditions).

[192] *NPRM*, 27 FCC Rcd at 12409, para. 144.

[193] *NPRM*, 27 FCC Rcd at 12411, para. 148. The Bureau of Economic Analysis defines EAs as "one or more economic nodes—metropolitan areas or similar areas that serve as centers of economic activity—and the surrounding counties that are economically related to the nodes." Final Redefinition of the BEA Economic Areas, 60 Fed. Reg. 13,114 (Mar. 10, 1995). There are 172 EAs.

[194] *Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service ("WCS")*, GN Docket No. 96-228, Report and Order, 12 FCC Rcd 10785, 10900, App. B at § 27.6 Service areas (1997) (*Part 27 R&O*) (licensing Guam and the Northern Mariana Islands, Puerto Rico and the United States Virgin Islands, American Samoa, and the Gulf of Mexico as Commission-created EAs 173-176).

[195] *NPRM*, 27 FCC Rcd at 12410, para. 145. Section 6403(c)(3) of the Spectrum Act directs the Commission to "consider assigning licenses that cover geographic areas of a variety of different sizes."

[196] *NPRM*, 27 FCC Rcd at 12411-12, para. 150.

that argue for smaller service areas, specifically Cellular Market Areas ("CMAs"),[197] which are a combination of Metropolitan Statistical Areas ("MSAs") and Rural Statistical Areas ("RSAs").[198] On November 27, 2013, CCA[199] submitted an alternative proposed scheme for smaller service areas based on a new geographic area size that CCA calls Partial Economic Areas ("PEAs").[200] PEAs, as described by CCA, are a subdivision of EAs based on the CMA boundaries which "ensure that some licenses consist of large population centers while other PEAs consist of less populous areas."[201] As a result, PEAs are smaller than EAs, and separate rural from urban markets to a greater degree than EAs.[202] The Wireless Bureau issued a Public Notice seeking comment on CCA's proposed PEA licensing scheme.[203] In addition, the Wireless Bureau sought comment on other alternative geographic licensing approaches, such as RWA and NTCA's proposal.[204] On March 20, 2014, CCA, NTCA, RWA and the Blooston Rural Carriers ("PEA Coalition") submitted a revised, joint PEA proposal for use in the incentive auction ("Joint PEA Proposal"),[205] and Verizon filed its own PEA proposal ("Verizon PEA Proposal").[206]

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[197] CMAs are standard geographic areas used for the licensing of cellular systems and are comprised of Metropolitan Statistical Areas ("MSAs") and Rural Service Areas ("RSAs"). *See* 47 C.F.R. § 22.909; *Common Carrier Public Mobile Services Information, Cellular MSA/RSA Markets and Counties*, Public Notice, 7 FCC Rcd 743 (1992) (*CMA Public Notice*).

[198] *Wireless Telecommunications Bureau Seeks Comment On A Proposal To License The 600 MHz Band Using "Partial Economic Areas,"* GN Docket No. 12-268, Public Notice, 28 FCC Rcd 17255, 17255-56 (2013) (*PEAs PN*).

[199] CCA, the Competitive Carriers Association, states that it "represents the interests of more than 100 competitive wireless carriers, including rural and regional carriers as well as national providers." CCA Comments at 1.

[200] In its filing, CCA emphasizes that it still supports licensing by CMAs, but offers the PEA proposal as an alternative to the proposed EA regime. Letter from Rebecca Murphy Thompson, CCA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Nov. 27, 2013) (CCA Nov. 27, 2013 *Ex Parte* Letter).

[201] CCA Nov. 27, 2013 *Ex Parte* Letter at 2.

[202] Pursuant to CCA's *ex parte* filing, it proposed 348 PEA licenses in the continental United States as compared with 170 EA licenses. *Compare* CCA Nov. 27, 2013 *Ex Parte* Letter, Att. *with* 47 C.F.R. § 27.6(a). CCA subsequently revised its proposed PEA boundaries. *See* Letter from C. Sean Spivey, Assistant General Counsel for CCA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Dec. 23, 2013) (CCA Dec. 23, 2013 *Ex Parte* Letter); CCA *PEAs PN* Reply at 9-10.

[203] *PEAs PN*, 28 FCC Rcd 17255.

[204] *Id.* at 17256-57. Under the RWA/NTCA proposal, there would be two phases of the forward auction. The Commission would conduct the reverse auction contemporaneously with the first phase of the forward auction during which forward auction bidders would bid on the basis of EAs, but would receive licenses covering only a portion of the EA – specifically, the MSA or MSAs (when there is more than one MSA) located within the EA. Once the first phase of the forward auction is completed, the FCC would hold the second phase of the forward auction for the remaining 429 RSAs. RWA/NTCA *PEAs PN* Comments at 10-11; Letter from Caressa Bennet, General Counsel for RWA, and Jill Canfield, Assistant General Counsel for NTCA to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Dec. 6, 2013).

[205] Letter from C. Sean Spivey, Assistant General Counsel for CCA, Jill Canfield, Assistant General Counsel for NTCA, Caressa Bennet, General Counsel for RWA, and John A. Prendergast, Counsel to Blooston Rural Carriers, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Mar. 20, 2014) (CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter). The Joint PEA Proposal divides the United States and its territories into 416 PEAs and the parties emphasize that the proposal they submit is "without prejudice to their continued support for CMAs." Letter from C. Sean Spivey, Assistant General Counsel for CCA, Jill Canfield, Assistant General Counsel for NTCA, Caressa Bennet, General Counsel for RWA, and John A. Prendergast, Counsel to Blooston Rural Carriers, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Mar. 11, 2014) (CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter).

[206] Letter from Tamara Preiss, Vice President, Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Mar. 20, 2014) (Verizon Mar. 20, 2014 *Ex Parte* Letter). Verizon argues in the alternative (Verizon

(continued….)

70. *Discussion*. We adopt the proposal to implement a geographic licensing approach.[207] We conclude that a geographic licensing approach is well-suited for the types of fixed and mobile services that will likely be deployed in this band.[208] In addition, geographic area licensing is consistent with the licensing approach adopted for similar spectrum bands that support mobile broadband services.[209]

71. Further, we adopt PEAs as the service area for the 600 MHz Band licenses. PEAs offer a compromise between EAs and CMAs because they are smaller than EAs, yet "nest" (or fit) within EAs, and can be easily aggregated into larger areas, such as Major Economic Areas ("MEAs") and Regional Economic Areas ("REAs" or "REAGs").[210] And like CMAs, PEAs divide urban and rural areas into separate service areas. In short, this approach will encourage entry by providers that contemplate offering wireless broadband service on a localized basis, yet at the same time will not preclude carriers that plan to provide service on a much larger geographic scale. As a result, licensing by PEAs will best promote entry into the market by the broadest range of potential wireless service providers without unduly complicating the auction. As CCA notes, PEAs "address concerns regarding the unusual complexity of this particular auction while also retaining many of the benefits of small license areas."[211]

72. Commenters agree that PEAs should: (1) nest within EAs; (2) reduce the number of service areas (as compared to the 734 CMAs); (3) reflect Metropolitan Statistical Areas ("MSAs"); and (4) be constructed from counties.[212] Commenters disagree primarily over which version of MSAs we should use to create PEAs. CCA, NTCA, and RWA argue in favor of using the MSA boundaries that the Commission uses for its current CMA boundaries,[213] updated with 2010 U.S. Census data for each county, because these boundaries have been "employed in numerous previous auctions, including Auctions 73 (700 MHz), 78 (AWS-1), and 92 (Lower 700 MHz)."[214] On the other hand, Verizon argues that we should adopt its proposal, which uses more recent MSAs, because they are "a much more accurate

(Continued from previous page)
Alternative PEA Proposal) that if we adopt the Joint PEA Proposal, we should modify some of the boundaries in the Joint PEA Proposal to "account for the expansion of some of the major metropolitan areas and associated population shifts." Letter from Tamara Preiss, Vice President, Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Apr. 29, 2014) (Verizon Apr. 29, 2014 *Ex Parte* Letter) at 2.

[207] *NPRM*, 27 FCC Rcd at 12409, para. 144.

[208] *See* § III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks).

[209] *See, e.g., Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, Report and Order, 18 FCC Rcd 25162, 25174 para. 30 (2003) (*AWS-1 R&O)*.

[210] *See* 47 C.F.R. § 27.6(a) ("Both MEAs and REAGs are based on the U.S. Department of Commerce's EAs. *See* 60 FR 13114 (March 10, 1995).").

[211] CCA *PEAs PN* Comments at 5; *see also* Public Service Wireless *PEAs PN* Comments at 4; Atlantic Telephone *et. al*. *PEAs PN* Comments at 4; Letter from Leighton T. Brown, Counsel for US Cellular, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att at 2 (filed May 7, 2014) (We support the "use of PEAs as the geographic license area size."); Letter from Dr. Apurva N. Mody, Chairman, WhiteSpace Alliance, to Marlene Dortch, Secretary, FCC, GN Docket No. 12-268 at 6 (filed May 7, 2014)("WSA believes that the Partial Economic Area[s] proposed by a coalition of rural interests presents a reasonable balance between the relatively large Economic Areas proposed in the Notice, and smaller geographic licensing areas that would be optimal.").

[212] *See* CCA Nov. 27, 2013 *Ex Parte* Letter; CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter; Verizon Mar. 20, 2014 *Ex Parte* Letter. Metropolitan statistical areas are geographic entities delineated by the Office of Management and Budget for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. United States Census Bureau, Metropolitan and Micropolitan Statistical Areas Main, https://www.census.gov/population/metro/ (last visited Apr. 9, 2014).

[213] *See CMA Public Notice*, 7 FCC Rcd 743.

[214] CCA Nov. 27, 2013 *Ex Parte* Letter at 2.

division of rural and urban areas."[215]

73. We adopt the PEA boundaries contained in the Joint PEA Proposal.[216] This approach will promote the simplicity and speed of the incentive auction, as well as our competitive goals. Specifically, the Joint PEA Proposal encourages broad participation by utilizing the MSA boundaries that the Commission currently uses.[217] Because these boundaries may more closely fit many wireless providers' existing footprints, they should provide a greater opportunity for wireless providers to acquire spectrum licenses in their service areas.[218] As Blooston notes, the Verizon PEA Proposal has "little in common with geographic areas where rural and competitive carriers currently offer wireless service."[219] In addition, Blooston argues that using the MSAs in the Joint PEA Proposal could increase service to rural areas as compared to Verizon's proposal.[220] Further, while the Joint PEA Proposal provides service areas small enough for smaller carriers to support,[221] the number of total service areas is low enough to reduce the time necessary to complete the incentive auction.[222] With respect to larger carriers, the Joint PEA Proposal "nests" within the EAs so it may facilitate spectrum aggregation during the auction and in the secondary market.[223]

74. We decline to adopt the Verizon PEA Proposal. First, rather than defining the boundaries for all PEAs, Verizon only defines those areas relating to MSAs.[224] Verizon clearly intended to provide the Commission with flexibility to consider a range of alternatives with respect to rural areas. However,

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[215] Verizon Mar. 20, 2014 *Ex Parte* Letter at 3. Verizon contends that the MSAs used by the Commission are "badly outdated . . . and thus fail to reflect more than thirty years of population growth and shifts." *Id*. at 2. *See also* United States Census Bureau, Metropolitan and Micropolitan Statistical Areas Main, https://www.census.gov/population/metro/ (last visited Apr. 9, 2014).

[216] *See* CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter at 3. We direct the Wireless Bureau to issue a Public Notice announcing the specific counties contained in each PEA (and the corresponding PEA number), as set forth in the Joint PEA Proposal.

[217] CCA Nov. 27, 2013 *Ex Parte* Letter at 2 (stating that they "respect existing CMA [i.e., MSA and RSA] boundaries").

[218] *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, GN Docket No. 13-185, Report and Order, FCC 14-31, para. 49 (rel. Mar. 31, 2014) (*AWS-3 Report and Order)*. Letter from D. Cary Mitchell, Counsel for Blooston Rural Carriers, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Apr. 10, 2014) (Blooston Rural Carriers Apr. 10, 2014 *Ex Parte* Letter) (CMAs "conform to the areas where many incumbent service providers already hold licenses and have wireless operations.").

[219] Blooston Rural Carriers Apr. 10, 2014 *Ex Parte* Letter at 2.

[220] *Id.* at 4 ("In the Rapid City area, Verizon's proposal would combine multiple tribal areas in EA 115 along the Nebraska border with large counties in northwestern Nebraska. This would result in a single rural service area that is far too large for rural and independent carriers to realistically bid or provide service, and companies that are interested in serving tribal lands (or the tribes themselves) would be precluded from bidding on a license that is so large. Moreover, including Custer and Fall River Counties in this large rural license, which have a significant economic nexus with Rapid City, would likely draw bidding from companies that have little or no interest in serving rural and tribal areas.").

[221] *See* CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter; *see also* CCA Comments at 1; RWA/NTCA *PEAs PN* Comments at 1; Blooston Rural Carriers Comments at 1, Att.

[222] As discussed in the Introduction, minimizing the number of licenses offered during the forward auction is important because the time necessary to conduct the bidding increases exponentially as the number of licenses increase.

[223] CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter at 2.

[224] Verizon proposes 218 service areas but does not provide boundaries for areas outside the MSAs. Verizon Mar. 20, 2014 *Ex Parte* Letter at 3.

implementing Verizon's PEA proposal, while respecting general principles of nesting within EAs and limiting the number of licenses in the auction, would create inefficient service areas for non-MSA-based service areas.[225] Further, adopting the Verizon PEA Proposal may diminish competitive carrier participation in the forward auction.[226] We disagree with Verizon that adopting the Joint PEA Proposal will lead to outdated service areas that are not based on objective criteria.[227] The Joint PEA Proposal creates PEA service areas by utilizing 2010 U.S. Census population and county boundary data; consequently, it takes into account current population data for the counties that are included in each PEA.[228] The PEA boundaries in the Joint PEA Proposal also are based on objective criteria.[229] We further decline to adopt the Verizon Alternative PEA Proposal, which modifies the Joint PEA Proposal "by adding specified counties to the PEAs representing some of the top markets."[230] Verizon's proposed modifications to the Joint PEA Proposal also have the potential to diminish competitive carrier participation in the forward auction.[231]

75. Although most commenters support PEAs as an alternative or compromise solution, the nationwide wireless carriers prefer EAs as the license size for the 600 MHz Band, and the smaller and/or rural carriers prefer CMAs.[232] We decline to adopt EAs or CMAs as the licensing scheme for the 600

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[225] For example, two counties in Georgia are "sandwiched" between the boundary for the Atlanta MSA and the boundary for the EA containing Atlanta. If we were to follow Verizon's principles, these two counties would form their own very small PEA, immediately adjacent to the much larger Atlanta MSA. In Maine, the MSA encompasses the middle of Maine and the non-MSA portion creates a "doughnut" around the MSA. These effects were most widespread in the original Verizon proposal, which included 218 MSAs. *See* Verizon Mar. 20, 2014 *Ex Parte* Letter at 3. The revised Verizon proposal focuses on fewer MSAs, but the resulting inefficiencies with respect to rural license areas are still significant. *See* Verizon Apr. 29, 2014 *Ex Parte* Letter.

[226] Letter from Rebecca Murphy Thompson, CCA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 1 (filed Apr. 11, 2014). RWA concurs, noting that that the Verizon PEA Proposal makes it "difficult (if not impossible) for small and rural wireless carriers to participate in the 600 MHz spectrum auction." Letter from Caressa D. Bennet, Counsel for RWA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Apr. 11, 2014).

[227] *See* Verizon Mar. 20, 2014 *Ex Parte* Letter at 2.

[228] CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter at 2.

[229] Specifically, PEAs were created by: (1) having the service areas "nest" into EAs; (2) limiting the number of service areas to approximately 400, which will limit the reverse and/or forward auction implementation risks; (3) generally combining contiguous MSA and RSA service areas within each EA; (4) complying with the statutory requirements of § 309(j) of the Communications Act; (5) having more than 15,000 people in each PEA (with the exception of four service areas); and (6) combining smaller territories (including unusually shaped service areas such as "donut holes") into larger territories. *See* Letter from C. Sean Spivey, Assistant General Counsel for CCA, Jill Canfield, Assistant General Counsel for NTCA, Caressa Bennet, General Counsel for RWA, and John A. Prendergast, Counsel to Blooston Rural Carriers, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Apr. 16, 2014) (CCA/NTCA/RWA/Blooston Apr. 16, 2014 *Ex Parte* Letter). *See also* CCA *PEAs PN* Reply at 6; Letter from John Leibovitz, Deputy Chief, Wireless Telecommunications Bureau, FCC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 4 (filed Mar. 4, 2014); CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter at 2.

[230] Verizon Apr. 29, 2014 *Ex Parte* Letter at 1.

[231] The PEA Coalition asserts that adopting Verizon's revised PEA boundaries even in a limited number of areas (as in the Verizon Alternative PEA Proposal) "would create inefficiencies and complicate 600 MHz band licensing for the vast majority of bidders and competitive carriers that are not themselves nationwide carriers." CCA/NTCA/RWA/Blooston May 2, 2014 *Ex Parte* Letter at 3.

[232] *Compare* Verizon Comments at 60-61 ("EAs draw an appropriate balance between enabling the efficient deployment of nationwide and regional services, and the policy objectives set forth in Section 309(j) and the Spectrum Act, . . . [and] offer mobile providers flexibility in deployment and the ability to take advantage of economies of scale."); Sprint *PEAs PN* Reply at 4 ("EAs provide a reasonable balance for selecting a license size

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MHz Band. As discussed above, we need to create interchangeable spectrum blocks in order to permit substitutability among the spectrum blocks (i.e., "generic blocks") in the forward auction.[233] To accomplish this goal, we can adopt only one license size for the entire 600 MHz Band and cannot offer a mix of license sizes as we have done in previous auctions.[234] Under the PEA approach, there are 416 service areas,[235] which is significantly fewer than the 734 CMA service areas, but more than the 176 EAs. This will reduce the exposure risk to the nationwide carriers as compared to CMAs. In addition, PEAs nest into EAs, MEAs, and REAGs, so that nationwide carriers can aggregate licenses to create the service area they desire, allowing them to take advantage of economies of scale. PEAs separate out the urban and rural areas, which should provide for greater auction participation by rural providers and allow them to bid on a geographic area license that better matches their service area.

76. We also decline to adopt broadcast Designated Market Areas ("DMAs"),[236] nationwide, REAG, or MEA licensing approaches. Some commenters suggest that the Commission consider matching licensing areas to broadcast DMAs to simplify auction procedures by aligning the geographic areas of the forward and reverse auctions.[237] We agree with commenters that assert that DMAs are not appropriate because they do not match wireless service footprints or existing FCC wireless service area

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that accords with traditional markets of interest while not being so big as to exclude smaller providers."); AT&T *PEAs PN* Comments at 3 (EAs will encourage widespread geographic build out, including in rural areas, and provide licensees with sufficient flexibility to scale their networks); T-Mobile *PEAs PN* Reply at 2 (smaller license sizes will subject bidders to exposure risk) *with* RTG Comments at 2 (EAs would shut out rural companies in violation of § 309(j) because EAs often include densely populated urban areas and typically cover larger geographical areas than the rural areas that rural carriers serve); Letter from Ron Smith, President of Bluegrass Cellular, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Jul 10, 2013) (if FCC adopts EAs, Bluegrass would "almost certainly be foreclosed from participating in the auction" because "it does not have the financial wherewithal to bid on four or five separate EAs encompassing five times the number of pops it currently serves."); Letter from Gregory W. Whiteaker, Counsel for Chat Mobility, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3 (filed Aug. 8, 2013) (adopting EAs "would delay the deployment of service to rural areas because the few large entities able to bid on such licenses have little or no incentive to serve the rural areas included within the large geographic license areas."); NTCA Comments at 3-4 (licensing significant portions of the 600 MHz spectrum as MSAs/RSAs would serve the public interest); CCA *Band Plan PN* Comments at 7-10 (CMAs encourage broad participation, generate maximum auction revenue, and promote competition); US Cellular *PEAs PN* Comments at 11-12 (CMAs preserve opportunities for small and regional carriers and foster service to rural and underserved areas).

[233] *See* § III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks).

[234] *See, e.g.*, *AWS-1 R&O*, 18 FCC Rcd at 25175-25177 paras. 35-40; *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, *Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, CC Docket No. 94-102, *Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones*, WT Docket No. 01-309, *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket 03-264, *Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 06-169, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, *Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010*, WT Docket No. 96-86; Decalatory Ruling on Reporting Requirement Under Commmission Part 1 Anti-Collusion Rule, WT Docket No. 07-166, 22 FCC Rcd 15289, 15315-18, paras. 62-68 (2007) (*700 MHz Second Report and Order*); *AWS-3 Report and Order* at paras. 48-49.

[235] CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter.

[236] Designated Market Area (DMA®) is a registered trademark of Nielsen Media Research, Inc. (Nielsen). Nielsen owns the copyright to the DMA listing.

[237] CCA Reply at 12; MetroPCS Comments at 18-19 (arguing that EAs are preferable, but DMAs might be another useful option).

designations.[238] Further, we find that DMAs, like EAs, do not sufficiently address the needs of smaller and rural wireless providers, given the number of licenses we would make available.[239] The Commission also sought comment on using nationwide and REAG service areas, but no commenters support using these service areas, and some commenters actively oppose them.[240] T-Mobile recommends that the Commission license by MEAs—a service area size larger than EAs—because the economically efficient size of wireless service is substantially larger than individual EAs, and MEAs will reduce transaction costs and help wireless companies achieve economies of scale.[241] T-Mobile notes that smaller licenses, such as PEAs, are manageable and would not create a significant exposure risk under certain conditions.[242] For the reasons discussed above, using smaller, PEA service areas strikes the appropriate balance and will allow both smaller and larger wireless carriers to obtain licenses that best align with their respective business plans.[243]

77. *Licensing Outside the Continental United States*. The Commission sought comment on licensing of the 600 MHz Band outside the continental United States and in the Gulf of Mexico.[244] For Alaska, Copper Valley Wireless supports licensing Alaska on a CMA basis.[245] RWA (formerly RTG)[246]

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[238] DMAs are the geographic areas in the U.S. used to measure local television viewing. The FCC does not use these broadcast areas to license wireless spectrum. RTG opposes the use of DMAs because broadcast viewing areas have no relationship to existing wireless licensing plans, and "[w]ireless licensing based on DMAs will have the unintended effect of allowing licensees to cherry-pick highly concentrated urban areas while leaving large rural areas unserved." Letter from Caressa D. Bennet, General Counsel, RTG, to Marlene H. Dortch, Secretary, FCC, GN Docket No 12-268 at 9 (filed Mar. 19, 2013). MetroPCS notes that "using DMAs only makes sense if there is a significant increase in the total number of licenses that would be available in the forward auction after re-packing. If not, it would not be worth introducing yet another license area into the already complicated wireless license area mix." MetroPCS Comments at 18-19.

[239] There are 210 DMAs compared to 172 EAs in the United States. *Compare* Nielsen, Local Television Market Universe Estimates, http://www.tvb.org/media/file/TVB_Market_Profiles_Nielsen_TVHH_DMA_Ranks_2013-2014.pdf (last visited Apr. 9, 2014) *with* 47 C.F.R. § 27.6.

[240] For example, CCA argues that "using large geographic areas would give significant and unwarranted advantages to the largest nationwide carriers at the expense of smaller carriers, and would risk leaving behind rural America . . . [and that] [l]arge geographic areas significantly reduce the number of potential bidders for licenses, reducing potential auction revenue as was the case in the Upper 700 MHz C Block." CCA Comments at 14. *See also* C Spire Comments at 7; Leap Comments at 5.

[241] T-Mobile Comments at 15-16.

[242] T-Mobile *PEAs PN* Comments at 2 ("while CCA's proposed licensing scheme [using PEAs] is not optimal, it may represent a reasonable compromise").

[243] AT&T and Verizon request that the Commission adopt package bidding, particularly if it adopts a geographic area license size smaller than EAs. Letter from Joan Marsh, Vice President, Federal Regulatory for AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 4 (filed Dec. 3, 2013) (AT&T Dec. 3, 2013 *Ex Parte* Letter); Verizon Mar. 20, 2014 *Ex Parte* Letter at 3. T-Mobile and others oppose permitting package bidding. *See* T-Mobile *PEAs PN* Comments at 1-2; CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter, at 3. Package bidding is discussed in § IV.C.2.a (Forward Auction – Bid Collection Procedures: Auction Format, Generic License Categories, Etc.).

[244] *NPRM*, 27 FCC Rcd at 12411-12, para. 150.

[245] Copper Valley Reply at 1-2. Copper Valley, which serves 15,000 square miles in south Central Alaska, supports CMAs because licensing using these smaller areas will provide it "with the most meaningful opportunity to participate in the incentive auction." *Id*. We note that although Copper Valley states that it opposes PEAs, it opposes specifically CCA's original proposal to license Alaska as one single PEA, advocating that Alaska should be split into four (CMA) service areas. Copper Valley Reply at 4-5.

[246] The Rural Telecommunications Group (RTG) changed its name to the Rural Wireless Association (RWA) on September 17, 2013. Press Release, *RWA, RTG – The Rural Wireless Association Announces Name Change to RWA*

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initially recommended that we license using Alaska Boroughs, which divide the state based on population density, and in any case, use service areas no larger than CMAs.[247] Subsequently, RWA (along with CCA, NTCA, and Blooston) filed the Joint PEA Proposal, which proposes to divide Alaska into four PEAs.[248] Recognizing that Alaska faces uniquely challenging operating conditions for deploying and operating networks,[249] adopting the Joint PEA Proposal endorsed by smaller and rural carrier associations should best address these concerns. The Alaskan PEA boundaries closely approximate the CMA boundaries in Alaska that providers support.[250] We note that to the extent bidders are interested in providing service in Alaska using smaller service areas than PEAs, they may use both pre- and post-auction mechanisms (such as bidding as a consortium and/or partitioning spectrum in a service area) to create the specific area they wish to serve.

78. For the Gulf of Mexico, we will follow the established policy and license the Gulf as a separate license[251] that will be comprised of the water area of the Gulf of Mexico starting 12 nautical miles from the U.S. Gulf Coast and extending outward.[252] Similarly, we will license Guam, the Northern Mariana Islands, Puerto Rico, the United States Virgin Islands, and American Samoa as we have in previous auctions, which is consistent with the Joint PEA Proposal.[253]

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and New Directors (Sept. 19, 2013), *available at* http://ruralwireless.org/2013/09/rtg-the-rural-wireless-association-announces-name-change-to-rwa/ (last visited Apr. 9, 2014).

[247] RTG (RWA) Comments at 6-7. As RWA describes, Alaska Boroughs divide the state based on population density, and are smaller than CMAs. RWA argues that smaller service areas would promote competition in Alaska and allow for greater penetration. *Id*.

[248] CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter at 2, Att.

[249] *Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform—Mobility Fund,* WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17829 at paras. 507–508 (2011); *aff'd In re: FCC 11-161*, No. 11-9900, 2014 WL 2142106 (10th Cir. May 23, 2014)..

[250] Alaska comprises four service areas under both the PEA and CMA licensing schemes. *Compare* Joint PEA Proposal *with CMA Public Notice*, 7 FCC Rcd 743. In Alaska, the only difference between the Joint PEA Proposal and CMAs is that the Joint PEA Proposal places the county of Yakutat Borough (FIPS 02282) into one service area rather than dividing it into two. CMAs 316 and 317 each include part of Yakutat Borough.

[251] Under the EA licensing scheme, the Gulf of Mexico is EA 176. 47 C.F.R. § 27.6. *See also AWS-1 R&O*, 18 FCC Rcd at 25177, para. 40; *Service Rules for Advanced Wireless Services in the 200-2020 MHz and 2180-2200 MHz Bands*, WT Docket No. 12-70, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16122-23, para. 51 (2012) (*AWS-4 Report and Order*), 27 FCC Rcd at 16122-23, para. 51; *NPRM*, 27 FCC Rcd at 12410, para. 145; *Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands*, Report and Order, WT Docket No. 12-357, 28 FCC Rcd 9483, 9502, paras. 44-45 (2013) (*H Block Report and Order*). We will similarly license the Gulf of Mexico as its own PEA, which the PEA Coalition proposes as PEA 222. CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter at Att.

[252] *See* 47 C.F.R. § 27.6(a)(2). We are establishing different performance benchmarks for the Gulf of Mexico because the performance benchmarks we adopt for the 600 MHz Band are measured by the percentage of the population in the service area. Determining "population" using the conventional methodology would be infeasible for the Gulf of Mexico because it is a body of water. *See* § VI.B.2.c.ii (Performance Requirements).

[253] *See* CCA/NTCA/RWA/Blooston Mar. 20, 2014 *Ex Parte* Letter at Att.; CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter at Att. In its accompanying map, the PEA Coalition proposes PEA 218 for Guam and the Northern Mariana Islands, PEA 219 for the Virgin Islands, PEA 220 for Puerto Rico, and PEA 221 for American Samoa. CCA/NTCA/RWA/Blooston Mar. 11, 2014 *Ex Parte* Letter at Att. Although there are no TV stations

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79. *Statutory Requirements*. We conclude that our action satisfies the Spectrum Act requirement that the Commission consider assigning licenses that cover geographic areas of a variety of different sizes.[254] Based on the extensive record developed in this proceeding, we have carefully considered assigning licenses using a variety of different geographic area sizes.[255] As stated above, however, we cannot offer a mix of license sizes as we have done in previous auctions without endangering our goal of repurposing spectrum through this auction: using one license size (PEAs) is essential to creating interchangeable spectrum blocks, which in turn are critical elements of the 600 MHz Band Plan developed to promote a successful incentive auction.[256] We note that various mechanisms are available to carriers that wish to serve larger or smaller geographic areas.[257]

80. We also conclude that licensing the 600 MHz Band on a PEA basis is consistent with the requirements of section 309(j)[258] because it will promote spectrum opportunities for carriers of different sizes, including small businesses and rural telephone companies. Just as larger carriers can aggregate EAs into larger geographic areas, PEAs are small enough to allow bidders to acquire a limited coverage area—often only a few counties—which should enable small businesses and rural carriers to compete with larger carriers in these areas. Further, if bidders want to acquire licenses for smaller geographic areas, they can make use of the partitioning and disaggregation rules.[259] Although the use of smaller

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licensed in American Samoa and the Northern Mariana Islands, we are including these territories in the forward auction to the extent spectrum is available. This is consistent with the requirements of the Spectrum Act because the Commission can make "reassignments of the television channels as the Commission considers appropriate." Spectrum Act § 6403(b)(1)(B)(i).

[254] Spectrum Act § 6403(c)(3) ("the Commission shall consider assigning licenses that cover geographic areas of a variety of different sizes"). US Cellular argues that the Commission must provide a mix of small service areas pursuant to this provision. US Cellular Comments at 17-18. We disagree. The statute expressly requires us only to consider licensing using a variety of sizes, not to do so. *See, e.g., Melcher v. FCC*, 134 F.3d 1143, 1154-55 (D.C. Cir. 1998) (holding that requirement in § 309(j)(4)(D) of the Communications Act that the FCC "consider the use of tax certificates" for small businesses, rural telephone companies, and businesses owned by minority groups does not mandate such use, but merely "instructs the FCC to 'consider' that possibility").

[255] In the *NPRM*, the Commission sought comment on a wide range of geographic area sizes, including offering a variety of sizes. *NPRM*, 27 FCC Rcd at 12410, para. 145. Furthermore, in response to the comments regarding the *NPRM*, the Wireless Bureau sought comment on a new licensing scheme that, according to CCA, would "ensure that some licenses consist of large population centers while other[s] . . . consist of less populous areas." *PEAs PN*, 28 FCC Rcd at 17256 (citing CCA Nov. 27, 2013 *Ex Parte* Letter). We have considered adopting a variety of sizes, in particular, using a combination of CMAs and EAs. KSW, Sinclair, and US Cellular each advocate that we should adopt a combination of EAs and CMAs. *See* KSW Reply at 6; Sinclair Reply at 3-5; US Cellular Comments at 9-19.

[256] *See* § III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks).

[257] As described above, the rules we adopt for the 600 MHz Band will permit a wireless provider to deploy service seamlessly across adjacent geographic areas. Further, wireless providers will have additional opportunities using secondary market mechanisms. *See* § VI.B.2.d (Secondary Markets); *but see MSH Report and Order* at § V.B.5 (setting forth limitations on the assignment, transfer, or leasing of 600 MHz Band licenses under certain conditions). Moreover, PEAs "nest" within EAs and therefore can serve as building blocks for carriers who wish to create larger footprints. Carriers that seek license areas smaller than PEAs may use auction mechanisms (e.g., consortium bidding) and secondary market transactions (e.g., partitioning, disaggregating, and spectrum leasing) to acquire spectrum for their preferred geographic area. *See* 47 C.F.R. § 1.2107(g); § VI.B.2.d (Secondary Markets); *but see MSH Report and Order* at § V.B.5.

[258] Under § 309(j)(4) the Commission, in prescribing regulations for assigning licenses by competitive bidding, shall "ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision of spectrum-based services."

[259] Under the rules we adopt today, a group of wireless providers can form a consortium to jointly bid on a license that they can subsequently partition as they desire. *See* 47 C.F.R. § 1.2107(g); § VI.B.2.d.ii (Partitioning and Disaggregation). We note that in the *MSH Report and Order*, we indicated that we plan to consider in a Further

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geographic service areas, such as CMAs, could potentially encourage participation by smaller providers and support greater variation in the amount of repurposed spectrum from area to area, on balance offering licenses for a large number of very small geographic service areas would be inconsistent with our auction design goals of simplicity and speed.[260] First, we must use fewer service areas because the time necessary to close the incentive auction increases dramatically as the number of licenses increases. As discussed above, we are designing the forward auction for speed.[261] Further, more service areas could complicate potential bidders' efforts to plan for, and participate in, the auction for related licenses, potentially affecting the success of the auction.[262] More service areas could also complicate subsequent service deployment.[263]

d. Market Variation

81. *Background*. Because the amount of UHF spectrum recovered through the reverse auction and the repacking process depends on broadcaster participation and other factors, the Commission explained in the *NPRM* that any band plan it adopted would have to accommodate variation in the amount of spectrum recovered in different geographic areas; otherwise, the amount recovered in most markets nationwide would be limited if less spectrum is recovered in certain markets.[264] The Commission sought comment on how to address potential variation in the amount of spectrum recovered in areas along the border with Canada and Mexico,[265] as well as whether and how to offer new 600 MHz spectrum blocks that are encumbered or "impaired" by potential co- or adjacent channel interference with domestic television services operating in nearby markets due to less spectrum being recovered in certain markets.[266] We define "impaired" spectrum blocks or "impaired" licenses as those in which a wireless provider is restricted from operating in the entire geographic boundary of a particular license area in order to prevent harmful interference to remaining television operations in or near the 600 MHz Band; or conversely, those licenses in which a wireless provider may receive harmful interference from remaining television operations in or near the 600 MHz Band.[267] In the *NPRM*, the Commission also sought comment on what types of impaired blocks it should offer in the forward auction, if any, and how to incorporate any such offerings into the auction design. The Wireless Bureau sought further comment on how certain band plan approaches could best address market variation in constrained markets.[268] In addition, the Office of

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Notice of Proposed Rulemaking possible changes to certain auction rules relating to joint bidding arrangements. *See MSH Report and Order* at § V.B.2.

[260] *NPRM*, 27 FCC Rcd at 12411, para. 147.

[261] *See* § I (Introduction).

[262] *See, e.g.*, AT&T Dec. 3, 2013 *Ex Parte* Letter at 2 ("a carrier might well decide that it makes no economic sense to invest in 600 MHz technology *at all* if it does not win 600 MHz spectrum rights in most of the geographic areas within its footprint").

[263] *NPRM*, 27 FCC Rcd at 12411, para. 147. *See also* Verizon *PEAs PN* Comments at 3 ("Given the smaller license size, licensees must manage significantly more potential co-channel interference along their service area boundaries.").

[264] *NPRM*, 27 FCC Rcd at 12406, para. 136.

[265] *Id.* at 12418, para. 172.

[266] *Id.*at 12419, para. 174.

[267] As explained below, we will provide additional guidance in the pre-auction process as to these boundaries and wireless licensees' obligations when holding an impaired license. We emphasize that forward auction bidders will know when they are bidding on an impaired license, and plan to seek further comment on the specific process and approach for bidding on impaired licenses in the *Comment PN*.

[268] *See generally Band Plan PN*, 28 FCC Rcd 7414. Specifically, the Wireless Bureau sought additional comment on three variations of the Down from 51 band plan: (1) Down from 51 Reversed; (2) Down from 51 with TV in the Duplex Gap; and (3) Down from 51 TDD. *Id*.

Engineering and Technology ("OET") released a Public Notice inviting comment on a methodology for predicting potential inter-service interference between television and licensed wireless services operating on the same or adjacent channels in nearby markets.[269]

82. *Discussion*. The 600 MHz Band Plan we adopt can accommodate market variation in order to avoid restricting the amount of repurposed spectrum that is available in most areas nationwide. We intend to offer a uniform number of 600 MHz spectrum licenses in most markets across the country, but the 600 MHz Band Plan will enable us to offer some impaired spectrum blocks, or alternatively, fewer spectrum blocks, in constrained markets where less spectrum is available. We find that accommodating market variation is necessary. If the 600 MHz Band Plan could not accommodate some market variation, we would be forced to limit the amount of spectrum offered across the nation to what is available in the most constrained market (the "least common denominator"), even if more spectrum could be made available in the vast majority of the country. By allowing for market variation in our 600 MHz Band Plan, we can ensure that broadcasters have the opportunity to participate in the reverse auction in markets where interest is high. As a result, more spectrum can be made available nationwide in the forward auction.

83. We recognize that there are certain advantages to having a generally consistent band plan. In particular, limiting the amount of market variation will limit the amount of potential co- and adjacent channel interference between television and wireless services in nearby areas ("inter-service interference").[270] Furthermore, limiting the amount of variation will help licensees achieve economies of scale when deploying their 600 MHz networks.[271] Therefore, we will accommodate market variation to a limited extent only.[272] In no case will we offer *more* spectrum in an area than the amount we decide to offer in most markets nationwide.[273] Rather, we will offer the same amount of spectrum nationwide in all areas where sufficient spectrum is available. In constrained markets where less spectrum is available, we will offer impaired blocks or fewer blocks than we offer in most markets nationwide.

84. The decision to accommodate market variation raises a number of issues, including how to prevent inter-service interference consistent with the requirements of the Spectrum Act,[274] how much market variation to accommodate under different spectrum recovery scenarios, where to place television stations in the 600 MHz Band if necessary in constrained markets, and whether and how to offer impaired spectrum blocks in the forward auction. Here, we explain the process by which we will resolve these issues and establish rules and auction procedures related to inter-service interference. Specifically, following this Order, we plan to issue an order that establishes the methodology for preventing inter-service interference. That methodology will govern post-auction co- or adjacent-channel operation of television and wireless services, including operation of new 600 MHz licensees in these areas (i.e., additional rules for licensees that hold impaired 600 MHz licenses). We will issue that order concurrent

[269] *See Office of Engineering and Technology Seeks to Supplement the Incentive Auction Proceeding Record Regarding Potential Interference Between Broadcast Television and Wireless Services*, GN Docket No. 12-268, Public Notice, 29 FCC Rcd 712 (2014) (*Inter-service Interference PN*).

[270] The *Inter-service Interference PN* addresses the potential interference scenarios between television and wireless services where co-channel operations are permitted in nearby areas. *See generally Inter-service Interference PN.*

[271] *See, e.g.*, Ericsson Reply at 11 (offering all markets with the same downlink band "facilitates device interoperability and promotes economies of scale by avoiding device fragmentation").

[272] The *Comment PN* will provide guidance and propose specific rules to address how market variation will work in the forward auction (e.g., how we will determine the amount of spectrum we offer generally; the degree to which we will accommodate constrained markets, etc.).

[273] As we note in § III.C (Unlicensed Operations), we expect that there will still be a substantial amount of spectrum available for use by TVWS devices in the post-auction television bands, particularly in areas outside of the central urban areas of the largest DMAs.

[274] *See* § III.B.2 (Implementing the Statutory Preservation Mandate).

with issuing the *Comment PN* inviting comment on final, specific auction procedures. This approach will ensure that potential bidders in both the forward and reverse auctions have a clear understanding about how we will protect against inter-service interference in the 600 MHz Band, and have an opportunity to comment on how such protection should be taken into consideration in the auction process.

85. The *Comment PN* will seek comment on aspects of market variation and inter-service interference that affect the incentive auction, such as how much market variation to accommodate under different spectrum recovery scenarios, where to place television stations in the 600 MHz Band in constrained markets, if necessary, and whether and how to auction impaired spectrum blocks. We will resolve these issues in the *Procedures PN*.[275] The approach we adopt will appropriately balance the costs and benefits of having a nationwide band plan versus accommodating market variation.

86. Although we defer establishing the methodology by which we will prevent inter-service interference so that we can do so based on a fully developed record with meaningful public input, we provide guidance on several matters in this Order. First, to prevent inter-service interference to television stations, 600 MHz licensees with impaired licenses may be required to operate within smaller boundaries than the entire area for which they hold a license.[276] We will provide forward auction bidders with sufficient information both before and after the incentive auction to determine whether they are bidding on, or hold, an impaired license. Licensees with impaired licenses will be limited to operation within the boundaries permitted under the inter-service interference rules we adopt ("permitted boundaries"). Thus, for example, licensees with impaired licenses will be allowed to operate at the power and out-of-band emission ("OOBE") limits authorized by our technical rules only to the permitted boundaries of the impaired licenses, even if the actual boundaries of their license areas extend further.[277] Likewise, such licensees will be required to meet the build-out requirements only for the area they are permitted to serve within each license area.[278]

87. Second, television stations operating on a co- or adjacent channel to a new 600 MHz licensee in a nearby market will be limited in their ability to expand their facilities following the incentive auction. In these markets, some broadcasters will be operating adjacent to or co-channel to wireless licensees. Such television licensees will not be permitted to expand their noise-limited service contours if doing so would increase the potential for interference to a wireless licensee's service area.[279] We recognize that there may be extraordinary circumstances beyond the control of a television licensee in which it must involuntarily relocate its facilities or cannot replicate its service area on its new channel

[275] Among other things, we anticipate seeking comment on whether to establish a threshold under which we would accommodate variation in no more than a certain percentage of top markets nationwide. For example, if the nationwide target amount were 126 megahertz and we were willing to accommodate variation of no more than 15 percent, then the threshold would be 85 percent of markets, or alternatively, 85 percent of the population nationwide.

[276] We are only restricting wireless providers from operating in areas where they are likely to cause harmful interference to broadcast operations. Nothing in our rules prevents a wireless provider from operating in a part of their service area in which they may be subject to, but are not likely to cause, harmful interference, even if they hold an "impaired license."

[277] We note that licensees with impaired 600 MHz licenses must operate within these "permitted boundaries" to protect against harmful interference to remaining television stations in or near the 600 MHz Band. Consequently, if a remaining television station affecting an impaired licensee's service area ceases operating, the 600 MHz licensee in that impaired area could then operate in its entire license area.

[278] *See* § VI.B.2.c.ii (Performance Requirements).

[279] We note this limitation applies only to television stations whose operations affect new 600 MHz licensees. Other stations that seek to expand their service areas may follow the standard procedures in our rules. Further, we clarify that this restriction applies only to affected stations seeking to expand their service areas in the direction of a wireless license. Affected stations will not be prohibited from reducing their service contours in the 600 MHz Band, provided they are otherwise permitted to do so under our rules and policies. *See also* §§ III.B.2 (Implementing the Statutory Preservation Mandate), V.C.1 (License Modification Procedures).

after the repacking process without expanding its contour in the direction of the wireless license area. Because this type of modification would affect both the television licensee and the wireless licensee, we expect these cases will need to be evaluated on a case-by-case basis, and will carefully consider requests for waiver of our rules in such situations. We encourage television and wireless licensees to work cooperatively to find an equitable solution should this situation arise.

e. Guard Bands

88. *Background*. Section 6407(a) of the Spectrum Act makes clear that "[n]othing in [the new incentive auction authority,] as added by section 6402, or in section 6403 shall be construed to prevent the Commission from using relinquished or other spectrum to implement band plans with guard bands."[280] In order to protect against harmful interference between dissimilar adjacent operations, and in accordance with section 6407, the Commission proposed to create guard bands in which it would prohibit high power operations.[281] In addition to preventing harmful interference, the Commission reasoned that guard bands would help to ensure that wireless spectrum blocks adjacent to television operations would support wireless broadband services to the same level of performance as spectrum blocks adjacent only to other spectrum blocks used for wireless broadband service.[282] It also proposed to incorporate any "remainder" spectrum into the guard bands.[283] The Commission proposed to size the guard bands in accordance with the requirement of section 6407(b) that they "shall be no larger than is technically reasonable to prevent harmful interference between licensed services outside the guard bands."[284] In the *NPRM*, the Commission also sought comment on the size of the guard band between the wireless broadband uplink and downlink bands (commonly referred to as the "duplex gap").[285]

89. *Discussion*. As permitted by section 6407(a), we incorporate guard bands into our 600 MHz Band Plan to prevent harmful interference between licensed services. Commenters strongly support the use of such guard bands.[286] We adopt a guard band between television and wireless operations that ranges from seven megahertz to 11 megahertz, depending on the amount of spectrum cleared, as discussed below. We adopt a uniform duplex gap of 11 megahertz for every clearing scenario, and uniform three megahertz guard bands to protect against interference between licensed WMTS services on channel 37 and adjacent wireless services. The Spectrum Act specifically authorizes the FCC to implement band plans with guard bands, subject to a "technically reasonable" restriction.[287] We interpret the statute to affirm the Commission's discretion to employ guard bands in exercising its spectrum management authority.[288] Establishing these guard bands not only protects against harmful interference

[280] Spectrum Act § 6407(a).

[281] *NPRM*, 27 FCC Rcd at 12412, para. 152.

[282] *NPRM*, 27 FCC Rcd at 12412, para. 152.

[283] *NPRM*, 27 FCC Rcd at 12419-20, paras. 175-76.

[284] *NPRM*, 27 FCC Rcd at 12412, para. 152 (quoting Spectrum Act § 6407(b)).

[285] *NPRM*, 27 FCC Rcd at 12417, para. 167. The Commission noted that the size of the duplex gap relative to the width of the pass band is often considered more important than the absolute size because filter roll off is generally proportional to frequency. The Commission also noted that in determining the appropriate duplex gap size to protect against harmful interference, it may consider factors such as the pass band width relative to the center frequency of the pass band, the duplex spacing between the transmitted and received signals, and allowances for temperature and manufacturing variation in components. *See id.*

[286] *See, e.g.*, Alcatel-Lucent Comments at 20; AT&T Comments at 22; AT&T Reply at 20-27; Cisco Comments at 11; Comcast Comments at 21; CTIA *Band Plan PN* Comments at 4; Motorola Comments at 12-13; Verizon Comments at 19-20; Verizon Reply at 2-4.

[287] Spectrum Act §§ 6407(a), (b).

[288] Title III of the Communications Act of 1934, as amended, 47 U.S.C. §§ 301, *et seq.*, "endow[s] the Commission with expansive powers," including "broad authority to manage spectrum . . . in the public interest." *Cellco P'ship v.*

(continued….)

between the 600 MHz service and adjacent licensed services, but also helps to ensure that the 600 MHz spectrum blocks that we offer in the forward auction are as interchangeable as possible, consistent with our auction goals.[289] Guard bands also will bolster innovation and investment by unlicensed devices. In that regard, section 6407(c) specifically authorizes "the use of such guard bands for unlicensed use."[290]

90. As discussed above, the incentive auction presents the unique challenge of not knowing in advance how much spectrum will be repurposed, and the 600 MHz Band Plan we adopt is therefore flexible enough to accommodate different spectrum recovery scenarios. The guard bands are tailored to the technical properties of the 600 MHz Band under each scenario.[291] In some scenarios, converting six megahertz television channels to paired five megahertz blocks would leave "remainders" of spectrum smaller than six megahertz. Auctioning these remainders would be inconsistent with our decision to license the 600 MHz Band in paired five megahertz spectrum blocks,[292] and would needlessly complicate the auction design.[293] Accordingly, such remainders are incorporated into the guard bands.[294] As a result,

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FCC, 700 F.3d 534, 541, 542 (D.C. Cir. 2012) (internal quotes and citations omitted). Determinations with respect to spectrum allocation policy have long been recognized to be precisely the sort that Congress intended to leave to the broad discretion of the Commission under § 303 of the Communications Act. *See Nat'l Ass'n of Regulatory Util. Comm'rs v. FCC,* 525 F.2d 630, 635-36 (D.C. Cir. 1976) (initial allocation of spectrum for land mobile radio service). The Spectrum Act reinforces the Commission's established authority by authorizing it to "implement and enforce" the Spectrum Act's provisions (including incentive auction authority) "as if this title is a part of the Communications Act of 1934." Spectrum Act § 6003(a). Nothing in § 6403(b) of the Spectrum Act "shall be construed to . . . expand or contract [that] authority, except as otherwise expressly provided." *Id.* § 6403(i)(1).

[289] *See* §§ III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks), IV.C.2.b (Forward Auction – Bid Assignment Procedures: Determining Winning Bidders and Assigning Frequency-Specific Licenses).

[290] Spectrum Act § 6407(c). The legislative history of § 6407 reinforces the statutory language. Section 6407 was designed as a compromise between competing versions of the legislation, some of which would have designated or reallocated spectrum for unlicensed use, and one of which did not (the version passed by the House). *Compare* S. 911, 112th Cong. § 303(a) (2011); H.R. 2482, 112th Cong. § 303(a); *with* H.R. 3509, 112th Cong. § 301 (2011), *with* H.R. 3630, 112th Cong., § 4103 (2011). Based on § 6407's language and legislative history, we reject EOBC's argument that the Spectrum Act requires that all repurposed spectrum, including guard bands, be auctioned. *See* EOBC Reply at 24-26.

[291] The Technical Appendix shows the size of the guard bands under each scenario. *See* Technical Appendix § III.B (Specific Band Plan Scenarios). We note that we may not use each of these scenarios in the forward auction. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[292] As described above, licensing the 600 MHz Band in five megahertz spectrum blocks will allow for the greatest amount of flexibility and efficiency in the 600 MHz Band Plan, will provide uniformity and utility, and will be the most compatible with current and emerging technologies. *See* § III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks).

[293] *See* Google/Microsoft Comments at 43 ("Soliciting separate bids for the remaining small spectrum slivers in the simultaneous forward and reverse auction will introduce needless complexity to the auction process."). *See also* § III.A.2.a (All-Paired, Down From 51 Band Plan). Specifically, by offering these remainders, we would have to offer additional types of licenses in the forward auction, which would increase the amount of time the auction takes to close and, therefore, the cost of bidder participation. For these reasons, we reject the argument that we should auction the guard band spectrum to the highest bidder based on its value for unlicensed use. *See* Letter from Peter Pitsch, Executive Director, Communications Policy, Intel, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Feb. 5, 2014).

[294] We note that commenters largely support this approach. *See, e.g.*, CCIA Comments at 2; CEA Comments at 24; Google Reply at 7 (asserting that it is technically reasonable for the remainder spectrum to be used as part of the guard bands because increasing separation distance between adjacent services: (1) reduces the likelihood of harmful interference; (2) improves the customer experience; and (3) reduces costs for carriers and consumers); Intel Reply at 21 (recommending adding remainder spectrum to the duplex gap "if the final band plan boundary conditions create remainder spectrum that would otherwise be wasted"); PISC Reply at 3 ("PISC is pleased to find a clear consensus
(continued….)

the guard band between television and 600 MHz downlink varies in size to some extent under different spectrum recovery scenarios.

91. Guard band size is subject to the statutory "technically reasonable" restriction we address below. Importantly, it also is limited by our goals for the incentive auction. The statute requires that the forward auction proceeds cover the costs of incentive payments to clear broadcasters from the 600 MHz Band and other identified costs.[295] The amount of spectrum available to generate such proceeds decreases with increases in guard band size. In other words, the bigger the guard bands, the less spectrum we can offer for sale in the forward auction.[296] Alternatively, we could seek to repurpose more spectrum, but that would require clearing more broadcasters, increasing the costs of incentive payments without increasing the amount of spectrum available in the forward auction to generate the necessary proceeds. Thus, in sizing the guard bands, we must be mindful of the objective of repurposing spectrum for new, flexible uses, which can be fulfilled only if the forward auction generates sufficient proceeds. Decreases in the amount of licensed spectrum available in the forward auction also may undermine competition among licensed providers in the 600 MHz Band, another important policy objective. The guard bands we establish in the 600 MHz Band Plan factor in all of these considerations.[297]

92. The guard bands meet the statutory requirement that guard bands be "no larger than is technically reasonable to prevent harmful interference between licensed services outside the guard bands."[298] We interpret "harmful interference" consistent with our rules, which define harmful interference as interference that "seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service."[299] Courts have held that the use of the statutory term "reasonable" "opens a

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among commenters supporting the Commission's proposal to designate the guard bands for unlicensed use and to add to the guard bands any 'remainder' spectrum that cannot be auctioned in standard 5 megahertz blocks.").

[295] *See* 47 C.F.R. § 6403(c)(2); § IV.A (Overview and Integration of the Reverse and Forward Auctions). The reserve price we adopt requires, among other things, that the forward auction proceeds cover such costs, as well as any Public Safety Trust Fund amounts needed for FirstNet. *See id.* (discussing final stage rule).

[296] *See* EOBC Reply at 24-26 (arguing that designating spectrum to unlicensed does not generate revenue to meet the Spectrum Act's stated goals and risks auction failure). The above-stated conversion process can magnify the impact of even small guard band size increases. For example, if the auction were to repurpose 84 megahertz of spectrum, a one-megahertz increase in duplex gap size (from 11 to 12) could mean making only six 5+5 megahertz paired blocks available in the forward auction instead of seven.

[297] The guard bands we adopt also take into account the 600 MHz Band OOBE and power limits, which mitigate the potential for harmful interference. *See* Technical Appendix § II.E (Effect of Frequency Separation on Inter- and Intra-service Interference (Guard Bands)).

[298] Spectrum Act § 6403(b).

[299] 47 C.F.R. § 2.1(c); *see also id.* §§ 15.3(m), 76.613(a). We interpret the statutory term "harmful interference" in accordance with the FCC's rules because neither the Spectrum Act nor the Communications Act defines the term, and "Congress' repetition of a well-established term generally implies that Congress intended the term to be construed in accordance with pre-existing regulatory interpretations." *Toyota Motor Mfg., Kentucky, Inc. v. Williams*, 534 U.S. 184, 193-94 (2002), *superseded by statute*, ADA Amendments Act of 2008, Pub.L. 110–325, 122 Stat. 3553 (2008); *see also McDermott Int'l, Inc. v. Wilander*, 498 U.S. 337, 342 (1991) ("In the absence of contrary indication, we assume that when a statute uses . . . a term [of art], Congress intended it to have its established meaning."). Although § 90.7 of the rules refers to a different definition of harmful interference, 47 C.F.R. § 90.7 ("specifically degrades, obstructs, or interrupts"), the Part 2 definition "shall be the definitive term or definition and shall prevail throughout the Commission's Rules." 47 C.F.R. § 2.1(a); *see InfoPET Identification Sys., Inc.*, 11 FCC Rcd 11944, 11947 at para. 9 (1996); *see also Northpoint Tech., Ltd. v. FCC,* 414 F.3d 61, 69 (D.C. Cir. 2005) (deferring to Commission construction of the same undefined statutory term, "harmful interference," by reference to the agency's own definition in 47 C.F.R. § 2.1).

rather large area for the free play of agency discretion."[300] In contrast, the term "necessary" has been read to refer to something "required to achieve a desired goal."[301] In that regard, we reject suggestions that the statute requires the Commission to restrict guard bands to the *minimum* size necessary to prevent harmful interference.[302] Congress knows how to draft provisions of this kind,[303] and did not use such language in section 6407. Rather, it left determination of the appropriate size of the guard bands to prevent harmful interference to the Commission's "reasonable" technical judgment. Establishing "technically reasonable" guard bands is thus not only a matter that Congress left to the Commission's discretion, but also the type of predictive judgment that lies at the core of the agency's expertise.

93. The record supports our conclusion that the guard bands we adopt are technically reasonable to prevent harmful interference. With respect to the guard band between television and wireless operations, which may be from seven to 11 megahertz, depending on the spectrum recovery scenario, most commenters support a size within that range.[304] With regard to the duplex gap, which is 11 megahertz, a number of device manufacturers and wireless carriers support a size of 10 to 12

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[300] *Orloff v. FCC*, 352 F.3d 415, 420 (D.C. Cir. 2003) (interpreting "unjust" and "unreasonable" in 47 U.S.C. § 201). Indeed, the D.C. Circuit has held, in the context of applying another statutory standard of what is "reasonable" with respect to "the interference potential of [radio] devices," that such a statutory mandate reflects no more than the usual requirement that the agency have a rational basis for its technical judgment, which is entitled to judicial deference. *American Radio Relay League, Inc. v. FCC,* 617 F.2d 875, 879 (D.C. Cir. 1980) (applying 47 U.S.C. § 302a(a)); *see also American Radio Relay League, Inc. v. FCC,* 524 F.3d 227, 233 (D.C. Cir. 2008) (granting FCC "considerable deference" where a "highly technical question" is involved, such as harmful interference). Other courts have observed that the statutory term "reasonable" is "inherently ambiguous." *City of Arlington v. FCC,* 668 F.3d 229, 255, n.126 (5th Cir. 2012) (citing cases), *aff'd,* 133 S. Ct. 1863 (2013); *Alliance for Cmty. Media v. F.C.C.*, 529 F.3d 763, 777 (6th Cir. 2008). Facially ambiguous terms can have their meanings rendered unambiguous by reference to statutory structure and history, *see, e.g., Alliance*, 529 F.3d at 777, but the statutory structure and history do not suggest an intent to limit the FCC's predictive judgment regarding harmful interference.

[301] *See GTE Serv. Corp. v. FCC,* 205 F.3d 416, 423 (D.C. Cir. 2000) (citing *AT&T Corp. v. Iowa Utils. Bd.*, 525 U.S. 366, 389-90 (1999)).

[302] *See, e.g.*, TIA Comments at 9-10 ("'Remainder' spectrum, like all reclaimed spectrum save for guard bands minimally sized to avoid interference, must be auctioned."); Joshua Pratt, The 600 MHz Incentive Auction: A Tension of Law and Public Policy at 22-23 (filed Nov. 26, 2013), available at http://apps.fcc.gov/ecfs/document/view?id=7520959592 (Pratt *Ex Parte*); *see also* AT&T Reply at 24-25 (guard bands should be no larger than what is "technically needed," or than the size "needed," or "sufficient"); Letter from Mike Gravino, Director, LPTV Spectrum Rights Coalition, to Tom Wheeler, Chairman, William Lake, Chief, Media Bureau and Gary Epstein, Chief, Incentive Auction Task Force, FCC, GN Docket No. 12-268 at 2 (filed Apr. 28, 2014) (The Commission should "not create guard-bands which are larger than exactly what is needed to prevent interference between TV and the wireless services.").

[303] *See, e.g.*, 47 U.S.C. § 251(c)(6) (duty to provide for physical collocation of equipment "*necessary* for interconnection or access to unbundled network elements"); 47 U.S.C. § 353(d) ("The Commission shall, when it finds it *necessary* for safety purposes, have authority to prescribe the particular hours of watch on a ship of the United States which in accordance with this part is equipped with a radiotelegraph station.") (emphases added).

[304] *See, e.g.*, Ericsson Reply at 17 (arguing that the Commission should establish guard bands of at least six megahertz for low power TV (50 kW EIRP or lower) and a larger guard band for higher power stations to prevent interference); Google/Microsoft Comments at 39-41, App. at 5-6 (the Commission should implement a conservative guard band that is larger than six megahertz); Motorola Comments at 12-13 (asserting that guard bands wider than six megahertz, preferably around 10 megahertz, would help mitigate interference); Sony Comments at 6 (stating that a six to eight megahertz guard band should be sufficient). *But see* CCA Comments at 15-16 (stating that three megahertz is a sufficient guard band size); Comcast Comments at 30 (stating that "the Commission should allocate at least 20 megahertz of contiguous spectrum in the 600 MHz band – the minimum amount of spectrum generally considered necessary for providing robust Wi-Fi services – for unlicensed use."); Free Press *Band Plan PN* Reply at 2 ("[T]he Commission should make available at the very least a contiguous 20 megahertz guard band or duplex gap for unlicensed use within the 600 MHz band frequencies . . . .").

megahertz.[305] Incorporating the "remainder" spectrum into the guard band between television and wireless operations enhances the protection against harmful interference to licensed services.[306] The three megahertz guard band in our Band Plan between WMTS on channel 37 and 600 MHz operations likewise is supported by examination of the record.[307]

94. The analysis in the attached Technical Appendix corroborates our conclusion that the guard bands in our 600 MHz Band Plan are technically reasonable to prevent harmful interference.[308] Guard bands employ frequency separation to protect against harmful interference between licensed services outside the guard bands; the degree of protection generally increases with the amount of separation. The extent to which frequency separation reduces the potential for interference between a transmitter and a receiver can be measured by a well-established relationship among transmitted power spectral density, receiver selectivity, and frequency separation between transmitter and receiver.[309] In the case of television and the 600 MHz downlink, the two specific interference cases are a television transmitter to a mobile broadband device, and a mobile broadband base station to a television receiver.

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[305] *See, e.g.*, Alcatel-Lucent Comments at 21 ("The duplex gap between wireless uplink and wireless downlink should be between 10 and 12 MHz."); AT&T Reply at 21 ("the size of the duplex gap needed to avoid such adjacent-channel interference is 10-12 megahertz"); Qualcomm Reply at 18 ("A duplex gap of approximately 11 to 12 MHz is the minimum needed to avoid interference between mobile downlink and uplink. . . ."); Verizon Comments at 18 ("The [duplex] gap must be at least 10 MHz (and possibly larger, depending on the overall band design."). *But see* NCTA Reply at 3-7 ("a duplex gap of at least 20 MHz—is technically reasonable and is the best way to promote the objectives of the Spectrum Act and the public interest"). *See also* Technical Appendix §§ II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)), III (Band Plan).

[306] *See* Google Reply at 7 (asserting that it is technically reasonable for the remainder spectrum to be used as part of the guard bands because increasing separation distance between adjacent services reduces the likelihood of harmful interference, which improves the customer experience and reduces costs for carriers and consumers).

[307] *See* § III.D.1.b.ii (Interference Protections for Incumbent Services). We do not establish a guard band between the adjacent operations in the 600 MHz uplink band and the Lower 700 MHz A Block (698 MHz to 704 MHz). *See* Technical Appendix § II.E.4 (Potential for Interference between 600 MHz Uplink and 700 MHz Uplink). Commenters agree that because these two bands are both used for terrestrial uplink services, they are harmonized and do not require guard bands to prevent harmful interference. *See, e.g.*, Alcatel-Lucent Comments at 21(stating that no guard band is needed between 600 MHz uplink and Lower 700 MHz uplink); CEA *Band Plan PN* Comments (stating that the 600 MHz uplink block should be situated adjacent to the 700 MHz uplink block, eliminating any need for a guard band between those operations).

[308] *See* Technical Appendix § II.E (Effect of Frequency Separation on Inter- and Intra-service Interference). As discussed above in Section I (Introduction), we are committed to an open and transparent process for the incentive auction. To that end, we provide the Technical Appendix to give additional insight into the FCC's analysis confirming our determinations about the appropriate guard band sizes, among other technical issues. We address the appropriate guard band size between 600 MHz downlink and WMTS services on channel 37 in § III.D.1.b.ii (Interference Protections for Incumbent Services), with supporting analysis in the Technical Appendix. *See* Technical Appendix § II.E.2 (Potential for Interference between 600 MHz Downlink and WMTS).

[309] For a detailed description of this Frequency Dependent Rejection (FDR) relationship, *see* NTIA, Frequency Dependent Rejection Overview, http://www.its.bldrdoc.gov/publications/2498.aspx (last visited Apr. 10, 2014); *see also* DISA/DSO, Communications Receiver Performance Degradation Handbook, Doc. Ctrl. No. JSC-CR-10-004, at 28-31 (2010), *available at* http://www.ntia.doc.gov/files/ntia/publications/jsc-cr-10-004final.pdf ; Edward F. Drocella, et al., NTIA, Description of a Model to Compute the Aggregate Interference From Radio Local Area Networks Employing Dynamic Frequency Selection, TM-09-461, at 5-9 (2009), *available at* http://ntiacsd.ntia.doc.gov/msam/FDR/FDRoverview.htm. The FDR methodology compares the interference potential to a theoretical situation where all the transmitter power falls directly on the receiver's desired channel. For example, if a transmitted signal reaches a receiver at a power of -40 dBm, and the FDR is 50 dB, this means the interference is equivalent to -90 dBm in the receiver's channel. The FDR value can also be viewed as the amount of transmitted signal attenuation at the receiver, which depends on the frequency offset (separation) between the receiver and transmitter due to the receiver detuning and different receiver and transmitter bandwidth overlaps.

Frequency dependent rejection ("FDR") values for these two cases at different degrees of frequency separation show significant differences in likely interference. Taken together, the results of these two interference cases corroborate our decision that the technically reasonable guard band size between television and the 600 MHz downlink is seven to 11 megahertz, depending on the particular band plan scenario.[310]

95. Transmit and receive filters often contribute significantly to interference protection, and accordingly we also consider the capabilities of mobile device filters in the case of television and the 600 MHz downlink. The transition band, or separation needed for significant filter rejection, can be as small as seven megahertz with reasonable cost, complexity, and size, but increasing the transition band size up to 11 megahertz reduces the filter cost, complexity, and size and enables a greater variety of filter technologies to be considered.[311] Consideration of this determination together with our FDR analysis confirms that a guard band size between television and wireless operations of seven to 11 megahertz is technically reasonable.

96. With respect to the duplex gap, many FDD technologies, including FD-LTE, allow simultaneous transmission and reception. Because the transmitter and receiver are co-located, however, there is a potential for self-interference (i.e., harmful interference within the device). For this reason, the FDD device contains a receive and a transmit filter designed to operate together to reduce the likelihood of such interference. The two filters depend on frequency separation, often referred to as the "duplex gap," to operate properly.[312] Factors that affect the impact of frequency separation are the transmitter's Out of Band Emissions ("OOBE") and filter capability.[313] With regard to the former, a duplex gap of up to 11 megahertz, depending on the spectrum recovery scenario, is reasonable to prevent third order intermodulation products adjacent to the transmit signal from overlapping the frequency region of the receive signal.[314] With regard to filter capability, in order to be as large as the achievable transition band, and considering the high rejection needed to prevent self-interference, the duplex gap should be at least 11 megahertz.[315] Consideration of these two factors together confirms that the duplex gap in our 600

[310] *See* Technical Appendix § II.E.1 (Potential for Interference between Television and 600 MHz Services).

[311] *See* Technical Appendix §§ II.A (Mobile Filter Considerations), II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

[312] The duplex gap may also refer to all the frequencies between the two filters, and in this proceeding it has been used by commenters in several related but distinct senses, such as all frequencies between the uplink and downlink pass bands regardless of the filter arrangement. To avoid confusion, we refer to the spectrum between the uplink and downlink bands in the 600 MHz Band as a "duplex gap," which serves as a guard band between the 600 MHz uplink and downlink bands.

[313] In modern mobile broadband devices, the strongest OOBE is in the region of third order intermodulation products adjacent to the transmit signal, so the duplex gap needs to be large enough to prevent this region from overlapping the frequency region of the receive signal. *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

[314] Intermodulation products are unintended transmissions that can be generated in radio components, and can be significant sources of out-of-band emissions. *See, e.g.*, CTIA Comments at 24-25 ("Intermodulation distortion occurs due to the interaction between two radio signals such that each affects the amplitude of the other signal, thereby distorting the received communication. The overall impact of the distortion will be driven by the magnitude of the two signals and it is additive, such that the more frequencies that are mixed together (and at higher powers), the more interference is generated."). *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)). We reject Google and Microsoft's argument that the size of the duplex gap needs to be equal to the size of the pass band to address the intermodulation issue. Google/Microsoft Comments, App. at 4; *see* Technical Appendix § II.C.2 (User Equipment Self-Intermodulation).

[315] *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

MHz Band Plan, which is 11 megahertz, is technically reasonable to prevent harmful interference.[316]

97. We reject arguments that the Commission should establish larger guard bands to facilitate their use by unlicensed devices.[317] For the reasons discussed above, doing so would threaten our ability to meet our goals in the incentive auction.[318] Moreover, guard bands larger than those incorporated in our 600 MHz Band Plan would not satisfy the requirements of section 6407(b).[319] The statutory "technically

[316] A number of commenters support a duplex gap of 11 megahertz. *See, e.g.*, Letter from Joan Marsh, Vice President, Federal Regulatory for AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed May 9, 2014) ("AT&T supports a minimum 11 MHz duplex gap as essential to effective deployment of the new 600 MHz band."); Letter from H. Nwana, Executive Director, Dynamic Spectrum Alliance, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed May 7, 2014) ("[T]he duplex gap between uplink and downlink licensed operations must be 11 or 12 MHz at an absolute bare minimum to . . . ensure that licensed devices are protected from harmful interference."); Letter from Paul Margie, Counsel, Google, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed May 8, 2014) (expressing support for establishing a nationwide 11 MHz duplex gap); Letter from Michael Calabrese, New America Foundation, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed May 6, 2014) ("The Order should find that a duplex gap of [at] least 11-12 MHz wide is technically reasonable."); Qualcomm Reply at 18 ("A duplex gap of approximately 11 to 12 MHz is the minimum needed to avoid interference between mobile downlink and uplink."); Letter from Dr. Apurva N. Mody, Chairman, WhiteSpace Alliance, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3 (filed May 7, 2014) ("the duplex gap between uplink and downlink licensed operations must be a minimum of 11 or 12 MHz"). In addition, a number of commenters support a duplex gap that is a minimum of 10 megahertz. *See also* Alcatel-Lucent Comments at 21 ("The duplex gap between wireless uplink and wireless downlink should be between 10 and 12 MHz"); Letter from Rick Kaplan, Executive Vice President, Strategic Planning, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att at 8 (filed May 9, 2014) ("The duplex gap should be at least 10 megahertz.") Verizon Comments at 18 ("The [duplex] gap must be at least 10 MHz (and possibly larger), depending on the overall band design.").

[317] In addition to TV white space (TVWS) device access to any unused channels in the reorganized television bands, s*ee* 47 C.F.R. §§ 15.701-15.717 (Subpart H-Television Band Devices), unlicensed proponents argue that the Commission should make spectrum available for unlicensed use on a nationwide basis, including: (1) an expanded guard band separating television and commercial wireless services; (2) an expanded guard band or duplex gap separating wireless uplink and downlink services; (3) two unused television channels set aside for wireless microphone use; and (4) channel 37 on a shared basis with WMTS and RAS. *See* Google/Microsoft Reply at 5-6, 8-9; IEEE 802 Reply at 2; Motorola Mobility Comments at 14-15; Wi-Fi Alliance Comments at 3-4; WISPA Comments at 16-18. Commenters argue that 10-28 megahertz of spectrum in the 600 MHz Band should be identified for unlicensed use. *See* Comcast Comments at 41-44 (20 megahertz of contiguous spectrum for Wi-Fi use); Google/Microsoft Comments at 32 (duplex gap should be maximum amount of "usable" unlicensed spectrum taking into account technical and economic factors); IEEE 802 Reply at 2 (minimum of three six-megahertz channels for TVWS use); Wi-Fi Alliance Comments at 3 (more than six megahertz guard band is needed for TVWS device to meet out-of-band emission limits and avoid interference to adjacent band services); WISPA Comments at 18 (24 megahertz of contiguous spectrum above channel 21); WSA Comments at 25-26 (10-14 megahertz guard bands between LTE and broadcasting and 18-28 megahertz duplex gap). Over the course of this proceeding, their proposal has evolved into a request for four "usable" channels for unlicensed use. *See* Letter from Austin C. Schlick, Director, Communications Law, Google, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Mar. 25, 2014) (seeking four "usable" six-megahertz channels for unlicensed use on a nationwide basis); Letter from Paul Margie, Counsel, Google, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Mar. 6, 2014) (seeking four "usable" six-megahertz channels for unlicensed use on a nationwide basis). By "usable" spectrum, these commenters mean the amount needed to accommodate six megahertz channels used by TVWS devices under the Part 15 rules, with additional spectrum on either side of the emission bandwidth to protect adjacent bands from harmful interference.

[318] *See* § III.A.1 (Background).

[319] One commenter, Google/Microsoft, submitted a technical analysis supporting a guard band of up to 12 megahertz between television and 600 MHz downlink services, and a duplex gap of up to 24 megahertz. *See* Google/Microsoft Comments at 37-42, App. We explain why we do not find this analysis persuasive in the Technical Appendix. *See* Technical Appendix § II.E.1 (Potential for Interference Between Television and 600 MHz Services).

reasonable" restriction was a compromise between one legislative proposal that would have required all repurposed spectrum to be licensed and other proposals that would have designated or reallocated repurposed spectrum specifically for unlicensed use.[320] That compromise permits the establishment of guard bands, and the use of such guard bands for unlicensed use, but requires that the guard bands be no larger than the Commission determines is technically reasonable for the specific purpose of preventing harmful interference between licensed services outside the guard bands. Thus, we reject suggestions that section 6407(c) implicitly requires us to size guard bands to facilitate unlicensed use without regard to their effect in preventing harmful interference.[321] Such arguments would effectively negate Congress's express directive in section 6407(b) regarding "size of guard bands." We also reject NCTA's argument that the duplex gap is not a "guard band" and, therefore, need not be sized in accordance with section 6407(b).[322]

f. Band Plan Technical Considerations

98. The 600 MHz Band Plan technical issues below are addressed in detail in the Technical Appendix. For a complete discussion of the issues and our conclusions, we refer readers to the Appendix.

(i) Pass Band Size and Mobile Filter Considerations

99. *Background.* In the *NPRM*, the Commission recognized that current technology limits the size of an FDD pass band to roughly four percent of the center frequency for a single duplexer, or filter, and a TDD pass band to 7.5 percent.[323] It noted, however that surface acoustic wave ("SAW") filters using alternative manufacturing processes with lithium niobate may support an FDD pass band of six percent.[324] The Commission sought comment on current filter technology, the actual limitations on filters, and why those limitations exist.[325] It also asked commenters to address the potential for future technologies that may support a wider pass band than what typically can be supported currently.[326] Finally, the Commission sought comment on how pass band size relates to the size of the guard bands,

[320] *See* n.292.

[321] *See* Free Press Reply at 7; NCTA Comments at 16-17. NCTA argues that "the Spectrum Act explicitly recognizes the importance of unlicensed spectrum in the wireless marketplace by specifically authorizing the Commission to permit the use of guard bands for unlicensed use and by otherwise recognizing the importance of unlicensed use of spectrum in parallel with the auction of spectrum for licensed uses," that "Congress expected the Commission to use that authority effectively and productively," and that Congress's "objective would be frustrated by the adoption of a band plan that hampered or limited the utility of those bands for that purpose." *Id.*

[322] *See* NCTA Comments at 11 (citing *NPRM*, 27 FCC Rcd at 12412, para. 152 & 12416, para. 166). NCTA's argument is based solely on the *NPRM* description of the duplex gap in the lead band plan proposal, not on an existing or proposed definition of the statutory term "guard band." *See id.* Contrary to NCTA's argument, interpreting "guard band" to include the duplex gap is consistent both with the statutory language, that the function of the duplex gap is "to prevent harmful interference between licensed services outside the guard bands," specifically 600 MHz uplink and downlink services, and with the common meaning of the term. Spectrum Act § 6407(b); AT&T Reply at 25-26 n.32 (defining guard band as "[a] narrow bandwidth between adjacent channels which serves to reduce interference between those adjacent channels") (quoting Newton's Telecom Dictionary 551 (26th ed. 2011)); Comcast Comments at 44 ("the duplex gap serves as a type of guard band"); Free Press *Band Plan PN* Reply at 2 n.5; Verizon Reply at 12 n.31 (characterizing duplex gap as "a guard band between the downstream and upstream channels" that is "required to avoid self-interference") (internal quotes and citations omitted); Cisco Comments at 11 n.19 (guard band includes allocation either "to separate adjacent transmit and receive bands within a given service" or "to separate bands of different services") (internal quotes and citations omitted).

[323] *NPRM*, 27 FCC Rcd at 12417-18, para. 169.

[324] *Id.* at para. 169.

[325] *Id.* at 12418, para. 170.

[326] *Id.* at para. 171.

including the duplex gap.[327]

100. Many commenters agree that current technology limits the pass band to roughly four percent of the center frequency for a single duplexer.[328] Some commenters support wider pass bands that would require multiple filters to achieve, however. Commenters' views differ on whether we should adopt a pass band size using one or multiple filters.[329]

101. *Discussion.* The 600 MHz Band Plan we adopt has at most a 60 megahertz pass band size, which can be accommodated by using multiple filters. The specific size of the pass band for the 600 MHz Band Plan depends on the amount of spectrum we can ultimately make available in the forward auction. Based on the results of our technical analysis, we agree with the commenters that assert that the maximum pass band size for current technology is roughly four percent of the center frequency for a single filter. However, we also agree with commenters who point out that this need not limit the 600 MHz Band Plan pass band size, as multiple duplexers can be used.[330] Therefore, as discussed in the Technical Appendix,[331] filter pass band size is not a limit on the pass band size for our 600 MHz Band Plan.

(ii) Mobile Antenna Considerations

102. *Background*. Some commenters suggest that mobile antenna bandwidth limitations limit the amount of paired spectrum that can be offered in a single band.[332] For example, Qualcomm suggests that bandwidths of 70 megahertz or more may not be feasible in smart phones without using a tunable antenna or multiple antennas.[333] AT&T proposes limiting paired spectrum to 25+25 megahertz using a Down from 51 configuration because supporting larger amounts necessitates the use of larger antennas and poses engineering challenges."[334] Other commenters, such as Ericsson and T-Mobile, suggest that although there is some decrease in antenna performance when allowing for more paired spectrum in a single band, making more paired spectrum available is nonetheless preferable.[335]

103. *Discussion*. We will not limit the amount of paired spectrum we make available because of mobile antenna concerns. We agree with Ericsson, T-Mobile and others that although more paired spectrum in a single band decreases antenna performance to some extent, it is better nonetheless to make

[327] *Id*.

[328] *See, e.g.*, AT&T Comments at 18; Motorola Comments at 12; Qualcomm Comments at 14-15; RIM Comments at 14.

[329] The following commenters support a pass band size of 25 megahertz: Alcatel-Lucent Comments at 28; AT&T Comments at 18; Ericsson Reply at 13-14; Intel Reply at 4-16; Qualcomm Comments at 4; Samsung *Band Plan PN* Reply at 3-5; Verizon Comments at 11-14 (for its band plan with a lower clearing target). NCTA supports a pass band size of 30 megahertz. NCTA Reply, App. at 25-30. The following commenters support a pass band size of 35 megahertz: T-Mobile Comments at 10; Verizon Comments at 7-11 (for its band plan with a higher clearing target).

[330] Letter from Kathleen Ham, T-Mobile USA, Inc. and Kathleen Grillo, Verizon, to Ruth Milkman, Chief, Wireless Telecommunications Bureau and Gary Epstein, Chief, Incentive Auction Task Force, FCC, GN Docket No. 12-268 (filed Sept. 16, 2013).

[331] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[332] *See, e.g.*, Qualcomm Reply at 24-25; RIM Comments at 8; T-Mobile Reply at 12; Verizon Comments at 14.

[333] *See* Qualcomm Comments at 6. Other commenters argue that tunable antennas are practical for wide deployment, however. *But see, e.g.*, Craig Sparks, Sprint, *600 MHz Band Plan Workshop Transcript* at 120-22.

[334] AT&T Comments at 30 ("[T]he extreme width of [the Down from 51 and 36 band plan's] duplex gap would necessitate the use of larger antennas and pose major engineering challenges").

[335] *See, e.g.*, Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 106-9; T-Mobile Reply at 18-20 (advocating for a 35x35 MHz pass band because it will create the most paired spectrum and arguing that the losses suffered by the antenna are manageable).

more paired spectrum available. For example, as set forth in the Technical Appendix, the propagation of the 600 MHz Band is such that even if repurposing a large amount of spectrum has a coverage impact, the coverage would still be as good as the 700 or 800 MHz Bands.[336] The relatively small potential costs of degradation in antenna performance are outweighed by the utility of repurposing spectrum. Further, these issues can be addressed using a tunable antenna or other antenna technologies.[337] Therefore, we will not limit the amount of paired spectrum we make available because of mobile antenna concerns.[338]

(iii) Intermodulation Interference

104. *Background.* Commenters raise two primary concerns about intermodulation causing harmful interference to mobile broadband users of the 600 MHz Band.[339] First, they argue that television stations should not be placed between the 600 MHz uplink and downlink bands ("TV in the duplex gap").[340] Second, they argue that in-band third order intermodulation products formed by the user equipment ("UE," e.g., mobile handset) transmission would combine with themselves and fall into the downlink pass band.[341]

105. *Discussion.* We will not limit the amount of spectrum available in the forward auction based on intermodulation interference concerns. As discussed in the Technical Appendix, we find that with appropriate frequency separation, placing television stations in the duplex gap will not cause harmful interference, should we decide to do so to accommodate market variation.[342] We also agree with Alcatel-Lucent that a technically reasonable duplex gap, which we adopt as part of our 600 MHz Band Plan, will prevent in-band third order intermodulation products from falling in the downlink pass band.[343]

(iv) Harmonic Interference

106. *Background.* Harmonics are a form of intermodulation product that is generated by self-intermodulation of a signal in a transmitter, resulting in the signal appearing at multiples of the desired frequency.[344] Some commenters express concerns about harmonic interference from 600 MHz mobile devices interfering with mobile devices in other bands, such as the PCS band and the BRS/EBS band. Most of these commenters focus on interference within the mobile device, which is caused by simultaneous use of certain bands via carrier aggregation.[345] Others argue that mobile-to-mobile

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[336] *See* Technical Appendix § II.B (Mobile Antenna Considerations).

[337] *See, e.g.*, T-Mobile Reply at 18-20; *see also* Craig Sparks, Sprint, *600 MHz Band Plan Workshop Transcript* at 120-22.

[338] *See* Technical Appendix § II.B (Mobile Antenna Considerations).

[339] Intermodulation interference occurs when signals combine in a non-linear device, which generates intermodulation products on related frequencies, and one of these products interferes with a receiver.

[340] *See, e.g.*, Alcatel-Lucent Comments at 14-16; CEA *Band Plan PN* Comments at 3; Ericsson Reply at 4, 9-10, 17; Google Reply at 8-9; Motorola Comments at 9-10; NAB Comments at 6; TechAmerica Reply at 4; US Cellular *Band Plan PN* Comments at 3.

[341] *See, e.g.*, Google Reply at 8-9; Alcatel-Lucent Comments at 14-16. Commenters have also raised concerns about intermodulation causing interference to TV receivers, which is discussed in § VI.B.1.a (Out-of-Band Emission Limits).

[342] *See* Technical Appendix § II.C (Intermodulation Interference). As discussed above, we are not now deciding whether to place television stations in the duplex gap. *See* § III.A.2.d (Market Variation).

[343] Alcatel-Lucent Comments at 14-16.

[344] For example, given a frequency f, the harmonic intermodulation products appear at $2f$, $3f$, $4f$, and so forth, and are progressively weaker.

[345] *See, e.g.*, Qualcomm Comments at 6-13 ("[I]t would be particularly challenging to support a 600 MHz uplink band that extends beyond 25 MHz in mobile devices that also support bands above 600 MHz.").

interference could occur between 600 MHz devices and devices in other bands,[346] and that using the 643-667 MHz Band for mobile uplink transmissions will result in harmonic interference.[347]

107. Not all commenters believe that the harmonic interference will result in harmful interference, however.[348] Alcatel-Lucent acknowledges that while harmonic interference will occur, the harmonics that are generated from base station emissions are manageable.[349] Sprint argues that potential third-harmonic conflicts already exist in the U.S., and "yet we have seen little evidence of such interference problems to date."[350] T-Mobile explains that the vast majority of the time, the device transmitter will operate with far less than 23 dBm power and, as a result, produce far less desensitization into the PCS receiver.[351]

108. *Discussion*. As discussed in the Technical Appendix, any potential harmonic interference created in the 600 MHz Band can be effectively mitigated so that it does not result in harmful interference.[352] The risk of mobile-to-mobile harmful interference through harmonic interference is minimal.[353] In addition, although we recognize that harmful interference within a device could occur in a carrier aggregation scenario, we agree with commenters who suggest that this potential can be mitigated in various ways.[354] Therefore, we find that we do not need to limit the amount of spectrum we offer in the 600 MHz Band due to the potential for harmonic interference.

B. Repacking the Broadcast Television Bands

109. Repacking involves reorganizing television stations in the broadcast television bands so that the stations that remain on the air after the incentive auction occupy a smaller portion of the UHF band, thereby freeing up a portion of that band for new wireless uses.[355] In repacking, the Commission will exercise its longstanding spectrum management authority,[356] as it has in prior actions such as the digital television transition, as well as the specific grant of authority in the Spectrum Act.[357] The Spectrum Act imposes express requirements on that exercise of authority; in particular, it makes repacking "subject to international coordination along the border with Mexico and Canada" and requires "all reasonable efforts to preserve, as of the date of the enactment of this Act, the coverage area and

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[346] *See, e.g.*, Alcatel-Lucent Comments at 13 ("Considering the body loss for both terminals, a new entrant's terminal transmitting, for example, at 650 MHz at 200 MWatts (23 dBm) can inject -26dBm into a nearby PCS terminal's receive antenna.").

[347] Alcatel-Lucent Comments at 3, 13-14; AT&T Comments at 19, 24-27; CTIA Comments at 26; Ericsson Reply at 31-32; Nokia Comments at 13-14; Verizon Comments at 14.

[348] Alcatel-Lucent Comments at 17; DISH Reply at 8-9; Sprint Comments at 25; T-Mobile Reply at 23-26.

[349] Alcatel-Lucent Comments at 17.

[350] Sprint Comments at 25.

[351] T-Mobile Reply at 24.

[352] *See* Technical Appendix §II.D (Harmonic Interference).

[353] *See* Technical Appendix §II.D (Harmonic Interference).

[354] *See* Sprint Reply at 18 ("With little additional low-band spectrum available, neither industry nor the Commission should preclude spectrally efficient, pro-competitive solutions simply because of harmonic issues that invite practical, technical solutions."); *see also* Technical Appendix §II.D (Harmonics Interference).

[355] *See* Spectrum Act § 6403(b)(1) (requiring the FCC, in order to "mak[e] available spectrum to carry out the forward auction," to "evaluate the broadcast television spectrum," and authorizing it, "subject to international coordination . . . ," to "make such reassignments of television channels as the Commission considers appropriate" and "reallocate such portions of such spectrum as the Commission determines are available for reallocation.").

[356] *See* n.288.

[357] *See* Spectrum Act §§ 6003(a), 6403(b).

population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69."[358]

110. The selection of winning reverse auction bids will depend in part on the Commission's ability to assign television channels to the stations that are not relinquishing their spectrum usage rights. Because participation in the reverse auction is voluntary, the option for active bidders to stay in their pre-auction band must remain available.[359] To ensure this option is available, the feasibility of assigning a channel in the pre-auction band must be checked for each non-participating station and each active bidder before each auction round. The reverse auction and the repacking process are, therefore, interdependent; for the incentive auction to succeed, they must work together.[360]

111. Speed is critical to the successful implementation of the incentive auction.[361] If the reverse auction bidding takes an unreasonably long time to complete because of the time required to determine whether there is an appropriate channel for each station that has not relinquished its spectrum usage rights, then the viability of the auction as a whole will be threatened.[362] Our repacking methodology, therefore, must be capable of analyzing complex technical issues in a timely manner, that is, fast enough not to unduly slow down the bidding process. Certainty also is vital: because the reverse auction outcome depends on repacking decisions, the results of the repacking process cannot be tentative or indefinite after the auction is complete.[363]

112. Because our implementation of the repacking process is driven by the Spectrum Act's express requirements, as well as by auction design considerations, explaining our decisions requires an understanding of the repacking methodology's role in the reverse auction. Accordingly, we begin this Section with an overview of how the repacking process will work in the context of the reverse auction. We then address how we will make all reasonable efforts to preserve television stations' coverage areas and populations served pursuant to the statute's requirements. Next, we address which stations' coverage areas and populations served we will make all reasonable efforts to preserve, both pursuant to the requirements of the statute and as a matter of Commission discretion. Last, we address coordination with Mexico and Canada along our common borders.

1. Repacking Process Overview

113. Here, we briefly describe the repacking methodology we adopt and how it will work in

[358] Spectrum Act §§ 6403(b)(1)(B), (b)(2). *See also id.* §§ 6403(b)(3) (no involuntary relocation from UHF to VHF), (g) (limitation on reorganization authority).

[359] Pre-auction bands, or home bands, include the lower VHF band (channels 2-6), the upper VHF band (channels 7-13), and the UHF band (channels 14-51).

[360] *See NPRM*, 27 FCC Rcd at 12359, para. 5.

[361] *See NPRM*, 27 FCC Rcd at 12378, para. 61 ("We believe that speed is important to the successful design of the incentive auction for a number of reasons, including the interdependence of the reverse and forward auctions.").

[362] Broadcast stations may drop out of the bidding or not participate in the first place if they must wait for days, weeks or even months to find out whether their bids are accepted. Excessively long reverse auction stages would also impose costs on bidders in the forward auction. Because closing the incentive auction requires completion of the final stage of both the forward and the reverse auction, the possibility of significant delay in the latter could discourage participation in the forward auction, as well. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[363] *See* Spectrum Act § 6403(e) (the FCC may not conduct more than one reverse auction or more than one repacking under §§ 6403(a)(1) and (b), respectively). As discussed below, after the auction is complete and any channel reassignments become effective, we will accept applications by individual stations to modify the channel assignments they received in the repacking process. *See* § V.C.1.b (Alternate Channel and Expanded Facilities Opportunities).

the context of the reverse auction.[364] As an initial matter, we adopt an approach that incorporates elements of both procedures proposed in the *NPRM* to assign channels to television stations that will remain on the air.[365] During the reverse auction bidding process, we will undertake a "repacking feasibility check" to ensure that each station that will remain on the air after the incentive auction is reassigned to a channel that satisfies the statutory preservation mandate.[366] After the final stage rule is satisfied and bidding stops (but before the incentive auction concludes), channel assignments will be optimized and finalized.[367] As discussed below, this approach will enable rapid evaluation of bids during the reverse auction. This approach also will provide certainty that a channel that complies with the requirements imposed by the Spectrum Act and our rules is available for every station that remains on the air following the incentive auction.

114. Prior to the commencement of the reverse auction, the staff will determine the coverage area and population served as of February 22, 2012 (the date of the enactment of the Spectrum Act) of every television station whose coverage area and population served the Commission will make all reasonable efforts to preserve in the repacking process, using the methodology described in the Office of Engineering and Technology Bulletin No. 69 ("OET-69").[368] With respect to certain facilities we are exercising discretion to protect, we will determine the coverage area and population served as of dates appropriate to those facilities.[369] Based on this data, the staff will develop constraint files for each station using the approach set forth in the *Repacking Data PN*, with the exceptions noted below.[370] OET explained in the *Repacking Data PN* how such data could be processed for use in the repacking process.[371] Specifically, an "interference-paired" file will be produced that includes records for each station. The interference-paired file will include a list of all the other television stations that could *not* be assigned to operate on the same channel or on an adjacent channel with each particular station.[372] Additionally, a "domain" file will be produced that includes records for each station. The domain file will include a list of all the channels to which the station could be assigned considering "fixed constraints," that is, incumbents in the bands other than domestic television stations that are entitled to interference protection at fixed geographic locations and on specific channels.[373] The two files, collectively the "constraint files,"

[364] The incentive auction is discussed in more detail below in § IV (The Incentive Auction Process).

[365] *See NPRM*, 27 FCC Rcd at 12374-75, paras. 45-46 (seeking comment on "integer programming algorithm" or optimization-based and sequential algorithm approaches to establishing channel assignments). This decision is discussed in detail in § IV.B.2.b (Reverse Auction – Bid Assignment Procedures: Determining Which Bids Are Accepted).

[366] *See NPRM*, 27 FCC Rcd at 12375, para. 46 (setting forth the sequential algorithm approach).

[367] *See NPRM*, 27 FCC Rcd at 12374, para 45 (setting forth the integer programming algorithm approach). Optimization techniques also will be employed during the initialization step of the reverse auction. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[368] *See* Spectrum Act § 6403(b)(2); OET-69 (Feb. 6, 2004), *available at* http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet69/oet69.pdf. The methodology described in OET-69 is addressed below in § III.B.2.b (OET-69 and *TVStudy*).

[369] The stations whose coverage area and population served we will make all reasonable efforts to preserve are set forth in § III.B.3 (Facilities to Be Protected).

[370] *See Incentive Auction Task Force Releases Information Related to Incentive Auction Repacking*, ET Docket No. 13-26, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 10370 (2013) (*Repacking Data PN*).

[371] The data included in the constraint files released in conjunction with the *Repacking Data PN* were based on preliminary assumptions and will not be used in the auction. *See id.* at 10374. As stated below, the data instead will be updated consistent with the decisions adopted in this Order.

[372] The interference-paired file will match the coverage area of a station to the degree that the area is populated.

[373] These incumbents include Canadian and Mexican television facilities or allotments, certain land mobile and radio astronomy facilities (RAS), as well as wireless medical telemetry (WMTS) devices.

will be used to check the feasibility of assigning permissible channels to stations that will remain on the air. The constraint files will enable the repacking methodology to rapidly evaluate during the reverse auction bidding process whether a channel could feasibly (that is, consistent with the preservation mandate of the Spectrum Act) be assigned to each station in light of the other stations that must also be assigned channels at that point during the auction.[374]

115. We adopt the approach to developing constraint files proposed in the *Repacking Data PN*, except that the determination of coverage area and population served, as required by the Spectrum Act, will not be calculated based on a single channel, or "proxy" channel, in each band.[375] Instead, we will calculate the coverage of a station and the interference between stations on every possible channel that could be assigned to the station during the repacking process.[376] Further, the data inputs and assumptions that appear in the *Repacking Data PN* will be updated to reflect the decisions adopted in this Order.[377]

116. During the initialization step of the reverse auction, the initial "clearing target" for how much television spectrum will be repurposed through the reverse auction and the repacking process will be determined based on broadcast stations' collective willingness to relinquish spectrum usage rights at the opening prices announced by the Commission.[378] The clearing target will dictate the total number of remaining channels available for the repacking process.[379]

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[374] Consistent with the *Repacking Data PN*, in addition to the data required to carry out the statutory preservation mandate, *see* Spectrum Act § 6403(b)(2) (mandating "all reasonable efforts" to preserve coverage area and population served), constraint files will include data necessary to meet the requirements of §§ 90.903, 73.623(e), and 2.106 of the Commission's rules. *See* 47 C.F.R. §§ 90.303 (requiring distance-based protections between television stations and land mobile operations in channels 14-20 in certain markets), 73.623(e) (protecting land mobile licensees operating in variance with the specified locations and channels under waivers of § 90.303), 2.106 (protecting channel 37 allocation for RAS and WMTS, and protecting channel 17 in Hawaii only where it is allocated on a primary basis for common carrier control and repeater stations for point-to-point inter-island communications; currently there are no operating services on channel 17). Further, the files will include data required to protect Canadian and Mexican facilities or allotments in line with our international obligations.

[375] In the *Repacking Data PN*, the calculations for coverage and interference were made on a single channel in each of the three television bands (low VHF, high VHF and UHF) as a proxy for that band. *See Repacking Data PN*, 28 FCC Rcd at 10385. NAB objected to the use of the proxy channel, expressing concern that it might underestimate actual interference after the repacking process. *See* Letter from Rick Kaplan, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 21 (filed Sept. 5, 2013) (NAB Sept. 5, 2013 *Ex Parte* Letter); *see also* Letter from Rick Kaplan, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2-3 (filed Nov. 27, 2013) (NAB Nov. 27, 2013 *Ex Parte* Letter). Although the "proxy" channel approach was the only one available at the time of the release of the *Repacking Data PN*, further staff work has resulted in the development of an approach where calculating constraints on every possible channel, without relying on proxies, is possible.

[376] As a result, the constraint files will include a list of all the other television stations that could <u>not</u> be assigned to operate on the same channel or on an adjacent channel with a particular station for every channel in the three bands rather than a "proxy" channel.

[377] Specifically, the baseline list of the television stations that will be included in the files for preservation of their coverage area and population served will be updated to reflect the decisions set forth in § III.B.3 (Facilities to Be Protected). An updated baseline list of those facilities and their populations served will be published prior to the auction. International allotment or protected facilities will also be updated to reflect the result of international coordination efforts. *See* § III.B.4 (International Coordination).

[378] This process is discussed in detail in § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[379] For example, a 126-megahertz clearing target would clear 21 of the 49 channels currently allocated for television service, and leave approximately 28 channels into which the remaining stations could be repacked. Constraints in certain television markets due to the presence of non-broadcast incumbents in the T-band (channels 14 through 20) or border constraints may impact the number of television channels available in those markets. The statute prohibits

(continued….)

117. At the start of the reverse auction bidding process, broadcast stations will fall into two general categories: non-participating stations that will remain on the air after the incentive auction, and participating stations that may or may not remain on the air (including stations that may elect to change bands from UHF to VHF or high VHF to low VHF), depending on the reverse auction outcome. The repacking feasibility checker will ensure that every non-participating station can be assigned a television channel in its pre-auction band.[380] Each time a participating station drops out of the auction, the repacking feasibility checker will determine whether a channel is available for each individual station that continues to participate in the bidding.[381] The bidding will continue within a stage until every station has either dropped out of the auction or had its bid accepted. Final channel assignments will not be made during the bidding stage.

118. After the bidding in the reverse auction ends, the forward auction bidding will begin. As the forward auction bidding proceeds, whether the final stage rule is met will be evaluated.[382] If the rule has not been satisfied, a new stage of the auction will commence with a lower spectrum clearing target.[383] If the rule has been satisfied, the channel assignments for each station that will remain on the air will be optimized to ensure an efficient post-incentive auction channel assignment scheme, taking into consideration factors such as minimizing relocation costs. We will seek comment on the details of the channel assignment optimization in the *Comment PN*.

2. Implementing the Statutory Preservation Mandate

119. Below, we address the requirements of section 6403(b) of the Spectrum Act.[384] We first address the Spectrum Act's mandate that we make "all reasonable efforts" to preserve coverage area and population served of television stations as of February 22, 2012, as determined using the methodology described in OET-69. To fulfill the statutory mandate, we will use new software developed by OET, *TVStudy*,[385] to implement the methodology of OET-69.[386] We conclude that section 6403(b)(2) directs us to protect stations' existing coverage areas, and interpret "population served" to mean the specific viewers who had predicted access to a station's signal. We also adopt the proposal to permit channel assignments that would not increase interference from any one station by more than 0.5 percent.[387]

(Continued from previous page)
channel reassignments from the UHF to the VHF band except on a voluntary basis, Spectrum Act § 6403(b)(3), so any reassignments from UHF to VHF must be pursuant to voluntary relinquishments through reverse auction bids.

[380] This process is discussed in detail in § IV.B.2.b (Reverse Auction – Bid Assignment Procedures: Determining Which Bids are Accepted). The initial spectrum clearing target will be set such that a channel will be available to all non-participating stations that is consistent with the requirements of the Spectrum Act and our rules.

[381] If the dropping out of one participating station means that another participating station cannot feasibly be assigned a channel, then the latter station's bid will be provisionally accepted. *See* § IV.B.2.b (Reverse Auction – Bid Assignment Procedures: Determining Which Bids are Accepted).

[382] The final stage rule will be met when the forward auction has raised enough proceeds to satisfy the requirements that we establish. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions). Forward auction bidding will continue as long as demand for wireless licenses in any area exceeds the number available in that area. *See* § IV.C.2 (Bidding Process).

[383] The staged structure of the reverse and forward auctions is discussed in detail below. *See* § IV.A (Overview and Integration of Reverse and Forward Auctions).

[384] Spectrum Act §§ 6403(b)(1), (2).

[385] *See* § III.B.2.b (OET-69 and *TVStudy*).

[386] Spectrum Act § 6403(b)(2); *see also* OET-69. OET Bulletin 69 "provides guidance on the implementation and use of Longley-Rice methodology for evaluating TV service coverage and interference" in accordance with the Commission's rules. *Id.* at 1.

[387] We defer a decision on proposals to adopt an aggregate interference cap. *See* § III.B.2.d (Preserving Population Served).

a. "All Reasonable Efforts"

120. The Spectrum Act gives the Commission broad discretion to "make such reassignments of television stations that the Commission considers appropriate" "[f]or purposes of making available spectrum to carry out the forward auction."[388] Congress imposed a qualification on this general mandate: "the Commission must make *all reasonable efforts* to preserve, as of the date of the enactment of this Act, the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin No. 69 of the Office of Engineering and Technology of the Commission."[389]

121. As the Commission explained in the *NPRM*, "[w]hile the statute does not define the term 'all reasonable efforts,' that phrase is not uncommon: its meaning depends on the circumstances involved, and comports with the common meaning of the word 'reasonable.'"[390] AT&T argues that Congress's use of the term "reasonable" gives the Commission "great flexibility to perform repacking in light of the overarching goals of the Spectrum Act."[391] In this regard, courts have held that the statutory term "reasonable" is ambiguous and that its generality "opens a rather large area for the free play of agency discretion."[392] In contrast, broadcasters generally argue that the statutory language, structure and history clearly reflect Congress's intent to protect them from any change in coverage area or population served in the repacking process.[393]

122. Consistent with the approach proposed in the *NPRM*, we interpret our "all reasonable efforts" obligation in light of the statutory context. Thus, in determining what is "reasonable," we agree with AT&T and other commenters[394] that we should take into account the other objectives in the Spectrum Act, including the goal of repurposing spectrum—an objective which clearly militates in favor

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[388] Spectrum Act §§ 6403(b)(1), (b)(1)(B)(i).

[389] *Id.* § 6403(b)(2) (emphasis added).

[390] *NPRM*, 27 FCC Rcd at 12393-94, para. 105 (citing cases).

[391] AT&T Comments at 76.

[392] *Orloff v. FCC*, 352 F.3d at 420 (interpreting "unjust" and "unreasonable" in 47 U.S.C. § 202(a). *See also Loveday v. FCC*, 707 F.2d 1443,1449 (D.C. Cir. 1983), *cert. denied*, 464 U.S. 1008 (1984) (explaining that "[a] variety of considerations, ranging from practical ones of administrative feasibility to legal ones, involving constitutional difficulties, support [the FCC's] view" that section 317 of the Communications Act, 47 U.S.C. § 317, which requires a broadcast licensee to "exercise reasonable diligence" to learn the identity of the sponsor of any paid matter transmitted over the airwaves, does not "require[] the exertion of every effort . . . to identify the real sponsors of paid material") (internal quotation marks omitted); *Wilder v. Virginia Hosp. Assoc.*, 496 U.S. 498, 519 (1990) (acknowledging that State had "substantial discretion" to choose among various methods of calculating reimbursement rates under Medicaid Act provision for "reasonable and adequate" reimbursement); *City of Arlington, Tex. v. FCC*, 668 F.3d 229, 255 (5th Cir. 2012) (interpreting "a reasonable period of time" in 47 U.S.C. § 332(c)(7)(B)), *aff'd* 133 S.Ct. 1863 (2013); *Capital Network Sys., Inc. v. FCC*, 28 F.3d 201, 204 (D.C. Cir. 1994) (court owed substantial deference to FCC's interpretation of "just," "unjust," "reasonable," and "unreasonable" in § 201 of the Communications Act mandating that any interstate communications charge, practice, classification, or regulation must be just and reasonable and declaring unlawful any that are unjust or unreasonable, because those terms are ambiguous).

[393] *See* Affiliates Associations Comments at 32; Comcast Comments at 12-13; Disney Comments at 34 ("any reduction in a station's service area due to additional interference effectively would amount to an involuntary relinquishment of spectrum rights and thus contravene Congress's mandate that the incentive auction process be voluntary."); NAB Comments at 18-21; NYSBA Comments at 21-22; Tribune Comments at 17; Univision Comments at 6.

[394] AT&T Comments at 77; AT&T Reply at 61-62; TIA Comments at 6-7; U.S. Cellular Reply at 15-16; Verizon Reply at 33; T-Mobile Reply at 89-91.

of an efficient repacking method.[395] This reading is consistent with the rest of the Spectrum Act. Section 6403(a)(1), for example, directs the Commission to "conduct a reverse auction . . . *in order to make spectrum available* for assignment through a system of competitive bidding."[396] It is also consistent with Congressional intent.[397] We therefore find that the statute requires that we use all reasonable efforts to preserve each station's coverage area and population served without sacrificing the goal of using market forces to repurpose spectrum for new, flexible uses.[398]

123. Accordingly, we reject NAB's contention that section 6403(b)(2) of the Spectrum Act is a "hold harmless" provision that requires the Commission to identify "extraordinary" or "truly exceptional" circumstances before altering a station's coverage area and population served.[399] We note that courts have interpreted the phrases "all reasonable efforts" or "every *reasonable* effort" to "require[] that a party make every reasonable effort, not every *conceivable* one."[400] Congress included the term "reasonable" in the statute because it anticipated that broadcasters' interests would not be the only interests that the Commission would have to consider in the repacking process. Had Congress instead intended to ensure the primacy of broadcasters' interests over all others, as NAB and others contend, Congress could have so specified.[401] It did not. Instead, it required the Commission to make "all

[395] *See Martin v. Monumental Life Ins. Co.,* 240 F.3d 223, 234 (3d Cir. 2001) (concluding that "best efforts" agreement can "be construed by reference to case law and surrounding facts" and should be read "in the context of the surrounding facts and circumstances."); *United Telecomm'ns, Inc. v. American Tel. & Comm'ns Corp.,* 536 F.2d 1310, 1319 n.7 (10th Cir. 1976) ("A 'best efforts' obligation . . . takes into account unanticipated events and the exigencies of continuing business . . . ."); *Mark Technologies Corp. v. Utah Resources Intern., Inc.,* 147 P.3d 509 (Utah Ct. App. 2006) (a "best efforts clause, like the one present here, creates an independent contractual obligation" of "diligence" that will "be measured subjectively in the context of the particular facts and circumstances involved."). Courts treat "all reasonable efforts" and "best efforts" interchangeably. *See, e.g., United Telecomm'ns, Inc.*, 536 F.2d at 1319 n.7 ("best efforts" obligation "requires only that . . . *all reasonable efforts* within a reasonable time to overcome any hurdles and accomplish the objective [be made]") (emphasis added).

[396] Spectrum Act § 6403(a)(1) (emphasis added).

[397] Specifically, the Joint Conference Report explained that "this legislation advance[s] wireless broadband service *by clearing spectrum for commercial auction*." *See* Joint Explanatory Statement of the Committee of Conference, H.Rep. 112-399 at 136 (emphasis added). Notably, the conference report does not identify preservation of broadcasters' coverage areas and populations served as a purpose of the law.

[398] *See* Raymond T. Nimmer, Jeff Dodd, Modern Licensing Law § 9.48 ("Here, then, is the irreducible minimum [required by an all reasonable efforts-type clause]: diligent, reasonable effort within reasonable time to overcome hurdles to the stated objective seems to establish the baseline duty."). *See U.S. v. Hayes*, 722 F.2d 723, 725 (11th Cir. 1984) (use of "some effort" rather than "all reasonable efforts" standard in assessing defense against contempt of court was abuse of discretion).

[399] NAB Comments at 19; *see also id.* at 20.

[400] *Bhd. of Maint. of Way Employees v. Union Pac. R.R. Co*., 358 F.3d 453, 458 (7th Cir. 2004); *see also Price v. Time, Inc*., 416 F.3d 1327, 1348 (11th Cir. 2005) (holding that a state shield law required a libel plaintiff to make "all reasonable efforts," "not every effort and not efforts for which there is a high probability of futility," to obtain the identify of a confidential informant before the court would force a journalist to disclose the informant's identity). Despite NAB's claim, *Raicovich* did not equate "all reasonable efforts" with "do everything feasible." *See* NAB *TVStudy PN* Reply at 5 (citing *Raicovich v. U.S. Postal Serv.*, 675 F.2d 417, 423-24 (D.C. Cir. 1982)); NAB Comments at 4-5 (filed Apr. 4, 2014) (NAB Apr. 4, 2014 Comments). The court used the latter phrase to describe "in general" Congress's goal in passing a comprehensive law pertaining to compensation and reinstatement of injured federal employees. *Raicovich*, 675 F.2d at 424. The "all reasonable efforts" language pertained to one provision of this comprehensive law describing the efforts an agency must undertake in placing employees injured for more than one year. The court never opined that such efforts required agencies to "do everything feasible" to place such employees.

[401] For example, Congress could have directed the Commission to simply "preserve," not to "make all reasonable efforts to preserve" broadcasters' coverage areas and populations served.

reasonable efforts" to preserve their coverage areas and populations served,[402] a qualification that requires of the Commission a certain level of *effort* rather than a particular outcome. Accordingly, we do not believe the statute requires us to precisely and strictly preserve broadcasters' coverage areas and populations served without considering the other objectives in the Spectrum Act.

124. Nor does the legislative history support broadcasters' interpretation of section 6403(b)(2). Comcast claims that "[d]uring markup, Congress specifically rejected alternate language that could have allowed the auction and repacking process to permanently reduce broadcasters' existing coverage, as long as the process resulted in 'substantially similar' coverage."[403] Comcast's argument misses the mark. The cited legislative history informs our reading of "coverage area and population served" in section 6403(b)(2). As we explain below, we interpret those terms to require efforts to preserve service to those viewers who had access to a station's signal within its protected coverage area as of February 22, 2012—an outcome that is consistent with Congress' rejection of the term "substantially similar coverage."[404] By contrast, "the reasonableness requirement [in section 6403(b)(2)] by its plain terms is a measure of effort – i.e., the actions taken to achieve a goal – and not of the outcome itself."[405] As CEA explained in its comments, "[t]he question is not whether the Commission will protect broadcasters"; rather, "[t]he question is whether the Commission is obligated to protect *all* of the existing levels of service without considering the impact on the goal of spectrum clearing."[406] We agree with CEA that the answer to that question "is plainly no."[407]

125. We clarify, however, that we are not adopting a "balancing approach" that weighs the objective of preserving coverage area and population served against the Spectrum Act's general objective of repurposing spectrum.[408] Rather, the other objectives in the Spectrum Act inform our assessment of the degree of effort required to protect the coverage areas and populations served of broadcast licensees, that is, whether we have satisfied the "all reasonable efforts" mandate. This approach is consistent with the Supreme Court's directive that "[s]tatutory construction . . . is a holistic endeavor" such that "[a] provision that may seem ambiguous in isolation is often clarified by the remainder of the statutory scheme."[409] By way of example, efforts that would preserve broadcasters' coverage areas and populations served, but would prevent us from repurposing spectrum, would not be "reasonable" in the larger context of the Spectrum Act.[410] We therefore reject Comcast's view that section 6403(b)(2) requires us to "focus

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[402] Indeed, as Verizon points out, "NAB itself applies a more generous interpretation of the term 'reasonable' in the repacking reimbursement context." Verizon Reply at 34 (citing NAB Comments at 58-59). In the context of reimbursement, NAB advocates applying the word's "'ordinary, natural meaning, in keeping with settled principles of statutory construction'" – i.e., "'not extreme or excessive,' and 'moderate, fair.'" *Id.*

[403] Comcast Comments at 12-13.

[404] *See* § III.B.2.d (Preserving Population Served).

[405] T-Mobile Reply at 87.

[406] CEA Reply at 14, n.37.

[407] *Id.*

[408] *See* Comcast Comments at 12-13.

[409] *United Savings Ass'n of Texas v. Timbers of Inwood Forest Assoc., Ltd*, 484 U.S. 365, 371 (1988), cert. denied 129 S. Ct. 2821 (2009); *see also Alliance for Cmty. Media v. FCC*, 529 F.3d 763, 777-78 (6th Cir. 2008) ("[T]he detection of inherent ambiguity in words such as 'reasonable' and 'unreasonable' by other courts in other sections of the Communications Act does not terminate the analysis here, because such observations are divorced from the specific context of Title VI").

[410] *Cf. Rural Cellular Ass'n v. FCC*, 588 F.3d 1095, 1103 (D.C. Cir. 2009) (explaining that "it is hard to imagine how the Commission could achieve the overall goal of § 254 -- the 'preservation and advancement of universal service,' 47 U.S.C. § 254(b) -- if the USF is 'sufficient' for purposes of § 254(b)(5), yet so large it actually makes telecommunications services less "affordable," in contravention of § 254(b)(1)").

exclusively on preserving the integrity of broadcasters' existing coverage area and population served."[411]

126. Similarly, by taking into account the other objectives in the Spectrum Act, we are not "pretend[ing] that the word 'all' does not exist in the phrase 'all reasonable efforts.'"[412] "All" as used in section 6403(b)(2) modifies "reasonable"; it measures quantity of effort, but does not affect the degree of effort required by the statute. "All" therefore requires only that we make every *reasonable* effort to preserve broadcasters' coverage area.[413] Under our reading of the statute, the Commission could not satisfy its statutory obligation if it undertook only one of several reasonable actions to preserve broadcasters' coverage areas and populations served. "All," however, has no bearing on whether any particular effort is "reasonable" and thus does not require the Commission to ignore the other objectives of the Spectrum Act when conducting the repacking process.[414]

b. OET-69 and *TVStudy*

127. *Background.* OET Bulletin No. 69, which is titled "Longley-Rice Methodology for Evaluating TV Coverage and Interference," provides guidance on the implementation and use of the Longley-Rice propagation methodology for evaluating television coverage and interference.[415] The methodology described in OET-69 predicts a television station's coverage area and population served, both of which the Commission must make all reasonable efforts to preserve under the Spectrum Act. OET-69 specifically states that a computer program is necessary to implement the methodology.[416] That computer program takes certain inputs, including population data, geographical terrain data, and data about stations' transmission facilities, and applies the methodology described in OET-69 to generate a station's predicted coverage area and population served.[417] The computer program that implements OET-69 thus produces "output"—or more specifically, a description of a station's predicted coverage area and population served within its noise-limited contour.[418]

128. Subsequent to the *NPRM*, OET issued a Public Notice announcing that it had developed and was releasing a new computer program, called *TVStudy*, for performing interference analyses to calculate television stations' coverage areas and populations served using the methodology described in OET-69.[419] OET proposed to use this computer program to support the incentive auction. It sought comment on the program generally, as well as the identification of any errors, unexpected behaviors, or anomalous results produced in running the software.[420] In addition, OET requested comment on the

[411] Comcast Reply at 10; *see also* NAB Comments at 19.

[412] Comcast Reply at 9.

[413] *See Bhd. of R.R. Trainmen, Enterprise Lodge No. 27, v. Toledo P. & W. R.R.*, 321 U.S. 50, 57 (1944) (explaining "[i]t is wholly inconsistent with the section's language and purpose to construe it . . . to require reasonable effort by only one conciliatory device when others are available" when "[t]he explicit terms [of the section] demand 'every reasonable effort' to settle the dispute").

[414] Comcast Reply at 8.

[415] OET-69 at 1. The OET-69 methodology is used to predict coverage and population served when prospective licensees file new applications or existing stations file modification applications. *See* 47 C.F.R § 73.616(e)(1). The OET-69 methodology was also used in the DTV transition.

[416] OET-69 at 1.

[417] *See id.* at 6, 11.

[418] *Id.* at 12; *see also* 47 C.F.R. § 73.622(e). This rule defines "noise-limited contour" as "the area in which the predicted F(50,90) field strength of the station's signal" exceeds specified levels.

[419] *See Office of Engineering and Technology Releases and Seeks Comment on Updated OET-69 Software*, ET Docket No. 13-26, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 950 (2013) (*TVStudy PN*). *See* n.473 for releases of updated versions of the *TVStudy* software.

[420] *TVStudy PN*, 28 FCC Rcd at 952.

implementation of various updates to inputs in the computer program, specifically: (1) population data, (2) terrain data, (3) treatment of inaccurate data in FCC databases, (4) treatment of antenna beam tilt, (5) calculation of depression angles, (6) the level of precision of geographic coordinates, (7) the establishment of a uniform calculation (cell) grid, and (8) the treatment of certain internal (Longley-Rice) warnings.[421]

129. The record reflects divergent views by industry stakeholders on the use of *TVStudy* in the incentive auction. NAB and several broadcasters strongly object to the use of *TVStudy* and the introduction of updated input values, claiming that there is no practical need for new software and that the proposed changes violate the Spectrum Act because they change the OET-69 "methodology."[422] On the other hand, commenters representing the wireless industry and equipment manufacturers applaud the release of *TVStudy* and the *TVStudy PN* proposals, arguing that relying on outdated computer software and data would undermine the FCC's ability to preserve broadcasters' coverage area and population served as of the date of the enactment of the Spectrum Act, in violation of the Spectrum Act's requirements and sound policy.[423]

130. *Discussion.* We will use *TVStudy*, the updated computer program that implements the methodology described in OET Bulletin No. 69, in the incentive auction. As discussed below, *TVStudy*'s capability to create and use a uniform nationwide grid for analysis of coverage area and population served is essential to the repacking process. In addition, the software previously used to implement OET-69 cannot support the incentive auction because it cannot undertake, in a timely fashion, the volume of interference calculations necessary to ensure that all stations that will remain on the air following the auction are assigned channels in accordance with the provisions of the Spectrum Act. Further, the proposed updates to the input values used in applying the OET-69 methodology allow for a more accurate analysis of each station's coverage area and population served as of the date of the enactment of the Spectrum Act and eliminate the use of input values that are now obsolete. Thus, with one exception that is explained below, we adopt the updated input values proposed in the *TVStudy PN*. We find that using *TVStudy* with updated input values to implement OET-69 will support the unique requirements of the incentive auction while satisfying our statutory obligation to make "all reasonable efforts" to preserve television stations' coverage area and population served as of February 22, 2012. Indeed, as discussed below, we find that the Spectrum Act not only permits us to use *TVStudy*, but—because the statute requires the Commission to make all reasonable efforts to preserve broadcast stations' coverage areas and populations served as of February 2012—requires us to update the software and data inputs necessary to implement the methodology set forth in OET-69 to predict coverage as of that date as accurately as possible.

131. The computer program previously used to implement OET-69 lacks the capabilities necessary to support a successful incentive auction. The Longley-Rice methodology described in OET-69 divides the area within a digital television station's noise-limited contour into approximately square "grid cells" to evaluate signal strength, or coverage, and any interference.[424] The computer program previously used to implement the OET-69 methodology generates station-specific grid calculations based on each station examined.[425] More specifically, the earlier software creates a new and unique grid for each station

[421] *Id*.at 952-55.

[422] *See generally* NAB *TVStudy PN* Comments; PTV *TVStudy PN* Reply; NAB Apr. 4, 2014 Comments.

[423] CEA *TVStudy PN* Comments at 10; *see also* CTIA *TVStudy PN* Reply at 3 ("The creation of a more updated and consistent software program to implement OET-69 is a logical step that will allow the Commission the ability to input the results into the overarching algorithm to be used as part of the incentive auction and repacking process").

[424] *TVStudy PN*, 28 FCC Rcd at 951.

[425] Comments include references to the "old software" or "present software" implementing OET-69 without clarifying to which software they are referring. The Media Bureau uses *tv_process* software for the evaluation of individual broadcast station applications (for a new station or a modification), whereas OET used separate software

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centered on the station's transmitting facilities. Signal strength and potential interference from other stations are calculated for each cell in that particular grid. Because each grid is unique to each station, however, no two station grids are typically the same, and signal strength and interference calculations for one station cannot be used to calculate coverage and interference for another station, even where they cover the same or portions of the same geographic area.[426] The cell-level data are not consistent from one station to another. Moreover, the earlier computer software lacks the capability to save grid calculations. Given these two limitations (i.e., the lack of uniform grid cells and the inability to save calculations), the earlier computer software would have to re-create an individual station's grid each and every time it has to analyze a possible channel assignment in the repacking process.[427] In other words, an individual station's grid may have to be re-created thousands of times before a determination is made as to which channel a station may be assigned following the auction.

132. In contrast, *TVStudy* has the capability to apply the OET-69 methodology to calculate signal strength and evaluate interference using a single, common grid of cells common to all television stations. Based on the data derived from the common grid, *TVStudy* can undertake pairwise interference analyses[428] of every station that will remain on the air after the incentive auction and generate data that identify combinations of stations that can (or cannot) co-exist on the same channel or adjacent channels. These data are used to generate the constraint files that will be employed in the repacking process.[429] Further, unlike the earlier software, much of the cell-level data produced by *TVStudy* are cached, or saved. Hence, the repacking methodology need not re-create a station's unique grid each time it examines a possible channel assignment, and the numerous interference calculations can be run in a much shorter period of time. These attributes of *TVStudy* (i.e*.,* the common grid and caching) are essential to the timely analysis of feasible channel assignments.[430] Below we first address broadcasters' statutory and other

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to implement OET-69 during the DTV transition and for certain other large scale analysis projects. *tv_process* was never used and cannot be used in a context that requires calculations involving more than an individual station.

[426] For example, if two television stations, Station A and Station B, are in the same market and their coverage overlaps in certain areas, we cannot use Station A's grid to determine coverage and interference for Station B.

[427] Thus, despite NAB's claim, the old software is not a reasonable alternative. *See* NAB Apr. 4, 2014 Comments at 9. The old software implementing OET-69 is based "on source code and data from the 1990s and earlier." *TVStudy PN*, 28 FCC Rcd at 950. As any computer user knows, this is "ancient in software terms." *See* Letter from Julie Kearney, CEA, to Marlene H. Dortch, Secretary, FCC, ET Docket No 13-26, GN Docket No. 12-268 at 4 (filed Mar. 18, 2013). The old software cannot "be downloaded and installed on modern [computers]," and it does not take "advantage of the many advances in user interface design" since the software was developed. *Id.* at 5, n. 24. *See also* Brattle *TVStudy PN* Comments at 2 ("[T]he 2004 implementation of this methodology relies upon an archaic FORTRAN program and contain little to no documentation for multi-station interference calculations.").

[428] A pairwise or station-to-station interference analysis studies "pairs" of television stations on the same channel (co-channel) and on upper and lower adjacent channels to each other. The analysis provides grid cell level information on where the two stations provide service and where they are predicted to interfere with each other when operating on the same or an adjacent channel. The outputs of the analysis are inputs to the repacking constraint generation process.

[429] *See* § III.B.1 (Repacking Process Overview).

[430] CTIA and CEA agree that *TVStudy* offers faster computations of television coverage and interference effects and is more capable of supporting the incentive auction than the previous software. *See* CTIA *TVStudy PN* Comments at 1-2; CEA *TVStudy PN* Comments at 2; *see generally* Comm. Tech. *TVStudy PN* Comments. While NAB claims that the earlier software was "fully capable of carrying out the tasks required for the incentive auction," NAB *TVStudy PN* Comments at 21, NAB's only support for this assertion is conclusory statements that it "conducted nationwide sample runs using *TVStudy* and the existing OET-69 methodology, and both runs took roughly the same amount of time." Decl. of Bruce Franca at para. 17, cited in NAB *TVStudy PN* Reply. *See* Letter from Rick Kaplan, NAB, to Marlene H. Dortch, FCC, ET Docket No. 13-26, GN Docket No. 12-268 at 2 (filed Apr. 26, 2013) (citing Comments of NAB *et al*., ET Docket No. 13-26 and GN Docket No. 12-268 (filed Mar. 21, 2013), Decl. of William R. Meintel at paras. 12-13). Notably lacking is a description of NAB's analysis—and specifically, whether it performed the
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arguments that we cannot use *TVStudy* or updated input values in applying the OET-69 methodology to preserve the coverage area and population served of stations in the incentive auction. We then address the specific updates to the input values associated with *TVStudy* that we adopt.

133. *Broadcaster Opposition.* NAB and several broadcasters broadly object to the use of *TVStudy* and the updated input values described above, asserting that any change to the computer software and data used by the Commission to implement OET Bulletin No. 69 in the past is a change to the "methodology of OET-69," and therefore, a violation of section 6403(b)(2) of the Spectrum Act.[431] NAB argues that when Congress directed the Commission "to preserve . . . the coverage area and population served of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69," it not only included OET-69 but "the procedures—here, the software—for carrying it into effect."[432] According to NAB, the proposed software changes would violate section 6403(b)(2) of the statute by altering the OET-69 methodology itself.[433]

134. We disagree. We conclude that the statutory language allows the Commission to update the computer software and input values used to implement the OET-69 methodology while adhering to the methodology described in OET Bulletin No. 69. The statutory language is ambiguous, and it is reasonable to read it narrowly. Indeed, we find unreasonable NAB's interpretation, which would compel the Commission to rely on outdated computer software and data to implement that methodology.[434] Accordingly, we interpret the statutory phrase "methodology described in OET Bulletin No. 69" to refer to the particular procedures for evaluating television coverage and interference that are provided for in that bulletin, not the computer software or input values used to apply that methodology in any given case.[435] Our interpretation is consistent with the common meaning of the word "methodology."[436] Distinguishing between a "methodology" and the "software" and "inputs" used for applying that

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pairwise interference analyses required by the repacking methodology we adopt—and the time it took to conduct those analyses using the old software as compared to *TVStudy*.

[431] NAB *TVStudy PN* Comments at 3; NAB Apr. 4, 2014 Comments at 5-7; *see generally* APTS *TVStudy PN* Reply; Sinclair *TVStudy PN* Comments; Block Stations *TVStudy PN* Comments.

[432] NAB *TVStudy PN* Comments at 3.

[433] NAB *TVStudy PN* Comments at iv.

[434] NAB's argument that there would have been no reason to refer to OET-69 unless Congress intended to prohibit software updates lacks merit. NAB *TVStudy PN* Comments at 5. As discussed, the Spectrum Act's requirement to use "the methodology described in OET Bulletin 69" assures the use of a well-established methodology for evaluating television coverage area and interference without locking in the use of outdated software or input values.

[435] Under our interpretation, the OET-69 methodology comprises (1) a specification for determining a contour that defines the boundaries of a station's coverage area, and (2) an algorithm for evaluating the availability of service within that contour, including the effects of interference from neighboring stations. The evaluation of service involves the use of the Longley-Rice propagation model, certain planning factors, electromagnetic properties of the environment, and parameters for describing a television station's transmission system. Planning factors describe television reception; for example, planning factors include antenna gain information for specific frequency bands, thermal noise levels, and system noise figure by band, etc. *See* OET-69 at 3, Table 3. Electromagnetic properties include the dielectric properties of earth and surface refractivity. The parameters that describe a television station's transmission system include effective radiated power, antenna pattern, antenna polarization and height of the radiation center above ground. *See* OET-69 at 6, Table 4.

[436] NAB *TVStudy PN* Comments at 3 & n.11 (quoting Webster's Third New International Dictionary of the English Language Unabridged at 1423 (1976) (defining "methodology" as "the processes, techniques, or approaches employed in the solution of a problem or in doing something: a particular procedure or set of procedures")). *See* CEA *TVStudy PN* Reply at 3 n.5 ("'Methodology' is defined by Webster's as 'a body of methods, rules, and postulates employed by a discipline**:** a particular procedure or set of procedures'") (quoting Merriam-Webster.com, http://www.merriam-webster.com/dictionary/methodology).

methodology also is consistent with the ordinary meaning of the latter words,[437] as well as with common understanding. Courts have recognized similar distinctions between administrative methodologies and the computer programs and data inputs used to apply them.[438] Likewise, evaluating TV coverage and interference using the methodology described in OET-69 requires a computer program and data inputs, but they are tools for applying the evaluation procedure, not the procedure itself.[439]

135. Even though computer software and certain inputs that are necessary to implement OET-69 are referred to in OET-69, we find they are not part of the OET-69 "methodology." Examination of OET-69 itself bears out this distinction. OET-69 characterizes the computer program as a tool for applying the Longley-Rice propagation model, explaining that "[a] computer is needed . . . because of the large number of reception points that must be individually examined."[440] OET-69 also makes clear that the computer program for applying OET-69 is subject to change—for example, it refers to "the computer program now used by the Media Bureau to evaluate applications . . . as well as predecessors of that program," and to "[t]he Fortran code currently used by the Media Bureau to evaluate new proposals"[441] — and provides instructions on how to use different computer programs to apply the Longley-Rice model.[442] Indeed, OET-69 contemplates that others will utilize their own computer programs to implement the OET-69 methodology and provides suggestions for obtaining information on using the Longley-Rice model in doing so.[443] Moreover, as discussed below, the Commission's bureaus have used different

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[437] *Compare* n.436 and accompanying text (defining "methodology" as, *inter alia*, "a particular procedure or set of procedures") *with Dictionary.com Unabridged.* Random House, Inc. http://dictionary.reference.com/browse/computer program (accessed: Apr. 13, 2013) (defining "computer program" as, *inter alia*, "a sequence of instructions that a computer can interpret and execute*"); id.* http://dictionary.reference.com/browse/software (defining "software" as, *inter alia*, "the programs used to direct the operation of a computer, as well as documentation giving instructions on how to use them."); *id.* http://dictionary.reference.com/browse/input (defining "input" as, *inter alia*, "something that is put in . . . data to be entered into a computer for processing"). *See also* CEA *TVStudy PN* Reply at 2 ("There is no mystery or term of art in the phrase 'methodology described in OET Bulletin 69' – it means just that, and does not extend to implementing software such as *TVStudy* or any other aspect not included in the Bulletin itself."); *id.* at 3 ("The standard meaning of the term 'methodology' reflects that it is distinct from the implementation of that methodology, and thus the process of implementing the methodology of OET-69 is distinct from the methodology itself.").

[438] *See, e.g., Qwest Corp. v. FCC*, 258 F.3d 1191, 1195-98 (10th Cir. 2001)(reversing the FCC's decision establishing a high-cost universal service support "methodology," but upholding the FCC's adoption of a computer model and input values for estimating the costs of providing telephone service for the purpose of applying the methodology).

[439] *See* CEA *TVStudy PN* Comments at 11 ("The *TVStudy* software is fully consistent with the Commission's obligation under the Spectrum Act to 'us[e] the methodology described in' OET-69. It merely implements that methodology, using updated data that [are] more accurate and thorough and establishing certain parameters not specified in OET-69.").

[440] *See* OET-69 at 1; *see also id.* at 10 ("The FCC computer program . . . is complex, and many of its options are available only by recompilation for each case of interest. The individual installing it should have computer programming skills and experience as a system administrator of the computer system on which it is to be installed because linking the data files, which occupy 1.6 gigabytes of disk space, will be a site-specific task.").

[441] *See id.* at 8 n.1, 10-11. Indeed, *TVStudy* includes features and functions that were not available in the software previously used to implement OET-69, including for the use of a uniform global grid and a graphical user interface to aid in the set-up of analyses. These attributes are integral to our repacking efforts. NAB's cramped reading of the statute would prohibit the Commission from making these necessary upgrades to the software tools used to implement OET-69.

[442] *See id*. at 8 n.1, 10-11.

[443] *See* OET-69 at 5 ("Those desiring to implement the Longley-Rice model in their own computer program to make these calculations should consult NTIA Report 82-100, *A Guide to the Use of the ITS Irregular Terrain Model in the Area Prediction Mode*, authors G.A. Hufford, A.G. Longley and W.A. Kissick, U.S. Department of Commerce,

(continued….)

computer programs to implement OET-69.[444] In contrast, the methodology itself has remained the same through multiple versions of OET Bulletin No. 69 (other than corrections and updated Internet references).[445] We further note that our rules distinguish between "the procedure set forth in OET Bulletin No. 69" and the inputs for applying it; for example, in evaluating post-digital TV transition allotments, the rules require the use of "the 2000 census population data" when calculating interference pursuant to the methodology in OET-69.[446] Thus, we agree with CTIA and others that *TVStudy* is merely an updated tool for implementing the methodology in OET-69.[447] Likewise, the updated input values that we adopt are not part of the OET-69 methodology within the meaning of the statute.

136. While NAB argues that the statutory phrase "methodology described in OET Bulletin 69" is "a term of art that was well established in 2012" to include the present software and input values,[448] NAB cannot point to a single instance of the FCC using, let alone defining, that phrase prior to enactment of the Spectrum Act. NAB does identify a number of decisions in which the Commission characterized use of specific Census and terrain data and treatment of "flagged" results as part of a "methodology."[449] However, only one of those decisions referred specifically to OET-69. In that decision, the Commission did not define or describe the OET-69 "methodology" but rather used the term "methodology" colloquially to refer to inputs associated with application processing.[450] Accordingly, we reject NAB's argument.[451] The cases on which NAB relies no more prove that Congress understood "methodology described in OET Bulletin 69" to include specific software and input values than cases referring, for

(Continued from previous page)
April 1982. The report may be obtained from the U.S. Department of Commerce, National Technical Information Service, Springfield, Virginia, by requesting Accession No. PB 82-217977").

[444] *See* para. 146.

[445] *See* OET-69 at 1.

[446] 47 C.F.R. § 73.616(e)(1). NAB argues that the rule's requirement to use 2000 Census data "was . . . incorporated into the OET-69 methodology" and that "Congress is thus presumed to have intended the use of 2000 Census data as part of the OET-69 methodology." NAB *TVStudy PN* Comments at 10-11. But the rule simply requires use of 2000 Census data for a particular purpose. Indeed, the rule itself distinguishes between such data and "the procedure set forth in OET Bulletin No. 69." If Congress had intended the FCC to use 2000 Census data in the repacking, it could have referred to the FCC rule instead of OET-69.

[447] CTIA *TVStudy PN* Reply at 14; CEA *TVStudy PN* Comments at 2.

[448] *See* NAB *TVStudy PN* Comments at 4-5; NAB Apr. 4, 2014 Comments at 5-6. *See also* NAB *TVStudy PN* Comments at 5-6 (arguing that "Congress must be deemed to have intended use of OET-69 without modification" because the statute uses "an administratively defined term without modification").

[449] NAB observes that the Commission previously found that an 'assumption of service [in the case of flagged results] was appropriate' and that 'reconciling calculations using *a new methodology* with the table calculations based on different methodology is difficult and likely to result in uncertainty in the results and contested decisions.'" *See* NAB *TVStudy PN* Comments at 7-8 (quoting *Commission's Rules and Policies Reflecting the Conversion to Digital Television*, Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 5946, 5972 (2001) (emphasis added)). *See also* NAB Comments at 9, 11 (citing *County of Los Angeles, California*, 23 FCC Rcd 18389, 18401 (2008), *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, 23 FCC Rcd 4220, 4312 (2008), and *In re State of New York*, 22 FCC Rcd 22195, 22198 (2007), 11 (citing *Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, 23 FCC Rcd 2994, 3067 (2007) (*Third DTV Periodic Review*) (describing the adoption of 2000 Census data as "revis[ing] the OET 69 interference analysis methodology"), and *Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions*, 13 FCC Rcd 19112, at * 22 (1998)).

[450] *Third DTV Periodic Review*, 23 FCC Rcd at 3067; *see* CEA *TVStudy PN* Comments at 5 n.27.

[451] In any event, we note that NAB's argument is moot as to the treatment of flagged results because, for the reasons we explain below, we will not change the treatment of flagged results in *TVStudy*.

example, to terrain elevations as an "input" to the Longley-Rice propagation model prove the reverse.[452]

137. In addition to being consistent with the statutory language, our interpretation furthers the statutory requirement to "make all reasonable efforts to preserve, as of the date of enactment of this Act [February 22, 2012], the coverage area and population served of each broadcast television licensee" by allowing us to update the computer program and input values for applying the OET-69 methodology.[453] For example, updated inputs like the 2010 U.S. Census data more accurately reflect the latest population changes, which show an increase in population nationwide of approximately ten percent between 2000 and 2010, as well as changes in population distribution. Use of 2000 Census data, as NAB urges, would preserve television service as of year 2000 rather than as of the date of enactment of the Spectrum Act. Had Congress intended to prevent any updates to the software and input values used to implement the OET-69 methodology, it could have expressly directed the FCC to use the methodology described in OET-69, including the February 6, 2004 version of one of the Commission's computer programs implementing that methodology and the inputs used as of that date. Instead, Congress required "all reasonable efforts" to preserve each station's coverage area and population served as of February 22, 2012, a mandate that necessitates the use of updated software and inputs with greater utility and accuracy. In light of this mandate, we disagree with NAB that Congress was interested not in "the realities of population growth" but in "reduc[ing] coercive pressure on stations to give up their licenses."[454] We cannot conclude that Congress intended to require us to maintain and somehow adapt an obsolete computer program that relies on inaccurate data—particularly given the threat that doing so could leave some viewers without television service.

138. Our reading is also consistent with other relevant statutory obligations and with Commission precedent. We have a well-established duty under the Administrative Procedure Act ("APA") to "analyze . . . new data" when faced with existing data that "are either outdated or inaccurate."[455] NAB's interpretation of section 6403(b)(2) is in direct conflict with our duty under the APA; it would require us to ignore new Census data despite significant population changes between 2000 and 2010, more accurate and updated terrain data, and corrected technical information. Consistent with its APA and other statutory obligations, the FCC has consistently relied on updated, accurate data and procedures when possible. In the Satellite Home Viewer Improvement Act of 1999 ("SHVIA"), for example, Congress directed the Commission to "take all actions necessary . . . to develop and prescribe by rule a point-to-point predictive model for reliably and presumptively determining the ability of individual locations to receive signals [of Grade B intensity]."[456] In implementing that statutory mandate, the Commission adjusted the Longley-Rice methodology for UHF stations but left VHF calculations

[452] The Commission has referred to terrain as an "input" into the Longley–Rice propagation model, Version 1.2.2, on several occasions in the past. *Amendment of the Commission's Rules to Establish New Personal Communications Services*, Memorandum Opinion and Order, 9 FCC Rcd 4957, Appendix D (1994) ("Terrain elevations used as input to the model should be from the U.S. Geological Survey 3–second digitized terrain database."); *see Amendment of Part 74 of the Commission's Rules with Regard to the Instructional Television Fixed Service*, Order and NPRM, 9 FCC Rcd 3348, para. 36 (1994).

[453] Spectrum Act § 6403(b)(2).

[454] *See* NAB *TVStudy PN* Comments at 11 ("Congress sought to reduce coercive pressure on stations to give up their licenses by adopting a fixed benchmark—OET-69 as of February 22, 2012—as a safeguard for broadcasters choosing not to participate in the incentive auction. In making that policy determination, Congress clearly favored predictability and industry experience over other considerations"). The Spectrum Act expressly provides that incentive auction participation for broadcasters is "voluntary." *See* Spectrum Act § 6403(a). Having so provided, Congress had no need to bar the FCC from accounting for "the realities of population growth" in the repacking process. *See also* § V.C.5 (Reimbursement of Relocation Costs).

[455] *Dow Agrosciences LLC v. Nat'l Marine Fisheries Service*, 707 F.3d 462, 473 (4th Cir. 2013) (citing *Sierra Club v. EPA*, 671 F.3d 955, 966-968 (9th Cir. 2012)).

[456] P.L. No. 106-113, 113 Stat. 1501, *codified at* 47 U.S.C. § 339(c)(3).

essentially unchanged.[457] The D.C. Circuit upheld that decision, finding that the Commission acted reasonably because its chosen methodology increased the accuracy of the model.[458] NAB tries to distinguish SHVIA on the basis that it expressly requires the Commission to "establish procedures for the continued refinement of the application of the model by the use of additional data as it becomes available"—a provision which the Spectrum Act lacks.[459] We are not persuaded. The underlying purpose of SHVIA was to identify "unserved households" eligible for the rebroadcast of distant network signals—an inherently pro-consumer objective.[460] Similarly, in the Spectrum Act, Congress required us to make "all reasonable efforts" to preserve coverage area and population served as of February 22, 2012 – an obligation that depends heavily on having accurate data for that date. We cannot fulfill the statutory mandate using outdated data. The 2000 Census data that NAB advocates using fail to reflect the increase in predicted population served that 88 percent of full power stations have experienced since that time.[461]

139. NAB also objects that the proposed updates "are unlawful because they do not preserve broadcast licensees' coverage areas and populations served as predicted on February 22, 2012" — predictions which it asserts necessarily depend on calculations pursuant to OET-69, as it was implemented on that date.[462] On the contrary, we read the date in section 6403(b)(2) to modify the preservation mandate, not the reference to OET-69.[463] In other words, we read the statute to require us to preserve the actual coverage areas and populations served by broadcast stations on February 22, 2012, not (as NAB contends) to preserve the coverage areas and populations served as calculated by using the input values and the version of the computer program implementing OET-69 in use by one of the Commission's bureaus on February 22, 2012. Use of the outdated computer program and input values would not fulfill our statutory mandate to preserve the "coverage area and population served" as of February 22, 2012, but rather the service provided long before the Spectrum Act's enactment.

140. We disagree with NAB that *TVStudy* redefines or reduces the coverage area of a significant number of stations in comparison with the earlier version of the OET-69 computer program.[464] OET took care in designing and developing *TVStudy* to ensure that it faithfully implements the OET-69 methodology, provides results that closely match those of the earlier computer software (notwithstanding updates that improve accuracy), and avoids bias that would systematically reduce broadcast stations' coverage areas and populations served. In support of its position, NAB, for example, predicts that station KMAX-TV in Sacramento, California, would suffer a 15 percent loss in the population served if we use *TVStudy* rather than the earlier OET software.[465] However, OET's analysis using *TVStudy* predicts that

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[457] *EchoStar Satellite LLC v. FCC*, 457 F.3d 31, 33 (D.C. Cir. 2006).

[458] *Id.*; *cf. Costa de Oro Television, Inc. v. FCC*, 294 F.3d 123, 129 (D.C. Cir. 2002) (finding that "the Commission's conclusion that Longley-Rice maps are more accurate than Grade B contours is 'precisely the type of technical issue on which we defer to the Commission's expertise.'") (citing *Keller Comm'ns v. FCC*, 130 F.3d 1073, 1077 (D.C. Cir. 1997)).

[459] *See* NAB *TVStudy PN* Reply at 8 (citing 47 U.S.C. § 339(c)(3)(A)).

[460] *EchoStar*, 457 F.3d at 33.

[461] *See* para. 149.

[462] NAB *TVStudy PN* Comments at 12-14.

[463] Spectrum Act § 6403(b)(2) (requiring the FCC to try to "preserve, as of [February 22, 2012], the coverage area and population served of each [station], as determined using the methodology described in [OET-69].").

[464] NAB *TVStudy PN* Comments at 13, 16. NAB Apr. 4, 2014 Comments at 8 (claiming, without providing any supporting evidence, that *TVStudy* produces "wildly different results"). We also note that the existing coverage area and population served are greater when estimated by *TVStudy* for more than one-half of the stations that are eligible to participate in the incentive auction.

[465] *See* NAB *TVStudy PN* Comments at 13. *See also* para. 161.

KMAX-TV will experience an eight percent increase in population served.[466] Further, OET's analysis using *TVStudy* and the updated inputs adopted in this Order shows that 88 percent of full power stations will experience an increase in population served, while only 12 percent show some decrease.

141. NAB also asserts that *TVStudy* departs from the OET-69 methodology because it considers LPTV stations and TV translators in its evaluation of service and interference analysis.[467] NAB is correct that *TVStudy* has the capability of studying the interference from LPTV and TV translators. However, NAB is incorrect in assuming that that option will be used in the repacking process.[468]

142. In addition, NAB claims OET "failed to conduct any cost-benefit analysis for its proposed changes."[469] According to NAB, "[t]he proposed changes to OET-69 and the attendant uncertainty w[ill] drive up the costs for broadcast licensees, as they scramble to acquaint themselves with the new methodology, without any countervailing benefit."[470] That is demonstrably not the case. The benefits of using *TVStudy* clearly outweigh the costs. As set forth above, use of *TVStudy* and the updated input values is essential to the repacking process and to fulfilling the statutory preservation mandate.[471]

143. Moreover, NAB's criticisms of OET's efforts to provide support for *TVStudy* are baseless.[472] Copies of *TVStudy* have been made available to the public continuously since its original release in February 2013.[473] The *TVStudy* software was released in a form allowing it to be easily installed and run on inexpensive, commonly available consumer computers. While OET has corrected minor errors and improved the functionality of *TVStudy* since its original release,[474] OET has informed the public of these updates by releasing Public Notices, or (as announced in September 2013) through updates

[466] Our analysis indicates that KMAX-TV's terrain-limited population would increase from 6,385,375 persons (using 2000 U.S. Census data) to 6,944,172 persons (using 2010 U.S. Census data). Our analysis showing the eight percent increase was based on use of *TVStudy* with all of the updated input values proposed in OET's *TVStudy PN* except for the change in the error flag treatment.

[467] NAB *TVStudy PN* Comments at 14.

[468] LPTV and TV translators, having secondary status, will not be considered in determining the coverage area and population served of full power or Class A broadcast stations in the repacking process. *See* § III.B.3.d.iii (LPTV and TV Translator Stations).

[469] NAB *TVStudy PN* Comments at 21.

[470] NAB *TVStudy PN* Comments at 22.

[471] *See* § III.B.1 (Repacking Process Overview).

[472] *See* NAB Apr. 4, 2014 Comments at iv.

[473] Updated versions of *TVStudy* were announced by public notice in April, July, August, and September 2013. *See Office of Engineering and Technology Releases Updated TVStudy Software*, ET Docket No. 13-26, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 5520 (2013); *Repacking Data PN*, 28 FCC Rcd 10370; *Office of Engineering and Technology Releases Updated TVStudy Software,* ET Docket No. 13-26 and GN Docket No. 12-268, Public Notice, 28 FCC Rcd 12327 (2013); *Office of Engineering and Technology Releases TVStudy Version 1.2.8 and Announces Future Updates Will Be Posted to the Web,* ET Docket No. 13-26 and GN Docket No. 12-268, Public Notice, 28 FCC Rcd 12979 (2013) (*TVStudy Update PN*). The most up-to-date version of *TVStudy* is posted at http://data.fcc.gov/download/incentive-auctions/OET-69/.

[474] Despite NAB's concerns, these changes have been limited to minor error corrections or improved functionality. *See* NAB Apr. 4, 2014 Comments at iv, 2, 16. NAB is also mistaken when it claims that there is no publicly available record of the changes made to *TVStudy*. *See id.* at 13, 15. Since the original release of *TVStudy*, OET has maintained a change log on the Commission's website fully describing the changes and improvements made to *TVStudy*. *See* TVStudy Installation and Upgrade Guide, available at http://data.fcc.gov/download/incentive-auctions/OET-69/ . While NAB takes issue with OET's removal from the website of previous versions of *TVStudy*, it was reasonable for OET to conclude that maintaining such versions on the website might lead to confusion. *See* NAB Apr. 4, 2014 Comments at 13. In any event, prior versions have always been, and will continue to be, available upon request.

on the Commission's website.[475] Commission staff have provided and continue to provide ongoing support to users seeking to implement and utilize *TVStudy*, including participating in an online discussion forum (list-serve) open to the public.[476] As the developer of *TVStudy*, OET has provided support to users of the software by responding to inquiries on the listserv.[477] Thus, broadcasters have had ample opportunity to evaluate and familiarize themselves with the updated software and input values.[478] Accordingly, contrary to NAB's claims, there should be no uncertainty associated with the use of *TVStudy*.

144. NAB complains that *TVStudy* contains "scores of soft switches," which contain variables or inputs that can lead to different predictions of coverage area and population served depending on how the switches are set.[479] Most of these switches reflect variables that are not meant to be changed from their default values, were included in the software to maximize flexibility, and have not changed since the original release of *TVStudy*.[480] In the *TVStudy PN*, OET tentatively defined the eight soft switches for the inputs that we adopt today.[481] The release of this Order finalizes the variables or inputs associated with

[475] *See* n.474.

[476] Cavell-Mertz maintains the list-serve, AFCCE-CDBS@cavell-mertz.com, which industry professionals have been using for a number of years to communicate issues associated with the Commission's Consolidated Database System (CDBS) and its derivative databases. Contrary to NAB's claim, public release of the minor corrections and updates to *TVStudy* has not been limited to "private channels." *See* NAB Apr. 4, 2014 Comments at 12-13, 15. Rather, consistent with the announcement in the *TVStudy Update PN*, the two latest updates to *TVStudy* were released to the public on the Commission's website. OET made additional efforts to announce such updates on the list-serv, which is open to the public and subscribed to by broadcast engineering professionals.

[477] *See, e.g., Office of Engineering and Technology Releases Updated TVStudy Software*, ET Docket No. 13-26, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 5520 (2013) (announcing details of the listserv). Inquiries OET received by other means of communications were summarized and responses were also provided on the list-serve. We expect OET will continue to support *TVStudy* users by responding to inquiries after release of this Order.

[478] NAB's suggestion that the existing software should be used because it was used after the DTV transition ignores a fundamental difference between the DTV transition and the incentive auction. *See* NAB *TVStudy PN* Comments at 4. During the DTV transition, the Commission allowed most stations to select their post-transition channel. *See Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital* Television, MB Docket No. 03-15, Report and Order, 19 FCC Rcd 18279, 18292 (2004). Interference analyses, where selectively used, only involved resolution of conflicts between individual stations. The DTV transition thus did not involve nearly as many interference analyses as the incentive auction, in which a far greater number of channel reassignments may be made by the Commission, so that the process did not demand as intensive or time-consuming computer analysis. Moreover, as described in § III.B.1 (Repacking Process Overview), there is a need for analytical speed in this context that was not present during the DTV transition.

[479] *See* NAB Apr. 4, 2014 Comments at iv; *see also id*. at 3, 8.

[480] Specifically, the majority of these parameters relate to interference protection requirements specified in the Commission's rules. *See generally* 47 C.F.R. §§ 73.600 *et seq.* (Subpart E – Television Broadcast Stations); *see also* 47 C.F.R. §§ 73.6000 *et seq.*(Subpart J – Class A Television Broadcast Stations); 47 C.F.R. §§ 74.700 *et seq.* (Subpart G – Low Power TV, TV Translator, and TV Booster Stations).

[481] In addition, the *Repacking Data PN* specified these inputs. *See Repacking Data PN*, 28 FCC Rcd at 10380–82, 10399–411.

the key soft switches.[482] In addition, a Public Notice released by OET concurrently with the Order provides guidance regarding how to set the switches for the remaining variables or inputs.[483]

145. As interested parties continue to work with *TVStudy*, there may be further opportunities for OET to correct minor errors in, or to improve the functionality of, the software, consistent with this Order. Accordingly, OET may continue to make improvements and other changes to *TVStudy* after release of this Order that are necessary and appropriate to correct minor errors or improve functionality, provided such changes are consistent with this Order. However, we recognize the importance of finalizing *TVStudy* well in advance of the auction. We direct OET to finalize *TVStudy* no later than the release of the *Procedures PN*. We also direct OET to release a detailed summary of baseline coverage area and population served by each television station to be protected in the repacking process, and to provide an opportunity for additional public input.

146. NAB further argues that it is "arbitrary and capricious" for the Commission to utilize *TVStudy* only in the incentive auction context.[484] According to NAB, if we adopt *TVStudy,* "the result would be that on the very same day that the auction is commenced using [*TVStudy*], a person or entity could file an application for a new television station, yet be required by the Commission to use the [old software]."[485] This assertion lacks merit because we have not yet addressed whether *TVStudy* will be used for purposes other than the repacking process.[486] We note that, contrary to NAB's assumption, the Commission does not always use the same computer software to implement OET-69. The Commission's bureaus have used *different* software programs to implement OET-69: the Media Bureau has used *tv_process* to process applications for new stations and modifications, OET has used "FLR" for large-scale projects, like the DTV transition, and the International Bureau has used "V-Soft Probe" for international coordination efforts. Each type of software provides a different utility that serves the purposes for which it is used (i.e., licensing, interference and international coordination).

147. NAB and other broadcasters also raise procedural objections that lack merit. Because we are adopting *TVStudy* and updated input values in this Order, NAB's claim that the Commission itself must approve the use of *TVStudy* and updated input values is moot.[487] NAB also complains that the comment cycle was too short.[488] We disagree. The *TVStudy PN* allowed 45 days for comments and an

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[482] This Order finalizes the setting of the soft switches on population, terrain and certain technical inputs, *see* § III.B.2.b (OET-69 and *TVStudy*), and adopts decisions that affect the settings of other switches (e.g. our decision to include areas covered by DTS in the preservation mandate is reflected in one of the *TVStudy* switches). This order does not finalize certain parameters in *TVStudy* that relate to the treatment of allotments outside of the U.S. due to the ongoing negotiations with Canada and Mexico.

[483] *See* para. 182. Specifically, the Public Notice specifies how the switches were set in developing the data being released with the Public Notice.

[484] Letter from Rick Kaplan, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3 (filed Apr. 19, 2013).

[485] *Id.; see also* NAB *TVStudy PN* Comments at 17-19; NAB Apr. 4, 2014 Comments at 18 (referring to 47 C.F.R. § 73.8000(d)(1), pertaining to incorporation of OET-69 by reference for purposes of 47 C.F.R. § 73.616).

[486] Reviewing courts have held that "the FCC is not required to address all problems 'in one fell swoop,' and may focus on problems depending on their acuteness," *Sorenson Comm'ns, Inc. v. FCC*, 567 F.3d 1215, 1222 (10th Cir. 2009) (citing *Nat'l Ass'n of Broadcasters v. FCC*, 740 F.2d 1190, 1207 (D.C. Cir. 1984)); *Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967. 1002 (2005) (*Brand X*) (affirming the FCC's decision to incrementally address the regulatory framework for different categories of facilities-based information service providers).

[487] *See* NAB *TVStudy PN* Comments at 17-19; *see also* NAB Apr. 4, 2014 Comments at 2, 11-12, 13, 18.

[488] NAB *TVStudy PN* Comments at 19.

additional 15 days for reply comments.[489] In addition, parties have had additional time to work with the updated software and inputs (and to submit *ex parte* filings) since the comment period closed.[490] While NAB claims that "formal" notice and comment procedures were required instead of Public Notices,[491] the purpose of the APA's notice and comment requirement has been fully satisfied by OET's issuance of the *TVStudy PN* and its publication in the Federal Register.[492] We have a robust record on the issues raised in the *TVStudy PN* and we have taken the comments and *ex parte* filings into account in adopting the use of *TVStudy* and the updated values in this Order.

148. *Use of 2010 U.S. Census Data*. Having addressed the broadcasters' statutory and other arguments that we cannot use updated software or input values in applying the OET-69 methodology, we turn to the specific updates to the input values associated with *TVStudy* proposed in the *TVStudy PN*. First, we adopt use of the latest available population data from the 2010 U.S. Census. The old software used population data from the 2000 U.S. Census or earlier. According to the 2010 U.S. Census, the country's population has grown 9.7 percent since the 2000 Census, an increase of 27.3 million people.[493] In addition, the distribution of the population across the country has shifted.[494]

149. NAB argues that we should continue to use 2000 Census data, claiming that its preliminary analysis of *TVStudy* with 2010 population data shows that 14 percent of broadcast licensees will experience a decrease in predicted population served.[495] Though our evaluation of *TVStudy* shows a similar apparent reduction, it also shows that *88* percent of full-service broadcasters will experience an increase in predicted population served.[496] Moreover, while NAB contends that "[t]hese changes are contrary to the Commission's statutory obligation to preserve 'population served,'"[497] NAB fails to acknowledge that using 2010 Census data, the most recent population data available, does not result in actual population loss but rather an accurate representation of a broadcast station's population served *as of 2010*. In other words, broadcast stations experiencing a "loss" in predicted population served were, in

[489] The broadcasting community participated extensively in this docket. In response to the *TVStudy PN*, ten parties submitted comments and ten parties submitted reply comments. Broadcasters, among other parties, also participated in several *ex parte* meetings with the Commission and its staff to discuss the issues raised in the *TVStudy PN*. NAB filed at least eight *ex parte* notices; CEA filed a letter in the record in response to NAB's *ex parte* filing of February 2, 2013. NAB also filed an additional set of comments in April 2014.

[490] In response to feedback received, OET has updated the original version of *TVStudy* on several occasions. *See* n.474. We note that other parties found the release of *TVStudy* timely. CEA, for example, noted that by releasing the software much earlier than the auction, OET is "wisely affording itself ample time before the auction to address any errors, unexpected behaviors, or anomalous results identified by interested parties who have run tests of the software." CEA *TVStudy PN* Comments at 2.

[491] NAB *TVStudy PN* Comments at 18-19; NAB Apr. 4, 2014 Comments at 14, 18-19.

[492] *Cf. Sagebrush Rebellion v. Hodel*, 790 F.2d 760, 764-65 (9th Cir. 1986) ("An agency's failure to provide notice and an opportunity to comment before taking action for which notice and comment were required by its enabling legislation, constituted harmless error because the agency had earlier provided notice and comment on almost identical issues in accordance with the notice and comment requirements of the National Environmental Protection Act"). *See also Appalachian Power Co. v. EPA*, 135 F.3d 791, 804 n.22 (D.C. Cir. 1998) ("if 'the purposes of notice and comment have been adequately served,' *Fertilizer Inst. v. EPA*, 935 F.2d 1303, 1311 (D.C. Cir. 1991)—we will find no procedural violation.").

[493] Population Distribution and Change: 2000 to 2010, United States Census Bureau, U.S. Department of Commerce (Mar. 2011) *available at* http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf.

[494] *Id*.

[495] NAB *TVStudy PN* Comments at 8-10.

[496] Our analysis was conducted using *TVStudy* (incorporating the changes adopted in this Order) with the 2010 Census data and the 2000 Census data. All other inputs remained constant.

[497] NAB *TVStudy PN* Comments at 11.

fact, serving a smaller population on February 22, 2012, than predicted using 2000 Census data because the 2000 Census data is outdated.

150. *Use of One Arc-Second Terrain Elevation Data.* We adopt use of terrain elevation data with a nominal resolution of one arc-second (approximately 30 meters) in most areas of the country. The one arc-second dataset, which is derived from smaller scale topographic maps with more granular elevation data than datasets used by earlier implementations of the OET-69 methodology, will allow for more accurate calculation of the effect of terrain on propagation of television signals.[498] The U.S. Geological Survey ("USGS") maintains a database with this terrain information, which is updated on a two-month cycle to integrate newly available and improved data.[499] The earlier software used to implement OET-69 relied on a terrain elevation database of three arc-second resolution (approximately 90 meters).[500] The USGS no longer distributes, maintains, or supports a three arc-second database, which also has a history of errors and no mechanism to check the validity of those errors or to correct them. We find no reason to continue using an obsolete database when there is an expert federal agency that offers up-to-date and more precise terrain data.

151. NAB opposes this change. According to NAB, OET-69 expressly requires use of a three arc-second database.[501] We acknowledge that OET-69 mentions that "the FCC computer program is *linked* to a terrain elevation database with values every three arc-seconds of latitude and longitude."[502] This is a descriptive statement about an input database, however, not a prescriptive element of the OET-69 methodology. We do not interpret the description of an input linked to the earlier software as a methodological requirement or a restriction against updating that software to incorporate more precise, accurate, and current data. [503]

152. NAB further maintains that switching from three to one arc-second terrain data will result in predicted losses in population served for 85.1 percent of all broadcast stations – results that NAB argues "simply cannot be squared with Congress's directive to preserve broadcast licensees' service populations, as calculated using the version of OET-69 in effect on February 22, 2012."[504] NAB did not provide any analytical information to support its calculations. By contrast, our analysis predicts that about one-half of the stations examined will maintain or slightly improve population coverage in comparison to what would have been predicted using the three arc-second terrain data, while one-half are predicted to experience a slight decrease in coverage.[505] Further, staff analysis shows that the results using the one arc-second terrain database are more accurate than those of the three arc-second database.[506]

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[498] *TVStudy PN*, 28 FCC Rcd at 953.

[499] *See* www.ned.usgs.gov (the National Elevation Dataset (NED) is a seamless dataset with the best available raster elevation data of the conterminous United States, Alaska, Hawaii, and the territorial islands). While USGS continues to update its NED, the Commission will be releasing a "snapshot" of the data it will be using in the auction as of a certain date to ensure consistent results.

[500] There have been a number of sources for three-arc-second databases; the Commission's three arc-second database was assembled from several different sources.

[501] NAB *TVStudy PN* Comments at 9.

[502] OET-69 at 6 (emphasis added).

[503] Commission precedent is consistent with our decision. *See Qualcomm Petition for Declaratory Ruling*, 24 FCC Rcd 13992, 13993, ¶ 1 n.4 (2009) (stating that the OET-69 methodology makes a service determination, in part, based on the elevation of terrain between the transmitter and each reception point); *Study of Digital Field Strength Standards and Testing Procedures*, ET Docket No. 05-182, Report to Congress on the Satellite Home Viewer Extension and Reauthorization Act of 2004, 20 FCC Rcd 19504, 19562, para. 132 (2005) (same).

[504] NAB *TVStudy PN* Comments at 9-10.

[505] Our analysis is based on publicly available data of all full power stations. It was conducted using *TVStudy* (incorporating the changes adopted in this Order) and the one arc-second terrain database and the three arc-second

(continued….)

153. *Antenna Beam Tilt Values.* We adopt use of actual beam tilt data, as those data are specified by the licensees and shown in the Commission's Consolidated Database System ("CDBS"), instead of an across-the-board-assumed downtilt figure. This will allow for a more accurate depiction of the predicted coverage of, and interference from, each television station. As the *TVStudy PN* recognized, the computer program previously used to implement the OET-69 methodology ignores this input from CDBS and instead uses the same electrical beam tilt for every location, regardless of the actual beam tilt value, which can result in a coverage projection that may effectively "miss" some of the population served.[507] In contrast, *TVStudy* uses the actual amount of electrical downtilt as specified by the broadcast licensees in CDBS, generating a more accurate model of coverage and interference effects and therefore

(Continued from previous page)
terrain database. A station-by-station comparison of population served when utilizing one arc-second versus three arc-second terrain data showed that these differences generally occur in areas where the terrain varies significantly over small distances. In such areas, the points analyzed for the one and three arc-second terrain data can result in differences in elevation, which affect the predicted propagation of signals. Our analysis of all full power stations shows that only two stations would experience terrain-limited population losses of greater than five percent solely due to the use of the one arc-second terrain data and 20 full power stations would experience gains of greater than five percent. Four full-power stations would experience interference-free population losses of greater than five percent and 22 full-power stations would experience gains of greater than five percent.

[506] In a separate study, we compared predicted field strength values applying *TVStudy* using one arc-second and three arc-second data to measured field strength values. The measured field strength data were of eight analog full power UHF television stations in New York, New York (WUHF-TV), Fresno, California (KJEO), Buffalo, New York (WBUF), Baton Rouge, Louisiana (WAFB-TV), Wilkes Barre, Pennsylvania (WBRE-TV), Springfield, Massachusetts (WHYN-TV), Philadelphia, Pennsylvania (WHYY-TV), and Madison, Wisconsin (WMTV), and were collected in the 1950s by the Television Allocations Study Organization (TASO). These data are publicly available. All other parameters in the study were held constant. The mean error between predicted and measured field strength values across all of the locations considered either decreased or remained constant in every case when one arc-second terrain data were used. The mean error between the TASO measurements and *TVStudy* for both terrain databases is shown in the table below:

	Mean Error, dB	
Station	1 arc-sec	3 arc-sec
KJEO	0.10	0.15
WAFB	10.5	10.9
WBRE	13.2	15.0
WBUF	14.1	14.7
WHYN	16.5	17.0
WHYY	11.9	13.7
WMTV	7.37	7.37
WUHF	10.2	11.6

See A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Fresno, California," [KJEO, TV Channel 47], Aug. 1, 1958; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Philadelphia, Pennsylvania," [WHYY-TV, TV Channel 35], Aug. 15, 1958; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Baton Rouge, Louisiana," [WAFB-TV, TV Channel 28], Nov. 18, 1957; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Buffalo, New York," [WBUF, TV Channel 17]; Oct. 24, 1958; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Springfield, Massachusetts," [WHYN-TV, TV Channel 40], Mar. 6, 1959; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Wilkes-Barre, Pennsylvania," [WBRE-TV, TV Channel 28], Sept. 24, 1957; A. D. Ring & Associates, "Field Strength Measurement Survey for AMST – Madison, Wisconsin," [WMTV, TV Channel 33], Feb. 5, 1958; Daniel B. Hutton, "Report on Mobile Field Strength Measurements, New York City UHF-TV Project," [WUHF-TV, TV Channel 31] FCC Report No. R-6302, Feb. 12, 1963.

[507] *TVStudy PN*, 28 FCC Rcd at 953.

better implementing the methodology in OET-69.

154. NAB claims that OET-69 expressly requires the use of a standard beam tilt to determine transmitting antenna patterns.[508] This argument lacks merit. OET-69's Table 8 represents a "typical" vertical pattern shape for a transmitting antenna, not a beam tilt angle.[509] In industry practice, the shape of an elevation pattern is held relatively constant, while beam tilt angle is adjusted to correspond with the maximum depression angle in any direction to maximize coverage.[510] Broadcast licensees are assumed to have chosen the appropriate beam tilt angle that maximizes their coverage. The *TVStudy* software only offsets the tabulation in Table 8 so that the maximum value (antenna beam tilt value) matches the value in CDBS, which is the actual value as inputted by the licensee. [511]

155. *Coordinates, Depression Angles, and Incorrect Data.* Instead of continuing to truncate or round geographic coordinates to the nearest second, as was the practice in earlier versions of software implementing OET-69, we adopt use of full-precision data in coverage and population served projections.[512] By increasing the precision of geographic coordinates, *TVStudy* eliminates rounding errors and provides at least three additional orders of precision. NAB opposes this change because it estimates that it will decrease predicted population served for 37.3 percent of stations and increase predicted population served for 38.1 percent of stations.[513] We find NAB's argument unpersuasive; there is no technical or computational basis to intentionally reduce the numerical precision of the geographic coordinates used to calculate station coverage and population served as of February 22, 2012.[514] As discussed above, the FCC has a well-established statutory obligation to address known inaccuracies in existing data.[515] Therefore, we adopt the proposal set forth in the *TVStudy PN*.[516]

156. For the same reasons, we adopt the *TVStudy PN* proposal to correct the previous software's error in calculating depression angles. Some versions of the computer program previously

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[508] NAB *TVStudy PN* Comments at 10.

[509] OET-69 at 13. The old OET-69 software employed by OET does not provide an elevation pattern specifically for Class A stations. In our analyses using *TVStudy* for the incentive auction, we will treat elevation patterns for Class A stations the same as those of full power stations, including use of the antenna beam tilt data in CDBS.

[510] *See* NAB Engineering Handbook, Chapter 6.8 (10th Edition 2007).

[511] Commission precedent is not inconsistent with our decision. *See* n. [449] and accompanying text. When it referred to "default vertical antenna patterns inherent in the OET-69 methodology" in a 2006 decision, the Commission was summarizing reply comments filed in response to a Petition. *Qualcomm Incorporated Petition for Declaratory Ruling*, WT Docket No. 05-7, Order, 21 FCC Rcd 11683, 11690, para. 14 (2006) ("*Qualcomm Order*"). It clearly had no intention of defining the scope of the "OET-69 methodology" for general purposes. Later in that same decision, the FCC used the term "methodology" in connection with two other departures from OET-69 that it approved for purposes of the Petition, but not in connection with the use of an actual vertical antenna pattern. *Compare Qualcomm Order*, 21 FCC Rcd at 11692, para. 18 (use of part 27 D/U ratios and accounting for the effect of multiple transmitters) *with id*. at 11694, para. 21 (use of actual vertical antenna patterns). While the Commission in the *Third DTV Periodic Review* declined to use actual vertical antenna patterns based solely on concerns with "time and resources," it never stated that using actual vertical antenna patterns would change the OET-69 "methodology." *Third DTV Periodic Review*, 23 FCC Rcd at 3071, para. 166. The Commission declined to use actual vertical antenna patterns in a section entitled "Post-Transition Interference Standards and Analysis Methodology," but the title of the general section does not imply that the Commission viewed actual or default vertical patterns as part of the OET-69 "methodology."

[512] *TVStudy PN*, 28 FCC Rcd at 954.

[513] NAB *TVStudy PN* Comments at 12.

[514] *TVStudy PN,* 28 FCC Rcd at 954.

[515] *See* para. 138.

[516] *See also* CEA *TVStudy PN* Comments at 6.

used to implement OET-69 erroneously calculated depression angles based on the antenna height above ground, rather than the height above mean sea level, which, as the *TVStudy PN* recognized, can cause the radiated power toward the cell under study to be incorrectly calculated.[517] This can result in an incorrect representation of a station's coverage area and population served.[518] Nevertheless, NAB objects to the correction of this error because it results in an estimated decrease in population served for 12.2 percent of stations and an estimated increase in population served for 22.1 percent of stations. Again, we disagree that the Spectrum Act requires us to disregard software improvements that increase the accuracy of predictions.

157. The *TVStudy PN* also recognized that there may be instances where the information entered into the FCC's broadcast station database, CDBS, may not be fully accurate. This could lead to incorrect results when the values in that database are used to predict coverage and interference.[519] While OET sought comment on methods to detect and correct inaccurate data, the commenting parties did not address this issue.[520] As discussed below, full power and Class A stations will be required to certify the accuracy of the information in CDBS prior to the incentive auction.[521]

158. *Longley-Rice Error Warnings or "Flags" Treatment.* We decline to adopt an alternative treatment of results that are flagged as "unusable or dubious" by the Longley-Rice algorithm underlying the OET-69 methodology.[522] Currently, the assumption is that the cells with such warning flags have coverage, even if surrounding cells are predicted to lack coverage or are subject to interference.[523]

159. NAB opposes any change in the treatment of the error flags, claiming it would change the OET-69 methodology, in violation of the Spectrum Act, and result in loss of coverage area for the majority of the broadcast stations.[524] By contrast, CEA contends that treatment of the flags is not part of the OET-69 methodology, and that providing the Commission flexibility in the treatment of such flags will allow us to better fulfill the objectives of the Spectrum Act.[525] In a similar vein, CTIA argues that the current assumption that a "flagged" cell receives television service overestimates broadcast licensees' coverage areas, an outcome that will "hamstring the Commission's ability to efficiently and effectively manage the repacking process."[526]

160. We are not persuaded that a change in the underlying assumption of error warnings or "flags" is necessary or appropriate at this time. As noted in the *TVStudy PN*, error warnings have been treated differently depending on context.[527] For example, the presence of an error "flag" is ignored in applying the methodology of OET Bulletin Nos. 72 and 73.[528] That assumption is consistent with the

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[517] *TVStudy PN*, 28 FCC Rcd at 954.

[518] This error mostly impacted stations on short towers located at high elevations (e.g., mountains).

[519] Examples of incorrect data include negative values for beam tilt, swapped values for mechanical beam tilt and orientation, missing maximum values for directional antenna patterns, missing or incorrect directional antenna flags, and ERP values entered in dBk instead of kilowatts.

[520] *See TVStudy PN*, 28 FCC Rcd at 954.

[521] *See* n.615.

[522] *TVStudy PN*, 28 FCC Rcd at 954.

[523] *Id*.

[524] NAB *TVStudy PN* Comments at 7.

[525] CEA *TVStudy PN* Comments at 14; *see also TVStudy PN*, 28 FCC Rcd at 955.

[526] CTIA *TVStudy PN* Comments at 8-9.

[527] *TVStudy PN*, 28 FCC Rcd at 954-955.

[528] CEA *TVStudy PN* Comments at 13.

purpose of OET-72 and OET-73, which were designed to identify whether service is available at a *specific location* (household).[529] OET-69 is designed to predict service availability within *a station's coverage area generally*, at points that are not specific households but are intended to be representative of a surrounding area or cell. The assumption of coverage in that context is consistent with the Commission's traditional assumption that service is available throughout a station's coverage area and that broadcasters locate and configure their transmitters to maximize coverage. Thus, despite the fact that the current treatment of error warnings may overestimate coverage areas, we find no compelling reason to change our treatment of the Longley-Rice error flags at this time. Further, we do not believe that assuming service for cells with error flags will significantly impact our ability to efficiently repack television stations, because this assumption does not increase the coverage area that we must make all reasonable efforts to preserve. Accordingly, we will continue to assume coverage where Longley-Rice error warnings appear.

161. On May 8, 2014, NAB filed a 129-page submission purporting to demonstrate that *TVStudy* "produce[s] flawed results" by comparing *TVStudy* and "the existing OET-69 software."[530] Despite the fact that OET first publicly released *TVStudy* over 15 months ago, NAB filed on the eve of the Sunshine period, limiting analysis of its submission and depriving interested parties of an opportunity for comment.[531] Nonetheless, analysis indicates that NAB's submission is flawed. First, NAB used the wrong legacy software for its comparison. NAB maintains that "the version of OET-69 in existence on February 22, 2012 (understood to include OET Bulletin 69 and its implementing software)" must be used in the repacking process.[532] NAB does not specify *which* of the legacy software programs for applying the OET-69 methodology in use as of that date it believes must be used.[533] If Congress had intended to require the use of particular software, however, presumably it would have required the use of OET's "FLR" software (which has been publicly available on OET's website for years), as the statute refers specifically to OET as the originator of OET-69.[534] Yet NAB apparently used a version of the Media Bureau's application processing software for its comparisons to *TVStudy*.[535] Second, NAB used the wrong input values for its comparison. NAB maintains that it used "the settings OET actually proposes to use."[536] NAB used such settings selectively, however, skewing the results of its comparison. For example, NAB maintains that use of *TVStudy* results in a loss of population served for approximately 52 percent of stations studied, yet NAB failed to update Census data reflecting an increase in the U.S. population between 2000 and 2010.[537] OET's analysis using the settings OET proposed to use (and that

[529] OET-72 and OET-73 were designed to implement the Satellite Television Extension and Localism Act of 2010 (STELA). STELA was enacted to ensure the satellite delivery of network television programming to specific viewers that *cannot* receive that programming from their local television station by means of an outdoor or indoor antenna. *See* Satellite Television Extension and Localism Act of 2010, Pub.L. 111-175, 124 Stat. 1218 (2010). OET Bulletin No 72 is available at http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet72/oet72.pdf; OET Bulletin No. 73 is available at http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet73/oet73.pdf.

[530] NAB Comments, ET Docket No. 13-26, GN Docket No. 12-268 at 1, 3 (filed May 8, 2014) (NAB May 8 filing) at 1, 3.

[531] *See* 47 C.F.R. § 1.1203(a), (c).

[532] NAB Comments at 4-5.

[533] *See* para. 146 (explaining that the Commission's different bureaus have used different software programs to implement the OET-69 methodology).

[534] *See* Spectrum Act § 6403(b)(2). Further, OET used "FLR" for all of the Commission's analyses of broadcast television stations' coverage areas and populations served during the DTV transition.

[535] *See* NAB May 8, 2014 filing, Declaration of Willliam R. Meintel at para. 7.

[536] NAB May 8 filing at 7.

[537] *See id.* at 5.

we adopt in this Order) results in a population increase for 88 percent of full power stations.[538] Third, NAB is mistaken that *TVStudy* must be flawed because it does not replicate the results produced by earlier software for applying OET-69.[539] The various legacy software programs used by the Commission's different bureaus do not always produce identical results: identical results are unnecessary when the software is being used for different purposes. *TVStudy* is not designed to produce the identical results produced by earlier software, although it does produce very similar results.[540] *TVStudy* is configured differently from earlier software so that it can support the repacking process using the most up-to-date and accurate information and technical evaluation capabilities and, therefore, necessarily does not produce exactly the same results.[541]

c. Preserving Coverage Area

162. *Background.* As stated above, the Spectrum Act requires that the Commission make "all reasonable efforts to preserve . . . the coverage area . . . of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69."[542] The term "coverage area" is not defined in the Spectrum Act, OET-69 or our rules. In the *NPRM*, the Commission proposed to interpret "coverage area" to mean a full power station's "service area," as defined in section 73.622(e) of our rules.[543] Noting that the rules governing Class A stations do not define a "service area" for such stations, the Commission proposed to use a Class A station's "protected contour" — the area within which it is protected from interference under our rules — as its "coverage area" for purposes of the repacking process.[544]

163. As discussed above, in the repacking process some stations may be reassigned to different channels. When a station is assigned to a different channel, its technical facilities (transmit power and antenna pattern) must be modified to preserve its coverage area, because radio signals propagate differently on different frequencies.[545] With such modifications, there may be some small

[538] *See* para. 140. We also note that NAB treated Class A stations differently from full power stations, which resulted in the largest discrepancies between the results produced by the earlier software and *TVStudy*. Further, in generating its comparison of *TVStudy* and the legacy software program using old input values, NAB used the wrong parameters relating to treatment of Class A stations, minimum antenna height above average terrain (HAAT), the number of terrain radials used to determine HAAT, Census Block coordinate rounding, treatment of DTS stations, and treatment of the digital antenna pattern field in the Commission's CDBS database. These errors appear to explain most of the apparent "losses" in coverage area and population in that comparison. *See* NAB May 8, 2014 filing, Att. A.

[539] *See* NAB May 8, 2014 filing at 4.

[540] *See* para. 140.

[541] There are differences between *TVStudy* and FLR that would be expected to produce different results even when the input parameters are set consistently. For example, *TVStudy* automatically corrects for obvious errors in the license data base; the FLR and Media Bureau software has no such capability. The terrain grid sizes can be set to be identical, but the programs use different compilations of the underlying 3 arc-second terrain data.

[542] Spectrum Act §§ 6403(b)(1)(B), (b)(2). *See also id.* §§ 6403(b)(3) (no involuntary relocation from UHF to VHF), (g) (limitation on reorganization authority).

[543] 47 C.F.R. § 73.622(e).

[544] *See NPRM*, 27 FCC Rcd at 12390, para 99. A Class A station's protected contour is different from, and generally smaller than, the noise-limited contour that defines the "service area" within which a full power station is protected from interference under our rules. *See* 47 C.F.R. § 73.6010.

[545] A broadcast signal transmitted on one channel will cover a slightly different area from a signal transmitted on a different channel at the same location using the same technical facilities (*e.g.*, antenna pattern, antenna height, and ERP). For a station on a new channel to replicate its existing coverage area, its transmission facilities must be adjusted to specify a new antenna pattern and/or Effective Radiated Power (ERP). "Replicate" in this context means to reproduce a station's existing noise-limited contour on a different channel.

differences in the specific geographic areas served within the station's noise-limited or protected contour, even though the total geographic area within the station's contour remains the same. These differences are due to the varying propagation characteristics of different channels, which can change the degree to which areas within a station's contour are affected by terrain loss. The Commission proposed to use replication software to calculate the power and antenna pattern adjustments necessary to reproduce, or "replicate," a station's coverage area on its channel for post-auction operation.[546] It further proposed to allow a station assigned to a new channel to continue to use its existing antenna pattern, and to adjust its power level so that the coverage area on the new channel would be the same in total square kilometers as before the repacking process, without regard to terrain losses, instead of using the calculated antenna pattern.[547] The Commission also asked whether it would be consistent with the Spectrum Act to consider a station's signal to be receivable at all locations within its noise-limited or protected contour (depending on whether it is a full power or Class A station) for purposes of replication.[548]

164. *Discussion.* We adopt the proposal to interpret the statutory term "coverage area" consistent with the definition of "service area" in OET-69 and section 73.622(e) of the Commission's rules with regard to full power stations.[549] Accordingly, we will consider a full power station's coverage area to be the geographic area within its noise- limited F(50,90) contour where the signal strength is predicted to exceed the noise-limited service level.[550] Consistent with the methodology in OET-69, areas within a station's noise-limited contour where its signal strength is below the noise-limited signal strength level, which typically occurs due to terrain obstructions or other propagation factors, will not be considered to be part of the station's coverage area.[551] As requested by KAZN and UVM, the coverage areas of full power stations that operate distributed transmission systems ("DTS") using multiple transmitters will be determined in accordance with the definition of authorized service area and method for determining DTS "authorized service areas" in sections 73.626(b), (c) and (d) of the rules.[552] Further, it is appropriate to use a DTS station's authorized service area as currently set forth in our rules as the definition of the coverage of such stations. While OET-69 does not specifically address DTS stations, we find that considering a DTS station's service area to be the combined coverage of its transmitters, as

[546] *NPRM*, 27 FCC Rcd at 12391, para. 100. Replication would only be performed for stations assigned to new channels after the auction. Stations remaining on their existing channels after the auction would not need to change their operation. The replication software is incorporated into *TVStudy.*

[547] *NPRM*, 27 FCC Rcd at 12391, para. 100. It may not be possible to build an antenna that achieves the antenna pattern calculated for the station by *TVStudy.*

[548] *NPRM*, 27 FCC Rcd at 12391, para. 102.

[549] *See NPRM*, 27 FCC Rcd at 12388, paras. 93-94; OET-69 at 1; 47 C.F.R. § 73.622(e)(1). The commenters that address the definition of coverage area support the proposal to interpret the statutory term "coverage area" to mean a full power station's "service area" as defined in § 73.622(e) of the Commission's rules. *See* Harris Comments at 7; NAB Comments at 23.

[550] 47 C.F.R. § 73.622(e)(1). This rule defines "noise-limited contour" as "the area in which the predicted F(50,90) field strength of the station's signal" exceeds specified levels. *Id.* Within this contour, service is considered available at locations where the station's signal strength, as predicted exceeds specified levels using the Longley-Rice methodology in OET Bulletin No. 69. 47 C.F.R. § 73.622(e)(2). "Noise" in this definition refers to background noise from thermal sources and from within typical TV receivers themselves, not to interference from other television stations. *See* OET-69 at 3-5 (distinguishing between "evaluations of service coverage and interference").

[551] *See* OET-69 at 7.

[552] 47 C.F.R. § 73.626(b), (c), and (d); UVM Reply at 12-13; KAZN Reply at 2-3. Those rules define the authorized service area of a DTS station as the area encompassed within the combined noise-limited signals of all of a station's DTS transmitters, subject to a maximum service area limit that corresponds to a pre-defined radius or contour that could be served from a single transmitter.

limited by the maximum distances specified in the rules, is consistent with that methodology.[553]

165. As proposed in the *NPRM*, we will make all reasonable efforts to preserve Class A stations' protected contours.[554] We disagree with commenters who argue that we must protect the entire area covered by Class A stations' signals, i.e., the noise-limited contour within which viewers may be able to receive the signal.[555] Because our rules only protect Class A stations' protected contours from interference, defining their coverage areas as their noise-limited contours would provide these stations with greater interference protection after the repacking process than they enjoy today.[556] In the absence of an explicit statutory directive, we find no basis to do so.[557] Our approach makes our interpretation of the statutory term "coverage area" consistent for full power and Class A stations, both of which will enjoy protection in the repacking process for the same area that now receives interference protection under our rules.[558]

166. In preserving a station's coverage area, we will replicate that station's contour on its new channel.[559] As noted earlier, OET-69 sets forth the methodology for determining the contours that define the boundaries of a station's coverage area.[560] As proposed in the *NPRM*, we adopt the "equal area" approach for replicating the area within the station's existing contour as closely as possible using the station's existing antenna pattern.[561] Assuming a station maintains its other existing technical parameters, i.e., location, antenna height and antenna pattern, we will permit the station to adjust its power on the new channel until the geographic area within the station's noise-limited or protected contour (depending on

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[553] In contrast, we will not include areas within a full power station's noise-limited contour that are served by replacement translators in a station's coverage area, as requested by the Affiliates Associations, NAB, and others. *See* Affiliates Associations Comments at 39-41, Bahakel Comments at 3, Belo Comments at 15-16, Bonten Comments at 10, Cox Media Comments at 4-5, Gray TV Comments at 7-8, NAB Comments at 33, Tribune Comments at 15, Disney Comments at 14 and WGAL Comments at 14-15. We address this issue in § III.B.3.d.iii (LPTV and TV Translator Stations).

[554] *NPRM*, 27 FCC Rcd at 12390, para. 99; *see also* 47 C.F.R. § 73.6010.

[555] *See* Affiliates Associations Comments at 25; Casa Comments at 3-4; Dispatch Comments at 4-5; Dispatch Reply at 7-8; Bonten Comments at 9-10; Bonten Reply at 8-9; Raycom Reply at 10.

[556] 47 C.F.R. §§ 73.6010, 73.6012.

[557] *See National Cable & Telecommunications Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 993 (2005) (noting presumption that Congress is aware of "'settled judicial and administrative interpretation[s]'" when it enacts a statute) (quoting *Commissioner v. Keystone Consol. Industries, Inc.,* 508 U.S. 152, 159 (1993)); *Hernstadt v. FCC*, 677 F.2d 893, n.22 (D.C. Cir. 1980) ("Congress is presumed to be cognizant of, and legislate against the background of, existing interpretations of law.").

[558] We note that, for purposes of this proceeding, the coverage area of Class A stations does not include areas within the protected contour of the Class A station where the signal is predicted to fall below the level needed for reception of service due to terrain obstructions. This clarification brings the definition of "coverage area" for Class A stations in line with the definition for full power stations and the principles of OET-69.

[559] Replication of coverage area was also adopted in the context of the DTV transition. *See Advanced Television System and their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, Sixth Report and Order,12 FCC Rcd 14588,14605, para. 29 (1997). In the DTV transition, the Commission replicated stations' analog coverage areas on a second channel for DTV service. *See id.* The Commission noted that this approach would ensure broadcasters would have the ability to reach the audiences they served at that time and viewers would have access to the stations that they received over-the-air at that time. *See id.* at 14605. Replication was based on appropriate propagation models and technical planning factors that were later incorporated in OET-69. *See Advanced Television System and their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, Sixth Further Notice of Proposed Rulemaking, 11 FCC Rcd 10968, 11002, para. 82 (1996).

[560] *See* OET-69 at 1-3.

[561] *See NPRM*, 27 FCC Rcd at 12391, para. 100; *see also Repacking Data PN*, 28 FCC Rcd at 10389.

whether the station is full power or Class A) is equal to the area within the station's original contour on its pre-auction channel. This approach will allow stations to preserve their existing coverage areas using antennas that are practical to build, so that stations will be able to actually construct their new facilities.[562]

167. In the *NPRM*, we proposed to make all reasonable efforts to preserve the existing coverage area of stations whose operations exceed the limits on antenna height above average terrain ("HAAT"), but not the absolute limits on effective radiated power ("ERP"), recognizing that a number of full power stations operate licensed facilities pursuant to a waiver of HAAT and ERP limits.[563] We adopt the proposal to protect in the repacking process the existing coverage areas of stations operating under a waiver of the HAAT or antenna height limits. As requested by several commenters, we will also protect the existing coverage areas of stations that operate under a waiver of ERP limits.[564] In addition, we will make all reasonable efforts to preserve the existing coverage areas of stations that operate above the HAAT and/or ERP limits pursuant to section 73.622(f)(5), except that such operations will not be protected to the extent that they exceed the maximum power limits specified in the Commission's rules without regard to HAAT.[565] Stations licensed pursuant to a waiver of the applicable ERP limit will be permitted to continue operations at power levels up to the existing authorized ERP.[566]

168. To the extent that a broadcaster participates in the auction through a UHF-to-VHF or a high-VHF-to-low-VHF bid, we will make all reasonable efforts to preserve its coverage area and population served. However, because these stations will be relocating to a different band, we anticipate that it may be difficult for them to maintain their antenna pattern on the new channel.[567] Accordingly, as discussed in Section V.C.1.a, we will allow successful UHF-to-VHF and high-VHF-to-low-VHF bidders to request alternative facilities that may result in increases in their coverage areas, as long as the increases do not cause interference to other stations.[568]

169. Although broadcasters generally support our decision to permit stations assigned to new channels to continue to use their existing antenna patterns with power adjustments,[569] the Affiliates Associations contend that we should not consider a station's signal to be receivable at all locations within its noise-limited contour, thereby ignoring terrain losses.[570] They argue that because the effect of terrain on signal reception is the *sine qua non* of the OET-69 model, ignoring terrain losses and assuming that a station's signal is receivable at all locations within its noise-limited contour would eviscerate the statutory

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[562] *See* Affiliates Associations Comments at 27 (contrasting with "facilities predicated on a theoretical antenna pattern that is impracticable, or even impossible, to build").

[563] *NPRM*, 27 FCC Rcd at 12391, n. 157. *See* 47 C.F.R. § 73.622(f). Our records indicate that, as of February 22, 2012, there were 16 licensed VHF stations operating pursuant to a waiver of the applicable ERP limit. There are also numerous licensees as of that date that operated with increased HAAT and/or ERP pursuant to 47 C.F.R. § 73.622(f)(5).

[564] *See* Bonten Comments at 9-10; Comcast Comments at 17, n.45; Disney Comments at 32-34.

[565] *See* 47 C.F.R. § 73.622(f)(5).

[566] *See* 47 C.F.R. § 73.622(f)(4). Our records indicate that no station has been granted a waiver of the 1,000 kW ERP limit.

[567] The number of antenna patterns manufactured for VHF channels is significantly smaller than for UHF channels. Review of one antenna manufacturer's online catalog shows nearly four times as many antenna azimuth patterns available at UHF than at VHF. *See, e.g.*, http://www.eriinc.com/Catalog/Antennas.aspx.

[568] *See* § V.C.1.a (Construction Permit Application Filing Requirements). As provided in § V.C.5 (Reimbursement of Relocation Costs), UHF-to-VHF and high VHF-to-low VHF stations are not entitled to reimbursement for the costs of moving to another band.

[569] Affiliates Associations Comments at v; Comcast Comments at 17; Anon. Broadcaster 1 Comments at 4-5.

[570] Affiliates Associations Comments at 29-30.

requirement to preserve coverage areas using the OET-69 methodology.[571] They acknowledge that there inevitably will be some changes in coverage area due to channel reassignments, but contend that the Commission can only satisfy the preservation mandate in the statute if it limits such changes to no more than 0.5 percent.[572] The Affiliates Associations alternately propose that the Commission allow stations "flexibility in specifying alternative facilities that increase a station's coverage area if that is necessary to fully preserve the coverage area and population served of a station following repacking."[573]

170. While we agree that the goal of the repacking process should be preservation of stations' pre-repacking coverage areas, we emphasize that, as the Affiliates Associations acknowledge, it may not be physically practical or possible for some stations to build modified facilities that result in less than a 0.5 percent change in the geographic area served within the original contour.[574] Because radio signals propagate differently on different frequencies, the signal of a station reassigned to a different channel will generally not be receivable in precisely the same locations within a station's contour as it was in its original channel. Instead, there may be signal losses due to terrain in different areas within the contour.[575] Such losses are unavoidable, so exact replication of coverage within a station's contour is not always attainable under the laws of physics. We also note that the Affiliates Associations have mischaracterized the proposal to preserve stations' coverage areas in the repacking process. We are not assuming that "coverage area" includes all of the area within a station's contour (i.e., that a station's signal is receivable at all locations within the contour). Rather, we will adhere to the OET-69 methodology, which considers variations in signal availability resulting from terrain losses, when determining the "coverage area" and "population served" that must be preserved in the repacking process.[576] Thus, we will not include areas where a signal is not receivable due to terrain losses in the coverage area to be preserved.

171. We decline to adopt the proposals advanced by the Affiliates Associations. First, we do not interpret the Spectrum Act to prohibit anything greater than a *de minimis* change in a station's coverage area. Rather, as discussed above, we agree with T-Mobile that "the reasonableness requirement [in §6403(b)(2)] by its plain terms is a measure of effort—i.e., the actions taken to achieve a goal—and not of the outcome itself."[577] Hence, the demand that the outcome of the repacking process be no more than a 0.5 percent change in the geographic area served, finds no support in the statute.

172. Nor does the Spectrum Act require us to expand stations' contours to account for terrain losses. As stated above, we adopt the "equal area" approach for replicating the area within a station's contour using the station's existing antenna pattern. This approach is designed to allow a station to use its existing facilities, allowing for some adjustments, to serve the same geographic area on the channel to which it is reassigned in the repacking process. The Affiliates Associations support our approach,[578] but

[571] Affiliates Associations Comments at 29-30.

[572] Letter from Wade H. Hardgrove *et al.*, Counsel for Affiliates Associations, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3 (filed Mar. 18, 2014) (Affiliates Associations' Coverage Area *Ex Parte*).

[573] *See id.*

[574] Affiliates Associations Comments at v and 28.

[575] The terrain obstacles remain the same in a geographic area, but the physics of propagation over or around those obstacles include a frequency-dependent component. Given that we will be recovering channels from 51 down, most television stations that are assigned new channels will have new channels that are lower in the band, with better propagation than their current channels.

[576] Specifically, as discussed in § III.B.2.d (Preserving Population Served), we acknowledge the terrain losses experienced on a station's original channel when we determine the "population served" to be preserved. We make all reasonable efforts to preserve the "population served" in a station's coverage area. The definition of coverage area for both full power and Class A stations does not include areas that are lost to terrain. *See* paras. 164-165.

[577] T-Mobile Reply at 87.

[578] Affiliates Associations Comments at 27.

seem to demand that we go even further by expanding a station's contour to compensate for terrain losses resulting from propagation differences on the reassigned channel are predicted to reduce the coverage area *within* the contour.[579] While not entirely clear, the Affiliates Associations seem to demand that we preserve the same square kilometers of coverage, not a station's actual coverage area prior to repacking. Such an approach finds no support in the Spectrum Act, which specifically directs us make "all reasonable efforts to *preserve* . . . the coverage area . . . of each broadcast television licensee, as determined using the methodology described in OET Bulletin 69."[580] Consistent with our approach to preserving population served,[581] we interpret the statute to direct us to make all reasonable efforts to protect the geographic area that a station actually served as of February 22, 2012. This approach, which is consistent with our efforts to replicate coverage areas during the digital transition,[582] is designed to ensure that after the repacking process, broadcasters will continue to reach the same viewers, and that viewers will continue to have access to the same stations. Expanding contours, as the Affiliates Associations' request, would thus be inconsistent with the statute, because it would not maintain the *status quo*; to the contrary, it would expand the geographic area that a station actually serves. The Affiliates Associations' proposal could provide the station with a "windfall" in the form of new viewers or, as discussed below, require us to undertake costly efforts to extend interference protection to areas with no viewers. We do not believe that either of these outcomes was intended by the Spectrum Act.[583]

173. Second, expanding contours in the repacking process is not practical or realistic, because it would compromise the repacking process and, ultimately, the success of the auction. Allowing contour extensions during the repacking process will make it more difficult to repack stations efficiently.[584] We would face the same problem if we were to prohibit any channel reassignment that resulted in anything greater than a *de minimis* change in the geographic area served. Reducing the number of potential channels significantly limits the Commission's flexibility to assign channels in the repacking process, increasing the potential costs of clearing the spectrum and decreasing the likelihood of a successful auction outcome.[585] We interpret the statute to require that we make all reasonable efforts to preserve each station's coverage area and population served without sacrificing the goal of a successful incentive auction.[586] As set forth below, we are adopting a number of measures that will effectively address

[579] Affiliates Associations' Coverage Area *Ex Parte* at 3.

[580] Spectrum Act §§ 6403(b)(1)(B), (b)(2). *See also id.* §§ 6403(b)(3) (no involuntary relocation from UHF to VHF), (g) (limitation on reorganization authority).

[581] *See* § III.B.2.d (Preserving Population Served).

[582] *See* n.559.

[583] Our rejection of the Affiliates Associations' proposal to expand contours to compensate for terrain losses will have no effect on existing television viewers. That will be addressed through our separate effort to preserve a station's "population served," described in § III.B.2.d (Preserving Population Served).

[584] This is because expanding a station's contour will create greater interference potential between that station and other stations, and require the Commission to protect a larger geographic area from interference. As a consequence, stations on the same channel, and adjacent channels, would have to be spaced farther apart. That, in turn, would effectively limit the number of potential channels to which a station could be reassigned.

[585] Limiting the number of potential channels to which a station can be reassigned increases the likelihood that the Commission will have to accept bids at higher prices in the reverse auction to ensure that it will have channels available for those stations that wish to remain on the air. *See* § IV.B.2.b (Reverse Auction – Bid Assignment Procedures: Determining Which Bids Are Accepted). Further, limiting the number of potential channels could require the Commission to reassign stations that are not participating in the reverse auction to channels above the clearing target. This would create an impairment that reduces the amount of spectrum available in the forward auction, which would reduce auction proceeds. *See* § III.A.2.d (Market Variation). Contour expansions likewise could create or worsen impairments to wireless blocks to be auctioned.

[586] *See* § III.B.2.a ("All Reasonable Efforts").

broadcasters' concerns without compromising the auction.[587] Under these circumstances, we need not adopt the proposals advanced by the Affiliates Associations to meet the statutory mandate.[588]

174. Third, broadcasters' concerns regarding the potential for substantial new terrain losses are exaggerated. The majority of UHF stations will be assigned to channels that are lower in the band than their original channels, because under the 600 MHz Band Plan the Commission will be seeking to repurpose UHF spectrum contiguously from channel 51 down, meaning that stations being reassigned to new channels within the UHF band generally will be assigned to channels lower in the band. Such stations are likely to experience *decreases* rather than increases in coverage lost to terrain within their contours due to the superior propagation characteristics of their lower frequencies.[589]

175. Finally, we are adopting a number of measures to effectively address the Affiliates Associations' concerns. For those stations that may experience a loss of coverage due to terrain, we are adopting several measures that will allow them to remedy such losses. Specifically, broadcasters will be able to file initial construction permit applications that expand their coverage area by up to one percent, as long as they do not cause new interference to any other station.[590] In addition, if a station is dissatisfied with its new channel assignment due to terrain losses, it may seek alternative transmission facilities on a different channel, provided a channel is available and the alternative facilities meet all existing technical and interference requirements and serve the public interest.[591] Further, if a licensee wishes to provide service to a specific area that had service on its pre-auction channel but lacks service on its new channel, it could use DTS, for example, to provide that coverage.[592] This approach will allow us fulfill our statutory duty to make "all reasonable efforts" to preserve broadcast licensees' coverage area and population served, as required by section 6403(b)(2) of the Spectrum Act.[593]

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[587] *See* para. 1755.

[588] *See, e.g., WildEarth Guardians v. Pub. Serv. Co. of Colorado*, 690 F.3d 1174, 1186-87 (10th Cir. 2012) (explaining that while "[i]t is possible [a utility] could have done more" to achieve Clean Air Act compliance, "doing so would have resulted in significant costs and delay" such that it was reasonable for the utility "to work towards . . . compliance while continuing construction"); *Grand Trunk Western R.R. Inc. v. Bhd. of Maint. of Way Employees*, 497 F.3d 568, 572 (6th Cir. 2007) (holding that "it would not be reasonable to require [the union] to engage in a third round of direct negotiations that are unlikely to succeed where two previous rounds of direct negotiation and mediation have failed"); *Price*, 416 F.3d at 1347-48 (11th Cir. 2005) (holding that it was unreasonable to require a libel plaintiff need not depose seventeen individuals to identify a confidential informant when deposing four the women from whom he was most likely to discover the identity).

[589] *See, e.g.*, William C.Y. Lee, *Mobile Communications Engineering*, 2nd Ed., New York: McGraw-Hill, 1997, Chapter 4, "Path Loss over Hilly Terrain and General Methods of Prediction." Path loss over a knife-edge obstruction is given by Equations 4.17 and 4.24, and the Fresnel parameter, ν (the Greek letter nu) includes a frequency-dependent component such that terrain losses increase with increasing frequency and decrease with decreasing frequency.

[590] *See* § V.C.1.a (License Modification Procedures).

[591] *See* § V.C.1.b (Alternate Channel and Expanded Facilities Opportunities).

[592] In contrast, increasing a station's contour as proposed by the Affiliates Associations may not address losses to specific viewers resulting from terrain. Increasing the contour would only increase the sum of the population served by adding viewers that did not receive service before.

[593] Courts have repeatedly held that it is reasonable for the agency to rely on a waiver process to address any unforeseen shortcomings that might arise in specific instances. *See Vt. Pub. Serv. Bd. v. FCC*, 661 F.3d 54, 65 (D.C. Cir. 2011) (finding a waiver process provided a reasonable means to update stale line count data used in a model for determining universal service support); *Rural Cellular Ass'n v. FCC*, 588 F.3d at 1104 (discussing, with approval, a waiver process used to provide certain wireless carriers additional support should an interim cap render support insufficient); *Rural Cellular Association v. FCC*, 685 F.3d 1083, 1095 (D.C Cir. 2012) (same); *Alenco*, 201 F.3d at 622 (finding a single carrier's reduced rate of return under an operating expenses cap "at most . . . presents an anomaly that can be addressed by a request for a waiver").

d. Preserving Population Served

176. *Background.* Channel reassignments, in combination with stations relinquishing their spectrum usage rights as a result of the reverse auction, may change the interference relationships among stations. Those relationships, in turn, may affect television stations' populations served. Existing interference to the stations that remain on the air will be eliminated by stations that go off the air. Likewise, new channel assignments generally will eliminate interference that was caused by the previous assignments. At the same time, new channel assignments could create a potential for new interference between nearby stations on the same channel or a first adjacent channel.[594]

177. In the *NPRM*, the Commission proposed to interpret the statutory term "population served" to mean the persons who reside within a station's service area at locations where service is not subject to interference, as specified in OET-69 and section 73.616(e) of the rules.[595] Section 73.616(e) provides that the population served within a station's service area "does not include portions of the population within the noise-limited service contour of that station that are predicted to receive . . . masking interference from any other station."[596] With regard to new interference, this rule provides that an application for a new or modified station will not be accepted "if it is predicted to cause interference to more than an additional 0.5 percent of the population served by another . . . DTV station."[597]

178. The Commission further proposed three options for fulfilling the statutory mandate to make all reasonable efforts to preserve "population served." Option 1 seeks to preserve service to the same total number of viewers but not necessarily the same viewers, allowing reassignments that would reduce a station's total population served as of February 22, 2012 by no more than 0.5 percent.[598] Option 2 seeks to preserve service to the same viewers, allowing interference from reassignments only in previously affected areas or if any newly interfering station, considered alone, would reduce a station's population served by no more than 0.5 percent.[599] Likewise, Option 3 seeks to preserve service to the same viewers, allowing new interference up to 0.5 percent between stations that interfered with one another as of February 12, 2012, as well as new interference up to two percent between stations that did not interfere with one another previously.[600] Option 3 allows "replacement interference" only from the specific station that caused interference previously, as opposed to any station.[601]

179. *Discussion.* As proposed in the *NPRM*, we interpret the statutory term "population served" to mean the persons who reside within a station's coverage area at locations where service is not subject to interference from another station or stations, as specified in OET-69 and section 73.616(e).[602] Commenters do not specifically address the *NPRM* proposal, although they express views on how the

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[594] Interference can occur between television signals on the same channel (co-channel) or on the channels immediately above and below (first adjacent channels) the desired signal. The standards for determining whether interference occurs to full power and Class A television stations from other full power and Class A stations are set forth in §§ 73.623(c) and 74.793 of the rules, respectively. *See* 47 C.F.R. §§ 73.623(c), 74.793(b), (c), (d). Full power stations are protected from interference within their noise-limited contours, whereas Class A stations are protected within their "protected contours."

[595] *NPRM*, 27 FCC Rcd at 12388, para. 94.

[596] 47 C.F.R. § 73.616(e).

[597] *Id.*

[598] *NPRM*, 27 FCC Rcd at 12392, para. 103. The Commission's existing rules treat 0.5 percent as "no new interference" because 0.5 percent is equivalent to zero when rounded to an integer value. *See id*.

[599] *Id*. at 12394, para. 106.

[600] *Id*. at 12395, para. 107.

[601] *Id.*.

[602] OET-69 at 5; 47 C.F.R. § 73.616(e).

Commission should make all reasonable efforts to preserve each station's population served in the repacking process.[603] We will consider a station's "population served" to be the population within the station's coverage area, as that term is defined above, less any portions of the areas where interference from other stations is present as of February 22, 2012.[604] Also, we adopt Option 2, proposed in the *NPRM*, to fulfill the statutory mandate to preserve "population served" as of February 22, 2012. Thus, we will preserve service to the same specific viewers for each eligible station, and no individual channel reassignment, considered alone, will reduce another station's population served on February 22, 2012 by more than 0.5 percent. This approach is consistent with the standard for evaluating interference from new or modified television operations in section 73.616(e) of the rules.[605] As noted above, the 0.5 percent level is considered to be no interference at integer precision.

180. Option 2 will best fulfill our mandate to make "all reasonable efforts" to preserve broadcast licensees' populations served as of the date of enactment of the Spectrum Act, for the following reasons. First, we agree with NAB and other broadcasters that section 6403(b)(2) of the Spectrum Act's charge that we "make all reasonable efforts to preserve . . . the population served of each broadcast television licensee" directs us to protect service to the specific viewers who had access to a station's signal as of February 22, 2012. Interpreting the preservation mandate to refer to existing viewers as of this date seems most consistent with the statutory language and legislative history, as well as Commission precedent. The statute's use of the word "preserve" suggests that the goal is to maintain the *status quo*, not to replace some viewers with others. That interpretation is reinforced by Congress's rejection of a bill that would have established a goal of substantial equivalence rather than preservation,[606] as well as another bill that would have required the FCC to preserve "interference levels with respect to [each] licensee's signal" rather than population served.[607] Further, the Commission historically has been concerned with avoiding disruption of service to existing viewers.[608] Thus, while Option 1 would provide greater efficiencies because it takes into account overall reductions in interference that result when broadcast stations relinquish all of their spectrum usage rights,[609] we decline to adopt it because it would not preserve service to existing viewers as of February 22, 2012.

181. Second, Option 2 best satisfies our auction design needs. Specifically, Option 2 can

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[603] *Compare* NAB Comments at 18-21, 24 (maintaining that Congress intended to protect the specific viewers who currently receive service from a station," and to prohibit increased interference except in exceptional circumstances), Affiliates Associations Comments at 32 (same); Comcast Comments at 12-13 (same); NYSBA Comments at 21-22 (same); Tribune Comments at 17 (same); Univision Comments at 6 (same), *with* AT&T Reply at 62-63 (arguing that the statute does not require or even permit the Commission to maintain coverage area and population served in all but "extraordinary circumstances" if such rigidity would risk decreasing the spectrum reallocated to mobile broadband uses.); CTIA Reply at 46-47 (same). We address our interpretation of the statutory preservation mandate in § III.B.2.a.

[604] *See* paras. 164-165.

[605] We note that 47 C.F.R. § 73.616(e) does not limit the amount of new interference from multiple stations under the 0.5 percent standard.

[606] *See* Comcast Comments at 8 (citing Wireless Innovation and Public Safety Act of 2011, H.R.3509, 112th Cong. §302(b)(3)(B)(2011)).

[607] Public Safety Spectrum and Wireless Innovation Act, H.R. 2482, 112th Cong., § 303(a)(2), adding new § 47 U.S.C. § 309(j)(8)(F)(iii)(III)(bb)(CC).

[608] *See, e.g., Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments, Television Broadcast Stations (Fond du Lac, Wisconsin),* Memorandum Opinion and Order, 26 FCC Rcd 12712, 12714-15 (2011) (technical changes "that would result in a loss in television service are generally considered *prima facie* inconsistent with the public interest, unless outweighed by countervailing factors").

[609] *NPRM*, 27 FCC Rcd at 12392, para. 103.

accommodate pairwise interference analyses.[610] Option 1 would require analysis of interference relationships on an aggregate rather than a pairwise basis. While Option 3 permits greater new interference than Option 2 (i.e., two percent per station versus 0.5 percent per station), it is unduly restrictive because it does not allow any "replacement" interference, making repacking less efficient.[611] Accordingly, Option 2 provides the most protection to television stations' existing populations served consistent with our auction design needs.

182. Even though NAB recommends the adoption of Option 2 as the standard for "all reasonable efforts," it also urges the Commission to cap the amount of total additional interference at one percent, and allow no new interference to stations that are currently experiencing ten percent or more interference within their service areas.[612] According to NAB, these interference caps are necessary because, while an individual station can only cause a maximum addition of 0.5 percent interference under Option 2, "stations repacked during the incentive auction process . . . would likely receive interference from multiple stations" which, in the aggregate, could "lead to significant viewer losses."[613] Contemporaneously with the release of this Order, OET, and the Wireless, Media, and International Bureaus will be releasing a Public Notice inviting comment on a staff analysis of the potential impact of aggregate interference on television stations as a result of the repacking process. We defer a decision on NAB's proposal until the record is fully developed on the requested cap. We will resolve the issue in a subsequent Order that will be released no later than the release of the *Comment PN*, and well in advance of the incentive auction.

3. Facilities to Be Protected

183. In this Section, we address which broadcast facilities we must make all reasonable efforts to preserve in the repacking process, as well as those we elect to protect as a matter of discretion. A broadcaster may have one or more of the following types of facilities: licensed; authorized (i.e., facilities that are not yet licensed but are authorized in a construction permit); and applied-for (i.e., facilities that are requested in a pending application for a construction permit).[614] The discussion that follows addresses our interpretation of the statutory preservation mandate as well as our discretionary protection decisions with regard to each of these types of facilities. We conclude that protecting certain facilities in addition to those the statute requires us to protect will serve the public interest. We also explain our decision not to extend protection to certain other categories of facilities.[615]

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[610] *See* § III.A (Repacking Process Overview).

[611] Under Option 3, locations where interference was formerly caused by stations that went off the air or changed channels cannot be permitted to occur from other stations.

[612] NAB Comments at 20-21. *See* Tribune Reply at 17 (supporting NAB's proposals); Broadcast Networks at 7 (same).

[613] NAB Comments at 29.

[614] We note that we technically do not "protect" specific "facilities" in the repacking process. A broadcaster that is reassigned to a different channel in the repacking process will have to modify its facilities in order to operate on its new channel. Rather, we use the term "facilities" as shorthand for the "coverage area and population served" of licensees that we make all reasonable efforts to preserve in the repacking process.

[615] To ensure a stable, accurate database, and to facilitate the repacking process, we will require all full power and Class A television stations to verify and certify to the accuracy of the information contained in CDBS with respect to their protected facilities. Prior to the start of the incentive auction, the Media Bureau will issue a Public Notice announcing each station's protected facility. All full power and Class A stations will be required to submit a form (to be developed by the Media Bureau following the release of this Order) specifying any changes to the information contained in CDBS and certifying to the accuracy of the information in CDBS or provided on the form for their protected facility. We delegate authority to the Media Bureau to announce by Public Notice the deadline and procedures for filing the form.

a. Mandatory Protection of Full Power and Class A Facilities

184. *Background.* Section 6403(b)(2) of the Spectrum Act directs the Commission, in making any reassignments or reallocations under section 6403(b)(1)(B), to "make all reasonable efforts to preserve, as of the date of enactment of [the] Act, the coverage area and population served of each broadcast television licensee." A "broadcast television licensee" is defined as the "licensee of—(A) a full-power television station; or (B) a low-power television station that has been accorded primary status as a Class A television licensee" under section 73.6001(a) of the Commission's rules.[616] In the *NPRM*, the Commission tentatively concluded that section 6403(b)(2) mandates all reasonable efforts to preserve full power and Class A facilities (1) licensed as of February 22, 2012; or (2) for which an application for a license to cover was on file as of February 22, 2012.[617]

185. *Discussion.* We adopt the tentative conclusion that section 6403(b)(2) mandates all reasonable efforts to preserve the "coverage area and population served" reflected in full power and Class A facilities (1) licensed as of February 22, 2012, the date of enactment of the Spectrum Act; or (2) for which an application for a license to cover was on file as of February 22, 2012. We also adopt the tentative conclusion that the scope of mandatory protection under section 6403(b)(2), which is limited to "broadcast television licensees," defined by the Spectrum Act as full power and Class A stations only, excludes LPTV and TV translator stations.[618] We interpret this mandate to apply to full power and Class A broadcasters that do not participate in the reverse auction and full power and Class A broadcasters that participate in the reverse auction but do not submit a winning bid. We also interpret this statutory mandate to apply to full power and Class A broadcasters that submit a winning bid to move from a UHF to a VHF channel or from a high VHF to a low VHF channel.[619]

186. We conclude that section 6403(b)(2) requires all reasonable efforts to preserve only facilities that were in operation as of February 22, 2012. The statutory mandate to make all reasonable efforts to "preserve" coverage area and population "served" as of a date certain (February 22, 2012) clearly reflects a Congressional intent to protect or maintain facilities operating on this date. This interpretation is consistent with the arguments of NAB and other broadcasters that section 6403(b)(2) directs us to protect service to the specific viewers who had access to a station's signal as of that date,[620] and with the Commission's historical concern with avoiding disruption of service to existing viewers.[621] The full power and Class A facilities that were in operation as of February 22, 2012 are facilities that were licensed on that date[622] or for which an application for a license to cover an authorized construction permit was on file. Under the Commission's rules the filing of a license to cover application, which is the

[616] Spectrum Act §§ 6001(6), 6403(a)(1).

[617] *NPRM*, 27 FCC Rcd at 12397, para. 113. The Commission also tentatively concluded that § 6403(b)(2) does not prohibit us from granting protection to additional facilities where appropriate. *Id*. We discuss our exercise of discretionary authority below.

[618] *Id.* at 12399, para. 118; Spectrum Act §§ 6001(6), 6403(a)(1); *see also* paras. 238-39 (explaining that LPTV and TV translator stations are not entitled to the protections afforded by § 6403(b)(2) because they are not "broadcast television licensee[s]" as defined in § 6001(6)).

[619] *See* § IV.B.1.b (Reverse Auction Bid Options). It is reasonable to interpret the preservation mandate as applying to such successful bidders. If such bidders were not covered by the mandate, stations likely would be less willing to submit UHF-to-VHF or high-VHF-to-low-VHF bids, thereby undermining our goal of allowing market forces to determine the highest and best use of spectrum.

[620] *See* § III.B.2.d (Preserving Population Served).

[621] *See id.*

[622] A license requires the licensee to broadcast; a license will be revoked if the station is silent for any consecutive 12-month period, and a station must seek approval to discontinue operations in excess of 30 days. *See* 47 U.S.C. § 312(g); 47 C.F.R. §§ 73.1635(a)(4), 73.1740(c), 73.1750.

last step in the process before the Commission issues a license, provides the applicant with the right to provide a broadcast television service to the public.[623] Thus, even if a facility was not licensed as of February 22, 2012, it is reasonable to assume that the facility was in operation as of that date if an application for a license to cover was on file.[624] Accordingly, we agree with commenters who argue that we must protect these facilities.[625]

187. We reject claims that section 6403(b)(2) mandates protection of facilities authorized in construction permits as of February 22, 2012.[626] As discussed above, we interpret section 6403(b)(2) to require all reasonable efforts to preserve only the coverage area and the population that a full power or Class A station was actually serving as of February 22, 2012, not the coverage area and population authorized to be served by a station at some point in the future. While facilities authorized in a construction permit are protected from interference under Commission rules,[627] the grant of a construction permit standing alone does not authorize operation of those facilities.[628] Rather, operations are permissible only upon completion of construction of the facilities authorized, provided the Commission is notified and an application for a license to cover is filed within 10 days.[629]

188. Some commenters contend that, if Congress intended its preservation mandate to apply to "licensed facilities" only, it would have used that terminology in section 6403(b)(2). Instead, these

[623] Upon completion of construction of the facility authorized in its construction permit, a permittee may operate the facility pursuant to program test authority provided that an application for a license to cover is filed within 10 days. *See* 47 C.F.R. § 73.1620(a)(1) (automatic program test authority). Full power and Class A permittees operating under program test authority must operate "in strict compliance with the rules governing broadcast stations," which include a minimum operating schedule. 47 C.F.R. §§ 73.1620(d), 73.1740(a)(2), 73.6001(b).

[624] Through comments filed in this proceeding, the Commission is aware of one station, KTNC-TV, Concord, California, that had a license application on file on February 22, 2012, but was unable to operate according to the technical parameters set forth in that application. We will exercise our discretion, however, to protect the facilities specified in the pending license application. *See* para. 223.

[625] *See, e.g.*, ACTBN Comments at 2–3; UCC Comments at 2–5; Dispatch Comments at 1–2; Univision Comments at 12–13.

[626] *See* Affiliates Associations Comments at 20–22; CCB Comments at 2–3; Channel 32 Comments at 4–5; Cox Media Comments at 6–7; Disney Comments at 15–16; KAZN Comments at 7–9; Parker Comments at 3–4; Tribune Comments at 20–21; 4 NY Broadcasters Comments at 3–4; *see also* Comcast Comments at 15–16; CTI Comments at 2–3.

[627] *See* 47 C.F.R. § 73.623(h).

[628] The Communications Act provides that a "construction permit" authorizes "construction" of a station for the transmission of signals by radio, whereas a "license" authorizes "use" of that station. *Compare* 47 U.S.C. § 153(13) *with* 47 U.S.C. § 153(49); *see also Cedar Rapids Television Co. v. FCC*, 387 F.2d 228, 230-31 (D.C. Cir. 1967) (upholding Commission decision declining to consider a facility authorized in a construction permit as "actual television operations").

[629] *See* 47 C.F.R. § 73.1620(a)(1) (automatic program test authority). Other provisions of § 6403 also support our interpretation that § 6403(b)(2) does not mandate protection of facilities authorized in construction permits. Reading § 6403(b)(2) to require all reasonable efforts to preserve the coverage area and population to be served by authorized but unlicensed facilities would undermine the purpose of § 6403(h). This provision makes the right of a "licensee," but not a permittee, to protest a proposed order of modification under § 316 of the Communication Act inapplicable in the case of a modification under § 6403. If § 6403(b)(2) were read to mandate all reasonable efforts to preserve the coverage area and population to be served by authorized but unlicensed facilities, then a permittee would have greater rights than a licensee in the repacking process, and the apparent purpose of § 6403(h) to expedite the auction and repacking process would be frustrated. Our reading also is consistent with other subsections of § 6403(b) that focus solely on the preservation of the rights of licensees and do not mention the preservation of any rights reflected in construction permits. *See* Spectrum Act § 6403(b)(3) (prohibiting the Commission from involuntarily reassigning a "licensee" from UHF to VHF or from high VHF to low VHF); *id*. § 6403(b)(4) (requiring the Commission to reimburse costs incurred by "licensees").

commenters note, section 6403(b)(2) refers expressly to "broadcast television licensee[s]" and not to "licensed facilities."[630] We do not, however, interpret section 6403(b)(2) as limiting our mandatory preservation obligation to facilities for which a license had been granted as of February 22, 2012. Rather, we interpret it to require all reasonable efforts to preserve actual operations as of February 22, 2012. Such operations were permissible on that date only for facilities for which a license had been granted or that were subject to a pending license to cover application.

189. We disagree with commenters who argue that failing to interpret section 6403(b)(2) broadly to mandate protection of facilities authorized in construction permits would frustrate the purposes of the Spectrum Act, one of which, they claim, is to hold harmless those broadcasters not participating in the reverse auction.[631] Commenters also claim that failure to protect such construction permits would undermine Congress's goal to ensure that viewers receive a reliable over-the-air digital signal following the DTV transition.[632] We reject these arguments. First, we do not interpret section 6403(b)(2) as a "hold harmless" provision that requires or allows us to ignore the broader objectives of the Spectrum Act.[633] Second, as discussed in the following section, we have discretion to extend protection beyond the scope of the statutory mandate where doing so is consistent with those objectives and serves the public interest. Congress struck a balance in the Spectrum Act by establishing the minimum extent to which the Commission must make all reasonable efforts to preserve broadcast facilities and leaving the Commission discretion to protect additional facilities in appropriate cases.[634]

b. Discretionary Preservation

190. *Background*. The Commission tentatively concluded in the *NPRM* that it has the discretion to protect additional facilities in the repacking process where appropriate.[635] The Commission proposed to exercise this discretion to protect the small number of new full power television stations that were authorized by construction permits, but were not yet constructed or licensed, as of February 22, 2012, and certain digital Class A facilities that also were not licensed on that date.[636] The Commission also sought comment on whether to protect any other authorized full power or Class A television facilities, including outstanding full power construction permits issued to effectuate a channel substitution following a rulemaking proceeding.[637]

191. *Discussion*. Although we interpret the Spectrum Act to mandate that we protect only facilities that were in operation as of February 22, 2012, we adopt the tentative conclusion in the *NPRM* that the Spectrum Act does not preclude us from exercising discretion to protect additional facilities beyond this statutory floor. Many commenters support this view.[638] Section 6403(i)(1) specifies that nothing in section 6403(b), including the preservation mandate in section 6403(b)(2), "shall be construed

[630] *See* Affiliates Associations Comments at 20–21; Bahakel Comments at 2–3; Channel 32 Comments at 4; Disney Comments at 16; Post-Newsweek Comments at 6; WGAL Comments at 7; *see also* Raycom Comments at 8.

[631] *See* Affiliates Associations Comments at 20–21; Belo Comments at 14; CCB Comments at 2–3; Channel 32 Comments at 5; CTI Comments at 2–3; Disney Comments at 2, 13–14, 15–16; Parker Comments at 3–4.

[632] *See* 4 NY Broadcasters Comments at 4; Channel 32 Comments at 5 n.15; Disney Comments at 2, 13–14, 16–18; Parker Comments at 3–6.

[633] *See* § III.B.2.a ("All Reasonable Efforts").

[634] Although we reject claims that § 6403(b)(2) mandates protection of facilities authorized in construction permits as of February 22, 2012, we exercise our discretionary authority to protect these facilities if licensed by the Pre-Auction Licensing Deadline, for the reasons discussed below.

[635] *NPRM*, 27 FCC Rcd at 12397, para. 113.

[636] *Id*. at 12397–98, paras. 114–115.

[637] *Id*. at 12398, para. 116.

[638] Comcast Comments at 16; Gray TV Comments at 3; Broadcast Networks Comments at 8.

to expand or contract the authority of the Commission except as otherwise expressly provided."[639] Furthermore, section 6403(b) does not expressly restrict the Commission's authority to protect facilities that are not subject to the statutory mandate where doing so would serve the public interest. That authority is clearly encompassed within the Commission's broad spectrum management authority under the Communications Act.[640]

192. Our exercise of discretion requires a careful balancing of numerous factors in order to carry out the goals of the Spectrum Act and other statutory and Commission goals. On one hand, failing to protect certain facilities beyond the statutory floor may deprive viewers of television service they currently receive. A decision not to protect certain facilities also may strand the investments broadcasters have made in these facilities, including equipment and construction costs, as well as the payment of legal and engineering costs associated with applying for and licensing a facility,[641] in the justifiable belief that their facilities would be protected in the repacking process. In addition, a decision to deny discretionary repacking protection could have an adverse impact on the Class A service's digital transition.

193. On the other hand, any additional preservation beyond the statutory floor may encumber additional broadcast television spectrum, thereby increasing the constraints on the repacking process due to interference and other technical requirements. This additional encumbrance could hinder our ability to repack television spectrum and undermine our goal of using market forces to repurpose spectrum for flexible use.[642] In addition, the exercise of discretionary protection may increase the costs of the reverse auction. Protecting facilities that were not in operation as of February 22, 2012 also may undermine our ability to prepare for the auction and repacking process and our need for a stable database of the facilities that will be protected prior to the auction. If we opt to protect facilities that significantly expand a station's coverage area, the cost of compensating the station for relinquishing its spectrum usage rights may be higher than if we were to protect only facilities licensed on February 22, 2012.[643]

194. As set forth more fully below, based on careful consideration of these factors, we conclude that the public interest is best served by extending protection to certain categories of facilities that were not licensed or the subject of a pending license to cover application as of February 22, 2012. More specifically, we will protect: (1) the small number of new full power television stations that were authorized, but not constructed or licensed, as of February 22, 2012; (2) full power facilities authorized in outstanding construction permits issued to effectuate a channel substitution for a licensed station; (3) modified facilities of full power and Class A stations that were authorized by construction permits granted on or before April 5, 2013, the date the Media Bureau issued a freeze on the processing of certain applications; and (4) Class A facilities authorized by construction permits to implement Class A stations' mandated transition to digital operations. Except in very limited circumstances discussed below,[644] we will limit discretionary protection to these categories.

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[639] Spectrum Act § 6403(i)(1).

[640] *See* n.288.

[641] The consideration of these factors in connection with the repacking process is consistent with Commission precedent. *See, e.g., Reexamination of the Comparative Standard for Noncommercial Educational Applicants*, MM Docket No. 95-31, Second Report and Order, 18 FCC Rcd 6691, 6707, para. 41 (2003) (pending applicants "spent the time and money necessary to complete all of the engineering and legal components of a long-form application"); *Reallocation and Service Rules for the 698-746 MHz Spectrum* (*Television Channels 52-59*), GN Docket No. 01-74, Report and Order, 17 FCC Rcd 1022, 1042-43, para. 45 (2002) (*Lower 700 MHz R&O*) ("With regard to applications for construction permits, we recognize parties have made investments in these applications . . . .").

[642] Because we cannot predict the outcome of the reverse auction or the number of stations that ultimately will be subject to the repacking process, we cannot predict with specificity the impact that affording certain protections will have on our repacking flexibility. We must rely on our general expertise and predictive judgments in this regard.

[643] *See* § IV.B.1.a (Reverse Auction Eligibility).

[644] *See* §§ III.B.3.b.v (Additional Cases) and III.B.3.d.ii (Out-of-Core Class A-Eligible LPTV Stations).

195. We also generally will limit our discretionary protection to facilities in the preceding categories that are licensed[645] by the Pre-Auction Licensing Deadline to be announced by the Media Bureau.[646] Our approach avoids the possibility that we will protect facilities authorized in construction permits that may never be constructed, as well as the need to protect two sets of facilities for many stations—those that have been licensed as well as those that are authorized by construction permits. Protecting two sets of facilities would hinder our ability to repack television spectrum and unduly complicate the repacking process, thus undermining the purpose of the Spectrum Act. Our approach is consistent with past Commission actions to freeze facilities modifications during major spectrum transitions, fairly accommodates broadcasters' legitimate expectations, and adequately balances their ongoing need to make technical modifications to their facilities and the Commission's need for a stable database in order to prepare for and carry out the incentive auction.

(i) New Full Power Stations

196. As proposed in the *NPRM*, we will exercise our discretion to protect the new full power television stations that were authorized by construction permits, but not yet licensed, as of February 22, 2012.[647] We have considered all of the circumstances involved, including the equities in favor of these permittees and the potential impact on repacking flexibility, and conclude that protection is warranted. Several of these stations are now licensed and providing service to viewers and their communities of license. Each of these licensed stations filed a license application either before or shortly after release of the *NPRM*,[648] which occurred approximately seven months after the Spectrum Act was enacted. The timing of the license applications thus suggests that these permittees made significant investments toward constructing the stations prior to the statute's enactment date, in reliance on Commission-authorized construction permits. Moreover, we conclude that protecting these facilities will have minimal impact on our flexibility in the repacking process, because they are small in number and they are licensed or authorized on VHF channels and/or in remote locations where we anticipate that our repacking needs will be limited.[649]

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[645] The references to "licensed" facilities in this Section of the Order encompass both licensed facilities and those subject to a pending license to cover application.

[646] We delegate authority to the Media Bureau to issue a Public Notice specifying the Pre-Auction Licensing Deadline. We conclude that establishment of such a deadline in advance of the auction is necessary in order to ensure that the Commission will have a largely static view of the facilities that will be protected in the repacking process. We anticipate that the Public Notice will give stations at least 90 days prior notice of this deadline.

[647] WACP, Atlantic City, New Jersey, WMWC, Galesburg, Illinois, and KUKL-TV, Kalispell, Montana are now licensed. The construction permit for the one remaining station in this category, WMDE, channel 5, Seaford, Delaware, was originally scheduled to expire in May 2014, but has been tolled pursuant to § 73.3598(b) of our rules. 47 C.F.R. § 73.3598(b). This station will not be protected unless licensed by its expiration date or the Pre-Auction Licensing Deadline, whichever occurs earlier.

[648] Although § 6403(b)(2) of the Spectrum Act provided notice to broadcasters that facilities not in operation as of February 22, 2012 may not be protected, the Commission confirmed and provided a more detailed explanation of that possibility in the *NPRM*. *See NPRM*, 27 FCC Rcd at 12390, para. 98 and 12397, paras. 113–114.

[649] Extending discretionary protection to VHF stations will have some impact on our repacking flexibility because it may limit our ability to accept UHF-to-VHF and high-VHF-to-low-VHF bids in the reverse auction, which will free up UHF spectrum. Overall, however, discretionary protection of VHF stations will have less impact on our repacking flexibility than protection of UHF stations because the Spectrum Act prohibits us from involuntarily reassigning stations from UHF channels to VHF channels in the repacking process and one of the central goals of that process will be to make as much UHF spectrum as possible available for new uses. *NPRM,* 27 FCC Rcd at 12361, para. 10. Further, fewer than 25 percent of full power and Class A stations are licensed on VHF channels, and many of these stations are located in sparsely populated states and areas.

(ii) Channel Substitution Construction Permits

197. *Background*. The Commission sought comment in the *NPRM* on whether to protect facilities authorized in a construction permit issued to a licensed station to effectuate a substitution of a new channel for its licensed channel (a "channel substitution").[650] The Commission noted that such stations already had completed a rulemaking process considering the proposed channel change, the Commission had modified the DTV Table of Allotments ("Table of Allotments") to reflect the change, and the substitute channels were entitled to interference protection under our rules.[651]

198. *Discussion*. We will exercise our discretion to protect facilities authorized in construction permits for channel substitutions that are licensed by the Pre-Auction Licensing Deadline. After considering the equities in favor of protecting the facilities authorized in channel substitution construction permits, as well as the potential impact on repacking flexibility, we conclude that protection is warranted. At the time the Spectrum Act was enacted, there were fewer than 20 of these construction permits outstanding. All of the rulemaking proceedings and corresponding changes to the Table of Allotments associated with these channel substitutions were completed prior to enactment of the Spectrum Act. In reliance on their Commission authorizations, a number of these stations have licensed their substitute channels, and are now providing service to viewers on their new channels. Approximately half of these licensed stations constructed their substitute facilities prior to release of the *NPRM*. Thus, it is apparent that significant investments were made toward constructing these substitute facilities prior to enactment of the Spectrum Act.[652]

199. The fact that these channel substitution allotments were protected in the Table of Allotments prior to enactment of the Spectrum Act further weighs in favor of protecting the corresponding authorized facilities. Moreover, the Media Bureau authorized the channel substitutions because the proposals would improve service to existing viewers and/or expand service to new viewers. Failing to protect them would deprive viewers of this improved television service.

200. Protecting these stations' substitute facilities rather than their facilities licensed on February 22, 2012 will not significantly impact our repacking flexibility. While protecting such substitute facilities may have some impact on our repacking flexibility in the case of a contour increase, the number of stations that will receive protection is small and the majority of protected channel substitutions involve channel changes within the UHF band, changes from a UHF to a VHF channel, and/or stations located in less populated areas where our repacking needs should be limited. We find that any impact on repacking flexibility caused by protecting these facilities is far outweighed by the equities in favor of protection noted above.

201. Seven of the channel substitutions we are electing to protect result in a station moving from a VHF to a UHF channel, which will encumber additional UHF spectrum by adding a new station to

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[650] *NPRM*, 27 FCC Rcd at 12399, para. 116; *see also* 47 C.F.R § 73.622(i). Under the Commission's rules, a station must engage in a two-step process, including a rulemaking proceeding and a subsequent application process, to change the channel allotted to it in the Table of Allotments. As noted in the *NPRM*, as of February 22, 2012, these stations held authorizations for two channels—a license for the channel on which they were operating at that time and a permit to construct the substitute channel. *NPRM,* 27 FCC Rcd at 12398 n. 177. Thus, as of February 22, 2012, these stations were "licensees" with respect to the channel on which they were operating and "permittees" with respect to their newly authorized, but not yet licensed, substitute channel.

[651] *NPRM*, 27 FCC Rcd at 12399, para. 116.

[652] The stations with channel substitution construction permits that did not complete construction of their substitute facilities prior to release of the *NPRM* did not receive their construction permits until various dates between mid-2011 and early 2012. These stations likely would not have been in a position to make substantial investments in construction of their facilities prior to the enactment of the Spectrum Act in February 2012. However, we expect that they have made significant investments since that time in reliance on their Commission authorizations. Accordingly, failure to protect these substitute facilities would result in a significant amount of stranded investment.

the band. If any of these stations participates in the reverse auction, it will have the opportunity to relinquish its newly allotted UHF channel through a UHF-to-VHF bid, which could increase the cost of clearing UHF spectrum. On balance, however, we conclude that these concerns are outweighed by the investments we expect these seven stations have made in constructing their substitute facilities, the fact that three of them have already licensed their substitute facilities and are providing service to viewers on their new UHF channels, and the improved or expanded viewer services the Media Bureau determined would result from these substitutions.

202. We will protect channel substitution construction permits only if they are licensed by the Pre-Auction Licensing Deadline. Some commenters maintain that unconditionally guaranteeing protection of the facilities authorized in these construction permits would not have a significant impact on the Commission's repacking flexibility and that the stations at issue relied on their expectation that they would have the normal, three-year construction period in which to build their new facilities.[653] As discussed above, we do not interpret the Spectrum Act as requiring the protection of facilities authorized in construction permits, and we decline to exercise our discretion to protect such facilities that are not licensed by the Pre-Auction Licensing Deadline. While we acknowledge that these channel substitutions were granted because the Media Bureau found them to be in the public interest, those findings did not take into account Congress's mandate in the Spectrum Act to repurpose UHF spectrum for flexible use. We find that preserving a facility for the channel licensed and operating on February 22, 2012 (as required by the Spectrum Act) as well as an authorized facility for a different channel that remains unbuilt would limit our repacking flexibility without offering sufficient countervailing public interest benefits. Furthermore, the stations in this category should have sufficient time and notice to complete construction by the deadline if they wish to ensure protection on their substitute channels.[654]

203. *Construction Permits to Relocate from Channel 51.* We also address our treatment of stations seeking to relocate from channel 51 pursuant to a voluntary relocation agreement with Lower 700 MHz A Block licensees. After the Commission instituted a freeze on the acceptance of channel substitution rulemaking petitions in May 2011,[655] it announced that it would lift the freeze to accept petitions for rulemaking filed by these stations.[656] Since enactment of the Spectrum Act, we have issued three orders reallocating stations from channel 51.[657] Consistent with our approach above, we will protect the substitute channel facilities of former channel 51 licensees if they are licensed by the Pre-Auction

[653] *See* Channel 32 Comments at 8; Disney Comments at 29; Gray TV Comments at 4–5; LeSea Comments at 1–3; Lincoln Comments at 2–3; NAB Comments at 31.

[654] Of the five channel substitution permits in this group that are not yet constructed, two must be constructed by dates in 2014, which we expect will precede the Pre-Auction Licensing Deadline. The remaining construction permits expire in 2015. These stations, whose channel allotments were modified prior to enactment of the Spectrum Act, will have sufficient time (i.e., approaching the traditional three-year construction period) to make necessary arrangements to have their substitute channel facilities licensed by the Pre-Auction Licensing Deadline if they prefer protection on their substitute channel. We encourage channel substitution permittees who no longer wish to construct their substitute channels to notify the Media Bureau and request that the channel on which they currently operate be reallotted to the Table of Allotments, 47 C.F.R. § 73.622(i).

[655] *Freeze on the Filing of Petitions for Digital Channel Substitutions, Effective Immediately*, Public Notice, 26 FCC Rcd 7721 (2011) (*Channel Substitution Freeze PN*).

[656] *General Freeze on the Filing and Processing of Applications for Channel 51 Effective Immediately and Sixty (60) Day Amendment Window for Pending Channel 51 Low Power Television, TV Translator and Class A Applications*, Public Notice, 26 FCC Rcd 11409 (2011) (*Channel 51 Freeze PN*).

[657] *Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments (Oklahoma City, Oklahoma)*, DA No. 14-130 (Vid. Div. rel. Feb. 4, 2014); *Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments (Cedar Rapids, Iowa)*, 28 FCC Rcd 13009 (Vid. Div. 2013); *Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments (Greenville, North Carolina)*, 27 FCC Rcd 8865 (Vid. Div. 2012). The Greenville and Cedar Rapids facilities have been constructed (File Nos. BLCDT-20121029ACA and BLCDT-20140416AA.

Licensing Deadline.[658] We conclude that protecting these stations' substitute facilities rather than the channel 51 facility licensed on February 22, 2012 will not significantly impact our repacking flexibility. While protecting such facilities may have some impact on repacking flexibility in the case of a contour increase, the number of stations involved is small, they are moving from channel 51 to another UHF channel, and some are within relatively unpopulated areas where our repacking needs should be limited. We conclude that the minimal impact that protection of these relocated channel 51 facilities would have on our repacking flexibility is outweighed by the public interest benefit of clearing broadcast operations from channel 51 as expeditiously as possible in order to promote deployment of wireless broadband service in the 700 MHz A Block.

(iii) Facility Modifications

204. *Background*. The Commission proposed in the *NPRM* not to exercise its discretion to protect construction permits for facilities modifications that were authorized but not licensed on February 22, 2012, or applications for such construction permits that were pending on that date.[659] That proposal was opposed by a number of broadcasters.[660]

205. On April 5, 2013, the Media Bureau issued a Public Notice (the "*Freeze PN*") imposing limitations on the filing and processing of certain applications by full power and Class A television stations in light of the forthcoming auction and the need to plan for the repacking process.[661] The Media

[658] Because rulemaking petitions seeking to relocate stations from channel 51 are still permitted to be filed, they are not subject to the Media Bureau's April 5, 2013 freeze on the filing of certain facilities modifications, which is discussed in the following Section. Accordingly, we will not impose the requirement discussed in the next Section that these facilities modifications need to be authorized in a construction permit by April 5, 2013 in order to qualify for protection. We conclude that our ability to plan for the auction and repacking process, and our interest in having a stable station database leading up to the auction, will not be undermined by the processing and grant of such petitions because we do not expect a significant number of such petitions to be filed and, in any event, our interest is outweighed by the significant public interest benefits in clearing channel 51 as expeditiously as possible. Moreover, for the reasons discussed above, we do not expect that protecting a substitute facility rather than the channel 51 facility licensed on February 22, 2012 will significantly impact our repacking flexibility. Further, in determining whether to grant any rulemaking petitions seeking to relocate from channel 51 that are filed after the release of this Order, the Media Bureau will assess the extent to which grant of the petition will affect repacking flexibility.

[659] *NPRM*, 27 FCC Rcd at 12397, para. 114.

[660] For example, some broadcast commenters assert that the Commission should exercise discretion to protect facilities licensed or authorized after enactment of the Spectrum Act in order to avoid unnecessary disruption and permit fulfillment of the reasonable service expectations of stations and their audiences. *See* Gray TV Comments at 3. Commenters also argue that outstanding construction permits should be protected because, by granting a construction permit application, the Commission made the statutorily required determination that the proposed facility would serve the public interest, and failure to protect the facility necessarily would contravene the public interest. Broadcast Networks Comments at 8. Other broadcasters claim that a failure to protect facilities licensed after February 22, 2012 would result unfairly in the loss of investments that broadcasters made in reliance on construction permits with a three-year construction period. *See, e.g.*, Channel 32 Comments at 5–7. In this regard, commenters point out that the Commission continued to accept and process modification applications after the enactment of the Spectrum Act, and broadcasters expended technical, financial, and other resources to implement modifications in reliance on the Commission's authorizations. Disney Comments at 21–23; Parker Comments at 8; Univision Comments at 12; Belo Comments at 17. Only T-Mobile supports a February 22, 2012 cut-off date for discretionary protection, observing that, while some broadcasters argue that this date is arbitrary or unfair, "the Commission would likely face similar complaints regardless of the date selected." T-Mobile Reply at 97. According to T-Mobile, "[t]he alternative of a less definitive or more flexible cut-off date is far worse" because it would "risk[] delaying or disrupting the auction by making a moving target out of the spectrum that is its subject." *Id.*

[661] *Media Bureau Announces Limitations on the Filing and Processing of Full Power and Class A Television Station Modification Applications, Effective Immediately, and Reminds Stations of Spectrum Act Preservation Mandate*, Public Notice, 28 FCC Rcd 4364 (2013).

Bureau announced that, effective April 5, 2013, it would not accept for filing modification applications for changes to existing television service areas that would increase a full power station's noise-limited contour or a Class A station's protected contour in one or more directions beyond the area resulting from the station's authorized facilities as of that date. Similarly, Class A displacement applications that would increase the station's protected contour would not be accepted.[662] The Media Bureau explained that these limitations were necessary to (1) create a stable database of full power and Class A facilities that would allow for development and analysis of potential repacking methodologies; and (2) avoid frustrating the goals of the incentive auction.[663]

206. The Media Bureau also announced that it would continue to process pending or future applications that comply with the limitations described in the *Freeze PN*.[664] Pending applicants at variance with these limitations were given 60 days to amend their applications to comply with the limitations or request a waiver. The Bureau stated that pending applications that were not amended would be processed subject to the rules and policies adopted in this Order.[665] Finally, the Bureau reminded stations that the Commission proposed to interpret section 6403(b)(2) as requiring only the preservation of facilities licensed as of February 22, 2012, and that it would decide in this Order the extent to which facilities that were not licensed as of that date would be protected in the repacking process.[666]

207. *Discussion*. We conclude that it will serve the public interest to extend discretionary protection to the facilities of full power and Class A stations authorized in construction permits that were granted on or before April 5, 2013, provided that the facilities are licensed by the Pre-Auction Licensing Deadline. We find that protection is justified by the equities in favor of these licensees, who expended technical, financial, and other resources to implement modifications in reliance on the Commission's grant of authorizations. We also conclude that these equities outweigh any adverse impact that protection may have on our repacking flexibility.

208. As commenters point out, the Commission continued to accept and grant modification applications after enactment of the Spectrum Act.[667] Once the Commission granted these applications, the authorized facilities were entitled to interference protection under our rules. Approximately 40 full power licensees with authorized modification construction permits on February 22, 2012 requested licenses to cover these facilities either before or shortly after release of the *NPRM*, suggesting that they made investments in constructing these facilities prior to enactment of the Spectrum Act in reliance on Commission authorizations.[668] Similarly, more than 30 full power licensees with construction permit applications that were granted after February 22, 2012 requested licenses to cover these facilities either before or shortly after release of the *NPRM*. Failure to protect these facilities, which are now licensed, would result in stranded investment and loss of service to viewers. While stations that constructed

[662] The Media Bureau stated in the *Freeze PN* that it would consider, on a case-by-case basis, requests for waiver of the filing limitations in the *Freeze PN* "when a modification application is necessary or otherwise in the public interest for technical or other reasons to maintain quality service to the public." *Id*. at 4365. It also stated that Class A minor change applications to implement the digital transition could be filed and would be processed subject to the limitations set forth in the Commission's rules. *Id*.

[663] *Id.* at 4364–65.

[664] *Id.* at 4365.

[665] *Id.*

[666] *Id*. at 4366.

[667] *See* Affiliates Associations Comments at 23; Channel 32 Comments at 6; Parker Comments at 8.

[668] *See* CCB Comments at 1–2 ($400,000 investment in modified facilities); CTI Comments at 2 ($200,000 investment in modified facilities); KAZN Comments at 5-6 ($2 million invested in DTS facilities); KRBK Comments at 2-3 ($1.7 million invested in modified facilities).

authorized facilities after issuance of the *NPRM* were on notice that these facilities might not be protected during the repacking process, we do not believe that this factor outweighs the harm that would result to broadcasters and viewers if such facilities are not protected.

209. We also conclude that the equities in favor of protecting these facilities modifications outweigh any potential adverse impact on our repacking flexibility. In July 2013, the Incentive Auction Task Force released updated *TVStudy* computer software for determining the coverage area and population served of each broadcast station and a Public Notice with the results of a staff analysis of whether a station could be reassigned to certain channels in the repacking process, using the licensed technical facilities of stations as of February 22, 2012.[669] After release of the *Repacking Data PN* and updated software, with respect to each licensee with a facilities modification construction permit authorized on or before April 5, 2013, but not licensed as of February 22, 2012, we compared the facility contour licensed on February 22, 2012 with the modified contour specified in the construction permit. Based on this comparison, we concluded that protection of the facilities specified in the construction permits, rather than the facilities licensed as of February 22, 2012, would not significantly impact our flexibility in the repacking process. We conclude that any such impact is outweighed by the equities in favor of these broadcasters, which expended technical, financial, and other resources to implement modifications in reliance on the Commission's grant of the authorizations.

210. Although some broadcasters challenge the specific timing of the *Freeze PN*, many acknowledge that a freeze would be necessary at some point in advance of the incentive auction[670] and that a freeze is consistent with past Commission actions during other major broadcast spectrum transitions.[671] We disagree that the timing of the *Freeze PN* was not adequately justified.[672] We conclude that the release of the *Freeze PN* well over a year after passage of the Spectrum Act appropriately balanced broadcasters' ongoing need for flexibility in making modifications to their facilities with the

[669] *Repacking Data PN*, 28 FCC Rcd 10370.

[670] For example, NAB claims that "a future freeze date [by which broadcaster service areas will be measured] is both fair to broadcasters . . . and in the public interest." NAB Reply at 55; *see also* KAZN Reply at 2 (agrees with NAB that Commission should establish a "freeze" date). WGAL suggests that the Commission "protect such post-February 22, 2012, facilities up to a deadline in advance of the spectrum repacking." WGAL Comments at 8–9.

[671] Disney acknowledges that "[h]istorically, the FCC imposes a freeze when it determines that it is in the public interest to impose a freeze upon the acceptance, processing, or action upon applications seeking to operate using spectrum that is the subject of a rulemaking to change license service rules or spectrum allocations." Disney Comments at 22 n.63; *see also* Cox Media Comments at 7 (citing to "the Commission's well-established practice of issuing freezes when it seeks to cut-off requests for facilities changes or cease processing pending requests" in urging that the Commission protect facilities sought or granted as of some future freeze date); Affiliates Associations Comments at 23 ("The Commission has not yet imposed a freeze on modifications like it did before conducting the post-transition DTV repacking . . . ."). Examples of such prior Commission actions include the following: *Channel 51 Freeze PN*, 26 FCC Rcd 11409 (freezing applications for new Channel 51 facilities to permit Commission consideration of interference issues to licensees of adjacent reallocated spectrum); *Freeze on the Filing of Applications for New Digital Low Power Television and Translator Stations*, Public Notice, 25 FCC Rcd 15120 (2010) (freezing new and major change applications for low power stations in rural areas to permit the Commission to evaluate proposals to reallocate 120 megahertz of spectrum to mobile broadband use); *Freeze on the Filing of Certain TV and DTV Requests for Allotment or Service Area Changes*, Public Notice, 19 FCC Rcd 14810 (2004) (freezing applications for changes to service areas and channels to assist the Commission in designing a channel election and repacking process to assign each eligible broadcaster an in-core post-transition DTV channel); *Freeze on the Filing of TV and DTV "Maximization" Applications in Channels 60-69*, Public Notice, 18 FCC Rcd 627 (2003) (announcing freeze to facilitate clearing of spectrum for auction of the Upper 700 MHz Band); *Freeze on the Filing of TV and DTV "Maximization" Applications in Channels 52-59*, Public Notice, 17 FCC Rcd 11290 (2002) (announcing freeze of broadcast applications leading up to the auction of the Lower 700 MHz Band).

[672] *See* Letter from Rick Kaplan, NAB, to William T. Lake, Chief, Media Bureau, FCC, GN Docket No. 12-268 (filed May 6, 2013).

Commission's need for a stable database in advance of the incentive auction.[673] For these reasons, we reject the argument that the *Freeze PN*, and any limits on the broadcast facilities that will be protected, should not have taken effect until just before the incentive auction.[674]

211. *Processing of Pending Applications*. Applications that were pending on April 5, 2013 that complied with the filing limitations set forth in the *Freeze PN*, or were amended to comply, as well as later-filed applications that comply with the filing limitations, will continue to be routinely processed by Commission staff. To the extent that such applications are granted, the facilities will be protected in the repacking process, provided they are licensed by the Pre-Auction Licensing Deadline. Because these modified facilities will not increase a full power station's noise limited contour or a Class A television station's protected contour in any direction beyond the area resulting from a station's authorized facilities as of April 5, 2013, extending protection to these facilities has no impact on our need for a stable database nor will it constrain our repacking flexibility.[675]

212. While the *Freeze PN* remains in effect, we direct the Media Bureau to begin processing facilities modifications and displacement applications that were on file but were not granted by April 5, 2013 and were not amended to comply with the filing limitations set forth in the *Freeze PN*. We emphasize, however, that any such facilities, even if authorized and subsequently licensed by the Pre-Auction Licensing Deadline, will not be protected in the repacking process.[676] In light of the justifications underlying the *Freeze PN* and the fact that these applications were not amended to comply with it, we find that protection is not warranted. In addition, because these applications request facilities that would increase the stations' contour in one or more directions beyond the area resulting from the stations' authorized facilities as of the date of the *Freeze PN*, they have the potential to constrain our repacking flexibility. Moreover, because these applications have not yet been granted, these applicants have not acted in reliance on Commission grants, made any substantial investment in constructing their requested modified facilities, or begun operating such facilities to provide service to viewers. The fact that these applicants may have expended resources in preparing and filing their applications does not outweigh the detrimental impact on our repacking flexibility, or our interest in maintaining a stable database in advance

[673] We also reject T-Mobile's argument that February 22, 2012 is the preferable freeze date because this date would remove the risk of "delaying or disrupting the auction by making a moving target out of the spectrum that is its subject." T-Mobile Reply at 97. By releasing the *Freeze PN* well before the commencement of the auction, and adopting a Pre-Auction Licensing Deadline by which facilities must be licensed in order to be protected, we have provided forward auction applicants adequate time to prepare for the auction and to consider bidding strategies, while at the same time providing flexibility to broadcasters to make modifications.

[674] NAB Reply at 55; KAZN Reply at 2.

[675] We note that the Media Bureau has granted two waivers of the *Freeze PN*. With respect to WBRA-TV, channel *3, Roanoke, Virginia, the licensee received a construction permit to operate at maximized power, which expired in June 2011. Although the licensee timely finished construction and began operating the maximized facility in 2009, it failed to file a license application. Because the maximized facility was constructed and operating prior to February 22, 2012, we will protect the subsequently licensed facility (BLEDT-20131218CHV). With respect to KERA-TV, channel *14, Dallas, Texas, the tower on which the licensed facility is located is being dismantled and, thus, is no longer available for reasons outside the licensee's control. The licensee proposed to move its facility to a tower located 3.9 km from its licensed site with no change in height (BPED-20130528ALD), and the Media Bureau has granted a construction permit authorizing this change. While the construction permit authorizes a minimal contour extension in several directions, the total geographic area within the proposed noise-limited service contour does not exceed that of the licensed NLSC. Although not authorized on or before April 5, 2013, we will protect this facility if licensed by the Pre-Auction Licensing Deadline. We find that the equities in favor of preservation, including the fact that the change is outside the licensee's control, outweigh the impact on our repacking flexibility.

[676] This ineligibility for repacking protection does not apply to minor change applications filed by analog Class A licensees to convert to digital service that were pending as of or are filed after the *Freeze PN*. Such applications are exempt from the *Freeze PN* and are discussed in the next subsection.

of the auction, that would result from preservation of these facilities.[677]

213. However, we direct the Media Bureau to process these applications, rather than instructing that they be dismissed, to afford as much flexibility to these applicants as possible. For example, a pending applicant may determine that the likelihood of its facility being impacted by the repacking process is relatively small. Alternatively, a pending applicant may conclude that the risk of losing some coverage of its modified facility is outweighed by the benefit of operating such facility prior to the post-auction transition.

(iv) Class A Television Stations Transitioning to Digital Service

214. We next address the protection of Class A licensees that were not operating digital facilities on February 22, 2012 and that received (or will receive) licenses for their initial Class A digital facilities after February 22, 2012. Some of these licensees will receive protection of their initial digital facilities under the discretionary protection we will afford to facility modifications authorized prior to issuance of the *Freeze PN*, as set forth in the previous discussion. However, not all Class A licensees were granted a digital construction permit prior to the *Freeze PN*. We accordingly discuss the protection of Class A stations' initial digital facilities separately here.[678]

215. *Background*. As explained in the *NPRM*, Congress authorized the incentive auction in the midst of the Class A television digital transition; the deadline for Class A stations to operate on a digital-only basis is not until September 1, 2015.[679] Because Class A licensees made their digital conversion plans in reliance on rules adopted in July 2011, the Commission proposed in the *NPRM* to protect in the repacking process certain digital Class A facilities that were not licensed as of February 22, 2012.[680] The Commission proposed to require such licensees to inform it of their digital transition plans and to elect protection of either their licensed analog facility or their authorized digital facility. The Commission also proposed to protect the licensed analog facilities of licensees that did not notify it of their election by a deadline it would determine in the future.

216. *Discussion*. We will exercise our discretion to protect Class A stations' initial digital

[677] The Media Bureau will continue to consider requests for waiver of the *Freeze PN*. Our interest in a stable database will not be undermined by the processing and grant of such requests because the Media Bureau will grant such requests only upon a strong public interest showing, thereby limiting the number of waivers granted. In determining whether to grant any requests for waiver of the *Freeze PN* that are filed after the release of this Order, the Media Bureau will assess the extent to which grant of the waiver will affect the Commission's repacking flexibility. We expect that any potential impact on repacking flexibility will be outweighed by the public interest benefits that justify a waiver of the *Freeze PN*. Moreover, given the expected limited number of waivers granted, we do not expect that protecting the facilities authorized pursuant to a waiver will significantly impact our repacking flexibility.

[678] As discussed above, § 6403(b)(2) mandates that we protect Class A facilities that were licensed or for which a license application was pending as of February 22, 2012. Moreover, we are exercising our discretion to protect modifications of Class A facilities, if licensed by the Pre-Auction Licensing Deadline, that were authorized in construction permits on or before April 5, 2013, the date of the *Freeze PN*, as well as after that date if proposed in applications that met the filing limitations set forth in the *Freeze PN*. Class A minor change applications filed by analog Class A licensees to convert to digital service that were pending as of or filed after April 5, 2013 were exempt from the *Freeze PN*, and the Media Bureau clarified that it would continue to process such applications if they comply with our current rules. *Freeze PN*, 28 FCC Rcd at 4365. In this Section, we discuss the extent to which initial digital facilities not licensed as of February 22, 2012, including facilities authorized after the date of the *Freeze PN*, will be protected in the repacking process.

[679] *NPRM*, 27 FCC Rcd at 12397, para. 115; *see also Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations*, MB Docket No. 03-185, Second Report and Order, 26 FCC Rcd 10732, 10753–54, para. 45 (2011) (*LPTV DTV Second R&O*).

[680] *NPRM*, 27 FCC Rcd at 12397, para. 115.

facilities that were not initially licensed until after February 22, 2012, including those that were not authorized until after the *Freeze PN*, provided they are licensed by the Pre-Auction Licensing Deadline.[681] Our records show that approximately 110 analog Class A stations have transitioned to digital operations since enactment of the Spectrum Act in reliance on transition rules adopted by the Commission in 2011. Failure to protect these facilities could have a significant negative impact on the service's digital transition and result in wasted investment. We also conclude that protecting Class A stations' digital facilities rather than their analog facilities licensed on February 22, 2012 will not significantly impact our repacking flexibility. While protecting such Class A digital facilities may have some impact on our repacking flexibility in the case of a contour increase,[682] we note that digital Class A stations have significantly smaller coverage areas than full power stations. While full power stations may radiate up to 1000 kilowatts power, Class A stations may radiate at a maximum operating power of 15 kilowatts.[683] In addition, the Spectrum Act already requires us to protect an analog Class A station's facilities as licensed on February 22, 2012, and we find that protecting a station's digital conversion facility, rather than its analog facility, will not have a significant additional impact on our repacking flexibility.

217. We do not adopt the proposal to allow Class A stations to elect protection of a digital construction permit that remains unbuilt as of the commencement of the auction process.[684] Rather, in order to qualify for protection, Class A digital facilities must be licensed by the Pre-Auction Licensing Deadline.[685] Class A stations that have not completed the transition to digital service as of that deadline will receive protection only of their licensed analog facilities, to the extent protected in this Order. We find that requiring Class A digital facilities to be licensed by the Pre-Auction Licensing Deadline in order to receive protection is warranted to avoid protecting facilities that may never be constructed.[686] We

[681] Many commenters support extending protection to digital Class A facilities initially licensed after February 22, 2012. *See, e.g.*, Casa Comments at 3–4 (KQDK-CA's digital facility, which was licensed in November 2012, should be protected to avoid stranding investment); Vision Comments at 7–8 (supporting allowing stations to elect protection of digital facilities at some future date, rather than protecting only those digital facilities licensed as of February 22, 2012).

[682] As discussed above, we find no significant repacking impact resulting from protection of construction permits authorized on or before April 5, 2013, but not licensed as of February 22, 2012, which includes some construction permits for initial digital Class A facilities. *See* para. 209. Task Force staff has conducted similar analyses on a continuing basis with respect to Class A initial digital facilities that were authorized after April 5, 2013. Based on those analyses, we conclude that protecting these digital facilities, including any increase in coverage area these stations will have by virtue of their digital construction permits vis-à-vis their analog facilities, will not significantly impact our flexibility in the repacking process.

[683] *See* 47 C.F.R § 74.735(b) (limiting UHF Class A stations to operating power of 15 kilowatts and VHF Class A stations to three kilowatts); *see also* 47 C.F.R. § 74.787(b)(2)(requiring Class A stations to have contour overlap between analog and initial digital facilities). We also note that as of February 22, 2012, there were fewer than 350 analog Class A stations, and since that date more than 60 of these licensees were cancelled or reverted to LPTV status and thus no longer are entitled to protection under the Spectrum Act.

[684] Class A minor change applications to implement the digital transition are not subject to the filing limitations in the Media Bureau's April 5, 2013 freeze. Our interest in a stable database will not be undermined by the processing and grant of such applications because we do not expect a significant number of them and, in any event, our interest is outweighed by the significant public interest benefits resulting from the Class A digital transition. Moreover, for the reasons discussed here, we do not expect that protecting the Class A digital, rather than the analog, facility will significantly impact our repacking flexibility.

[685] Licensees choosing to flash-cut to digital service on their analog channel are required to submit an FCC Form 302-CA application to cover construction of the digital facility. Licensees with a digital companion channel also must submit an FCC Form 302-CA application to transfer Class A status to their constructed digital facility. *LPTV DTV Second R&O*, 26 FCC Rcd at 10756–57, paras. 52-3.

[686] As a practical matter, we note that relatively few Class A stations are at risk of having their digital facilities unprotected under our approach. More than half of Class A licensees already have licenses for their digital facility, and a third hold or have a pending application for a digital construction permit. However, we note that

(continued….)

further find that Class A licensees have a reasonable amount of advance notice to complete construction of their digital facility and obtain a license by the deadline, in light of the fact that such licensees have been on notice since July 2011 of the need to file construction permits to covert to digital service, the specific notice provided by the Media Bureau informing them of the importance of beginning the digital conversion process,[687] and the length of time between release of this Order and the expected timing of the Pre-Auction Licensing Deadline.

218. We clarify that we are not modifying the deadline for Class A stations to convert to digital service in this Order. Licensees are free to wait until the September 2015 deadline to complete their digital transition, but will receive repacking protection only for their analog facilities consistent with the provisions of this Order.[688]

(v) Additional Cases

219. *World Trade Center Stations*. We will afford discretionary protection to stations affected by the destruction of the World Trade Center and will not require certain authorized facilities for these stations to be licensed by the Pre-Auction Licensing Deadline. Full power television stations WNBC, WABC-TV, WPIX, and WNET were licensed and operating on the World Trade Center, and WPXN-TV held a construction permit to move to that site, when it was destroyed in the terrorist attacks of September 11, 2001. Each of these five stations, as well as WCBS-TV, currently are operating at the Empire State Building and have pending applications for construction permits seeking interference protection for facilities in Lower Manhattan near the previous site of the World Trade Center. Given the unique circumstances facing these stations, which were forced to move to a temporary location after the destruction of the World Trade Center,[689] the length of time necessary to construct a building comparable to the World Trade Center to which they could relocate, and the small number of stations involved, we conclude that there are significant equities in favor of providing these stations with a choice as to which facilities will be protected in the repacking process. Accordingly, we will permit each of these stations to elect protection of either: (1) their licensed Empire State Building facilities or (2) facilities at One World Trade Center ("1WTC"), the primary building of the new World Trade Center complex, that are authorized in a construction permit.[690] Providing these stations with such flexibility will not significantly impact our repacking flexibility or our interest in a stable database,[691] and any such concerns are far outweighed by the substantial equities in favor of flexibility noted above.

220. To be eligible for protection under the second option, stations must obtain a construction permit for the 1WTC facilities by the Pre-Auction Licensing Deadline. Such facilities, however, are not required to be licensed by the Pre-Auction Licensing Deadline in order to be protected. Because stations

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approximately 35 analog Class A licensees still have not filed for a digital construction permit, despite individual notice from the Media Bureau in the first quarter of 2013 of the need to do so. The digital facilities of these stations will not be protected if they are not licensed by the Pre-Auction Licensing Deadline.

[687] *See, e.g.*, Mar. 3, 2013 letter from Deputy Chief, Video Division to KVBI-LP (http://licensing.fcc.gov/cgi-bin/prod/cdbs/forms/prod/getimportletter_exh.cgi?import_letter_id=39467).

[688] *See* §§ III.B.3.a (Mandatory Protection of Full Power and Class A Facilities); III.B.3.b (Discretionary Preservation) (discussing discretionary preservation of certain modifications authorized on or before the *Freeze PN*, provided they are licensed by the Pre-Auction Licensing Deadline).

[689] The licensee of WPXN-TV was unable to construct authorized facilities at the World Trade Center because of the terrorist attack of September 11, 2001.

[690] The deadline for these stations to elect the facility to be protected in the repacking process is the Pre-Auction Licensing Deadline.

[691] Because 1WTC is close to the former World Trade Center site and the facilities that were destroyed were operating with maximum height and power, moving the stations to 1WTC will not result in a significant change in the stations' coverage contours.

seeking to operate permanent facilities on 1WTC have had to await the construction of the building before they could file for construction permits reflecting their proposed new facilities, we find that it would be unreasonable to require such stations to construct in time to meet this deadline.[692]

221. *Stations Reallocated Pursuant to Section 331 of the Communications Act*. We will exercise our discretion to protect the facilities for new full power television stations on channel 2 at Wilmington, Delaware and channel 3 at Middletown Township, New Jersey that were allotted in 2013 pursuant to a court order.[693] Although these allotments were made and applied for after passage of the Spectrum Act, it is necessary to protect these facilities to avoid frustrating the court's mandate that we authorize these facilities and the mandate under section 331 of the Communications Act that the Commission allocate a commercial VHF channel to each State if possible.[694] In addition, we note that, because the court's mandate is limited to two stations that will operate on VHF channels, protecting these facilities will have minimal impact on our repacking flexibility.

222. Although the Wilmington station is now licensed, the Middletown Township facility is not.[695] We will not require this station to be licensed by the Pre-Auction Licensing Deadline in order to be protected in the repacking process. The station's channel was not allotted until March 2013, it was not possible for the station to file a construction permit application for the facility until after this date, and the application was not grantable until April 14, 2014. Thus, it would be unreasonable to require this station to be constructed in time to meet the Pre-Auction Licensing Deadline.

223. *KTNC-TV, Channel 14, Concord, California*. TTBG, the former licensee of KTNC-TV, channel 14, Concord, California, constructed and had an application for a license to cover on file for its authorized channel 14 facility prior to February 22, 2012, but was operating at reduced power on that date (and continues to do so) due to its inability to satisfy a condition pertaining to non-interference to land mobile stations.[696] TTBG argues that it should be allowed to choose protection of either its licensed pre-DTV transition facility on channel 63, or the facility specified in its construction permit for channel 14.[697] We will exercise our discretion to protect the facilities in TTBG's pending channel 14 license application, even if they are not fully operational and the station has not received a license by the Pre-Auction Licensing Deadline, in order to prevent stranded investment in the event the station is able to commence full operations.[698] Given the unique circumstances that have prevented TTBG from operating at full

[692] In addition, we will waive the *Freeze PN* to accept any applications from stations impacted by the destruction of the World Trade Center proposing a facility at 1WTC because we do not believe that it was possible to prepare a FCC Form 301 application for that site by April 5, 2013 given the stage of construction of the site at that time.

[693] These channels were allotted to the Post-Transition DTV Table of Allotments, *see* 47 C.F.R. § 73.622(i), after a U.S. Court of Appeals for the District of Columbia Circuit decision. *PMCM LLC, TV v. FCC*, 701 F.3d 380 (D.C. Cir. 2012); *Reallocation of Channel 3 from Ely, Nevada to Middletown Township, New Jersey*, Report and Order, 28 FCC Rcd 2825 (2013); *Reallocation of Channel 2 from Jackson, Wyoming to Wilmington, Delaware*, Report and Order, 28 FCC Rcd 2828 (2013). The Wilmington facility is now licensed (File No. BLCDT-201131129AIH).

[694] Section 6403(i)(1) specifically states that nothing in § 6403(b) "shall be construed to expand or contract the authority of the Commission except as otherwise expressly provided." Spectrum Act § 6403(i)(1).

[695] FCC File No. BPCDT-20130528AJP.

[696] TTBG Comments at 1–4.

[697] *Id.* at 4.

[698] FCC File No. BLCDT-20091210ABC. Because § 6403(b)(2) requires only preservation of actual operations on February 22, 2012, and TTBG was not operating on that date at its fully authorized power, we conclude that these facilities are not entitled to mandatory protection. In the event the channel 14 authorization is subsequently modified, the modified facility will be protected if licensed by the Pre-Auction Licensing Deadline. We will not protect TTBG's channel 63 facility. Television stations were required by statute to cease digital operations on channels 52-69 (out of core channels) and operate on only the "core" television channels 2-51 by June 12, 2009. *See*

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power, the fact that it had completed construction and filed a license to cover application as of the enactment of the Spectrum Act, and the minimal impact that protecting this one facility will have on our repacking flexibility, we conclude that the equities in favor of protection outweigh any potential harm.

224. *KHTV-CD, Los Angeles, California*. We will not protect stations that are eligible for a Class A license but that did not file an application for such license until after February 22, 2012, even if the application is granted before the auction.[699] For the reasons discussed in detail below, however, we make one exception for KHTV-CD, Los Angeles, California.[700]

c. Non-Final License Revocation or Downgrade Proceedings.

225. We clarify that any licensee of facilities that are eligible for protection in the repacking process as set forth in this Order that is the subject of a non-final license validity proceeding[701] or downgrade order will be protected until the proceeding or order becomes final and non-reviewable. Specifically, this treatment will apply to the facilities of licensees who have been downgraded from Class A to LPTV status, and to the facilities of full power and Class A licensees with expired, cancelled, or revoked licenses. This approach is consistent with the protections from interference afforded under our general processing standards, and we see no reason to depart from those standards with respect to the repacking process. Moreover, we agree with commenters who argue that denying protection to such facilities effectively would invalidate the licensees' rights to pursue their pending appeals.[702]

d. Facilities That Will Not Receive Discretionary Protection

226. We will not exercise our discretion to extend protection in the repacking process beyond the facilities discussed above. Doing so may encumber additional broadcast spectrum, increase repacking constraints, and undercut our ability to repurpose spectrum. We conclude that these concerns outweigh other considerations with regard to facilities that are not entitled to mandatory protection or addressed above. Below, we specifically address our decision not to afford protection to pending rulemaking petitions to move from a VHF to a UHF channel, out-of-core Class A-Eligible LPTV stations, LPTV and TV translator stations, and special temporary and experimental authorizations.

(i) Pending Channel Substitution Rulemaking Petitions

227. *Background*. Section 6403(g)(1)(B) of the Spectrum Act provides that the Commission "may not" reassign a television licensee from a VHF to a UHF channel from the enactment date of the Spectrum Act until the completion of the incentive auction "unless (i) such reassignment will not decrease the total amount of [UHF] spectrum made available for reallocation . . . or (ii) a request from such licensee for the reassignment was pending at the Commission on May 31, 2011."[703] In the *NPRM*, the Commission proposed not to act on VHF-to-UHF channel change requests pending on May 31, 2011 "in order to ensure that we do not unnecessarily compromise our flexibility in the repacking process."[704] The

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DTV Delay Act, Pub. L. 111-4, 123 Stat. 112 (2009). Because television stations have been statutorily prohibited from operating on channel 63 since 2009, we decline to protect that facility.

[699] *See* § III.B.3.d.ii (Out-of-Core Class-A-Eligible LPTV Stations) (deciding not to extend discretionary protection to such stations).

[700] *See id*.

[701] *See* § IV.B.1.a.iv (Relinquishment of Expired or Revoked Licenses and Downgraded Class A Licenses) (defining "license validity proceeding" as a proceeding regarding the expiration or cancellation of a license).

[702] *See* UVM Reply at 20.

[703] Spectrum Act § 6403(g)(1)(B).

[704] *NPRM*, 27 FCC Rcd at 12398, para. 117; *see* Spectrum Act § 6403(g)(1)(B). When the *NPRM* was adopted, there were 10 such requests pending. *Channel Substition Freeze*, 26 FCC Rcd 7721. The petition for Augusta, Georgia was subsequently dismissed at petitioner's request.

Commission also noted that granting these requests prior to the incentive auction could create an opportunity for the petitioners to relinquish their rights to newly allotted UHF channels through UHF-to-VHF bids in the reverse auction.[705]

228. *Discussion.* We decline to exercise our discretion to protect the facilities requested in pending VHF-to-UHF channel substitution rulemaking requests.[706] Although the number of petitions involved is small, protecting them would encumber additional UHF spectrum by adding new stations to the UHF band, thereby increasing the number of constraints on the repacking process and limiting our flexibility. We conclude that protecting the facilities requested in these petitions would disserve our goals by increasing the potential cost of repurposing UHF spectrum for new, flexible uses.[707] Moreover, these petitioners have not acted in reliance on Commission grants, have not made any investment in constructing their requested facilities, and have not begun operating the proposed facilities to provide service to viewers. Although the petitioners have expended some resources in preparing and filing their rulemaking petitions, we find that this factor does not outweigh the detrimental impact on repacking flexibility that would result from preservation of the UHF facilities proposed in these petitions.

229. We disagree with commenters who assert that section 6403(g)(1)(B) compels the Commission to process and grant channel substitution rulemaking requests that were pending on May 31, 2011.[708] The statute grants the Commission the discretion to reassign a licensee from VHF to UHF if either of the two statutory conditions in this provision is satisfied, but it does not mandate such reassignment.[709] Further, the mandatory reading advocated by commenters would compel the

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[705] *NPRM*, 27 FCC Rcd at 12397, para. 117 n.181.

[706] This includes the facilities addressed in *Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments, Television Broadcast Stations (Cleveland, Ohio)*, Notice of Proposed Rulemaking, 26 FCC Rcd 14280 (Vid. Div. 2011).

[707] If a petition to move from a VHF to a UHF channel is granted in advance of the incentive auction and protected in the repacking process, the station could demand a share of incentive auction proceeds in exchange for relinquishing its newly granted rights through a UHF-to-VHF bid in the reverse auction. In response to the Commission's expression of concern about this possibility in the *NPRM*, 27 FCC Rcd at 12398 n.181, Bonten stated that it would accept a condition on its construction permit prohibiting it from submitting such a bid. Bonten Comments at 7. We note, however, that § 6403(a)(2) provides that "a relinquishment of usage rights . . . *shall include*" three types of relinquishment, one of which is a UHF-to-VHF bid. Spectrum Act § 6403(a)(2) (emphasis added).

[708] For example, according to Media General, "Congress mandated that the FCC process pending VHF-to-UHF allotment petitions . . . that were pending [as of May 31, 2011]." Media General Comments at 5. *See also* Bonten Comments at 6; Raycom Comments at 2–4 (failure to process the pending petitions contravenes Congressional intent that they be processed in the ordinary course).

[709] As stated above, § 6403(g)(1)(B) provides that during the relevant time period, the Commission "may not" reassign a broadcast television licensee from a VHF channel to a UHF channel "unless" either of two conditions is satisfied. Thus, the two conditions trigger exceptions to the general prohibition against reassigning a licensee from VHF to UHF. The Commission and a number of courts have interpreted the "may not . . . unless" and "shall not . . . unless" construction in other contexts as permissive. For example, the 1993 Budget Act provides that the Commission "shall not" issue any license by lottery "unless" one or more applications were accepted for filing before July 26, 1993. The Commission interpreted this language as permissive, providing it with the discretion to use lotteries—but not mandating lotteries—if the condition following "unless" was satisfied. *See, e.g., Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Memorandum Opinion and Order, 9 FCC Rcd 7387, 7391, para. 13 (1994); *see also Folden v. U.S.*, 56 Fed. Cl. 43, 46 (2003), *aff'd,* 379 F.3d 1344, 1350 (Fed. Cir. 2004); *Ranger Cellular v. FCC*, 333 F.3d 255, 257 (D.C. Cir. 2003). Similarly, the Seventh Circuit interpreted a federal education law providing that attorney's fees "may not" be awarded for an attorney's participation in a certain type of meeting "unless" the meeting is convened by order of a court or agency as permissive, granting the discretion to award attorney's fees if the condition following "unless" was satisfied. *Linda T. v. Rice Lake Area Sch. Dist.*, 417 F.3d 704, 709 (7th Cir. 2005); *see also Petrarca v. Rhode Island*, 583 F.Supp. 297, 300 (D.R.I. 1984) (statute stating that prisoner "shall not" be paroled "unless" certain

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Commission to grant all pre-May 31, 2011 VHF-to-UHF channel substitution requests without regard to whether the requests meet our technical requirements or otherwise serve the public interest.[710] There is no indication in the statute that Congress intended such a result.[711]

230. Some commenters argue that failure to process these pending rulemaking petitions would inequitably treat these petitioners differently from similarly-situated petitioners whose petitions resulted in the issuance of an NPRM after May 31, 2011 and were subsequently granted.[712] We disagree. The two petitions that resulted in the issuance of an NPRM after May 31, 2011 were accompanied by expedited consideration requests,[713] whereas none of the pending petitions requested such consideration. Moreover, both of these petitions were granted prior to enactment of the Spectrum Act. Thus, their processing was not dependent on the Commission's consideration in this proceeding of the goals of the auction and repacking process or the meaning of section 6403(g)(1)(B).

231. Having determined that section 6403(g)(1)(B) does not compel grant of the pending VHF-to-UHF petitions, we direct the Media Bureau to dismiss any of these petitions if issuance of an NPRM would not be appropriate. This would be the case, for example, if the proposed facility would result in an impermissible loss of existing service or the petition fails to make a showing as to why a channel change would serve the public interest. We further direct the Media Bureau to hold in abeyance

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conditions are met provided parole board with "discretion to keep a convict in prison for any amount of time, up to his maximum sentence, after he has met these criteria").

[710] Some commenters claim that § 6403(g)(1)(B) compels the Commission to *act on* or *process* (but not necessarily grant) the pending pre-May 31, 2011 VHF-to-UHF channel substitution requests. *See* Media General Comments *passim*; Bonten Comments at 6–9; Bonten Reply at 2–6; Raycom Comments at 3–6; Raycom Reply at 4–6. This argument has no merit. The statute expressly refers to "reassign[ment]," not processing.

[711] If Congress had intended such a result, it could have explicitly provided that the Commission "shall" reassign a licensee from VHF to UHF "if" a "request from such licensee for the reassignment was pending at the Commission on May 31, 2011." Congress knows how to use a "shall . . . if" construction, and did so in other provisions of the Spectrum Act. *See* Spectrum Act § 6403(d)(4). Bonten and Media General rely on letters from Members of Congress purporting to interpret § 6403(g)(1)(B) to "allow those broadcasters who had invested the time and resources necessary to file reallocation petitions to have their petitions considered in accordance with existing Commission standards and processes." Letter from Sen. Kay Hagan (D-NC), Sen. Lindsey Graham (R-SC), Sen. Saxby Chambliss (R-GA) to Julius Genachowski, Chairman, FCC (May 1, 2012), at 1; Letter from Rep. G.K. Butterfield (D-NC), Rep. Kathy Castor (D-FL), Rep. Morgan Griffith (R-VA), Rep. Gregg Harper (R-MS), Rep. Cliff Stearns (R-FL) to Julius Genachowski, Chairman, FCC (July 26, 2012) at 1. *See* Bonten Comments at 6; Media General Comments at 6; *see also* Letter from Sen. Mark R. Warner (R-VA) to Julius Genachowski, Chairman, FCC (May 16, 2012). We do not read these letters as interpreting § 6403(g)(1)(B)(ii) to require the Commission to grant the pending requests. We also note that it is well-settled that such post-enactment explanations of intent are of little or no probative value in interpreting legislative history. *See Regional Rail Reorganization Act Cases*, 419 U.S. 102, 132 (1974) ("[P]ost-passage remarks of legislators, however explicit, cannot serve to change the legislative intent of Congress expressed before the Act's passage.") (citations omitted); *Bread Political Action Committee v. FEC*, 455 U.S. 577, 582 n.3 (1982) ("We cannot give probative weight to these [post-enactment] affidavits [of a Senator and his assistant], however, because '[s]uch statements 'represent only the personal views of th[is] legislato[r], since the statements were [made] after passage of the Act.'") (citations omitted).

[712] Media General Comments at 9–10; NAB Comments at 31–32.

[713] In one case, the station's tower had collapsed and since it was required to construct a new facility, it requested a channel change in order to address on-going viewer reception problems. *Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments, Television Broadcast Stations. (Eau Claire, Wisconsin)*, MB Docket No. 11-100, Report and Order, 26 FCC Rcd 10326 (2011). In the other case, the licensee had already modified its facility twice to increase power in an attempt to alleviate reported VHF reception problems and its proposed channel substitution would result in a population gain of approximately 515,000 persons. *Amendment of Section 73.622(i), Post-Transition Table of Allotments, Television Broadcast Stations. (Panama City, Florida)*, MB Docket No. 11-140, Report and Order, 26 FCC Rcd 14415 (2011).

any remaining petitions or related rulemakings proceedings and to process them once the Media Bureau lifts the filing freezes now in place, unless the petition is withdrawn.[714]

(ii) Out-of-Core Class A-Eligible LPTV Stations

232. *Background*. The Community Broadcasters Protection Act of 1999 ("CBPA") accorded certain qualifying LPTV stations with "primary" Class A status.[715] Although the statute prohibited the Commission from granting Class A status to LPTV stations operating on out-of-core channels (channels 52-69),[716] it provided such stations with an opportunity to achieve Class A status on an in-core channel (channels 2-51).[717] There remain approximately 100 formerly out-of-core Class A-eligible LPTV stations that obtained an in-core channel but did not file for their Class A license until after February 22, 2012 or have not yet filed for a Class A license.

233. *Discussion*. With one exception, we will not protect stations that are eligible for a Class A license but that did not file an application for such license until after February 22, 2012, even if the application is granted before the auction.[718] These stations are not entitled to mandatory preservation because their Class A facilities were not licensed or the subject of a pending Class A license application as of February 22, 2012.[719] The fact that such a station may obtain a Class A license after that date does not alter this conclusion because section 6403(b)(2) mandates preservation of only the full power and Class A facilities that were actually in operation as of February 22, 2012.[720] We also reject the claim that the CBPA requires preservation of such stations.[721] Despite the availability of two alternative approaches whereby these stations could obtain Class A status, the stations in this category failed to take either step

[714] *See* para. 556. We direct the Media Bureau to hold such petitions in abeyance, rather than process them, because allowing VHF stations to move their existing service into the UHF band on an unprotected basis pending the outcome of the repacking process presents a significant potential for viewer disruption if the station's operations in the UHF band are displaced. We find there to be less potential for viewer disruption in the case of pending modifications that do not comply with the *Freeze PN*, which the Media Bureau will process but, if granted, will not be protected in the repacking process. *See para*. 212. In the case of a facilities modification, only the increase in contour will not be protected, not the station's entire existing service.

[715] Community Broadcasters Protection Act of 1999, Pub. L. No. 106-113, 113 Stat. Appendix 1 at pp. 1501A-594 – 1501A-598 (1999), *codified at* 47 U.S.C. § 336(f).

[716] 47 U.S.C. § 336(f)(6)(A); *see Establishment of a Class A Television Service*, MM Docket No. 00-10, Report and Order, 15 FCC Rcd 6355, 6396–97, para. 103 (2000) ("it would be inconsistent with the statute to provide interference protection on a channel outside the core") (*Class A R&O*).

[717] Such stations were required to obtain a construction permit for an in-core channel before receiving Class A status. 47 U.S.C. § 336(f)(6)(A) (providing that, when an out-of-core Class A-eligible LPTV licensee was assigned an in-core channel, the Commission was required to issue a Class A license simultaneously). To effectuate this requirement, the Commission directed out-of-core Class A-eligible LPTV stations seeking Class A status to file a Class A license application simultaneously with the construction permit application to move to an in-core channel. *Class A R&O*, 15 FCC Rcd at 6396–97, para. 103. The Commission commenced protection of such stations with the award of the in-core construction permit, rather than waiting until the in-core facility was constructed. Some out-of-core Class A-eligible LPTV stations did not follow the procedures outlined by the Commission. Instead, these stations filed their Class A license applications after the in-core facility was constructed, which the Media Bureau granted if otherwise consistent with the Commission's rules.

[718] Moreover, spectrum usage rights covered by such unprotected facilities will not be recognized for relinquishment during the reverse auction. *See* § IV.B.1.a.ii (Spectrum Usage Rights Eligible for Relinquishment).

[719] *See* § III.B.3.a (Mandatory Protection of Full Power and Class A Facilities) (explaining that § 6403(b)(2) mandates that we protect Class A facilities that were licensed or for which a license application was pending as of February 22, 2012).

[720] *See id*.

[721] *See* Venture Reply at 9–10.

and thus remained secondary LPTV stations on February 22, 2012.[722]

234. Moreover, we decline to extend discretionary protection to LPTV stations that had not filed an application for a Class A license as of February 22, 2012. Protecting such stations would encumber additional spectrum by requiring protection of approximately 100 stations, thereby increasing the number of constraints on the repacking process and limiting our flexibility.[723] While we recognize that these stations have made investments in their facilities, we conclude that this does not outweigh the significant detrimental impact on repacking flexibility that would result from protecting them, especially in light of the failure of such stations to take the steps to obtain a Class A license and remove their secondary status in a timely manner. These stations failed to file for Class A licenses until after February 22, 2012, or have still failed to file to date, despite the fact that the CBPA and the Commission's rules implementing it were adopted more than a decade ago.[724] These stations remained secondary and any investment was made with "explicit, full and clear prior notice that operation in the LPTV [and TV translator service] entails the risk of displacement."[725] Although we will not protect stations that filed for and obtained a Class A license after February 22, 2012, in the repacking process, we will provide them with an advanced opportunity to locate a new channel. Specifically, if such station obtains a Class A license but is displaced in the repacking process, it may file a displacement application during one of the filing opportunities for alternate channels.[726]

235. We will, however, exercise our discretion to protect one station in this category -- KHTV-CD, Los Angeles, California, licensed to Venture. Venture made repeated efforts over the course of a decade to convert to Class A status.[727] During this period,[728] Venture continued to have a Class A

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[722] *See* § III.B.3.d.iii (LPTV and TV Translator Stations) (explaining that protection of LPTV and TV translator stations in the repacking process is not mandated by § 6403(b)(2)).

[723] Almost all of the stations in this category operate on UHF channels and many are located in spectrum-congested areas.

[724] Indeed, in 2000, the Commission cautioned that "it would be in the best interest of qualified LPTV stations operating outside the core to try to locate an in-core channel *now*, as the core spectrum is becoming increasingly crowded and it is likely to become increasingly difficult to locate an in-core channel in the future." *Class A R&O*, 15 FCC Rcd at 6396–97, para. 103 (emphasis added). Moreover, all out-of-core LPTV stations were required to file displacement applications for an in-core channel by September 1, 2011. *LPTV DTV Second R&O*, 26 FCC Rcd at 10733, para. 2. Thus, all stations in this category had the opportunity to file for Class A status when filing for their in-core channel by September 1, 2011, well in advance of February 22, 2012.

[725] *In the Matter of Petition by Community Broadcasters Association to Amend Part 74 of the Commission's Rules,* Memorandum Opinion and Order, 59 Rad. Reg. 2d (P&F) 1216, 1217, para. 4 (1986) (*Community Broadcasters Association MO&O*). Our decision above to exercise discretion to protect new full power stations licensed after February 22, 2012 does not warrant protection of the Class A-eligible stations in this category, even if they obtain a Class A license before the auction. *See* Venture Reply at 10; *see also* § III.B.3.b.i (New Full Power Stations). As an initial matter, such full power stations are small in number and are licensed or authorized on VHF channels and/or in remote locations, and thus present far less impact on repacking flexibility than the approximately 100 stations in this category, almost all of which operate on UHF channels and many of which are located in spectrum-congested areas. Moreover, the new full power stations have proceeded to obtain licenses for their stations in due course, whereas the stations in this category have failed to take the steps necessary to remove their secondary status, despite the fact that the CBPA and the Commission's rules implementing it were adopted more than a decade ago.

[726] *See* § V.C.1.b (Alternate Channels and Expanded Facilities Opportunities) (delegating authority to the Media Bureau to determine whether such stations should be permitted to file for a new channel along with priority stations or during the second filing opportunity). Except as indicated here, our existing displacement rules will apply to such applications. *See* 47 C.F.R. §§ 73.3572(a)(4) and 74.787(a)(4).

[727] Venture was granted an in-core construction permit for KHTV-LP, constructed the facility, and filed a Class A license application for the in-core channel in July 2001. In that application, it made the required certification that it "does, and will continue to" meet all Class A operating requirements and applicable full power requirements. *See* FCC File No. BLTTA-20010712AHT, FCC Form 302-CA, Section II, Questions 3, 4, 8, 9, 10. That application

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license application on file in which it certified that it was meeting, and would continue to meet, all Class A operating requirements and applicable full power requirements.[729] After finally locating and constructing a suitable in-core channel, Venture filed its Class A license application just two days after February 22, 2012.[730] Given the unique circumstances that prevented Venture from filing its Class A license application for channel 27 until just two days after February 22, 2012, its certified operation of KHTV-LP consistent with Class A operating requirements since 2001, and its repeated efforts to convert to Class A status, we conclude that the equities in favor of protection of this station outweigh the minimal impact that protecting this one facility will have on our repacking flexibility.

(iii) LPTV and TV Translator Stations

236. *Background*. Section 6403(b)(5) of the Spectrum Act provides that nothing in section 6403 "shall be construed to alter the spectrum usage rights of low-power television stations." The Commission proposed in the *NPRM* not to extend repacking protection to LPTV or TV translator stations, noting that these low power stations always have had secondary status under the Commission's rules.[731] In addition, the Commission sought comment on its view that the interference protection ordinarily accorded to LPTV and TV translator facilities against modifications of Class A facilities under section 336(f)(7)(B) of the Communications Act does not apply with respect to channel assignments made in the repacking process.[732]

237. *Discussion*. Although we recognize the valuable services that many LPTV and TV

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was dismissed pursuant to § 336(f)(7) of the Communications Act, however, because the licensed facility was predicted to cause interference. Venture Reply at 4. Venture subsequently filed three more applications for in-core channels, each of which was dismissed because of interference or international objection. *Id*. at 4–6. KHTV-LP was displaced by the commencement of digital operations by a full power station on channel 48 in May 2003 and was granted an STA to operate on channel 67 through 2011.

[728] In addition to its initial Class A license application filed in July 2001 that was later dismissed, Venture filed a Class A license application for the construction permit application it filed in 2002, certifying again that it was meeting all Class A operating requirements and applicable full power requirements. While the construction permit application was dismissed due to interference, the Class A license application remained pending until July 11, 2012. Venture Reply at 5 n.12, 6–7 (stating that KHTV "abide[d] by the FCC's Class A continuing eligibility requirements for the last 12 years").

[729] Thus, Venture certified that KHTV-LP aired a minimum of 18 hours of programming each day and three hours of locally produced programming each week, and complied with the Commission's main studio requirements, rules governing informational and educational children's programming, the public inspection file rule, including preparing and placing in the file on a quarterly basis an issues/programs list and the station's quarterly-filed Children's Television Programming Report, the political programming rules, station identification requirements, and the Emergency Alert System (EAS) rules. *See Class A R&O*, 15 FCC Rcd at 6366, paras. 24–25.

[730] The application for a construction permit for this in-core channel (channel 27) was filed in August 2009. That application was granted on February 15, 2012. Because Venture had not filed a Class A license application with its August 2009 construction permit application, the staff granted Venture an LPTV authorization on February 15, 2012, requiring that Venture obtain an LPTV license for channel 27 before applying for Class A status. Venture filed a license to cover construction of the LPTV facility on February 17, 2012, which the staff granted on February 22, 2012. Accordingly, Venture was unable to file its Class A license application for channel 27 until after that date. Venture Reply at 6. That application (FCC File No. BLDTA-20120224ABQ) was granted on July 11, 2012.

[731] *NPRM*, 27 FCC Rcd at 12399, para. 118.

[732] *Id*. Specifically, § 336(f)(7)(B) of the Communications Act prevents the Commission from approving a proposed modification of a Class A license "unless the . . . licensee shows" non-interference to LPTV or translator facilities authorized or proposed before "the application for . . . modification of such a license . . . was filed." 47 U.S.C. § 336(f)(7)(B). The Commission proposed to interpret § 336(f)(7)(B) as "reflect[ing] an intention to grant protection against changes in Class A facilities proposed by licensees, not to limit the previously unanticipated broadcast television spectrum auction required by Congress in the Spectrum Act." *NPRM*, 27 FCC Rcd at 12399, para. 118.

translator stations provide, we decline to extend repacking protection to these stations. We recognize that our decision will result in some viewers losing the services of these stations, may strand the investments displaced LPTV and TV translator licensees have made in their existing facilities, and may cause displaced licensees that choose to move to a new channel to incur the cost of doing so. On balance, however, we conclude that these concerns are outweighed by the detrimental impact that protecting LPTV and TV translator stations would have on the repacking process and on the success of the incentive auction. As discussed below, we adopt measures to mitigate the potential impact of the auction and repacking process on LPTV and TV translator stations, including adopting special procedures for displaced stations to select a new channel among the limited number of channels that will remain following the repacking process.[733] We will also initiate a rulemaking proceeding after the release of this Order to consider further actions to provide regulatory relief to displaced LPTV and TV translator stations.[734]

238. Protection of LPTV and TV translator stations in the repacking process is not mandated by section 6403(b)(2). The protection provision applies only to "each broadcast television licensee," which is defined as the "licensee of—(A) a full-power television station; or (B) a low-power television station that has been accorded primary status as a Class A television licensee" under section 73.6001(a) of the Commission's rules.[735] There is no basis in the text of section 6403(b)(2) or the pertinent statutory definitions to conclude that low power stations that have not been accorded Class A status are entitled to the protections afforded by section 6403(b)(2).[736]

239. We disagree with parties who argue that section 6403(b)(5) mandates protection of LPTV and TV translator stations in the repacking process.[737] Section 6403(b)(5) provides that nothing in section 6403 shall be construed to "alter the spectrum usage rights of low power television stations." This provision simply clarifies the meaning and scope of section 6403; it does not limit the Commission's spectrum management authority.[738] In any case, our decision not to protect LPTV or TV translator stations when we repack full power television stations does not "alter" their spectrum usage rights.[739] LPTV and TV translator stations are secondary to full power television stations, which may be authorized and operated "without regard to existing or proposed low power TV or TV translator stations."[740] As T-Mobile points out, "the Commission made clear more than three decades ago that secondary, low power television stations 'may not cause interference to, and must accept interference from, full-service

[733] *See* § V.D.1 (Transition Procedures: LPTV and TV Translator Stations).

[734] *See id*.

[735] Spectrum Act §§ 6001(6), 6403(b)(2).

[736] TV translators were not made eligible for Class A status under the CBPA. *See Class A R&O*, 15 FCC Rcd at 6369–70, para. 35.

[737] ICN Comments at 1; Mako Comments at 5; NRB Comments at 4–5; SEI Comments at 3; Signal Above Comments at 2–3.

[738] *See* n.288.

[739] Several commenters refer to recent statements by Congressman Joe Barton as support for their argument that Congress intended that all licensed television stations, including LPTV stations, be protected in the repacking process. *See* Capitol Reply at 3; MSGPR Comments at 5 ("Congressman Barton reminded the Chairman that the intent of Congress was to protect broadcasters, and it was therefore not their intention to force LPTV broadcasters off the air or remove them from the market."); A. Weiss Comments at 6 ("Congressman [Joe] Barton never intended for the FCC to have the right to wipe out existing licensed LPTV broadcasters who were serving the public."). However, as discussed above, post-enactment explanations of the intent of individual legislators cannot substitute for legislative history, or override the clear meaning of the statutory language. *See* n.711.

[740] *See* 47 C.F.R. § 74.702(b).

television stations, certain land mobile radio operations and other primary services.'"[741]

240. We reject IBN's assertion that LPTV and TV translator stations' spectrum usage rights are protected from taking by the Fifth Amendment to the U.S. Constitution.[742] The Communications Act is clear that there can be no ownership interest in spectrum licensed to broadcast television stations,[743] and that this principle is equally true for licenses awarded at auction.[744] Any rights of LPTV and TV translator station licensees to use spectrum are defined by their licenses, which expressly subject them to accepting interference from primary services.[745]

241. Although we have discretion to grant protection to additional facilities where appropriate, we do not believe that extending protection to LPTV and TV translator stations in the repacking process would be consistent with the goals of the Spectrum Act. There are more than 5,500 licensed LPTV and TV translator stations, and almost 4,500 of these stations are licensed on UHF channels. Protecting them would increase the number of constraints on the repacking process significantly, and severely limit our recovery of spectrum to carry out the forward auction, thereby frustrating the purposes of the Spectrum Act. While we recognize that LPTV and TV translator station operators have made investments in their facilities, they have done so with "explicit, full and clear prior notice that operation in the LPTV [and TV

[741] T-Mobile Reply at 99 (citing *Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend the Rules for Digital Class A Television Stations,* , MM Docket No. 03-185, Report and Order, 19 FCC Rcd 19331, 19333, para. 2 (2004) (*Digital LPTV Order*)). Accordingly, we disagree with commenters who assert that LPTV and TV translator stations are secondary only to full power television stations, and are entitled to repacking protection vis-à-vis new primary users of the repurposed broadcast spectrum. Letter from Mike Gravino, Director, LPTV Spectrum Coalition, to Marlene H. Dortch, Secretary, FCC, Gen. Docket No. 12-268 at 3–4 (filed Aug. 27, 2013)(LPTV Spectrum Aug. 27, 2013 *Ex Parte* Letter); Mako Comments at 4–6; MSGPR Comments at 2; SEI Comments at 4–5. We note that in an analogous situation, when the Commission reallocated spectrum comprising television broadcast channels 52-69 to wireless usage, it likewise treated LPTV stations as secondary to the services provided by future wireless licensees in the reallocated spectrum. *See Lower 700 MHz R&O*, 17 FCC Rcd at 1034–5, para. 27 (LPTV and TV translator stations not permitted to cause harmful interference to primary services, including new licensees in Channels 52-59, and cannot claim protection from harmful interference from primary services, including new licensees in Channels 52-59); *Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, MM Docket No. 87-268, Sixth Report and Order, 12 FCC Rcd 14588, 14652–53, para. 142 (1997) (noting that, as a secondary service, LPTV stations must cease operation when a new service provider on reallocated channels 60-69 is operational and would receive interference from the LPTV station).

[742] *See* U.S. Const., amend. V. IBN argues that "[i]n the modern era when applicants for television spectrum must often participate in auctions run by the Commission, old theories that licensees have no property rights are obsolete and invalid." IBN Comments at 3.

[743] *See* 47 U.S.C. §§ 301, 304, 309(h); *FCC v. Sanders Bros. Radio Station*, 309 U.S. 470, 475 (1940) ("The policy of the Act is clear that no person is to have anything in the nature of a property right as a result of the granting of a license."); *see also Ashbacker Radio Corp. v. FCC*, 326 U.S. 327, 331–32 (1945); *CBS, Inc. v. FCC*, 453 U.S. 367, 395 (1981); *Prometheus Radio Project v. FCC*, 373 F.3d 372, 428 (3rd Cir. 2004). We also note there is no merit to the argument that a post-auction rulemaking change that may affect the value of an auctioned license should be considered a taking under the Fifth Amendment. *See Mobile Relay Assocs. v. FCC*, 457 F.3d 1, 11–12 (D.C. Cir. 2006); *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*, WT Docket No. 07-293, Report and Order and Second Report and Order, 25 FCC Rcd 11710, 11775-76, para. 150 & n.388 (2010) (*2010 WCS Order*).

[744] *See* 47 U.S.C. § 309(j)(6); *Celtronix Telemetry, Inc. v. FCC*, 272 F.3d 585-589 (D.C. Cir. 2001).

[745] *See Digital LPTV Order*, 19 FCC Rcd at 19333, para. 2 ("stations in the low power television service are authorized with 'secondary' frequency use status. These stations may not cause interference to, and must accept interference from, full-service television stations, certain land mobile radio operations and other primary services") (citing 47 C.F.R. §§ 74.703, 74.709, 90.303).

translator service] entails the risk of displacement."[746]

242. We likewise decline to exercise our discretionary authority to protect replacement digital low power TV translator stations authorized pursuant to section 74.787(a)(5) of the Commission's rules ("digital replacement translators" or "DRTs").[747] There are approximately 150 licensed or authorized DRT facilities, all of which are on UHF channels separate from the primary stations whose signals they carry. If the Commission protected these facilities, it would have to protect a separate channel facility for each DRT operated by a full power station, significantly affecting repacking flexibility in markets where they are licensed. As discussed below, however, in order to mitigate the potential impact of the repacking process on DRTs, we will afford DRT displacement applications priority over other LPTV and TV translator displacement applications in cases of mutual exclusivity.[748] Moreover, in connection with the rulemaking proceeding we intend to initiate relating to the potential displacement of LPTV and TV translator stations, we will consider whether to create a new replacement translator service for stations that experience losses in their pre-auction service areas.

243. We do not agree with commenters who claim that the licensing process for the DRT service justifies according DRTs different repacking protections than other TV translators.[749] In creating the DRT service, the Commission concluded that, because assigning these translators a separate call sign based on the translator's channel would cause technical problems and impose additional costs, it would instead assign DRTs the same four letter call sign as their associated full power station.[750] In addition, the Commission associated DRTs with full power stations' main licenses so that the translators could not be separately transferred or assigned, or converted to a LPTV station, thus "ensur[ing] that the replacement translator service is limited to only those situations where a station seeks to restore service to a loss area and the license is used for that purpose."[751] In doing so, the Commission did not confer an operating status on DRTs that differs from other TV translator stations. On the contrary, it put the licensees of these facilities on notice that DRTs, like other TV translator stations, would be secondary in nature and therefore subject to displacement.[752]

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[746] *Community Broadcasters Association MO&O,* 59 Rad. Reg. 2d (P&F) at 1217, para. 4.

[747] *See* PTV Comments at 8; Bahakel Comments at 3; Bonten Comments at 10; Bonten Reply at 7–8; CBS Reply at 2–4; Cox Media Comments at 5; Cox Media Reply at 2–4; NAB Comments at 33; PTV Reply at 4; Raycom Reply at 8; Tribune Comments at 18–21; WGAL Comments at 13–14. We do not interpret the statute to mandate protection of the coverage area and population served by secondary translators "who re-broadcast the main station's signal." *See* NAB Comments at 4 (filed May 8, 2014). Despite NAB's claim, our interpretation is not "contrary to the plain text of the Spectrum Act." *Id*. Moreover, interpreting the statute to mandate protection of secondary translators, including DRTs, would have a detrimental impact on the repacking process and on the success of the incentive auction. *See* para. 237.

[748] *See* § V.D.1 (Transition Procedures: LPTV and TV Translator Stations). We also note that, if a station is reassigned to a new channel in the repacking process, its need for a DRT may no longer exist or may be significantly different based on the signal propagation characteristics of its new channel assignment.

[749] CBS argues that the Commission should protect DRTs because, unlike typical TV translator stations, DRTs are not given a separate call sign, and may not be separately assigned or transferred. *See* CBS Reply at 4. PTV and NAB also assert that, because DRTs were authorized to fill in full power station service areas, they are an integral part of full power stations' facilities that must be protected. PTV Reply at 8; NAB Comments at 33.

[750] *See Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Replacement Digital Low Power Television Translator Stations*, MB Docket No. 08-253, Report and Order, 24 FCC Rcd 5931, 5943–44, paras. 28–29 (2009) (*DRT R&O*).

[751] *DRT R&O*, 24 FCC Rcd at 5941, para. 23.

[752] The Commission determined that the DRT service would be licensed "with 'secondary' frequency use status," *id.* at 5942, para. 25, and that the rules associated with television translator stations generally would apply to the new service.

244. Finally, we adopt our proposal in the *NPRM* not to extend interference protection to LPTV or TV translator stations vis-à-vis Class A television stations in the repacking process.[753] Section 336(f)(7)(B) of the Communications Act prevents the Commission from approving a modification of a Class A license "unless the . . . licensee shows" that its proposal would not cause interference to LPTVor translator facilities authorized or proposed before "the application for . . . modification of such a license . . . was filed."[754] We do not interpret this language, which grants LPTV and TV translator stations protection against changes to facilities proposed by Class A licensees, to restrict the Commission in implementing the previously unanticipated broadcast television spectrum incentive auction and repacking process authorized by Congress in the Spectrum Act.[755]

(iv) Special Temporary and Experimental Authorizations

245. Several commenters argue that section 6403(b)(2) requires the Commission to protect not only licensed facilities as of February 22, 2012, but also any other facilities that were being used to serve viewers on that date, including facilities operating pursuant to experimental authorizations or Special Temporary Authority ("STA").[756] We disagree. As numerous commenters have argued in this proceeding, Congress is presumed to legislate against the background of existing laws and regulations.[757] STAs and experimental authorizations are, as their names indicate, interim, provisional, and non-permanent in nature.[758] These authorizations also are secondary to all other authorized and licensed users, including secondary services such as the LPTV service.[759] We are not persuaded that Congress intended to require the Commission to preserve experimental, temporary, or secondary facilities in the repacking process. We also decline to exercise our discretionary authority to protect such facilities. While station operators may have made investments in these authorizations, they have done so with full prior notice that operations pursuant to these authorizations are secondary and subject to termination at any time. In addition, there are presently outstanding a small number of these authorizations allowing full power

[753] *NPRM*, 27 FCC Rcd at 12399, para. 118. We did not receive any comments on our *NPRM* proposal regarding this issue.

[754] 47 U.S.C. § 336(f)(7)(B).

[755] LPTV Coalition asserts that the Commission should conduct a study of the Spectrum Act's impact on the LPTV and TV translator industry pursuant to the Unfunded Mandates Reform Act (UMRA). LPTV Spectrum Aug. 27, 2013 *Ex Parte* Letter at 3. UMRA, however, does not apply to independent regulatory agencies such as the Commission. *See* 2 U.S.C. § 1502(1) (incorporating terms as defined under 2 U.S.C. § 658); 2 U.S.C. § 658(1) (providing that the term "agency" has the same meaning as defined in § 551(1) of title 5 of the U.S. Code, "but does not include independent regulatory agencies"). Because we decline to protect LPTV stations in the repacking process, we also reject the proposal of the LPTV Coalition that LPTV stations should be able to qualify for primary status when they are repacked. *See* LPTV Spectrum *Ex Parte* Letter at 4–5.

[756] Affiliates Associations Comments at 21; WGAL Comments at 2.

[757] *See Brand X*, 545 U.S. at 993 (noting presumption that Congress is aware of "'settled judicial and administrative interpretation[s]'" when it enacts a statute) (quoting *Commissioner v. Keystone Consol. Indus., Inc.,* 508 U.S. 152, 159 (1993)); *Hernstadt v. FCC*, 677 F.2d 893, 903 n.22 (D.C. Cir. 1980) ("Congress is presumed to be cognizant of, and legislate against the background of, existing interpretations of law.").

[758] Experimental authorizations permit a station to conduct technical experiments directed toward improvement of operations and service, *see* 47 C.F.R. Part 5, subpart D, and STAs permit a station to temporarily operate at a specified variance from the station's authorization or the rules applicable to the particular class of station. 47 C.F.R. § 73.1635; *see* 47 C.F.R. § 73.1635(a)(4) (providing that an STA may be granted for an initial period not to exceed 180 days and that a "limited number of extensions" may be granted, not to exceed 180 days per extension). That rule also specifically provides that "[a]n STA may be modified or cancelled by the FCC without prior notice or right to hearing." 47 C.F.R. § 73.1635(b).

[759] *In the Matter of Promoting Expanding Opportunities for Radio Experimentation and Market Trials Under Part 5 of the Commission's Rules and Streamlining Other Related Rules*, ET Docket Nos. 10-236, 06-155, Report and Order, 28 FCC Rcd 758, 760, para. 3 (2013).

broadcasters to operate with power levels in excess of those permitted under our rules, and protecting such authorizations would have a negative impact on our repacking flexibility.

4. International Coordination

246. Section 6403(b)(l) of the Spectrum Act states that, for purposes of making spectrum available for the forward auction of broadcast television spectrum, the Commission "may, subject to international coordination along the border with Mexico and Canada," reassign television channels and reallocate available portions of spectrum.[760] In the *NPRM*, the Commission acknowledged the need to coordinate, stating, "[w]e note that modification of the 700 MHz band arrangements [negotiated with Canada and Mexico during the DTV transition] or the creation of new separate arrangements pertaining to the 600 MHz spectrum will be necessary to implement 600 MHz operations in areas along the common border and to protect these 600 MHz operations from cross-border interference."[761]

247. Pursuant to international treaty,[762] the United States coordinates all radio spectrum operations in the border areas with Canada and Mexico. Coordination secures interference protection and promotes successful operations for all users of spectrum along the borders. Through efforts of the U.S. Department of State ("State Department") with technical input from the FCC, several bilateral arrangements have been negotiated with Canada and Mexico governing the border areas to afford each country the opportunity to maximize efficient use of spectrum. As explained in the *NPRM*, "[t]hese arrangements provide for the establishment of new services, protection of new and existing services from cross-border interference, and the integration of new services within each country's domestic spectrum agenda."[763] For example, the United States was able to complete its DTV transition and reallocate spectrum from broadcast television to wireless service pursuant to and in accordance with agreed-upon cross-border arrangements requiring coordination of reassigned television stations operating within certain distances of the borders.[764] Canada has largely completed its DTV transition, again in accordance with agreed-upon cross-border arrangements. Mexico's DTV transition is still ongoing, as is coordination of television station reassignments and reallocations in accordance with agreed-upon cross-border arrangements.

248. We stress that this cross-border coordination process is continual. In addition to holding numerous face-to-face working level bilateral meetings and teleconferences on various spectrum issues throughout the year, the U.S.-Canada Radio Technical Liaison Committee ("RTLC") and the U.S.-Mexico High Level Consultative Committee on Telecommunications ("HLCC") hold high level meetings to discuss spectrum coordination issues and set agendas for discussion of future issues. The active participants in the RTLC meetings are the State Department, FCC, and Industry Canada, and in the HLCC meetings, the State Department, FCC, Instituto Federal de Telecomunicaciones ("IFT")[765] and Secrétaria de Comunicaciones y Transportes ("SCT").[766]

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[760] Spectrum Act § 6403(b)(1).

[761] *NPRM,* 27 FCC Rcd at 12426-27, para. 197.

[762] *See generally* International Telecommunication Union Radio Regulations (rev. World Radio Conference 2012).

[763] *NPRM*, 27 FCC Rcd at 12371-72, para. 34.

[764] *Id.* at 12426-27, para. 197. *See also* 2000 U.S.-Canada DTV Letter of Understanding, 2008 U.S.-Canada DTV Exchange of Letters, 2005 U.S.-Canada 700 MHz Public Safety Land Mobile Arrangement and 2011 U.S.-Canada 700 MHz Commercial Land Mobile Arrangement (Arrangement 0); 1998 U.S.-Mexico DTV Memorandum of Understanding, and 2006 U.S.-Mexico 698-806 MHz Protocol for Terrestrial Non-Broadcasting Radiocommunication Services.

[765] Prior to September 2013, when IFT began operation, IFT's predecessor, the Comisión Federal de Telecomunicaciones (COFETEL), participated in HLCC meetings.

[766] In September 2013, a new entity, the Federal Communications Institute or IFT (Instituto Federal de Telecomunicaciones), assumed COFETEL's responsibilities, as well as new authorities granted by a major

(continued….)

249. The FCC has used this ongoing process to keep Canada and Mexico fully informed on broadcast television spectrum incentive auction coordination issues. Beginning in 2010, Commission staff discussed with Mexico and Canada the National Broadband Plan and its recommendation to conduct an incentive auction to make more spectrum available for wireless broadband service.[767] In 2011, Commission staff informed Canada and Mexico of the Commission's progress in planning for the incentive auction, including discussion of repacking models for the 600 MHz Band and the status of pending legislation authorizing the FCC to conduct an incentive auction. The FCC staff further briefed Canadian and Mexican counterparts at the first meetings following passage of the Spectrum Act, including providing detailed descriptions of the Commission's proposed process for conducting the incentive auction. In numerous meetings and teleconferences since adoption of the *NPRM,* FCC staff provided detailed briefings on the *NPRM* and discussed the 600 MHz Band Plan for the incentive auction, interference issues, and coordination issues for resolution. Significantly, Industry Canada recognized 600 MHz spectrum coordination issues in a 2013 spectrum outlook report, stating: "[i]t is expected that the Canadian usage of the UHF TV band will eventually be harmonized with usage in the United States. Industry Canada will evaluate the timing and the process that could be used in Canada for the repurposing of the 600 MHz band, based on the outcome of the incentive auction process in the United States."[768]

250. As planning for the incentive auction progressed, the FCC increased incentive auction-related coordination. In 2013, it formed technical task groups with both Industry Canada and IFT to conduct regular meetings to further coordination. The FCC has used these meetings to demonstrate the mutual benefit to all our countries of harmonized usage of the 600 MHz Band, and to keep our neighbors informed of our specific plans for usage of the band as a result of the incentive auction. All parties at the meetings agree on the technical benefits of freeing more spectrum for wireless broadband and harmonizing use of the 600 MHz Band.

251. The FCC combined these technical meetings with high level engagements by Commission leaders to foster greater cooperation. Chairman Genachowski, Commissioner Clyburn (both as Commissioner and as Acting Chairwoman) and Chairman Wheeler have met with senior officials from both Canada and Mexico on various occasions regarding coordination of the 600 MHz Band, including representatives from Industry Canada, the Department of Canadian Heritage, the Canadian Radio-television and Telecommunications Commission, and from Mexico, SCT, the new Mexican regulator IFT, and its predecessor COFETEL. These engagements continue bilaterally and at meetings of international organizations where senior level officials of the United States, Canada and Mexico are present.

252. These efforts demonstrate that the FCC is moving quickly to coordinate 600 MHz spectrum usage with Canada and Mexico, as urged by several commenters.[769] They also show that the FCC is fully complying with its obligation to ensure that spectrum reassignments and reallocations taken by the Commission are coordinated with Canada and Mexico.

253. NAB asserts in its comments on the *NPRM* that the Spectrum Act "requires coordination as a *precondition* to repacking."[770] In a 24-page document filed on the eve of the Sunshine period[771] (thus

(Continued from previous page)
Constitutional and statutory communications reform initiative. As a result, IFT now participates in the HLCC process.

[767] Federal Communications Commission, Connecting America: The National Broadband Plan at 88-91 (2010).

[768] Industry Canada, Spectrum Mgmt. and Telecomms., Commercial Mobile Spectrum Outlook 33, (2013) available at https://www.ic.gc.ca/eic/site/smt-gst.nsf/vwapj/Outlook-2013-en.pdf/$FILE/Outlook-2013-en.pdf.

[769] *See, e.g.*, Belo Comments at 12-13; Nokia Comments at 21; CEA Comments at 34.

[770] NAB Comments at 15.

[771] *See* 47 C.F.R. § 1.1203(a), (c).

preventing in-depth analysis and depriving interested parties of an opportunity for comment), NAB and other broadcasters claim that, "the FCC must conclude new agreements with Canada and Mexico before conducting the incentive auction" and that, to repack stations as part of the incentive auction, we must negotiate a "new, pre-approved table of allotments with Canada and Mexico."[772] We disagree with NAB that we must complete such coordination before the auction or the repacking process, either as a legal or a practical matter. As a legal matter, the statutory language does not impose a temporal requirement regarding coordination; rather, consistent with the ordinary meaning of the phrase "subject to,"[773] we interpret the statute to mean that any reassignments or reallocations the Commission makes are governed or affected by coordination.[774] Thus, the statute affords the FCC discretion in determining how to implement the coordination process, including the timing of that process.[775] NAB argues to the contrary in its latest filing because agreements were reached in advance of the DTV transition,[776] and Congress presumably was aware of that precedent when it adopted the Spectrum Act.[777] NAB mischaracterizes the precedent of the DTV transition, and places more weight on it than it will bear. International coordination is an ongoing process; in the case of the DTV transition, coordination of some TV stations continued past the DTV transition deadline. Even if Congress could be assumed to share the NAB's subjective view of the DTV transition, however, the statutory language hardly can be stretched to require the Commission to conduct the incentive auction coordination on a schedule similar to the DTV coordination, given that international coordination by its nature involves negotiation with sovereign nations whose actions the FCC cannot control.[778] For all of these reasons, we agree with CTIA and Verizon that preapproval by Canada and Mexico of all reassignments and reallocations is not required by the Spectrum Act.[779]

254. Further, we disagree with NAB that as a practical matter the Commission must complete coordination, including assignment of specific channel allotments, in order to carry out the repacking process. What is required to undertake the repacking process is a mutual understanding with Canada and Mexico as to how the repacking in the United States will be conducted to protect border stations in all countries from interference, and how any possible repacking *could* be conducted in Canada and Mexico should either of those countries ever determine that they might want to undertake such a process. Based on the incentive auction coordination discussions to date, the mutual benefit to Canada, Mexico, and the United States to find more spectrum to meet the burgeoning demand for wireless broadband, and our shared history of cooperative spectrum coordination, we expect to reach arrangements with Canada and Mexico that will enable us to carry out the repacking process in a manner that is fully consistent with the

[772] *See* Letter from Rick Kaplan, Executive Vice President, NAB, *et al.* to Marlene H. Dorch, Secretary, Federal Communication Commission in Docket No. 12-268 at 8-9 (May 8, 2014) (May 8, 2014 NAB International Filing) . *See also* Affiliates Association Reply at 26-27; Block Stations Reply at 5; Harris Broadcast Reply at 3, 4, 6-7.

[773] The Spectrum Act states: "For purposes of making available spectrum to carry out the forward auction . . .the Commission . . . may, subject to international coordination along the border with Mexico and Canada – . . . (i) make such reassignments of television channels as the Commission considers appropriate; and (ii) reallocate such portions of such spectrum as the Commission determines are available for reallocation." Spectrum Act § 6403(b)(1).

[774] *See* Black's Law Dictionary, 1425 (6th Ed. 1990) (defining "subject to" as meaning "[l]iable, subordinate, subservient, inferior, obedient to; governed or affected by; provided that; provided; answerable for.").

[775] Spectrum Act § 6403(b)(1).

[776] *See* May 8, 2014 NAB International Filing, Declaration of Bruce Franca at 2, para. 8 ("international coordination agreements were reached with Canada and Mexico *before* any significant implementation of DTV by U.S. stations occurred").

[777] *See id.* at 6 n.17 and accompanying text.

[778] Had it so intended, Congress might have required "all reasonable efforts" to produce such agreements in advance, as it did with regard to preservation of existing broadcast service. *See* Spectrum Act § 6403(b)(2). Yet it did not.

[779] CTIA Comments at 32; Verizon Comments at 32.

requirements of the statute and our goals for the auction.[780]

255. While NAB claims that the Spectrum Act requires the Commission to conduct the incentive auction coordination the same way it conducted the DTV coordination, it also asserts that the amount of time required for the DTV coordination will make it impossible for the FCC to do so prior to the incentive auction and the repacking process.[781] Contrary to NAB's arguments, the incentive auction is not the DTV transition: unlike the former, the latter involved a time-consuming television station-by-television station coordination. While NAB is correct that the coordination process can take time, the FCC, as explained above, has already been engaged with Canada and Mexico on incentive auction coordination for years.[782]

256. As the foregoing discussion clearly demonstrates, NAB's suggestion that the Commission is waiting until after the incentive auction and the repacking process to begin coordination, or that it is "planning to reach agreements with Canada and Mexico only *after* the auction,"[783] is simply wrong. The Commission is making an all-out effort to reach arrangements. NAB's further suggestion that coordination must not be ongoing because broadcasters have not been briefed on it is also wrong.[784] The Commission regards the confidentiality of the ongoing government-to-government incentive auction coordination discussions as critical to their ultimate success.[785]

257. The Commission noted in the *NPRM* that "modified domestic rules might be necessary in order to comply with any future agreements with Canada and Mexico regarding use of the 600 MHz Band."[786] In addition to cross-border spectrum sharing arrangements, the Commission sought comment in the *NPRM* on possible changes to FCC rules. While the FCC received comments regarding the arrangements, discussed above, it received none regarding possible rule changes. We have determined that minor changes to section 27.57(b) are required to include the spectrum band to be auctioned and to make the rule applicable to wireless services. Therefore, we adopt these changes and include the revised rule in Appendix A.

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[780] As demonstrated above, the Commission is making every effort to reach to new arrangements with Canada and Mexico as soon as international sovereignty and the internal processes and spectrum policies of our neighbors allow. If for any reason we are unable to conclude such arrangements prior to repacking, we will repack U.S. broadcast stations consistent with existing agreements. Contrary to NAB's assertions (May 8, 2014 NAB International Filing at 7), we can do so consistent with the requirements of the Spectrum Act.

[781] NAB Comments at 13; May 8, 2014 NAB International Filing at 9; Declaration of Bruce Franca at 7-8, paras. 21-23.

[782] NAB also fails to acknowledge that the FCC still has considerable time to continue to coordinate with Canada and Mexico, with the auction targeted for mid-2015 and, thereafter, a phased transition of spectrum from broadcast to wireless operations, which will occur in the U.S. over a period lasting up to 39 months after the broadcast station repacking becomes effective.

[783] May 8, 2014 NAB International Filing at 9.

[784] May 8 NAB, 2014 International Filing, Declaration of Bruce Franca at 6, para. 17

[785] We note, however, that the many meetings and discussions outlined above have addressed, among a number of key factors, non-operational allotments. *See* Letter from Rick Kaplan, NAB to Gary Epstein, Mindel De La Torre, Ruth Milkman, and William Lake, FCC, GN Docket No. 12-268 at 2 (filed March 7, 2013) (urging the FCC to "identify the number of non-operational allotments [with no operating broadcast station] that are currently being protected by Canada, Mexico and the U.S . . . [and p]ropose to Canada and Mexico using these non-operational allotments to find new channels . . . to accommodate repacked U.S. stations in the border areas").

[786] *NPRM*, 27 FCC Rcd at 12426-27, para. 197. Section 27.57(b) of the Commission's rules states that operation in the 698-763MHz, 775-793, and 805-806 MHz bands is subject to international agreements with Mexico and Canada, and that, consistent with such agreements, licenses must not cause interference to, and must accept harmful interference from, television broadcast operations in Mexico and Canada. 47 C.F.R. § 27.57(b).

C. Unlicensed Operations

258. Below, we address the operation of unlicensed devices in the reorganized UHF band. We will allow TVWS devices to operate on any unused television channels following the incentive auction. We also intend to designate, after additional notice and opportunity for public input, one unused channel in the remaining television band in each area for shared use by wireless microphones and TVWS devices. In addition to access to these unused channels in the television bands, we designate the 600 MHz Band guard bands for unlicensed use nationwide and will allow unlicensed use of channel 37 in locations that are not being used for the RAS or WMTS. Such use will be subject to the completion of a rulemaking proceeding that we will initiate after the release of this Order to consider changes to our existing Part 15 rules to further facilitate the use of TVWS devices in the remaining television spectrum and flexible unlicensed use in the 600 MHz Band guard bands and on channel 37 (600 MHz and TVWS Part 15 Proceeding). In order to provide certainty to all potential bidders, and to participants in the unlicensed device ecosystem, we intend to conclude that rulemaking prior to the incentive auction.

1. Background

259. The Commission's Part 15 rules provide for operation of low power radio transmitters on an unlicensed basis in many different spectrum bands.[787] These unlicensed radio transmitting devices (unlicensed devices) are an important part of this nation's communications capabilities, serving to augment the operations of licensed services and to meet the needs of a wide range of wireless applications. Unlicensed devices operate on a non-interference basis within bands allocated for authorized services or designated for Industrial, Scientific and Medical ("ISM") devices. The Part 15 rules specify the minimal technical requirements necessary to prevent harmful interference to authorized services. This approach has provided manufacturers and developers with the flexibility to devise a wide variety of innovative standards and devices, like WiFi and Bluetooth, which are thriving in bands that were formerly considered to be lacking significant commercial value.

260. Today in the television bands, the Part 15 rules allow the operation of two general categories of unlicensed devices, fixed and personal/portable ("TV White Space devices" or "TVWS devices").[788] Fixed devices may operate at power levels up to four watts equivalent isotropically radiated power ("EIRP") and incorporate a geo-location capability and a means to access a database that provides a list of available television channels at their location.[789] They also must contact a database to obtain a channel list before operating and re-check the database at least once daily.[790] Personal/portable devices may operate at power levels up to 100 milliwatts EIRP and must contact a database to obtain a list of available channels or operate under the control of another white space device that obtains a list of available channels from a database.[791] Fixed TVWS devices may operate on channels 2-51 (except channels 3, 4 and 37), while personal/portable devices may operate on channels 21-51 (except channel

[787] 47 C.F.R. part 15. Under Part 15, unlicensed devices are allowed to operate on frequencies allocated to other services on the basis that unlicensed devices do not cause harmful interference and have no rights to protection from interference. *Id.* § 15.5(b). The rules allow unlicensed operation across most frequency ranges, but specify radiated field strength and/or conducted power limits, as appropriate, at low levels in order to minimize the potential for harmful interference.

[788] *See Unlicensed Operation in the TV Broadcast Bands,* ET Docket No. 04-186, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807 (2008) (*Unlicensed Operation Second R&O* or *2008 White Spaces Order*). *See also* 47 C.F.R. §§ 15.703(c) and 15.703(i).

[789] *See* 47 C.F.R. §§ 15.711(b)(1) and 15.711(b)(3)(i). As an alternative to incorporating a geo-location capability, fixed devices may have their geographic coordinates determined and programmed by a professional installer.

[790] *See id.* § 15.711(b)(3)(i).

[791] *See id.* §§ 15.711(b)(3)(ii) and 15.711(b)(3)(iv)(A).

37).[792]

261. In the *NPRM*, the Commission sought comment on how best to preserve and expand unlicensed use of the television bands and repurposed UHF spectrum, including making some spectrum available for unlicensed operations on a nationwide basis.[793] The Commission proposed to continue to allow the operation of TVWS devices in the remaining broadcast television spectrum on unused television channels, under the same rules they use for access currently.[794] The Commission also sought comment on whether it should permit unlicensed operations on the two unused channels in the television bands near channel 37 (if available) that currently are designated exclusively for wireless microphones.[795]

262. In addition, the Commission proposed to make 600 MHz Band guard band spectrum available for unlicensed device use on a non-interference basis.[796] The Commission sought comment on whether the existing power and emission limits for TVWS devices in the television bands are appropriate for unlicensed operations in the 600 MHz Band guard band spectrum to protect licensed operations in adjacent bands, whether the same database process should be used to make such spectrum available for use by unlicensed devices operating in the guard bands, and whether changes would be required to accommodate different amounts of guard band spectrum.[797] The Commission also sought comment on making some portion of the duplex gap available for unlicensed operations.[798]

263. The Commission further proposed to make channel 37 available for unlicensed use, while protecting WMTS and the RAS that operate on this channel.[799] It sought comment on appropriate interference protection criteria for WMTS and the RAS. The Commission noted that its rules require that locations of WMTS operations be registered with the American Society for Healthcare Engineering ("ASHE"), and that there are relatively few radio astronomy operations, all of which operate at specified locations. It therefore believed that protection of these services would be feasible by identifying appropriate protection areas in the TV bands databases.[800]

2. Discussion

264. We are taking a number of actions to make available a significant amount of spectrum for unlicensed use in the post-auction television bands, the 600 MHz Band guard bands, and on channel 37, some of it on a nationwide basis.[801] In total, we will make between 20 and 34 megahertz of spectrum newly available for unlicensed use, including for use by unlicensed broadband devices. This new spectrum for unlicensed use will be in addition to the TV white space channels that will exist after the

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[792] *See id.* §§ 15.703(i), 15.703(k) and 15.703(m). As of this date, the Commission has approved nine fixed TVWS devices but no personal/portable devices.

[793] *NPRM,* 27 FCC Rcd at 12437, para. 227.

[794] *Id.* at 12439, para. 233. The Spectrum Act provides that nothing in § 6403(b) "shall be construed to . . . prevent the implementation" of the Commission's *2008 White Spaces Order* "in the spectrum that remains allocated for broadcast television use after the reorganization required by" § 6403(b). Spectrum Act § 6403(i)(2). *See Unlicensed Operation Second R&O*, 23 FCC Rcd 16807.

[795] *NPRM,* 27 FCC Rcd at 12440-12441, para. 238.

[796] *Id.* at 12440, paras. 234-236.

[797] *Id.* at 12440, paras. 235-36.

[798] *Id.* at 12421, para. 178.

[799] *Id.* at 12440, para. 237.

[800] *Id.*

[801] In the discussion below, we use the general term "unlicensed operation" with respect to operations in the guard bands and on channel 37, and the specific term "TVWS device" with respect to operations in the television broadcast bands.

incentive auction. These actions will help to create certainty for the unlicensed industry, thereby promoting greater innovation in new devices and services, including increased access for broadband services across the country.[802]

265. First, we anticipate that there will be at least one channel not assigned to a television station in all areas of the United States at the end of the repacking process,[803] and we intend, after notice and an opportunity for public input, to designate one such channel in each area for shared use by TVWS devices and wireless microphones. We will also permit TVWS devices to operate on all other available channels in those portions of the UHF band that remain allocated and assigned only to broadcast services.[804] We expect that there will still be a substantial amount of spectrum available for use by these devices in the post-auction television bands, particularly in areas outside of the central urban areas of the largest DMAs.

266. Second, we will permit unlicensed devices to operate in the 600 MHz Band guard bands, as specifically contemplated by section 6407(c) of the Spectrum Act, which will make spectrum available for unlicensed devices nationwide. Under the band plan we adopt in this Order, between 14 and 28 megahertz of spectrum in the 600 MHz Band guard bands will be available for unlicensed use nationwide, depending on the amount of spectrum recovered in the auction, including in major markets where today and post-auction few if any vacant television channels may be available.

267. Third, we will permit unlicensed operations on channel 37 at locations where it is not in use by incumbents, subject to the development of the appropriate technical parameters to protect incumbents from harmful interference.

268. Finally, we will initiate a rulemaking proceeding to establish Part 15 technical rules that implement our decisions here, and to revisit our TVWS rules.[805] We will allow TVWS devices to continue to operate in those portions of the UHF band that will be repurposed for the 600 MHz Band until a 600 MHz Band licensee commences operations.[806]

a. Television Bands

269. We anticipate that there will be at least one channel in the UHF band in all areas that is not assigned to a television station in the repacking process. As is the case today, these white space channels will be necessary to avoid interference between primary broadcast stations in the final channel assignment process. Although we also anticipate that there will be fewer unused television channels in

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[802] *See Id.* at 12238, para. 232, 12440, para.234. We note that this spectrum for unlicensed use is in addition to spectrum that is available nationwide in a number of other bands, including the 915 MHz, 2.4 GHz, 5 GHz and 5.8 GHz bands. *See* 47 C.F.R. § 15.247 (rules for the 915, 2.4 GHz and 5.8 GHz bands) and subpart E of Part 15 (rules for the 5 GHz band).

[803] For engineering reasons, there may be a few areas with no spectrum available in the television bands for unlicensed devices and wireless microphones to share.

[804] As discussed in § III.E (Allocations), we are allocating the 600 MHz Band for co- primary broadcasting, fixed, and mobile services. After the incentive auction, full power and Class A stations will be relocated out of portions of the 600 MHz Band that will be used for new fixed and mobile services; however, some low power and TV translator stations may continue operating for some period of time in spectrum that will be assigned to new wireless broadband services or designated for unlicensed guard band use. *See* § V.D.3 (Transition Procedures for TVWS and Unlicensed Device Operations). Ultimately, unlicensed TVWS devices will not be permitted to operate in geographic locations where spectrum is assigned to new wireless broadband services.

[805] Our rules generally condition operation of unlicensed devices on the requirement that they not cause harmful interference to authorized services. *See* 47 C.F.R. § 15.5(b). The Spectrum Act likewise conditions unlicensed use of guard band spectrum on not causing harmful interference to licensed services. Spectrum Act § 6407(e).

[806] *See* § V.D.3 (Transition Procedures for TVWS and Unlicensed Device Operations).

the repacked television bands,[807] we believe that at least one of them should be available for shared use by wireless microphones and unlicensed devices. We therefore intend, after additional notice and an opportunity for comment, to designate one television channel in each area for such shared use.[808] We also agree with those commenters who argue that television channels that remain unused by broadcast television stations after the incentive auction should not be designated exclusively for wireless microphones, and instead should also be made available for potential use by unlicensed TVWS devices.[809] Accordingly, in addition to the channel designated for shared use by wireless microphones and unlicensed devices as described above, we will make any other television channels unused by broadcast television stations after the incentive auction available for TVWS device use (to the extent consistent with the applicable technical rules) as well as wireless microphone use except at those specified times and locations where wireless microphone users have registered their operations for interference protection in the TV bands databases.[810] In taking this approach, we seek to strike a balance between the interests of all users of the television bands, including secondary broadcast stations as well as TVWS devices and wireless microphones, for access to the UHF TV spectrum.

b. Guard Bands

270. The 600 MHz Band Plan includes guard bands to prevent harmful interference between licensed services outside the guard bands. Under the Spectrum Act, these bands may be no larger than technically reasonable to prevent harmful interference to licensed services.[811] Consistent with the Spectrum Act, the 600 MHz Band Plan we adopt provides for a guard band between television spectrum and 600 MHz downlinks, a guard band between 600 MHz uplinks and downlinks (a duplex gap), and guard bands between 600 MHz downlinks and channel 37, to protect licensed services from harmful interference.[812] We will not know until the conclusion of the incentive auction which specific 600 MHz Band Plan scenario we will employ, including the specific sizes of the guard bands. Depending on the amount of spectrum recovered in the auction, guard band spectrum will total at least 14 megahertz, and as

[807] Currently, TVWS devices are prohibited from operating on the first unused channel above channel 37 and the first unused channel below channel 37. *See* 47 C.F.R. § 15.707(a). Depending on the amount of spectrum recovered in the incentive auction, there may be no television channels remaining above channel 37 in some or all parts of the country. Thus, in some areas, particularly urban areas in certain DMAs, the two unused television channels previously designated (where available) exclusively for wireless microphone use may no longer be available.

[808] *See* Letter from Austin Schlick, Director, Communications Law, Google Inc., to Gary Epstein, Chair of the Incentive Auction Task Force, Federal Communications Commission, GN Docket No. 12-268 (filed Apr. 21, 2014) (asking that the FCC preserve up to two vacant channels in each television market that are now being used by wireless microphones and open such channels to use by unlicensed TVWS devices following the incentive auction).

[809] *See, e.g.*, Broadcom, CSR, and Marvell Comments at 1; IEEE 802 Comments at 3-4; Google and Microsoft Comments at 51; Motorola Comments at 14-15, 51; Neul Comments at 6-7; PISC Comments at 41; WSA Comments at 34; WISPA Comments at 17-19; Google Reply at 11-13; IEEE Reply at 2-4; PISC Reply at 16-19; Wi-Fi Alliance Reply at 2. *See also* para. 309.

[810] *See* § III.D.3 (LPAS and Unlicensed Wireless Microphones). As discussed in § V.D.4 (Transition Procedures for LPAS and Unlicensed Wireless Microphones), however, we will continue to prohibit TVWS devices from operating on the two channels currently designated for wireless microphones until the Commission's rules to improve the TV bands databases to provide for more immediate protection of registered wireless microphone operations becomes effective. Licensed wireless microphone users may register their operating information in the TV bands databases at any time. *See* 47 C.F.R. § 15.713(h)(8). Entities operating large numbers of wireless microphones on an unlicensed basis must comply with channel use requirements and must obtain Commission approval before they can register in the TV bands databases. *See* 47 C.F.R. § 15.713(h)(9).

[811] Spectrum Act § 6407(b). This issue is discussed in detail in § III.A.2.e (Guard Bands).

[812] *See* § III.A.2.e (Guard Bands).

much as 28 megahertz.[813] As an example, if we clear 84 megahertz of spectrum, there will be a three megahertz guard band between channel 37 and the 600 MHz Band downlink band, and an 11 megahertz duplex gap between 600 MHz Band uplink and downlink bands (a total of 14 megahertz).[814] If we clear 126 megahertz of spectrum, there will be two three megahertz guard bands adjacent to channel 37, an 11 megahertz duplex gap, and a nine megahertz guard band between the 600 MHz Band downlink band and television licensees (a total of 26 megahertz).

271. Permitting unlicensed operations in the 600 MHz Band guard bands will make additional spectrum available for unlicensed devices nationwide. The record provides significant support for this action.[815] Unlicensed devices complement licensed services and serve a wide range of consumer needs. They contribute tens of billions of dollars to our economy annually, not only through the sales of unlicensed products themselves, but also through collateral commercial activities that they facilitate. Making spectrum available for unlicensed devices will result in economic and consumer benefits, including greater broadband innovation and increased access for broadband services.[816] Additionally, unlicensed spectrum poses low barriers to entry, allowing any party to operate unlicensed devices or provide wireless broadband services.[817] Finally, spectrum in the 600 MHz frequency range has excellent propagation characteristics that allow signals to reach farther and penetrate walls and other structures, thus making it well suited for a variety of unlicensed applications.[818] Commenters have suggested that an 11 megahertz guard band, which we are adopting for the duplex gap (and the lower guard band under at least one clearing scenario), would be usable for broadband unlicensed devices.[819]

272. Qualcomm claims that allowing unlicensed operation in the guard bands or duplex gap at the levels permitted under the TVWS rules (*e.g.*, power limits, antenna height) would cause harmful interference to licensed mobile LTE operations.[820] Qualcomm's analyses purport to demonstrate that unlicensed and wireless operations would have to be separated by as much as 8.5 megahertz to avoid harmful interference.[821] Broadcom, on the other hand, argues that the assumptions in Qualcomm's analyses are unrealistic and that low power unlicensed devices can operate without causing harmful

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[813] The smallest amount of guard band spectrum (14 megahertz) results if 84 megahertz of spectrum is repurposed, while the largest amount of guard band spectrum (28 megahertz) results if 108 megahertz or 138 megahertz of spectrum is repurposed.

[814] Under this scenario, channel 37 functions as a guard band between 600 MHz downlink and television spectrum.

[815] *See, e.g.*, Google/Microsoft Comments at 32; Motorola Mobility Comments at 14; WGAW Comments at 8. *See also* Spectrum Act § 6407(c). Section 6407(c) was a compromise intended by the conferees to "create a nationwide band of spectrum that can be used for innovative unlicensed applications." 158 Cong. Rec. H915 (daily ed. Feb. 17, 2012) (remarks of Rep. Waxman).

[816] Motorola Mobility Comments at 15-16.

[817] Google/Microsoft Comments at 3.

[818] *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket Nos. 04-186 and 02-380, Second Memorandum Opinion and Order, 25 FCC Rcd at 18662, para. 1 (2010).

[819] Broadcom Apr. 23, 2014 *Ex Parte* Letter at 2 (Wi-Fi devices can transmit at 40 milliwatts with a four megahertz gap from LTE downlinks without causing harmful interference to licensed operations); WISPA/CompTIA/CCIA/Free Press/Google/Public Knowledge/Microsoft/Broadcom Apr. 22, 2014 *Ex Parte* Letter at 1; PISC/NAF/Public Knowledge/Free Press Apr. 21, 2014 *Ex Parte* Letter at 2.

[820] *See* Qualcomm *Ex Parte* at 1 (filed May 8, 2014) (interference analyses for both fixed and personal portable TVWS devices rely on various assumptions, such as the appropriate propagation model, signal path losses, receiver filter characteristics and other technical characteristics). *See also* Qualcomm *Ex Parte* (filed April 3, 2014); Qualcomm *Ex Parte* (filed Feb. 19, 2014).

[821] *Id*. at 19.

interference to wireless LTE operations.[822] We note that there are significant differences in the assumptions underlying the Qualcomm and Broadcom analyses relative to factors such as the assumed characteristics of the filters in the wireless broadband devices, propagation loss, and body loss. In addition, the current rules for white space devices provide for different power levels under different conditions and certain of Qualcomm's analyses assumed that devices might operate in this spectrum at the highest permissible power level of 4 Watts effective isotropic power level. We disagree with TIA that all operation in the 600 MHz Band guard bands should be licensed to reduce the potential for harmful interference.[823] We note that licensed wireless service providers do not oppose unlicensed use of the guard band spectrum provided that unlicensed devices do not interfere with and accept interference from licensed wireless broadband operations.[824]

273. While our Part 15 rules for unlicensed use provide an appropriate and reliable framework for permitting low power uses on an unlicensed basis,[825] a further record is necessary to establish the technical standards to govern such use. The appropriate assumptions for the technical analyses will be considered in the forthcoming 600 MHz and TVWS Part 15 proceeding.[826] Consistent with the Spectrum Act,[827] unlicensed use of the guard bands will be subject to the Commission's ultimate determination that such use will not cause harmful interference to licensed services. At this juncture, we are confident that unlicensed devices can operate in the duplex gap under existing TVWS rules without causing such interference. We note, for example, that unlicensed devices are permitted to operate throughout the entire 10 megahertz duplex gap at 1920 – 1930 MHz for the personal communications service.[828] We tentatively conclude that devices operating at a level of 40 mW and having a bandwidth of six megahertz will be viable in this spectrum. We intend to adopt technical rules governing unlicensed use of the 600 MHz Band guard bands in the 600 MHz and TVWS Part 15 Proceeding prior to the incentive auction to address concerns about the potential impact on auction bids.[829]

c. Channel 37

274. We also will permit unlicensed operations in channel 37, subject to the development of the appropriate technical parameters for such operations as part of our 600 MHz and TVWS Part 15 Proceeding in order to protect the WMTS and RAS from harmful interference. Unlicensed operations on channel 37 will be authorized in locations that are sufficiently removed from WMTS users and RAS sites to protect those incumbent users from harmful interference.

275. We recognize the importance of WMTS to patient care,[830] and will remain mindful of this critical function when developing these technical parameters. We also recognize the concerns of WMTS equipment manufacturers and users about the potential for unlicensed operations on channel 37 to cause

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[822] *See* Broadcom *Ex Parte* at 4 (filed April 23, 2014).

[823] TIA Comments at 10-13.

[824] AT&T Reply at 35-36 (not opposing unlicensed use of the guard band spectrum provided that it does not interfere with licensed wireless broadband operations and accepts interference from such operations); CTIA Reply at 25-26 (same); Verizon Reply at 8-9 (same).

[825] We interpret section 6407(c) of the Spectrum Act as consistent with that view. Section 6407(c) grants the Commission the discretion to permit "the use" of the 600 MHz Band guard bands "for unlicensed use."

[826] Spectrum Act § 6407(e).

[827] *See id*.

[828] For example, the Broadband Personal Communications Services (PCS) uplink and downlink bands are separated by a ten megahertz duplex gap that is used by Unlicensed PCS devices, primarily cordless telephones. *See* 47 C.F.R. Part 15, subpart D (Unlicensed Personal Communications Service Devices).

[829] *See* Sony Comments at 6; Qualcomm Comments at 23; TIA Comments at 11.

[830] *See* para. 281.

harmful interference to the WMTS. Parties disagree on the appropriate interference analysis methodology (e.g., I/N ratio and signal attenuation factors) as well as the ability of the TV bands databases to provide adequate protection to the WMTS.[831] We will consider these issues as part of our 600 MHz and TVWS Part 15 Proceeding, with the objective of developing reliable technical requirements that will permit unlicensed operations, while protecting the WMTS and RAS from harmful interference.[832]

276. Subject to the adoption of appropriate technical rules, authorizing the use of channel 37 for unlicensed operations will make additional spectrum available for unlicensed devices on a nationwide basis, thereby advancing our goal of promoting innovation in new unlicensed devices. This will make an additional six megahertz of spectrum available for unlicensed devices in areas of the country that are not in close proximity to hospitals or other medical facilities that use WMTS equipment, or to RAS sites. It is appropriate to revisit the Commission's previous decision to prohibit unlicensed operation on channel 37.[833] The repurposing of spectrum for wireless services will reduce the number of channels available for TVWS use, and channel 37 could provide additional spectrum for such use in those areas where it is not used for the WMTS and RAS. Channel 37 spectrum could be combined with guard bands on one or both sides of channel 37, if the amount of recovered spectrum requires the use of such guard bands, to provide a larger band for unlicensed use.[834] Also, since the time the Commission made its decision to prohibit unlicensed use of channel 37, we have designated multiple TV bands database administrators, have had extensive experience working with their databases, and have a high degree of confidence that they can reliably protect fixed operations. The fixed locations where the WMTS is used are already registered in the ASHE database, and these data could be added to the TV bands databases. WMTS operations could then be protected by establishing minimum distance separations as is done to protect other fixed operations, such as TV stations, wireless microphones and receive sites. The TV bands databases should be capable of handling the large number of registered WMTS sites easily, and these data can be updated on a frequent basis to ensure that new and changed WMTS registrations are quickly reflected in the TV bands databases.

277. As noted above, the Commission has extensive experience permitting unlicensed device operation, while protecting authorized incumbent services from harmful interference. In particular, we anticipate that we can provide reliable protection of the WMTS through the use of a database system like the TV bands databases.[835] If spectrum adjacent to channel 37 continues to be allocated for and used by

[831] GEHC Comments at 32-34, Reply at 4; Philips Healthcare Comments at 4; WMTS Coalition Reply at 12-13. Broadcom disputes certain aspects of GEHC's interference analysis and argues that GEHC understates the sharing opportunities between the WMTS and unlicensed devices. Letter from Jennifer K. Bush, Associate General Counsel, Broadcom Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2-3 (filed Jan. 17, 2014) (Broadcom Jan. 17, 2014 *Ex Parte* Letter).

[832] We intend to address in the future proceeding whether the concerns that WMTS location information in the ASHE database may be imprecise or missing can be addressed by establishing conservative separation distances from unlicensed devices and by reminding hospitals and other medical facilities of their obligation under the rules to register and maintain current information in the database and notify the database administrator when any information changes. *See* 47 C.F.R. § 95.1111(a) and (b). We also note that WMTS use at a medical campus such as a hospital complex could be protected in the TV bands databases using a capability similar to the databases' current feature that restricts channel availability at the minimum distance from the boundary of an area (as defined by four geographic points) in which low power auxiliary devices (wireless microphones) are used.

[833] *See Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket Nos. 04-186 and 02-380, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd at 16186, para. 155 (2008).

[834] Depending on the amount of spectrum recovered, a single guard band may be required above channel 37, or guard bands may be required above and below channel 37.

[835] For example, the database would contain the locations of WMTS installations that require protection, and unlicensed device operators could access the database to determine whether channel 37 is available for their use at a given location. The database would protect the WMTS by prohibiting operation of unlicensed devices on channel

(continued….)

broadcast television services, this approach would also benefit TVWS equipment manufacturers and users by allowing us to consider modification of the out-of-band emission limits on channels 36 through 38 that were designed to protect the WMTS.[836] TVWS equipment manufacturers have had to avoid operation on channels 35 and 39 to comply with the limits. However, if we modify these emission limits as part of the 600 MHz and TVWS Part 15 Proceeding, TVWS devices may be able to operate on these channels.

278. With regard to the RAS, there are a limited number of sites to protect, and their locations could be included in a database in the same manner as the sites of other protected services, such as the Offshore Radiotelephone Service, the Private Land Mobile Radio Service and Commercial Mobile Radio Service ("PLMRS/CMRS"), and certain other receive-only sites.[837] We intend to explore in the 600 MHz and TVWS Part 15 Proceeding whether it would be appropriate to adopt rules to prohibit operation of unlicensed devices within a certain distance from the sites and require unlicensed device operators to access the database to determine whether channel 37 is available for their use at a given location. In addition, we intend to seek comment on whether to adopt any other technical requirements necessary to protect the RAS, such as power and antenna height limits.

D. Other Services

1. Channel 37 Services

279. We decline to relocate WMTS stations or RAS observatories from channel 37. We conclude that we cannot relocate these services in accordance with the provisions of the Spectrum Act. Our 600 MHz Band Plan includes three megahertz guard bands between channel 37 and any adjacent wireless broadband services. We will establish coordination zones around existing RAS facilities so that any such wireless broadband services can be deployed to cover the broadest area possible with minimal impact to RAS observatories.[838]

a. Background

280. Channel 37 (608-614 MHz) is allocated for both RAS and Land Mobile Service (the latter being limited to WMTS).[839] RAS is a receive-only service that uses highly sensitive receivers to examine and study radio waves of cosmic origin. There are twelve RAS telescopes that have been using

(Continued from previous page)
37 within a specific distance that would be determined in a further rulemaking proceeding. Because WMTS installations are registered in a private database supported by ASHE, the designated WMTS coordinator, *see* 47 C.F.R. § 95.1111(a), we will need to explore the issues regarding importing information from the current ASHE database for use with the TV bands databases and whether any additional information needs to be collected.

[836] *See* 47 C.F.R. § 15.709(c)(4). These limits were established based on the assumption that TVWS devices could be used in close proximity with WMTS equipment operating on adjacent channels. They are significantly tighter than the adjacent channel emission limits that apply on other channels and are difficult for manufacturers to meet. Compliance with these limits can preclude white space operation on channels 35 and 39 due to the sharp filtering required to meet the limit on channel 37. However, if the locations of WMTS operations are placed in a database, we can protect these operations by ensuring that adjacent channel TVWS devices are at least a specified minimum distance from their locations. This would eliminate the need for special, tighter emission limits to protect the WMTS since the required minimum separation distance between white space devices and adjacent channel WMTS equipment would offset higher out-of-band emission limits.

[837] *See* 47 C.F.R. § 15.712(d), (e) and (h).

[838] As discussed in § III.C.2.c (Channel 37), we are not making channel 37 available for any new licensed uses, but we will expand unlicensed use by allowing unlicensed devices to operate in channel 37 subject to our determination in a future proceeding that we can impose technical parameters to prevent harmful interference to WMTS and RAS services.

[839] 47 C.F.R. § 2.106.

channel 37 or plan to use channel 37 in the near future.[840] Of these, ten comprise the National Radio Astronomy Observatory's ("NRAO's") Very Long Baseline Array ("VLBA"), which are distributed in several locations in the United States and its territories, and collect simultaneous observations that are combined to emulate a single telescope 5000 miles in diameter.[841] The remaining two telescopes are characterized as single dish instruments.[842] The Commission protects RAS from in-band harmful interference by imposing field strength limits on WMTS and requiring coordination of WMTS use within certain distances of RAS observatories.[843] In addition, TVWS devices are prohibited from operating on channel 37 and on any other channel within 2.4 kilometers of protected radio observatories.[844]

281. WMTS is used for remote monitoring of patients' vital signs and other important health parameters (e.g., pulse and respiration rates) inside medical facilities. In addition, WMTS includes devices that transport the data via a radio link to a remote location, such as a nurses' station, which is equipped with a specialized radio receiver. WMTS operates licensed stations on three bands, including 608-614 MHz (channel 37) in the UHF band. Health care institutions are required to register their locations and coordinate the use of all three bands through the ASHE, the designated frequency coordinator,[845] prior to commencing operation.[846] This process minimizes the potential of WMTS users from causing interference to, and receiving interference from other WMTS devices.

282. In the *NPRM*, the Commission invited comment on whether to relocate RAS, and if relocated, whether the replacement spectrum should be a subset of the 500-700 MHz range for RAS' continuum observations or in a different band.[847] The *NPRM* also requested comments on the cost of relocating RAS from channel 37 to another channel in the 500-700 MHz range, and whether it would be more desirable to relocate RAS to either channel 32 or the low (channels 2-6) or high (channels 7-13) VHF band.[848] In response to the Commission's request that commenters identify all current and planned RAS observation sites within the United States,[849] the National Science Foundation ("NSF") provided a list of thirteen sites where "radio astronomy observations are conducted, have been conducted or are

[840] Letter from Karl B. Nebbia, Associate Administrator to Julius Knapp, Chief, Office of Engineering and Technology, GN Docket No. 12-268, App. A at 2 (filed May 6, 2014) (accompanying National Science Foundation Comments) (hereinafter "NSF Comments").

[841] These stations operate together as a large interferometer. Detailed information on the VLBA is available at: http://www.vlba.nrao.edu/astro/obstatus/current/node5.html. The VLBA telescopes are located in Mauna Kea, Hawaii, Owens Valley, California, Brewster, Washington, Kitt Peak, Arizona, Pie Town, New Mexico, Fort Davis, Texas, Los Alamos, New Mexico, North Liberty, Iowa, Hancock, New Hampshire, St. Croix, Virgin Islands.

[842] Two large radio telescopes operate at Green Bank WV and Arecibo, PR. In addition, we note that the *NPRM* considered thirteen observatories operating in channel 37 by including the Allen Telescope Array in Hat Creek, CA. However, this facility cannot operate below 900 MHz and will therefore not be considered further for protection in this band. NRAO Comments at 2.

[843] *NPRM*, 27 FCC Rcd at 12428, para. 203 (citing 47 C.F.R. §§ 95.1115(a)(1), 95.1119, 95.1107). 47 C.F.R.§ 95.1119 (WMTS devices are prohibited from operating within 80 kilometers distance from the three single-dish sites and 32 kilometers from the ten VLBA sites. The rule also provides coordination requirements).

[844] *NPRM*, 27 FCC Rcd at 12428, para. 203.

[845] *See Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, ET Docket 99-255, Order, 16 FCC Rcd 4543 (2001) (*WMTS R&O*).

[846] *See WMTS R&O* and *Order*, 16 FCC Rcd 4543 (2001).

[847] *NPRM*, 27 FCC Rcd at 12429, para. 206.

[848] *Id.* at para. 207.

[849] *Id.* at 12428-29, para. 204.

planned to be conducted."[850] Nickolaus Leggett states that in addition to these listed sites, there are amateur radio astronomy operations within the United States in educational environments such as high schools, junior colleges, colleges, and universities.[851] However, Leggett does not provide any data regarding actual number of facilities, their locations, or specific capabilities.

283. The Commission also sought comment on whether or not to relocate WMTS users from channel 37 to a nearby television channel or to other spectrum, whether such relocation, if necessary, could be accomplished by retuning existing equipment or if new equipment would be required, and what the estimated relocation costs would be.[852] The *NPRM* also requested comments on the timeframe and process for the possible relocation of WMTS, including the appropriate standard for relocation.[853]

b. Discussion

(i) Statutory Limit on Relocation Costs

284. We conclude that the Spectrum Act limits our authority to relocate incumbent RAS and WMTS users from channel 37 because the total costs of relocating all such users would exceed $300 million. The Spectrum Act directs the FCC to "evaluate the broadcast television spectrum" and to "make such reassignments of television channels as the Commission considers appropriate."[854] The Spectrum Act also provides the Commission with authority to "implement and enforce" this provision of that Act "as if . . . a part of the Communications Act."[855] However, section 6403(b)(4) of the Spectrum Act, which is entitled "[p]ayment of relocation costs," restricts that discretion in certain respects. Section 6403(b)(4)(A)(iii) requires the Commission to reimburse, from the TV Broadcaster Relocation Fund,[856] the costs reasonably incurred by "a channel 37 incumbent user, in order to relocate to other suitable spectrum," provided that "all such users can be relocated," and that "the total relocation costs of such users do not exceed $300,000,000."[857] We interpret "such users" to refer to all channel 37 users; that is, all RAS and WMTS incumbents.[858] We thus conclude that section 6403(b)(4) prohibits the Commission from relocating any channel 37 incumbent user, unless the Commission can move all of the channel 37 incumbents (i.e., all of the RAS and WMTS incumbents) to suitable spectrum for $300 million or less.

285. Examination of the record reflects that the cost of relocating all of the RAS and WMTS incumbents from channel 37 would far exceed $300 million. NSF estimates that relocation costs for RAS would likely not exceed $1 million per site to design, build, and implement new receivers and feed horns[859] or no more than $13 million total.[860] However, commenters, including potential wireless service

[850] NSF Comments at 2. Both CORF and NRAO commented that observations are made on channel 37 spectrum at the ten VLBA sites and Green Bank, but neither stated that such observations are made at Arecibo. *See* CORF Comments at 5-6; *see also* NRAO Comments at 1. NRAO further notes that other sites, such as Arecibo, have observed on channel 37 in the past and are capable of doing so in the future; and that the Allen Telescope is not capable of performing below 900 MHz. NRAO Comments at 2.

[851] Leggett Comments at 3.

[852] *NPRM*, 27 FCC Rcd at 12431, paras. 211–12.

[853] *Id.* at para. 213.

[854] Spectrum Act § 6403(b)(1)(A). We note that, although "reserved exclusively" for RAS and WMTS, channel 37 is one of the "television channels" identified in the Commission's rules. 47 C.F.R. § 73.603(a), (c). We also note that the Spectrum Act provides the Commission with authority to "implement and enforce" its provisions, including § 6403(b)(1)(A), as if they were part of the Communications Act. Spectrum Act § 6003(a).

[855] Spectrum Act § 6003(a).

[856] *See id.* § 6403(d).

[857] *Id.* § 6403(b)(4)(A)(iii).

[858] *Id.*

[859] A feed horn is a satellite dish component that distributes the signal from the dish to the receiver.

providers and WMTS equipment manufacturers, agree that the relocation of all WMTS operations on channel 37 would be well in excess of $300 million.[861]

286. WMTS infrastructure is expensive, complex and integrated into the physical building of a medical facility.[862] Since 2000, when channel 37 was allocated for land mobile use and limited to the WMTS, the healthcare industry has invested heavily in developing and deploying WMTS systems in that band.[863] Most WMTS devices manufactured since that time have been designed to operate only on channel 37 to take advantage of specific filter designs that mitigate against potential adjacent channel interference from UHF digital TV stations.[864] As of January 13, 2014, there were more than 121,000 registered WMTS devices in use at more than 2,300 locations.[865]

287. Furthermore, most WMTS devices that operate on channel 37 are designed to operate only within that spectrum and cannot simply be retuned. Thus, relocation to different spectrum would require redesign and replacement of the equipment.[866] The record reflects that the replacement costs of WMTS devices, on average, are between $6,000 and $10,000 each.[867] The WMTS Coalition states that a conservative estimate of relocation costs, without factoring in additional costs such as for engineering and installation, would be almost $2 billion.[868] The consensus among commenters is that WMTS operations would be too costly to relocate: no commenter has provided any estimate that places costs within the $300,000,000 statutory limit.[869] Considering the number of registered devices and the average cost estimates provided for equipment replacement alone, the cost of WMTS relocation could easily approach

(Continued from previous page)

[860] NSF Comments at 8-9. NSF states that estimated relocation costs would likely not exceed this amount regardless of whether sites were required to move in-band within the UHF TV spectrum or to a completely new band such as the VHF-TV spectrum.

[861] *See* AT&T Comments at 39, GEHC Reply at 4, WMTS Coalition Comments at 16, Letter from Lawrence J. Movshin, Counsel, WMTS Coalition, to Marlene H. Dotch, Secretary, FCC, GN Docket No. 12-268 (filed Jan. 15, 2014) (WMTS Coalition Jan. 15, 2014 *Ex Parte*)..

[862] GEHC Comments at 7.

[863] *Id.* at 6.

[864] WMTS Coalition Comments at 14.

[865] WMTS Coalition Jan. 15, 2014 *Ex Parte*.

[866] *See* GEHC Reply at 8-9. Replacement includes devices, antenna, cabling, and access points. *See also* Philips Comments at 2.

[867] *See* GEHC Reply at 8-9. The cost of a specific deployment would be based on the size and layout of the health care institution, the amount of infrastructure needed (*e.g.*, antennas, cabling, etc.), as well as monitoring stations. Our understanding is that the estimated cost is an average per device for the entire system; *see also* Letter from Dale Woodin, Executive Director, ASHE to Ira Keltz, Office of Engineering and Technology (May 20, 2013). (ASHE estimates that WMTS devices cost in the range of $5,000 - $10,000 on a system-wide basis resulting in an estimated investment in this band in the range of $0.7-$1.4 billion); *see also* WMTS Coalition Jan. 15, 2014 *Ex Parte*, Att. at 6 (claiming that there are a significant number of devices that have not been registered and estimating costs for a replacement system to average almost $9,500 per transmitter, the WMTS Coalition claims that the total replacement cost could exceed $2 billion for an estimated 212,000 installed transmitters).

[868] GEHC Comments at 8. GEHC estimates the WMTS investment in channel 37 operations at between $0.7 and $1.2 billion, exclusive of installation, testing, and training costs and increases in operating and maintenance expenses that would be associated with the replacement of current equipment. GEHC states that this estimate does not include administrative, engineering, or installation costs which would cause the total cost of relocation to increase above this amount.

[869] WMTS Coalition Comments at 13. *Accord* AT&T Comments at 39 (stating that it is "AT&T's current understanding is that it would likely be cost prohibitive to relocate wireless medical telemetry devices from Channel 37").

one billion dollars or more.[870] We therefore conclude that WMTS cannot be relocated within the constraints specified in the statute. Because the statute requires that both RAS and WMTS be relocated from channel 37, and because the estimated costs of relocating WMTS far exceeds the statutory limit, we conclude that none of the channel 37 incumbents will be relocated and both WMTS and RAS will continue to operate on channel 37 following the incentive auction.

(ii) Interference Protections for Incumbent Services

288. The introduction of wireless broadband operations on adjacent channels could be problematic for RAS and WMTS on channel 37 unless appropriate mitigation measures are taken.[871] Both GEHC and Philips Healthcare, two of the largest manufacturers of WMTS devices, argue that more stringent OOBE limits on new commercial wireless systems are necessary to ensure safe operation of WMTS devices.[872] In addition, the WMTS Coalition argues that a guard band between wireless systems and channel 37 is needed to protect WMTS from adjacent channel interference.[873] As the NRAO notes "the worst possible outcome . . . would be to create or preserve an allocation to RAS that is rendered unusable by RAS because it is not adequately supported."[874]

289. To address these concerns, we adopt certain interference protection measures. Under the 600 MHz Band Plan we adopt,[875] operations adjacent to channel 37 will remain as television or be limited to wireless downlink, or both, depending on the incentive auction outcome. Limiting new wireless operations to downlink adjacent to channel 37 eliminates the possibility of mobile devices, which can operate anywhere, transmitting on nearby frequencies in close proximity to RAS and WMTS installations. This in turn reduces the potential of interference from mobile devices to the incumbent services.

290. The 600 MHz Band Plan also incorporates guard bands to prevent harmful interference between 600 MHz broadband wireless service and the licensed services on channel 37.[876] Our decision to incorporate guard bands into the 600 MHz Band Plan is discussed in detail above.[877] The three megahertz guard band in our Band Plan between WMTS on channel 37 and 600 MHz operations is supported by examination of the record. Wireless broadband base stations operate at higher power than mobile devices and pose a harmful interference risk if operated adjacent to channel 37 in locations near WMTS sites.[878] A three megahertz guard band on either side of channel 37 is technically reasonable to provide protection from OOBE and overload interference to WMTS from adjacent wireless broadband services.[879] This

[870] Taking into account that there are a number of devices not registered, as well as additional labor and transactional costs associated with relocation, it is more likely that costs would exceed one billion dollars.

[871] *See, e.g.*, CTIA Reply at 31-32; *see also* NAS-CORF Comments at 6 (WMTS and RAS "both need strong protection from interference "); *see also* NRAO Comments at 6 ("conditions will change drastically after the UHF rebanding plan is implemented as adjacent spectrum is repurposed and/or re-packed").

[872] Philips Healthcare Comments at 5; GEHC Comments at 24.

[873] WMTS Coalition Jan. 15, 2014 *Ex Parte*.

[874] NRAO Comments at 6.

[875] *See* § III.A.2 (600 MHz Band Plan).

[876] If 84 megahertz is repurposed, adjacent wireless broadband services will be placed above channel 37, requiring only a single guard band between channel 37 and the wireless broadband services. If the auction clears more than 84 megahertz, two guard bands will be necessary, one above and one below channel 37.

[877] *See* § III.A.2.e (Guard Bands).

[878] *See generally* GEHC Comments at19. *See also* GEHC Reply at 30-31. Philips Healthcare also provided interference threshold numbers that are not as conservative as those provided by GEHC. *See* Philips Healthcare Comments at 5.

[879] In light of this conclusion, our decision to establish three megahertz guard bands satisfies the requirements of § 6407(b) of the Spectrum Act.

guard band will ensure that OOBE from nearby wireless base stations do not significantly raise the noise floor in channel 37, which otherwise could impact a receiver's ability to reliably detect and demodulate desired signals. In addition, this guard band will prevent harmful interference caused by overload in the adjacent channels. Such interference could force active components in WMTS receivers into compression resulting in desensitization. The analysis in the attached Technical Appendix corroborates our conclusion.[880]

291. If the auction clears less than 84 megahertz of spectrum, the spectral environment around channel 37 will remain the same, with channels 36 and 38 available for television operations. Consistent with current rules, which do not provide any specific protections for channel 37 incumbents beyond the DTV OOBE limits, we will not implement guard bands between channel 37 and adjacent television operations in that case. The WMTS community argues that an increased number of television stations could be assigned to channels 36 and 38 in the repacking process,[881] and that WMTS operations located near a DTV transmitting antenna will experience a reduction in useable spectrum of more than 20 percent, effectively reducing system capacity for WMTS operations.[882] The need to relocate stations to channels 36 or 38 will depend on the results of the auction. If stations are relocated to these channels, the extent of any potential interference to WMTS will depend in large part on the locations of the stations. Under certain scenarios channels 36 or 38 would not be used at all for television service. Some stations currently operating on channels 36 or 38 may choose to participate in the auction or be reassigned to other channels in the repacking process, making channel 37 more usable for WMTS in some locations. While we are sensitive to the desire to minimize any detrimental impact on WMTS, under the current circumstances, WMTS will not receive enhanced protection if additional stations are added to channels 36 or 38 as a result of the repacking process.

292. RAS poses different interference concerns than WMTS. Our current rules do not specify protection levels for radio astronomy sites.[883] The RAS has been able to function successfully on channel 37 due to the relatively stable spectral environment associated with television operations on adjacent channels and the flexibility the Commission has had in locating television stations far away (both geographically and spectrally) from RAS locations. Because of the extreme sensitivity of the RAS receivers, wireless operations near channel 37 could cause harmful interference following the auction.[884] However, a collateral benefit of our decision to establish guard bands to prevent harmful interference to WMTS from adjacent wireless operations also provides protection to RAS. In other words, because the guard bands for WMTS provide frequency separation from wireless services, the physical separation necessary for wireless services to protect RAS from harmful interference decreases significantly.

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[880] *See* Technical Appendix § II.E.2 (Potential for Interference between 600 MHz Downlink and WMTS). This analysis is based on the receive filter characteristics and the protection criteria used in an interference analysis provided by GEHC. GEHC Comments at 46-51. We note that some commenters supported a band plan scenario which provided a four megahertz guard band between WMTS and wireless broadband services. *See* GEHC Reply at 25. However, the support was based on spectrum recovery scenarios that we do not adopt in this Order. Further, no technical information was provided in support of a four megahertz guard band.

[881] GEHC Reply at 26.

[882] *See* WMTS Coalition Comments at 26-27; GEHC Comments at 7; GEHC Reply at 27; Philips Healthcare Comments at 4.

[883] *See* 47 C.F.R. § 2.106 FN US74 which states, "the radio astronomy service shall be protected from unwanted emissions only to the extent that such radiation exceeds the level which would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates."

[884] *See, e.g.*, Motorola Mobility Comments at 12 ("these services will find the operating environment far more severe as they become sandwiched between advanced mobile networks and high-powered broadcast facilities"). The emissions mask for commercial wireless systems would allow OOBE into channel 37 of -13dBm per 100 kHz, regardless of power level; over 100 dBm higher than the level of protection recommended in ITU recommendation RA.769 ("Protecting Criteria used for radio astronomical measurements"). *See* 47 C.F.R. §27.53(g).

293. Recognizing the value of providing as much flexibility as possible to new 600 MHz Band licensees, we are not adopting any specific constraints on wireless fixed and base station locations operating in the 600 MHz downlink band, but instead will require any new 600 MHz licensee to coordinate with NSF prior to commencing operations at permanent fixed locations near RAS observatories.[885] Requiring coordination will provide the necessary certainty to RAS observatories that their sites will be protected. Specifically, we will require such coordination for stations within 25 kilometers of a VLBA installation.[886] Staff analysis to support these separation distances is detailed in the attached Technical Appendix.[887] Because the RAS observatories are generally located in remote locations, we do not expect dense wireless deployment near those sites. Thus, this requirement does not present a significant burden to 600 MHz wireless licensees' network because the number of necessary coordinations is expected to be minimal. In addition, many observatories are also protected by terrain features (e.g., nearby mountains) that block wireless signals, making coordination, in most cases, a simpler process.

294. We note that the only two single dish radio astronomy installations that operate in channel 37 are the Green Bank, WV and Arecibo, PR observatories. Our rules already require specific procedures for wireless operations near those locations.[888] We also note that in many cases, geographic features that protect RAS sites will block wireless system signals. Consistent with section 1.924, we will require wireless licensees to provide the following information: identification of the geographical coordinates of the antenna location (NAD-83 datum), the antenna height, antenna directivity (if any), type of emission, and effective isotropic radiated power.[889] We strongly encourage the parties to cooperate so as not to unreasonably frustrate the operations of RAS or wireless operations.

2. Television Fixed Broadcast Auxiliary Stations

295. *Background.* Subpart F of the Commission's Part 74 rules allows certain fixed broadcast auxiliary service ("BAS") operations on television channels 14-51 on a secondary basis.[890] Because these stations are secondary, they must not interfere with and must accept interference from current and future full-power television stations, LPTV stations (including Class A stations) and TV translator stations.[891]

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[885] We note that radio astronomy observations in channel 37 are conducted using two types of installations – single dish and Very Long Baseline Array (VLBA) – each of which have different protection requirements. VLBA observations are less susceptible to interference than single dish observations because interfering signals do not correlate across the multiple receivers that comprise the array. Also, we note that we are not limiting the notification to a subset of the UHF band due to the extreme sensitivity of RAS receivers. Similarly, our rules for TV white space devices prevent them from operating on any available TV channel within 2.4 kilometers of an RAS site (47 C.F.R. § 15.712(h)).

[886] Our decision here is consistent with other Commission actions regarding coordination for sites near RAS observatories. *See, e.g.*, Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service, IB Dkt. No. 07-101, *Report and Order*, 24 FCC Rcd. 10414, 10431 (2009) (the Commission adopted a 50 km coordination zone for vehicle mounted earth stations around VLBA sites).

[887] *See* Technical Appendix § II.E.3 (Potential for Interference between 600 MHz Downlink and RAS).

[888] *See* 47 C.F.R. § 1.924.

[889] *See* 47 C.F.R. § 1.924(d).

[890] *See generally* 47 C.F.R. §§ 74.600 *et seq.* (Subpart F – Television Broadcast Auxiliary Stations). Specifically, § 74.602(h) permits TV studio transmitter links (STLs), TV relay stations, and TV translator relay stations to operate fixed point-to-point service. Only licensees of a TV broadcast station, a Class A TV station, a TV broadcast network entity, a low power TV station, or a TV translator station may hold fixed BAS licenses on TV channels 14-51. *See* 47 C.F.R. §§ 74.600, 74.632(a).

[891] 47 C.F.R. § 74.602(h)(2). Fixed BAS in TV Channels 14-51 is also secondary to land mobile stations in areas where land mobile sharing is currently permitted. *Id.*

There are a relatively low number of fixed BAS stations operating in channels 14 to 51.[892] In addition to operating in the UHF band, fixed BAS operates in several other frequency bands on a primary basis.[893]

296. In the *NPRM*, the Commission proposed to continue to allow fixed BAS on a secondary basis in the UHF band spectrum that remains available for television services nationwide following the incentive auction.[894] It also proposed that fixed BAS stations be required to cease operating and relocate at their own expense when a new 600 MHz wireless licensee intends to commence operations within interference range.[895] The Commission further proposed that broadcast television or new wireless licensees be required to provide 30 days' notice to all incumbent fixed BAS operations within interference range prior to commencing operations.[896]

297. *Discussion.* We will continue to license fixed BAS on a secondary basis in the UHF spectrum that remains allocated and assigned to full power television services nationwide. However, as discussed in Section V.D.2 below, fixed BAS stations must cease operating and/or relocate out of the 600 MHz Band repurposed for wireless services, at their own expense, no later than the end of the Post-Auction Transition Period; or, during the Post-Auction Transition Period, if a new 600 MHz wireless licensee intends to commence operating and there is a likelihood of harmful interference from the fixed BAS station.. The few commenters addressing fixed BAS relocation issues are supportive of this approach.[897] We discuss below the requirements relating to cessation of BAS operations in the reorganized UHF band.[898]

298. Fixed BAS licensees will not be entitled to compensation for relocating to other frequencies.[899] Fixed BAS is a secondary service,[900] and the Spectrum Act does not provide for

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[892] The Commission's Universal Licensing System (ULS) reflects 192 fixed BAS licensed in TV Channels 14 through 51 with 151 of these stations licensed on television channels 21 through 51.

[893] Fixed BAS stations are also licensed in the non-TV UHF, 900 MHz, 2 GHz, 7 GHz, 13 GHz, and 18 GHz bands, though new stations are no longer licensed in certain subbands. *See* 47 C.F.R. §§ 74.602(g), 74.602(h)(3)(4).

[894] *NPRM*, 27 FCC Rcd at 12485, para. 217.

[895] *Id.* at 12485, paras. 218, 220.

[896] *Id.* at 12485, para. 219. *See, e.g.*, 47 C.F.R. § 101.103(d) (30-day coordination "notice and wait" requirement). *See also Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, WT Docket No. 95-157, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8825 (1996); *Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78 and 101 of the Commission's Rules*, ET Docket No. 01-75, Report and Order, 17 FCC Rcd 22979 (2002); *Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*, WT Docket No. 10-153, Report and Order, Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order, 26 FCC Rcd at 11628 (2011).

[897] *See, e.g.*, Affiliates Associations Comments at 41-42; CTIA Comments at 43; Verizon Reply Comments at 50.

[898] *See* § V.D.2 (Television Fixed Broadcast Auxiliary Stations).

[899] We note that the Commission did not provide for the reimbursement of secondary fixed BAS from TV channels 52-59 or from TV channels 60-69. *Reallocation of Television Channels 60-69, the 746-806 MHz Band*, Report and Order, 12 FCC Rcd 22953 (1998).

[900] Section 74.602(h) provides that TV STLs, TV relay stations, and TV translator relay stations may be authorized "on a secondary basis and subject to the provisions of subpart G of [Part 74]." 47 C.F.R. § 74.602(h). Secondary licensees must accept interference from and must not cause interference to primary services. *See Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, WT Docket No. 95-157, First Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 8825, 8869, para. 89 (1996).

reimbursement of any relocation costs through the TV Broadcaster Relocation Fund.[901]

3. Low Power Auxiliary Stations and Unlicensed Wireless Microphones

299. Low power auxiliary station ("LPAS") operations, which are currently authorized only for broadcast and certain related entities,[902] are intended for uses such as wireless microphones, cue and control communications, and synchronization of TV camera signals (referenced collectively as "wireless microphones").[903] The Commission's rules provide for licensed LPAS operations on unused television channels on a secondary, non-exclusive basis.[904] The Commission also currently permits certain unlicensed operations of wireless microphones (including related devices) in the television bands pursuant to a limited waiver and Part 15 rules.[905] In the *NPRM*, the Commission noted that the repacking process may result in a reduced amount of spectrum available for use by wireless microphones, and sought comment on how best to accommodate licensed and unlicensed wireless microphone operations, along with the other uses, in the television bands and 600 MHz Band guard band spectrum to ensure that this spectrum is used efficiently and effectively following the incentive auction.[906]

300. Wireless microphones provide many important functions that serve the public interest, and today operate throughout the television bands. They play an essential role in enabling broadcasters and other video programming networks to serve consumers, including helping to cover breaking news and broadcasting live sports events.[907] They significantly enhance event productions in a variety of settings (including theaters and music venues, film studios, conventions, corporate events, houses of worship, and internet webcasts), often are integral to creating high quality content that consumers demand and value, and contribute substantially to our economy.[908] Below, we discuss wireless microphone operations in the television bands, where we provide additional opportunities for access to available channels following the

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[901] *See* Spectrum Act § 6403(b)(4)(A).

[902] *NPRM*, 27 FCC Rcd at 12433, para. 221 & n.336; 47 C.F.R. § 74.832(a)(1)-(6) (specifying particular broadcast and production entities eligible to hold LPAS licenses).

[903] *See generally* 47 C.F.R. §§ 74.801 *et seq.* (Subpart H – Low Power Auxiliary Stations); *NPRM*, 27 FCC Rcd at 12433-12434, para. 221. This Section does not address operations of wireless assist video devices, which are authorized under Part 74, Subpart H rules on a licensed basis. 47 C.F.R. §§ 74.801; 74.870.

[904] *NPRM*, 27 FCC Rcd at 12433, para. 221. *See generally* 47 C.F.R. §§ 74.801 *et seq.* (Subpart H – Low Power Auxiliary Stations). The Commission's rules provide that LPAS operations are limited to locations removed from existing co-channel TV broadcasting stations by not less than certain distances specified in the rules (unless otherwise authorized), *id.* § 74.802(b), that LPAS licensees will not be granted exclusive frequency assignments, *id.* § 74.802(d), that selection of frequencies for operations shall be guided by the need to avoid interference with TV broadcast reception, and that station usage is "secondary to TV broadcasting and land mobile stations" operating in the spectrum allocated for TV broadcasting and "must not cause harmful interference." *Id.* § 74.803(b).

[905] *See NPRM*, 27 FCC Rcd at 12434-12435, para. 222. As referenced in this Order, "unlicensed wireless microphones" includes all LPAS devices that operate on an unlicensed basis in the television bands pursuant to this waiver and certain Part 15 rules.

[906] *NPRM*, 27 FCC Rcd at 12435-12436, paras. 224-225.

[907] *See, e.g.*, CBS et al Comments at 3-4; NAB Comments at 47-48 (importance for production of broadcast programming and electronic news gathering (ENG)); NFL Comments at 3 (providing reliable and secure communications that professional games require); SAG-AFTRA Comments at 1-2; Joint Reply of the Commissioner of Baseball, NBA, NFL, NHL, NCAA, NASCAR at 2-5 (critical for capturing audio from in-game events and enhancing viewers experience).

[908] *See, e.g.*, Broadway League Comments at 3-5 (enable world-class sound experiences for millions of Broadway theater goers, contributing significantly to economy); Sennheiser Comments at 3-5 (ubiquity of microphones in all aspects of entertainment business, in news reporting, in sports, and in commercial, civic, and religious life); Shure Comments at 4-8 (organizations large and small rely on wireless microphones to deliver clear, real-time audio to audiences, and significantly enhance the economic value of these enterprises).

incentive auction, and in the 600 MHz Band guard bands, where we will permit microphone users to operate, subject to the forthcoming rules for low power operations in those bands. In addition, as discussed in Section V.C.4, below, during the Post-Auction Transition Period we will allow wireless microphone users to continue to operate in the repurposed spectrum pursuant to certain conditions.[909] Recognizing the many important benefits provided by wireless microphones, we also will be initiating a proceeding in the next few months to address the needs of wireless microphone users over the longer term, both through revisions to our rules concerning use of the television bands and through promotion of opportunities using spectrum outside of the television bands.

a. Television Bands

301. *Background*. The television channels available for wireless microphones currently include two unused channels (when available) in the UHF band near channel 37, where unlicensed TVWS device operations currently are prohibited,[910] as well as any other channels available at locations that are separated from television stations by specified separation distances.[911] The number of these other channels varies depending on location, and often may include channels that also can be used by unlicensed TVWS devices.[912] Licensed LPAS operators may obtain protection from interference from TVWS devices on those channels by reserving them at specified locations and times of operation in the broadcast TV bands databases.[913] In addition, certain qualifying unlicensed operators also can obtain interference protection from unlicensed TVWS devices at specified times by registering with the Commission, enabling them to have their operations included within the broadcast TV bands databases.[914]

302. To promote more efficient and effective wireless microphone operations in the television bands following the incentive auction, the Commission sought comment in the *NPRM* on reducing the current required separation distances between wireless microphones and television stations for co-channel operations in the broadcast TV bands, as well as on permitting even closer wireless microphone operations than provided for generally in the rules through a coordination process or use of a database.[915] The Commission noted that, in a separate proceeding on wireless microphones, it sought comment on other rule revisions, including expanding eligibility for certain unlicensed entities so that they could operate on a licensed basis under the Part 74 LPAS rules in the television spectrum.[916]

303. *Discussion.* We take several steps in this proceeding, and in the related wireless

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[909] *See* § V.D.4 (LPAS and Unlicensed Wireless Microphones). In § V.D.4, we also address operations of wireless assist video devices during the Post-Auction Transition Period.

[910] *NPRM*, 27 FCC Rcd at 12434, para. 222; *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket Nos. 04-186 and 02-380, Second Memorandum Opinion and Order¸ 25 FCC Rcd at 18671-18677, paras. 25-36 (2010) (*TV White Spaces Second MO&O*); 47 C.F.R. §15.707(a); *see also id.* § 15.712(f)(2).

[911] *NPRM*, 27 FCC Rcd at 12434, para. 222. *See* 47 C.F.R. § 74.802(b).

[912] In many areas, there may be more of these other channels available for wireless microphone operations than are available for unlicensed white space devices. For instance, the Commission's rules provide that only fixed white space devices may operate below channel 21, and such devices are not permitted in any channel immediately adjacent to occupied TV channels. *See* 47 C.F.R. §§ 15.703(c), 15.707, 15.711, and 15.712.

[913] *NPRM*, 27 FCC Rcd at 12434, para. 222; *TV White Spaces Second MO&O*, 25 FCC Rcd at 18675-18676, para. 33; 47 C.F.R. § 15.712(f) and 713(h)(8).

[914] *See NPRM*, 27 FCC Rcd at 12434-12435, para. 222; *TV White Spaces Second MO&O*, 25 FCC Rcd at 18675-18676, paras. 32-33; 47 C.F.R. § 15.713(h)(9). Wireless microphone use also is authorized on licensed and unlicensed bases on frequencies outside of the core TV bands. *See NPRM*, 27 FCC Rcd at 12435, para. 222 n.348.

[915] *NPRM*, 27 FCC Rcd at 12436, para. 225. Different separation distances apply in the VHF band. *Id.*

[916] *NPRM*, 27 FCC Rcd at 12435-12436, para. 224 n.354.

microphones proceeding,[917] to ensure that the reduced amount of television spectrum that remains following the incentive auction can continue to accommodate wireless microphone operations, along with other uses of this spectrum, in an efficient and effective manner. First, we are revising our rules for co-channel operations to expand the areas where wireless microphones may be used in the television bands. Second, in the related wireless microphones proceeding, we are concurrently extending to certain unlicensed wireless microphone users the rights of licensed LPAS users to access television spectrum.[918] Third, although there may no longer be two unused television channels available for wireless microphones following the incentive auction, we intend to designate one television channel that is not assigned to a television station in the repacking process for use by both wireless microphones and unlicensed TVWS devices. In addition, we will take further steps in the near term in the 600 MHz and TVWS Part 15 Proceeding to make improvements to the registration system in the TV bands databases. These steps will provide licensed LPAS operators a more timely and effective means to obtain needed protection from unlicensed TVWS device operations on any of the available television channels. On balance, we conclude that the changes we are making best serve to address the important needs of wireless microphone users as well as other users that seek access to the broadcast spectrum that remains available for use following repacking.

304. *Co-channel Operations*. To ensure that wireless microphones users have access to as many television channels as possible following the repacking process, we are revising our rules for co-channel operations in two ways. These revisions will provide wireless microphones with access to additional television channels in particular locations without raising interference concerns to television licensees. Such additional access may be particularly important in those locations where most television channels are occupied by broadcasters and wireless microphone users seek access to several channels.

305. First, we reduce the current co-channel separation distances applicable to wireless microphone operations in the television bands. The current rule,[919] which was adopted prior to the transition to digital television, was designed to protect analog television reception and, therefore, is outdated. Further, the distances the rule specifies in many cases may be greater than necessary to protect against interference because it does not account for variations in power or antenna height that reduce the size of some stations' service areas. Consistent with Shure's proposal to take into account the predicted television station contour and the radiated power of the wireless microphone,[920] we revise the rule to permit wireless microphones to operate at distances as close as four kilometers from a television station's

[917] In the *NPRM*, the Commission noted that, in a separate proceeding on wireless microphones, it was considering whether to expand eligibility for certain entities to operate on a licensed basis under the Part 74 LPAS rules, and would be issuing a public notice seeking to refresh the record in that proceeding. *NPRM*, 27 FCC Rcd at 12435–36, para. 224 n.354 (citing *Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band*, WT Docket No. 08-166, WT Docket No. 08-167, ET Docket No. 10-24, Report and Order and Further Notice of Proposed Rulemaking, 25 FCC Rcd 643, 682-687 paras. 81-90 (2010) (*Wireless Microphones Order and Further Notice*)). On October 5, 2012, a Public Notice was issued to do so. *See The Wireless Bureau and the Office of Engineering and Technology Seek to Update and Refresh Record in the Wireless Microphones Proceeding*, WT Docket Nos. 08-166, 08-167, ET Docket No. 10-24, Public Notice, 27 FCC Rcd 12067 (2012).

[918] Concurrent with our release of this Order, we will be releasing an order in the wireless microphones proceeding that provides for limited expansion of Part 74 licensee eligibility for certain unlicensed wireless microphone users. *See Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band*, WT Docket No. 08-166, WT Docket No. 08-167, ET Docket No. 10-24, Report and Order and Further Notice of Proposed Rulemaking, FCC 14-50 (adopted May 15, 2014) (*Wireless Microphones Second Report and Order*).

[919] *See* 47 C.F.R. § 74.802(b) (specifying the applicable separation distances for VHF and UHF channels under current rules).

[920] Shure Comments at 25. *See also, e.g.*, PISC Reply at 22-23 (proposing that wireless microphone users be allowed to choose between relying on a geographic separation or on the actual signal strength received at a venue's location).

predicted service contour (including digital or analog full power, Class A, and LPTV stations).[921] A number of commenters support reducing the applicable separation distances for co-channel operations.[922]

306. Our action aligns the separation distance rules for wireless microphones with those for unlicensed personal/portable TVWS devices,[923] which operate at similar power levels. Personal/portable TVWS devices are permitted to operate with a maximum power of 100 milliwatts and must operate at least four kilometers outside the protected service contour of co-channel television stations (digital or analog), a distance based on a power level of four watts (4,000 milliwatts).[924] Most wireless microphones typically operate at power levels of less than 50 milliwatts.[925] For analog wireless microphones, even if there were as many as 16 operating simultaneously in a six megahertz TV channel, more than the typical six to eight microphone range for most existing technologies,[926] the total transmitted power within a six megahertz channel will not exceed 800 milliwatts, five times less than the power on which the four kilometer separation distance required for personal/portable TVWS devices is based. Even were sixteen wireless microphones on a six megahertz channel to operate at up to 250 milliwatts, as permitted for licensed LPAS operators,[927] the total transmitted power still would not exceed four watts (4,000 milliwatts). Thus, we disagree with commenters that express general opposition to any reduction of the co-channel separation distance,[928] and conclude based on our technical analysis that a four kilometer separation distance between wireless microphones and a television station's protected service contour will protect television reception from interference.

307. Second, to enable licensed LPAS operators to access additional co-channel spectrum, we

[921] The contour values that the Commission used for protecting TV reception from TV white space devices are specified in § 15.712(a)(1). In developing this rule, the Commission used the contour values in § 73.622(e) (for digital TV stations) and § 73.683(a) (for analog TV stations).

[922] *See, e.g.*, Boeing Comments at 4; Google and Microsoft Comments at 52-53; PISC Comments at 37-39; Sennheiser Comments at 10-11; WISPA Comments at 19-20; Sennheiser Reply at 18; Shure Reply at 20-21; WSA Reply at 11-12; WISPA Reply at 9-11. Commenters argue that doing so would authorize wireless microphone use on additional channels in more locations, channels which might otherwise go unused. *See, e.g.*, PISC Comments at 34-35 (noting that reducing the co-channel separation distance potentially could make several additional channels available for wireless microphone use in New York City, where availability of spectrum for wireless microphones is limited). As detailed below, we reject NAB's argument that any rule revision reducing the current co-channel separation distance would unduly increase the risk of interference with TV reception.

[923] 47 C.F.R § 15.712(a)(2) (required separation distance for personal/portable white space devices where antenna height above average terrain is less than three meters).

[924] The Commission derived the four kilometer separation distance based on a power level of 4,000 milliwatts (four watts), concluding that it would protect television reception within a station's service contour from a fixed co-channel TVWS device operating with a power level of up to 4,000 milliwatts EIRP and an antenna height of three meters HAAT. *See Unlicensed Operation in the TV Broadcast Bands*, ET Docket No. 04-186, *Third Memorandum Opinion and Order*, 27 FCC Rcd 3692, 3699-3700 paras. 17-18 (2012). The required separation distances from a television station contour for Mode II personal/portable TVWS devices are the same as for four watt fixed devices with an antenna height above average terrain of three meters. *See* 47 C.F.R. § 15.712(a)(2). The Commission required that personal/portable TVWS devices also comply with this four kilometer co-channel separation distance.

[925] *See Wireless Microphones Order and Further Notice,* 25 FCC Rcd at 684-685, para. 86.

[926] As a general matter, six to eight analog wireless microphones can operate on a six megahertz channel. *See TV White Spaces Second MO&O*, 25 FCC Rcd at 18676, para. 33. In recent years, some manufacturers have developed equipment that permits as many as 16 microphones on a television channel under certain circumstances.

[927] *See* 47 C.F.R. § 74.861(e)(1)(ii).

[928] *See, e.g.*, NAB Reply, WT Docket Nos. 08-166, 08-167, OET Docket No. 10-24 at 20 (filed Mar. 12, 2013) (opposing, without technical analysis, any general rule revisions reducing co-channel separation distances for all wireless microphone users because of concern that this could create a risk of interference to Part 74 operations and to TV viewers).

also will permit licensees to operate even closer to television stations than the revised separation distances, provided that any such operations are coordinated with the television licensees. Several commenters assert that wireless microphones can operate effectively on co-channels much closer to television stations than currently allowed, and several point out that many already do so today.[929] Many commenters assert that such closer co-channel operations can be ideal for wireless microphones because such operations would be free of unlicensed TVWS devices.[930] Commenters propose various solutions to allow for closer co-channel operations, including coordination with affected broadcasters.[931] Based on the record before us, we conclude that the best approach is to permit licensed LPAS users, including newly eligible licensees (see discussion below), to obtain access to additional television channels at a given location through the coordination process. Requiring coordination with broadcasters effectively addresses the concerns of those commenters, including NAB, that oppose or express concern about revising the rules to provide for closer co-channel operations, based on the potential for interference to television operations.[932] We note that many of the licensed LPAS operators, including both broadcasters and many users that would now be eligible for licenses, already coordinate with each other to share spectrum.[933] Several broadcasters state that they successfully coordinate the sharing of channels among broadcasters and other wireless microphone users, including Broadway theaters in New York City, on a routine

[929] *See, e.g.*, Google and Microsoft Comments at 53-54; PISC Comments at 34-37; Shure Comments at 25; WSA Comments at 34-35; PISC Reply at 20; WSA Reply at 12; Letter from Michael Calabrese, Director, Wireless Future Project, New America Found., PISC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2-3 (filed Aug. 19, 2013) (PISC Aug. 19, 2013 *Ex Parte*); *cf.* Spectrum Bridge Comments at 9. *But see* NFL Comments at 5 (revising the separation distance may not be helpful in providing more spectrum for wireless microphones because NFL wireless microphones users already encounter interference from television stations under existing separation rules).

[930] *See, e.g.*, PISC Comments at 34-35; WSA Comments at 35; WISPA Reply at 10-11. *But see* CP Comm. Reply at 3 (arguing that wireless microphone users prefer interference-free channels but not necessarily co-channels).

[931] *See, e.g.*, Boeing Comments at 4-5 (wireless microphone users should be required to coordinate their operations with broadcasters and to use a database that could account for the particular interference conditions at a location); WSA Comments at 34 and Reply at 12 (advocating coordination); Sennheiser Comments at 11 and Reply at 18 (wireless microphone operations should be permitted where the TV signal falls below a specified threshold); PISC Comments at 34-37 and Reply at 21-22 (wireless microphone operations should be permitted only where they may be shielded from TV signals due to building attenuation); Shure Comments at 25 (same); WSA Reply at 12 (same); PISC Comments at 21-22, 39-40 (database accounting for particular interference conditions); Shure Comments at 25 and Reply at 20-21 (same); WISPA Comments at 19-20 (same).

[932] *See, e.g.*, NAB Reply, WT Docket Nos. 08-166, 08-167, OET Docket No. 10-24 at 20 (filed Mar. 12, 2013) (opposing general rule revisions reducing co-channel separation distances for all wireless microphone users because of concern that this could create a risk of interference to Part 74 operations and to TV viewers, while stating that, under 47 C.F.R. §§ 74.803 and 74.24, broadcast professionals using the frequency coordination process already are permitted where necessary to operate wireless microphones at shorter co-channel distances at certain locations, such as inside studios or buildings, where such operations would not create interference to other protected operations).

[933] Under existing rules, LPAS licensees that seek to operate wireless microphones in the same area are required to endeavor to select frequencies in such manner as to avoid mutual interference with each other and are guided by the need to avoid interference to TV broadcast reception, and LPAS operations by Part 73 or broadcast auxiliary licensees are permitted on a short term basis without prior Commission authorization, provided that they coordinate with the broadcast station licensee. 47 C.F.R. §§ 74.803; 74.24. Unlicensed wireless microphone users that would be newly eligible for licensing, such as various Broadway theaters, also have indicated that they are familiar with the frequency coordination process. *See, e.g.*, Broadway League Comments at 12 (noting that there are few available channels than in the heart of the Broadway Theatre District, and "through skillful engineering and coordination, Broadway theatres have extracted use from every available slice of spectrum without causing interference").

basis.[934]

308. *Expanded License Eligibility for Certain Unlicensed Wireless Microphone Users*. In the *Wireless Microphones Second Report and Order* that we adopt concurrently with this Order, we expand licensed LPAS eligibility to include professional sound companies and venues that use wireless microphones in connection with major events/productions.[935] These revised licensing rules will extend to currently unlicensed wireless microphone users operating at specified locations the rights of licensed LPAS operators to operate in television spectrum, including the same rights to access the TV bands databases for interference protection from unlicensed TVWS devices.[936]

309. *Designating Channels for Wireless Microphones*. As noted above, we anticipate that there will be at least one television channel in all areas of the United States that is not assigned to a television station in the repacking process.[937] As is the case today, such "white space" channels will be necessary to avoid interference between primary broadcast stations in the final channel assignment process. Although we anticipate that there will be fewer such unused television channels in the repacked television bands,[938] we intend, after additional notice and an opportunity for comment, to designate one of these television channels in each area for shared use by wireless microphone and unlicensed devices.[939] We also agree with those commenters who argue that unused television channels that remain unused by broadcast television stations after the incentive auction should not continue to be designated exclusively for wireless microphone use and should be made available for potential use by unlicensed TVWS devices as well.[940] Accordingly, in addition to the channel designated for shared wireless microphone and unlicensed TVWS device use as described above, we will make any other unused television channels following the incentive auction available for shared wireless microphone and TVWS device use (to the extent consistent with the applicable technical rules), except at those specified times and locations where wireless microphone users have registered their operations for interference protection in the TV bands databases.[941]

310. We will not continue to designate any television channels unused by television stations exclusively for the use of wireless microphones. We disagree with commenters who argue that we should permanently reserve two channels for wireless microphones,[942] as this would significantly reduce the amount of spectrum available for auction and repurposing for wireless services, particularly in many of

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[934] Letter from Catherine Wang, Counsel for Shure Incorporation, to Marlene H. Dortch, Secretary, FCC, Docket No. 12-268 (filed Feb. 10, 2014) (Shure et. al. Feb. 10, 2014 *Ex Parte* Letter) (filed jointly by several broadcasters, frequency coordinators, and wireless microphone manufacturers).

[935] *See generally Wireless Microphones Second Report and Order*.

[936] *Id*.

[937] *See* para. 265.

[938] *See* n.807 and accompanying text.

[939] *See* Letter from Austin Schlick, Director, Communications Law, Google Inc., to Gary Epstein, Chair of the Incentive Auction Task Force, Federal Communications Commission, GN Docket No. 12-268 (filed Apr. 21, 2014) (asking that the FCC preserve up to two vacant channels in each television market that are now being used by wireless microphones and open such channels to use by unlicensed TVWS devices following the incentive auction).

[940] *See* n.809.

[941] *See* n.810.

[942] *See, e.g.*, Broadway League Comments at 12-23; Broadcast Network Comments at 10-11; Collective Wireless Microphone Interests Comments at 5; CP Comm. Comments at 5-6; NAB Comments at 6-7, 47-48 (wireless microphones are essential for broadcasters); NFL Comments at 2-5; Performing Arts Working Group Comments at 4; SAG-AFTRA Comments at 2; Shure Comments at 15; Disney Comments at 46-47; Comcast and NBC Universal Reply at 24-25; Lectrosonics Reply at 4; NAB Reply at 56-57; Sennheiser Reply at 15-17; Shure Reply at 10-11; Sports League Reply at 6-7; TV Programmers Reply at 9-12.

the larger markets across the nation, and preclude any sharing of the limited television spectrum when it is not being used for wireless microphone operations. The steps we are taking concerning wireless microphone operations in the repacked television bands, taken together with other steps we discuss elsewhere in the Order to accommodate wireless microphone uses, represent a balanced approach to addressing the needs of wireless microphone users and the other users that seek access to the more limited television spectrum that is likely to remain available for use following the incentive auction.[943]

311. *Improvements Relating to the TV Bands Databases*. Given our decision to no longer designate two unused television channels, where available, exclusively for wireless microphones, we agree with commenters that we should take steps to improve the operation of the TV bands databases.[944] Such improvements would enable licensed LPAS operations (including newly eligible licensees)[945] to obtain more immediate protection from interference from TVWS devices on any available television channels at the times and locations that these wireless microphone users need. We plan to address how best to make these improvements in the 600 MHz and TVWS Part 15 Proceeding that will address the TV bands databases in the reorganized bands (along with related issues such as the rules for low power operations in the guard bands), and we will take into account concerns and suggestions raised by the commenters there.[946]

b. Guard Bands

312. *Background*. In the *NPRM*, the Commission also sought comment on the operation of wireless microphones in spectrum established for 600 MHz Band guard bands.[947] The Commission proposed to make the guard bands available for unlicensed device use,[948] and requested comment on

[943] *See, e.g.*, PISC Comments at 41; WSA Comments at 34-35; Google Reply at 13. In addition to the steps we are taking here and in the *Wireless Microphones Second Report and Order*, we note that in many areas there may be several channels available for use by wireless microphones that cannot be used by TVWS devices. *See* n.910. For instance, in channels below channel 21, personal/portable TVWS devices are not permitted to operate. Moreover, unlike wireless microphones, fixed TVWS devices may not operate on any channel immediately adjacent to occupied TV channels. *See* 47 C.F.R. §§ 15.703(c), 15.707, 15.711, and 15.712. In addition, licensed LPAS operators and qualifying unlicensed operators, which will now be eligible for licenses under revised rules, *see Wireless Microphones Second Report and Order*, can reserve the use of channels otherwise available for TVWS devices by registering those needed channels in the TV bands databases for the dates and times that wireless microphones are needed. *See, e.g.*, Google and Microsoft Comments at 51-52; Spectrum Bridge Comments at 9; Google Reply at 12-14; PISC Reply at 16-19; WSA Reply at 13; WISPA Reply at 11-13.

[944] NAB, for instance, argues that if two television channels are no longer designated for wireless microphones, the Commission should take steps to improve protections for licensed LPAS operations by requiring database administrators to exchange registrations and make changes in the database in real time with all updates made within ten minutes of receipt, and should require unlicensed white space devices to check the database every 20 minutes instead of every 24 hours. NAB Comments at 47-48; NAB Wireless Microphone Comments at 8-9; *see also* Shure Comments at 26-27; Comcast and NBC Universal Reply at 25-26. In addition, several commenters representing unlicensed wireless microphone users argue that the Commission's rules for unlicensed wireless microphone registration, including requiring authorization 30 days in advance of events, do not provide sufficient flexibility for event planning for qualifying unlicensed users. *See, e.g.*, Broadway League Comments at 7-10; Collective Wireless Microphone Interests Comments at 4, CP Comm. Comments at 4, Shure Comments at 25-26; Thompson Engineering Comments at 2; Sports Leagues Reply at 9.

[945] *See generally Wireless Microphones Second Report and Order*.

[946] Based on the limited record before us, and because improvements would involve substantive revisions to the current requirements pertaining to the broadcast TV bands databases, we decline to make these changes at this time.

[947] *NPRM*, 27 FCC Rcd at 12435-12437, paras. 224, 226.

[948] *NPRM*, 27 FCC Rcd at 12440, para. 234. The Spectrum Act authorizes the Commission to permit the use of guard bands for unlicensed operations and provides that unlicensed use must rely on a database or other methodology as determined by the Commission. Spectrum Act §§ 6407(c), (d).

whether wireless microphone operations could co-exist with such unlicensed operations, as well as whether to require wireless microphones to comply with the technical requirements established for unlicensed operations in the guard bands, including the ability to access a database. The Commission also asked whether wireless microphones should be permitted in the guard bands only on an unlicensed basis, or whether those that qualify for registration in the TV bands databases should be able to protect their operations against interference from unlicensed devices operating in these bands.[949]

313. *Discussion.* We are allowing unlicensed devices to operate in the guard bands, including the duplex gap.[950] To make additional spectrum outside of the repacked television bands available for wireless microphone uses, we also will permit wireless microphone devices to operate in the 600 MHz Band guard bands on an unlicensed, unprotected basis provided that they comply with the technical requirements we will adopt for low power device operations in these guard bands in our upcoming rulemaking. Most commenters support permitting wireless microphones to operate in the guard bands,[951] although they disagree about the precise nature of such operations, including the technical rules that should apply.[952]

314. In addition to permitting unlicensed wireless microphone operations in the guard bands, we will permit certain wireless microphones operations in a portion of the duplex gap on a licensed basis.[953] Broadcasters and cable programming networks contend that without the continued availability of

[949] *NPRM*, 27 FCC Rcd at 12435-12437, paras. 224, 226; 12439-12440, para. 234.

[950] *See* § III.C (Unlicensed Operations).

[951] *See, e.g.*, Boeing Comments at 5; Broadway League Comments at 12-13; CP Comm. at 2 n.5; NAB Comments, WT Docket Nos. 08-166, 08-167, OET Docket No. 10-24 at 20 (filed Jan. 25, 2013) at 6; Disney Comments at 47; PISC Comments at 43 (permit wireless microphones only if they conform with requirements for unlicensed device operations); Sennheiser Comments at 11-12; SBE Comments at 13; Shure Comments at17-18; WSA Comments at 34; Ericsson Reply at 33; TV Programmers Reply at 13. Certain types of wireless microphone applications can be effective when operating on an unlicensed basis, thus alleviating the need for television spectrum. *See, e.g.*, Sennheiser Comments at 11-12 (the most promising applications for wireless microphones that operate on an unlicensed basis in the guard bands may be those for "non-professional" use). Several commenters specifically support wireless microphone operations in the duplex gap, depending on the band plan adopted. *See, e.g.*, Broadcast TV Affiliates Comments at 46; NAB Comments at 46; WSA Comments at 34; Comcast and NBCUniversal Reply at 24-25; Shure Reply at 9-10, 17.

[952] Some commenters support wireless microphone operations in the guard bands only insofar as they would operate on an unlicensed basis consistent with the rules applicable to unlicensed device operations in the guard bands. *See, e.g.*, PISC Comments at 43; Neul Comments at 5; Spectrum Bridge Comments at 8; WSA Comments at 34; Google Reply Comments at 14. Some commenters support licensed wireless microphone operations in the bands. *See, e.g.*, Broadway League Comments at 12-13 (supporting allowing both licensed and unlicensed wireless microphone operations); NAB Comments, WT Docket Nos. 08-166, 08-167, OET Docket No. 10-24 at 20 (filed Jan. 25, 2013) at 6 (requesting designating and reserving the guard bands only for licensed wireless microphone operations). Some request that wireless microphone users should be permitted to register for interference protection from unlicensed devices in the guard bands. *See, e.g.*, Shure Comments at 17-18; Sennheiser Comments at 11-12; Shure Reply at 16.

[953] With respect to the duplex gap, commenters disagree about the extent to which the spectrum should be made available for wireless microphones and/or unlicensed device operations. Some support only unlicensed operations in the duplex gap, *see, e.g.*, New America/PISC *Ex Parte* at 2 (filed May 7, 2014); WSA *Ex Parte* at 5 (filed May 7, 2014), or request that 40 mW unlicensed operations be permitted in 6 megahertz of the duplex gap, *see* Google/Microsoft *Ex Parte* at 1 (filed May 8, 2014). Others support use of the duplex gap for wireless microphones, but not other unlicensed devices. *See, e.g.*, Letter from Catherine Wang, Counsel, Bingham, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 12-268 at 4 (filed May 8, 2014) (representing a group of broadcasters, wireless microphone manufacturers, and professional wireless microphone users and frequency coordinators); Qualcomm *Ex Parte* at 1 (filed May 8, 2014) (allowing unlicensed operation in the duplex gap at the levels permitted under the TVWS rules would cause harmful interference to licensed mobile LTE operations).

unused television channels for interference-free wireless microphone operations, they will have difficulty providing certain programming, including emergency information, on which their ability to provide vital information to first responders and the public depends.[954] Without access to some guard band spectrum for this purpose, there may be areas in the country where there would be little if any certain access to UHF band spectrum for wireless microphone operations on a protected basis. Accordingly, we conclude that the public interest will be served by allowing broadcasters and cable programming networks using wireless microphones on a licensed basis in a portion of the duplex gap to obtain interference protection from unlicensed devices at specified times and locations, on an as-needed basis. In the 600 MHz and TVWS Part 15 Proceeding, we will examine how best to provide access to a portion of the duplex gap by licensed wireless microphone users, while also ensuring that unlicensed users of the duplex gap can make use of this spectrum to provide broadband services as described above.[955] We anticipate that the duplex gap would be partitioned such that six megahertz would be available for unlicensed broadband devices to operate under the existing TVWS rules for 40 mW personal/portable devices, and four megahertz adjacent to the 600 MHz Band downlinks would be available for licensed wireless microphone operations.

315. In taking this approach in the guard bands, we seek to promote unlicensed operations generally while also providing access to more spectrum for wireless microphone uses, consistent with the requirement that operations in the guard bands do not cause interference to, and serve to prevent interference to, licensed services outside of the guard bands.[956]

c. Long-Term Needs of Wireless Microphone Users

316. Through the actions described above, we seek to accommodate the needs of wireless microphone users in the reorganized UHF spectrum that will continue to be available for their use. We recognize, however, that much of the UHF spectrum that currently is unused and available for wireless microphone operations may no longer be available following the incentive auction. As discussed in Section V.D.4 below, we will allow wireless microphone users to continue to operate in the spectrum repurposed for wireless service during a transition period following the incentive auction under specified conditions, both to address near-term needs and to help facilitate their transition to spectrum that is available for their use.[957] Considering the important benefits of wireless microphone use, we plan to initiate a proceeding in the near term to explore additional steps we can take, including the use of

[954] *See, e.g.*, Letter from Jared S. Sher, VP, Associate General Counsel, 21st Century Fox, Anne Lucey, Senior VP for Regulatory Policy, CBS, Susan Mort, Assistant General Counsel, Time Warner, Kathleen Kirby, Counsel, Radio Television Digital News Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 1-2 (filed May 7, 2014) (representatives of news gathering organizations describing critical need of wireless microphones for providing emergency information); Letter from Rick Kaplan, Executive Vice President, Strategic Planning, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 4 (filed Apr. 28, 2014).

[955] *See* para. 273.

[956] As discussed above, we will initiate a proceeding to establish technical parameters for low power operations in the guard bands. In that proceeding, we will fully address concerns about low power operations within the guard bands and the potential for interference from such operations to licensed services outside of the guard bands. *See, e.g.*, NFL Comments at 6; Qualcomm Comments at 22-24; SAG-AFTRA Comments at 3; Qualcomm Reply at 9.

[957] We reject requests that we develop a mechanism for reimbursement of wireless microphone users' relocation costs, *see, e.g.*, Sennheiser *Reassignment Costs PN* Comments at 5-11; CP Comm. *Reassignment Costs PN* Comments at 1-3; *but see* CTIA *Reassignment Costs PN* Reply at 7-9 (opposing any reimbursement), as wireless microphone users are not eligible for any such reimbursement. *See* Spectrum Act § 6403(b)(4)(A); § V.C.5.a (statutory reimbursement mandate applies only to full power and Class A television licensees that are involuntarily reassigned to new channels in the repacking process pursuant to § 6403(b)(1)(B)(i)). Wireless microphone users operate on a secondary or unlicensed basis.

additional frequency bands by wireless microphones.[958] In that proceeding, we will work with wireless microphone users, both licensed and unlicensed, to accommodate their long-term needs.[959]

E. Allocations

317. *Background.* The radio spectrum is divided into separate frequency bands that are allocated to various terrestrial or space radiocommunication services, such as broadcasting, fixed, mobile, and fixed-satellite.[960] These allocations are shown in the Table of Frequency Allocations ("Table of Allocations"),[961] which is, in effect, "the master zoning map for how different parts of the spectrum may be used."[962] Each frequency band may be allocated for multiple services, with each service afforded either primary or secondary interference rights.[963] Although the assignment, licensing and use of a frequency band must be in accordance with the Table of Allocations (except as otherwise provided in section 2.102 of the Commission's rules),[964] service rules govern access to and use of the band within the framework of the Table. The service rules provide for, among other things, the particular type of operation permitted under each allocation in a frequency band and how it will be licensed.[965]

318. Prior to the Spectrum Act's enactment, the Commission proposed to add fixed and mobile services to the Table of Allocations for all of the UHF and VHF broadcast television bands (except for channel 37) on a co-primary basis with broadcast television, as a preliminary step towards carrying out the goals of the National Broadband Plan.[966] The FCC later deferred a decision on its allocations proposal to this proceeding.[967] In the *NPRM*, the Commission invited additional comment on

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[958] We note that in recent years wireless microphone users have been turning increasingly to frequency bands outside of the UHF band to address some types of their needs, including uses on an unlicensed basis in the 902-928 MHz and 2.4 GHz bands.

[959] Several commenters request that the Commission initiate such a proceeding. *See, e.g.*, Letter from Catherine Wang, Counsel, Bingham, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 12-268 at 4 (filed May 8, 2014) (representing a group of broadcasters, wireless microphone manufacturers, and professional wireless microphone users and frequency coordinators); Broadway League *Ex Parte* at 2 (filed May 8, 2014).

[960] *See* 47 C.F.R. § 2.1. Some allocations identify a broad category for similar types of radiocommunications; for example, a broadcasting allocation is used for transmission intended to be received directly by the general public whether sound (*e.g.,* AM or FM radio) or television. *Id.* Service rules determine which type of broadcasting service is used in a specified frequency band. Other allocations are limited to certain types of uses; for example, satellite allocations are specific as to type of use such as fixed, mobile, broadcasting or maritime mobile satellite.

[961] 47 C.F.R. § 2.106.

[962] *Fostering Innovation and Investment in the Wireless Communications Market*, 24 FCC Rcd 11322, 11326 para. 21 (2009).

[963] For example, the Commission has amended the Table of Allocations to establish co-primary fixed and mobile allocations in frequency bands used by commercial mobile radio services (CMRS), thereby permitting these bands to be used for fixed services, mobile services, or any combination of the two. *Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services*, 11 FCC Rcd 8965 paras. 32-33 (1996). The FCC also has adopted flexible co-primary allocations in several frequency bands used by Miscellaneous Wireless Communications services (Part 27). *See, e.g.*, 47 C.F.R. § 27.2(a).

[964] 47 C.F.R. § 2.102(a).

[965] CMRS service rules typically permit any type of fixed or mobile use, *see, e.g.*, 47 C.F.R. § 24.3, but restrictions apply in some cases. For example, cellular system architecture may not be used in the 775-776/805-806 MHz guard bands under Part 27. 47 C.F.R. § 27.2(b).

[966] *See Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements to VHF,* Notice of Proposed Rulemaking, 25 FCC Rcd 16498, 16504 para. 16 (2010).

[967] *See Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements to VHF,* Report and Order, 27 FCC Rcd 4616, 4621 para. 10 (2012) (*Channel Sharing Report and Order*).

the same proposal in light of the Spectrum Act's enactment and the views expressed by broadcasters in the earlier proceeding.[968] The Commission also proposed to modify the Table in the event of a decision to relocate RAS and WMTS incumbents from Channel 37 (608-614 MHz).[969]

319. *Discussion.* We adopt in part the Commission's proposal to add fixed and mobile allocations to the Table of Allocations on a co-primary basis with broadcast television. Specifically, we will add fixed and mobile services to the Table of Allocations for UHF channels 21-36 (512-608 MHz) and 38-51 (614-698 MHz), but not for UHF channels 14-20 (470-512 MHz) (also known as the "T-Band") or for VHF channels 2-13 (54-72, 76-88, and 174-216 MHz). We conclude that our action addresses the practical requirements of the incentive auction and the concerns raised by broadcasters and other parties. We retain the allocations for Channel 37 for the RAS and the Land Mobile Service for WMTS.[970]

320. Adding fixed and mobile services to the Table of Allocations for UHF channels 21-36 and 38-51 is necessary to address the practical requirements of the incentive auction and the UHF band transition that follows it. As stated above, the assignment, licensing and use of frequencies must be in accordance with the Table,[971] yet we cannot know in advance of the incentive auction which frequencies will be repurposed for new uses in which geographic areas because that depends on the outcome of the incentive auction.[972] Further, by adding fixed and mobile services to the Table of Allocations for all of the frequencies that could be repurposed prior to the incentive auction, we will assure forward auction bidders that the frequencies on which they bid will be available for new, flexible uses without the need to conduct additional allocation proceedings post-auction that could risk delaying the transition and the introduction of new services.[973] The Commission has taken similar allocation actions in advance of prior spectrum auctions.[974] Accordingly, we decline NAB's request to defer any allocations decisions until after the auction process is complete.[975] In addition, we also find that, following the incentive auction, co-primary fixed/mobile/broadcasting allocations in the Table also will be necessary to allow users that currently operate on such frequencies on either a primary or secondary basis—including full power, Class A and LPTV stations, TV translator stations, BAS stations, and LPAS—to continue operating for an interim period on frequencies that will be repurposed during the course of the UHF band transition,[976] as well as to allow LPTV and TV translator stations to continue to operate on such frequencies during the

[968] *NPRM*, 27 FCC Rcd at 12399-400, paras. 119, 121.

[969] *NPRM*, 27 FCC Rcd at 12401, para. 121-122. The Commission asked about a range of possible frequencies to relocate RAS, including channel 4 (66-72 MHz) in the VHF band. *Id.* at 12429, para. 207.

[970] *See NPRM*, 27 FCC Rcd at 12427, para. 199.

[971] 47 C.F.R. § 2.102(a).

[972] *See NPRM*, 27 FCC Rcd at 12401, para. 123. *See* CTIA Comments at 17; Verizon Comments at 59-60;; Motorola Comments at 13-14.

[973] *See* CEA Comments at 17.

[974] For example, prior to auctioning both the upper and lower 700 MHz bands, the Commission added allocations for fixed and mobile services on a co-primary basis with broadcasting. *See Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, Fifth Report and Order, 12 FCC Rcd 12809 (1997); *recon*., 13 FCC Rcd 6860 (1998); Sixth Report and Order, 12 FCC Rcd 14588 (1997); *see also Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, First Report and Order, 15 FCC Rcd 476 (2000); *Reallocation of Television Channels 60-69, the 746-806 MHz Band*, Report and Order, 12 FCC Rcd 22953 (1997); and *Lower 700 MHz R&O*, 17 FCC Rcd 1022.

[975] *See* NAB Reply at 34-35; *see also* APTS Comments at 36-37.

[976] The Commission took similar action in connection with the digital television transition. *See Lower 700 MHz R&O*, 17 FCC Rcd at 1029–30, para. 14 (retaining an allocation for broadcast television service in the Table for the Lower 700 MHz Band in order to allow broadcasting during the digital television transition).

reorganization of the UHF band.[977]

321. We believe that our action also addresses concerns raised by broadcasters.[978] First, we will not add fixed and mobile services to the Table of Allocations for VHF channels 2-13 or the T-Band, as originally proposed, because doing so is unnecessary. The Commission did not propose to repurpose any portion of the VHF band or the T-Band for fixed or mobile wireless use, and the 600 MHz Band Plan that we adopt does not provide for the possibility of such repurposing.[979] In addition, consistent with the provisions of the Spectrum Act, the Commission expects to act on the T-Band on a separate, later timetable.[980] Second, the service rules for the broadcast and wireless services, as modified in this Order, will ensure that broadcast and mobile wireless operations in the 600 MHz Band do not interfere with or otherwise disrupt one another. Third, to clearly identify where broadcast television and mobile wireless services will be permitted, we will later modify the Table of Allocations promptly to reflect the outcome of the incentive auction. Specifically, we hereby delegate authority to the Chief of the Office of Engineering and Technology to take such actions as are necessary to modify the Table of Allocations to be consistent with the outcome of the incentive auction—e.g., to remove the co-primary fixed and mobile allocations from segments of the UHF band that will remain available only for television broadcast service on a nationwide basis.[981]

IV. THE INCENTIVE AUCTION PROCESS

322. In this Section we discuss the incentive auction process that will determine the availability of spectrum usage rights in the reorganized UHF band and assign rights. We adopt a descending clock format for the reverse auction, which will simplify participation for broadcasters. For the forward auction, we adopt an ascending clock format. As described below, we also adopt rules on bidding procedures and other elements of the reverse and forward auctions. This Section also addresses how the reverse and forward auctions, the spectrum clearing target and the forward auction band plan determination, and the final stage rule will be integrated to determine the final incentive auction results.

323. Consistent with the Commission's practice in past spectrum license auctions, we adopt rules in this Order that will allow subsequent determination of specific final auction procedures.[982]

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[977] *See* § V.D.1 (LPTV and TV Translator Stations).

[978] *See* NAB Reply at 34-35 (arguing that a pre-incentive auction allocation decision would signal that the FCC seeks to repurpose all of the broadcast television bands).

[979] Accordingly, we disagree with CTIA that the Commission would sacrifice necessary flexibility by not adding co-primary allocations for fixed and mobile services to the Table of Allocations for all of the broadcast television bands. *See* CTIA Comments at 17-18.

[980] The Spectrum Act provides for the future relocation of public safety licensees from the T-Band and auctioning of T-Band spectrum separately from the broadcast television spectrum incentive auction, *see* Spectrum Act §§ 6103, 6403, and the Commission's Public Safety and Homeland Security Bureau issued a Public Notice inviting comment on T-Band issues. *See Wireless Telecommunications Bureau and Public Safety and Homeland Security Bureau Seek Comment on Options for 470-512 MHz (T-Band Spectrum)*, PS Docket No. 13-42, Public Notice, 28 FCC Rcd 1130 (2013). Because the Commission will act separately on the T-Band, we also conclude that expanding the existing land mobile allocation for the T-Band is unwarranted at this time. *See NPRM*, 27 FCC Rcd at 12401, para. 122.

[981] In other portions of the UHF bands, the Table of Allocations will continue to reflect co-primary allocations for broadcasting, fixed and mobile services. Although we anticipate that portions of the UHF bands will be cleared of full power and Class A broadcast television stations nationwide or only in certain geographic areas, low power and TV translator stations will continue to operate in these bands with secondary status until they are notified by a new wireless licensee that it is ready to begin operations. *See* § V.D.1 (LPTV and TV Translator Stations). Our foregoing delegation to OET also includes authority to modify the Table to add a footnote indicating that fixed and mobile services are authorized only in band segments and in geographic areas specified in Part 27.

[982] *See* § I (Introduction). For the reverse auction, we adopt new rules that will enable implementation of final, specific auction bidding procedures through the pre-auction process. For the forward auction, we describe existing spectrum license auction rules that permit implementation of specific forward auction procedures, and modify the

(continued….)

Following this Order, a pre-auction process will precede the bidding process for the incentive auction. This pre-auction process will determine both the specific final auction procedures, based on additional public input, and the auction participants, through an application process. The process will be initiated by the release of the *Incentive Auction Comment PN*, which will solicit public input on final incentive auction procedures, and which will include specific proposals for crucial auction components such as opening prices. Thereafter, the *Incentive Auction Procedures PN* will specify final procedures, including dates, deadlines, and other final details of the application and bidding processes.[983] The rules we adopt in this Order provide for the ability to refine aspects of the reverse and forward auctions if the record developed in response to the *Comment PN* during the pre-auction process reflects the need to do so.

324. Although we concur with Verizon that the incentive auction presents complex auction design issues and that all parties will be best served if the Commission can resolve as many issues as possible sooner rather than later and well in advance of the auction,[984] we disagree that auction procedures need to be finalized in this Order. The Commission's practice of finalizing auction procedures in the pre-auction process provides adequate time for participants to both comment on the final procedures and to develop business plans in advance of the auction.[985] This approach has worked well, and a similar one is all the more necessary for the incentive auction due to its novelty and complexity. Maintaining flexibility in the implementation of final procedures is a prudent approach to assuring that the incentive auction will take place in a timely manner and fulfill the goals we have established by this Order.

A. Overview and Integration of the Reverse and Forward Auctions

325. The incentive auction will consist of a reverse and a forward auction. The reverse auction portion of the broadcast television spectrum incentive auction will collect information about the price at which broadcast television licensees would be willing to voluntarily relinquish some or all of their spectrum usage rights. The forward auction portion of the incentive auction will identify the prices that potential users of repurposed broadcast television spectrum would pay for new licenses to use the spectrum. This information, together with information from the reverse auction and subject to meeting the requirements for repurposing spectrum through the incentive auction, will determine the winning bidders for new flexible use licenses and the prices those bidders will pay for the spectrum licenses.

326. The reverse and forward auctions will be integrated in a series of stages. Each stage will consist of a reverse auction and a forward auction bidding process, and stages will be run until it becomes clear that the overall proceeds requirements for the incentive auction can be satisfied. Prior to the first stage, the initial spectrum clearing target will be determined. Then the first stage of the reverse auction will be run to determine the total amount of incentive payments to broadcasters required to meet that spectrum target. The first stage of the forward auction bidding process will follow the reverse auction bidding process for the first stage. If the proceeds of the forward auction are sufficient to satisfy the final stage rule during the first stage, the forward auction bidding process will continue until there is no excess demand for licenses, and then the incentive auction will close. If the rule is not satisfied, however, a

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existing rules or otherwise clarify them so that they can accommodate potentially novel features of the forward auction.

[983] The *Procedures PN* will be released well in advance of the application process for the incentive auction. As noted above, separate public notices may be released to seek comment on and/or to establish final auction procedures if that would more efficiently and effectively dispatch our business and fulfill our goals for the incentive auction. *See* § I (Introduction).

[984] Verizon Comments at 24. *But see* PTV Comments at iii ("PTV also applauds the Commission for recognizing that this NPRM is just the first of many steps in ensuring a successful incentive auction and subsequent repacking. The Commission can help ensure that the process is transparent and fair by developing more detailed proposals through a series of public notices and providing the public additional opportunities to comment . . . .").

[985] *See* 47 U.S.C. § 309(j)(3)(E). Moreover, the transparency of this pre-auction process should reinforce the confidence of potential participants, furthering our goal of facilitating participation to the fullest extent possible.

second stage of the incentive auction will be run with a smaller spectrum clearing target in the reverse auction and fewer spectrum licenses available in the forward auction. If the final stage rule again is not met during the second stage, additional stages will be run, with progressively smaller spectrum clearing targets in the reverse auction and fewer licenses available in the forward auction, until the requirements of the rule are satisfied.

327. Here, we address how the reverse and forward auction bidding processes will be integrated through the spectrum clearing target, the stage structure, and the final stage rule. As with other components of the incentive auction, we adopt rules here to enable us to implement these components, and will establish final, specific procedures based on more public input during the pre-auction process.

328. *Initial Spectrum Clearing Target*. The initial clearing target—the maximum amount of spectrum sought to be cleared of television stations and repurposed through the incentive auction—will be determined before commencement of the reverse and forward auction bidding processes.[986] In this "initialization step," each participating broadcaster will indicate its willingness to accept the opening price for various bid options.[987] The opening price will be the highest price offer that the broadcaster could receive for a bidding option. The initial clearing target will correspond to one of the spectrum recovery scenarios in our 600 MHz Band Plan.[988] The initial clearing target will be as high as possible given the number of broadcasters participating in the reverse auction and their willingness to bid at their opening prices, considering the parameters established for the repacking process and the amount of market variation to be accommodated.[989]

329. Commenters generally support rules designed to maximize the amount of repurposed spectrum.[990] A few commenters, however, encourage the Commission to establish a specific initial clearing target goal of 120 megahertz.[991] Consistent with our goal of allowing market forces to determine the highest and best use of spectrum, we choose instead to determine the initial clearing target based on information provided to the Commission by broadcast television licensees in the initialization step.

330. Broadcast television licensees' responses to opening prices will determine which licensees participate in the reverse auction for which bid options. A licensee entitled to protection in the repacking process that does not file an application to participate in the reverse auction, as well as any applicant declining to accept an opening price for any option—that is, declining to participate in the reverse auction—will be designated for assignment of a television channel in its pre-auction or home band.[992] Thus, at the conclusion of the initialization step, the Commission will know, at a minimum, which television stations need to be assigned channels in their home bands in the repacking process, and

[986] A similar process was described in Appendix C of the *NPRM*. *See NPRM*, 27 FCC Rcd at 12571.

[987] A bidder that accepts a price for a relinquishment option, whether the opening price or any other price offer in the reverse auction, makes a binding commitment to accept the relinquishment option if the auction system selects that bid as a winning bid. *See* § IV.B.2.d (Reverse Auction – Additional Bidding Procedures). *See also* § IV.B.1.b (Bid Options) (describing bid options for license relinquishment or license modification).

[988] *See* § III.A (600 MHz Band Plan); Technical Appendix.

[989] *See* §§ III.A.2.d (Market Variation), III.B.2 (Implementing the Statutory Preservation Mandate).

[990] For instance, Motorola Mobility states that the Commission should implement an auction process that maximizes the amount of spectrum that can be repurposed for wireless broadband services, and that the Commission should "adopt flexible policies that support spectrum clearing." Motorola Mobility Comments at 2. Likewise, Verizon notes that commenters broadly agree the auction design should maximize the amount of repurposed spectrum, and maximize broadcaster participation. Verizon Reply at vi.

[991] *See, e.g.*, Cisco Comments at 9; EOBC Reply at 14; HTSC Comments at 6; Verizon Comments at 22. *But see* NTA Comments at 13–14; NTA Reply at 4 (stating that the goal of repurposing 120 megahertz seems arbitrary).

[992] *See* § III.B.1 (Repacking Process Overview).

can set the initial spectrum clearing target accordingly. The Commission will use optimization techniques to determine the amount of spectrum that can be cleared or repurposed based on the feasibility of assigning channels to non-participating stations that are entitled to protection in the repacking process, as well as to participating stations that are willing only to move to a lower band.[993]

331. *Stage Structure.* The incentive auction will be conducted in a series of stages.[994] Each stage will be associated with a spectrum clearing target for bidding in the reverse auction and a corresponding license inventory for bidding in the forward auction. The clearing target and license inventory will be reduced from stage to stage, if the final stage rule is not satisfied. We adopt this structure in large part to facilitate bidder participation. Unlike alternatives in which the reverse auction bidding process would be run for all possible clearing targets before the forward auction bidding process, or vice versa, the stage structure does not require bidders in either side of the auction to provide more bid information than is needed for the auction to close. Further, bidders in each side of the auction will receive some information about conditions on the other side, facilitating their bidding decisions.[995] In addition, stopping the incentive auction at the earliest stage in which the final stage rule is met avoids prolonging the bidding processes unnecessarily, consistent with our recognition that speed is important to a successful auction outcome. The stage structure also provides a workable framework for determining the greatest amount of spectrum that can be cleared while satisfying the final stage rule.[996]

332. Commenters agree that the stage structure we adopt will facilitate and encourage auction participation by broadcast television licensees.[997] They note the informational advantages of a staged approach, including the importance of price discovery to participants.[998] We disagree with AT&T that running the reverse auction in full for all clearing targets (a "single-pass") before the forward auction commences would simplify participation for reverse auction bidders.[999] On the contrary, we agree with EOBC that the single-pass proposal would deprive broadcast television licensees of any information about the forward auction and require them to reveal more information than necessary during the reverse auction bidding.[1000] Nor are we persuaded by AT&T's claim that the need to conduct forward auction bidding between the reverse auction bidding process in each stage would impose a significant burden on participating broadcasters, particularly given that the stage structure might avoid the need for multiple stages, thereby concluding the entire auction more quickly.[1001]

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[993] *See* § IV.B.2.b (Reverse Auction Bid Assignment Procedures).

[994] *See NPRM*, 27 FCC Rcd at 12379, para. 67; *see also id.* at 12579 (Appendix C) (referring to an interleaved approach).

[995] In that regard, we note that the 600 MHz Band Plan is designed to provide potential forward auction participants with as much information as possible prior to the incentive auction so that they may prepare for the various contingencies that may unfold during the bidding.

[996] Because the reverse and forward auction bidding processes will be conducted for a common benchmark amount of cleared spectrum in each stage, the auction mechanism will be able to compare the incentive payments required to clear a given amount of spectrum to the forward auction proceeds available to pay for such clearing.

[997] *See* EOBC Comments at 11; Verizon Comments at 25; *see also* T-Mobile Reply at 72–75 (suggesting that the reverse auction should run for more than one clearing target at a time, but less than all possible targets).

[998] *See, e.g.*, EOBC Comments at 11 (supporting a stage structure to "enhance the information available to participants about the supply and demand on each side of the incentive auction"); EOBC Reply, Eisenach Reply Declaration at 15–16; T-Mobile Reply at 74.

[999] *See generally* AT&T Comments at 63.

[1000] EOBC Reply, Eisenach Declaration at 15–16; *see also* Verizon Comments at 26.

[1001] *Compare* AT&T Reply, Che & Haile Reply Analysis at 13 (suggesting that a "single-pass" auction would create less of a burden on broadcasters' time), *with* Verizon Comments at 27 (arguing that a staged approach actually limits the duration of the auction for broadcasters because they are able to drop out of the auction at various incremental

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333. Some wireless carriers contend that the single-pass approach would provide the greatest level of certainty for forward auction participants, thereby enhancing participation in the forward auction.[1002] We recognize that wireless carriers need time for planning and information regarding auction inventories in order to assess auction strategies and obtain financing.[1003] We note, however, that uncertainty about the number of spectrum licenses that will be available is inherent in the incentive auction, and affects parties on both sides of the auction process. We have sought to address this uncertainty in the 600 MHz Band Plan by establishing a set number of potential spectrum recovery scenarios, limiting the number of contingencies for which potential forward auction participants must plan.[1004] We conclude that the stage structure, which shares information about supply and demand with forward and reverse auction participants at the same time, is the optimal integration method for this incentive auction because it will facilitate broadcaster participation and serve as an effective means of determining whether the final stage rule can be satisfied at various spectrum clearing target levels.

334. Once the initial spectrum clearing target is determined, establishing the initial target for the first stage of the incentive auction, the reverse auction bidding process will begin.[1005] In that process, reverse auction bidders will be asked, in a series of bidding rounds, whether they are willing to accept progressively lower prices for the bid options. This bidding process will determine the total amount of the incentive payments that broadcast television licensees will require in order to voluntarily relinquish spectrum usage rights that will permit clearing of enough television channels to meet the initial clearing target. Generally, the prices for a bid option will descend from round to round until a station's voluntary relinquishment of rights becomes necessary to meet the spectrum clearing target.[1006]

335. Although each stage generally will be associated with a single clearing target, during the first stage of the auction the target may be reduced or modified in certain areas if we implement a "dynamic reserve price," under which bidders would be asked if they are willing to accept lower prices in areas without bidding competition (that is, areas where there is not active bidding by more stations than needed to meet the initial clearing target). If stations in such areas do not accept reduced prices and cannot be assigned a channel in the television bands, then they may be assigned a channel in the repurposed spectrum. Alternatively, the clearing target may have to be adjusted to make channels available for those stations.[1007] Details of the operation of any dynamic reserve price rule would be established in the *Incentive Auction Procedures PN* after an opportunity for comment.

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stages), and T-Mobile Reply at 74 (stating that a "single pass" auction would take considerably more time to complete than a staged auction).

[1002] *See, e.g.*, Sprint Comments at 6; *see also* US Cellular Comments at 20; MetroPCS Comments at 8. Both US Cellular and MetroPCS support auction designs that differ from our chosen approach in other significant ways, with US Cellular opposing bidding for generic licenses in the forward auction and MetroPCS advocating an ascending clock reverse auction. Thus, their arguments regarding stage structure have less force. *See* §§ IV.B.2.a (Reverse Auction Bid Collection Procedures), IV.C.2.a (Forward Auction Bid Collection Procedures).

[1003] *See* Leap Reply at 4; MetroPCS at 8; Sprint Comments at 6.

[1004] We note that the 600 MHz Band Plan we adopt is consistent with different spectrum clearing targets, which targets will determine the scope of potential options for forward auction bidders. *See generally* § III.A (Band Plan for the New 600 MHz Band); Technical Appendix. With respect to specific concerns about time available to prepare for the auction, we further note that we will establish the specific timing, including the lag, if any, between auction stages and between the reverse and forward auction bidding processes within a stage, in the pre-auction process.

[1005] The reverse auction bidding process is addressed in more detail in the next Section. *See* § IV.B.2 (Reverse Auction – Bidding Process).

[1006] *See* §§ III.B.1 (Repacking Process Overview), IV.B.2 (Reverse Auction Bidding Process).

[1007] We will determine whether and how to "impair" spectrum in the pre-auction process. *See* § III.A.2.d (Market Variation).

336. Once the reverse auction bidding process has ended, the amount of the incentive payments required to achieve the spectrum clearing target will be known, as will any impairments to that target, and the auction system will announce the inventory of licenses available for bidding in the forward auction. Then the forward auction bidding process will be conducted to determine how much bidders are willing to pay for the inventory of licenses corresponding to the initial clearing target. The final stage rule for the incentive auction (addressed below) will be continuously evaluated during the forward auction bidding process.[1008] If the final stage rule is satisfied, then the incentive auction will end with the first stage. Bidding will continue in the forward auction, however, until there is no excess demand for licenses. If the final stage rule is not satisfied, the incentive auction will proceed to a second stage.[1009]

337. In a second stage, the spectrum clearing target in the reverse auction would be smaller than in the first stage. Likewise, the license inventory in the forward auction would be smaller than in the first stage. Reducing the spectrum clearing target will increase the likelihood of satisfying the final stage rule because less spectrum will need to be cleared and, therefore, fewer broadcasters will require incentive payments and prices in the reverse auction will generally fall. If the final stage rule is not satisfied in the second stage, then additional stages would be run with smaller clearing targets in the reverse auction and license inventories in the forward auction, until the final stage rule is satisfied.[1010]

338. *Final Stage Rule.* The earliest auction stage that meets the "final stage rule" will be the final stage of the auction.[1011] The final stage rule is a reserve price with two components. The current auction stage (and associated clearing target) will be designated as the *final stage* if the requirements of both components are met. In the pre-auction process, we will consider whether to apply the final stage rule solely to "major markets" and, if so, how to identify such markets. This approach could significantly speed up the determination of whether the final stage rule is satisfied.

339. The first component of the rule will be satisfied by the average price per MHz-pop[1012] for licenses in the forward auction or the total proceeds associated with those licenses, depending on the amount of spectrum cleared in that stage.

340. Specifically, the first component of the reserve price will be satisfied if, for a given stage of the auction:

- the average price per MHz-pop for licenses in the forward auction meets a price benchmark that will be set by the Commission in the pre-auction process,[1013] *or*
- the total proceeds associated with licenses in the forward auction exceed the product of the price benchmark, the spectrum clearing benchmark, and the total number of pops for those licenses.[1014]

[1008] *See* § IV.C.2 (Forward Auction Bidding Process). Stopping procedures that specifically define when the bidding in the forward and reverse clock auctions ends will be discussed and established in the pre-auction process.

[1009] *See* § IV.C.2.a (Forward Auction Bid Collection Procedures) (noting the possibility of using extended rounds in some circumstances).

[1010] *See* § III.A.2 (600 MHz Band Plan). The *Procedures PN* will determine, after additional opportunity for comment, how clearing targets for any subsequent stages will be established.

[1011] As noted above, after the final stage rule is satisfied, bidding will continue in the forward auction until there is no excess demand for licenses.

[1012] The term "MHz-pop" is defined as the product derived from multiplying the number of megahertz associated with a license by the population ("pop" or "pops") of the license's service area.

[1013] This version of the first component will apply when the clearing target for the given stage of the auction is at or below the Commission's specified spectrum clearing benchmark.

[1014] That is, if $p is the benchmark average price per MHz-pop, and Q is the spectrum clearing benchmark, the alternative version of the first component will be satisfied if the total proceeds from the licenses are at least $p times

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The price and spectrum clearing benchmarks will be established by the Commission in the *Procedures PN*, after an opportunity for additional comment.

341. The second component of the final stage rule requires that, under either of the prongs of the first component above, the proceeds of the forward auction also must be sufficient to meet the clearing costs identified in the reverse auction, the other expenses set forth in section 6403(c)(2) of the Spectrum Act,[1015] and any Public Safety Trust Fund amounts still needed in connection with FirstNet after the close of the H Block and AWS-3 auctions.[1016] If the requirements of both components are met, then the final stage rule is satisfied.

342. The final stage rule advances our goal of allowing market forces to determine the highest and best use of spectrum. The approach described above will allow the incentive auction to determine the best balance of spectrum cleared and spectrum license prices attained through competition, while ensuring that the auction meets the statutory requirements. The first component's alternative conditions are designed to address the unique nature of the incentive auction, in particular the fact that we will not know how much spectrum will be available for the forward auction when establishing the price and spectrum benchmarks before the auction. This approach recognizes that if the incentive auction repurposes a relatively large amount of spectrum for flexible uses, per-unit market prices may be expected to decline consistent with the increase in available supply. The alternative formulation allows the first component to be satisfied in a stage with a high spectrum clearing target based on the total proceeds of the forward auction, even if the per-MHz-pop price is less than the benchmark price.

343. We establish the final stage rule pursuant to the underlying auction provisions in the Communications Act, which direct the Commission to establish methods for requiring a reserve price unless it determines that it is not in the public interest to do so.[1017] An objective common to all FCC auctions of spectrum licenses is that auction prices generally reflect competitive market values for comparable spectrum licenses.[1018] The reserve price approach described above will serve the public interest and this goal. The first component of the final stage rule's reserve price ensures that the forward

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Q times the total pops in those licenses. The alternative version of the first component will apply only when the spectrum clearing target for a given stage of the auction is above the Commission's spectrum clearing benchmark.

[1015] The Spectrum Act requires that the forward auction generate proceeds sufficient to pay winning bidders in the reverse auction and cover relevant administrative costs of the auction and an estimate of relocation costs subject to reimbursement. *See* Spectrum Act § 6403(c)(2).

[1016] The Spectrum Act establishes the priority for making payments or deposits from the Public Safety Trust Fund as amounts are deposited into the Fund, including to fund FirstNet, but does not mandate additional deposits. *See* Spectrum Act § 6413(b). Section 6413(b) specifies that the first $7.135 billion of the proceeds from auctions authorized under the Spectrum Act and deposited into the Fund will be used for FirstNet-related purposes.

[1017] 47 U.S.C. § 309(j)(4)(F). In our spectrum license auctions, a reserve price establishes the price below which a license or licenses subject to auction will not be awarded. *See* 47 C.F.R. § 1.2104(c). The Commission has, in recent auctions, established a reserve price in order to help ensure that auction prices reflected competitive market values for spectrum licenses. Typically, the amount of a reserve price(s) and the way in which it will be applied during the auction are established in the pre-auction process. *See, e.g.*, *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Second Report and Order, 22 FCC Rcd 15289, 15400-01, para. 304 (2007) (directing the Wireless Bureau to adopt aggregate reserve prices reflecting the potential market value of the 700 MHz Band spectrum based on a variety of factors); *see also Auction of H Block Licenses in the 1915-1920 MHz and 1995-2000 MHz Bands Scheduled for January 14, 2014; Notice and Filing Requirements, Reserve Price, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 96*, AU Docket No. 13-178, Public Notice, 28 FCC Rcd 13019, 13063–64, paras. 169–74 (2013) (setting a reserve price to recover for the public a portion of the value of the spectrum), *recon. denied*, 28 FCC Rcd 16108 (2013).

[1018] We will base the benchmark average per-unit price on factors including, but not limited to, prices received in auctions of comparable spectrum licenses. As stated above, the *Procedures PN* will determine the specific parameters of the final stage rule after further notice and comment in the pre-auction process.

auction recovers "a portion of the value of the public spectrum resource," as required by the Communications Act.[1019] Our approach based on the specific price and spectrum clearing benchmarks aims to assure that prices for licenses in the forward auction reflect competitive values without reducing the amount of spectrum repurposed for new, flexible-use licenses.

344. The second component of the final stage rule's reserve price ensures that the forward auction recovers the clearing costs and other expenses identified by the Spectrum Act.[1020] We also include FirstNet funding in the second component of the reserve price, consistent with section 309(j)(3)'s express command that in designing our auction rules we "seek to promote the purposes specified in [section 1 of the Communications Act]."[1021] Those purposes include "promoting safety of life and property through the use of . . . radio communications."[1022] Among the funding priorities identified in the Spectrum Act, including other public safety-related priorities, ensuring the build-out of FirstNet uniquely clearly furthers this purpose, as confirmed by examination of the public safety provisions of the Spectrum Act, which is part of the same "overall statutory scheme."[1023] Congress specifically directed the Commission to reallocate spectrum to and license FirstNet, instructed the Commission to "take all actions necessary to facilitate the transition of the existing public safety broadband spectrum to [FirstNet]," and authorized the Commission to "take any action necessary to assist [FirstNet] in effectuating its duties and responsibilities" under the Spectrum Act.[1024]

345. We also note that the auctions authorized by the Spectrum Act, including incentive auctions, are the sole source of federal funding identified by Congress for FirstNet.[1025] At this time, there are no additional incentive auctions planned prior to the end of fiscal year 2022. Thus, unless FirstNet funding is part of the final stage rule for the broadcast television spectrum incentive auction, full funding of the Public Safety Trust Fund ("PSTF") for FirstNet may be deferred indefinitely. We are optimistic that the proceeds from the H Block and AWS-3 auctions will be sufficient to fully fund amounts for FirstNet. Nonetheless, we include PSTF funding for FirstNet as part of the final stage rule to address the possibility that such amounts will not be fully funded from the proceeds of those earlier auctions, and pursuant to the explicit public safety goals set forth above. For the reasons explained above, we disagree with commenters that contend the Commission should not apply a final stage rule or conditions beyond the expenses enumerated in the Spectrum Act.[1026]

[1019] 47 U.S.C. § 309(j)(3)(C).

[1020] We will assess the satisfaction of these statutory expenses in the aggregate. *See, e.g.*, Anon. Broadcaster 2 Comments at ii, 8–10; EOBC Comments at 12–13; EOBC Reply at 23 (arguing that a national measure will provide the Commission with "the greatest flexibility to utilize spectrum in the largest markets to unlock the value of spectrum in smaller markets throughout the country"). We reject Sinclair's contention that an allocated share of these expenses should be satisfied independently in each license area. Sinclair Comments at 14.

[1021] 47 U.S.C. § 309(j)(3).

[1022] 47 U.S.C. § 151. *See also Nuvio Corp. v. FCC*, 473 F.3d 302, 312 (D.C. Cir. 2007) (Kavanaugh, J., concurring) ("broad public safety and [9-1-1] authority Congress has granted the FCC").

[1023] *See FDA v. Brown and Williamson Tobacco Corp.*, 529 U.S. 120, 132–33 (2000). *See also Maricich v. Spears*, 133 S. Ct. 2191, 2203 (2013) ("[I]n expounding a statute, we . . . look to the provisions of the whole law, and to its object and policy[.]") (quoting *U.S. Nat'l Bank of Ore v. Indep. Ins. Agents of America, Inc.*, 508 U.S. 439, 455 (1993)).

[1024] Spectrum Act §§ 6201(a), 6201(c), 6213.

[1025] *See* 47 U.S.C. §§ 309(j)(8)(D)(ii), 309(j)(8)(F), 309(j)(8)(G)(iii)(II)(aa) (added by the Spectrum Act) (directing that proceeds from the auctions required by the Spectrum Act and incentive auctions held prior to the end of fiscal year 2022 be deposited in the Public Safety Trust Fund).

[1026] *See, e.g.*, Verizon Comments at 55–56; Anon. Broadcaster 2 Comments at 8; EOBC Comments at 12–13. We read § 6403(c)(2) of the Spectrum Act as simply requiring that the incentive auction recover the expenses specified therein, i.e., payments to the reverse auction winning bidders, the Commission's administrative expenses, and the

(continued….)

346. Once the final stage rule is satisfied, and bidding has continued in the forward auction until there is no excess demand for licenses, winners of generic licenses in the forward auction will participate in an assignment round for specific frequency assignment.[1027] Final prices for forward auction licenses will be set in the assignment round.[1028] Results of the final stage of the reverse auction will determine which broadcasters will relinquish which spectrum usage rights and how much of the auction proceeds they will receive in exchange.[1029] Stations that will remain on the air will proceed to the final channel assignment process.[1030]

B. Reverse Auction

347. The reverse auction portion of the incentive auction will collect information about the price at which broadcast television licensees would be willing to voluntarily relinquish some or all of their spectrum usage rights. We describe below the pre-auction and bidding processes for the reverse auction.

1. Pre-Auction Process

348. We adopt a pre-auction application filing process for reverse auction participants, similar to that used in spectrum license auctions. The process will, among other things, require broadcast television licensees to make disclosures and certifications establishing their eligibility to participate in the reverse auction. Such an approach will ensure serious participation without being unduly burdensome. Below, we discuss these eligibility requirements and what information a broadcast television licensee must provide to the Commission to demonstrate its eligibility to participate in the reverse auction.

349. We also discuss the Commission's obligation to keep confidential the participation of broadcasters in the reverse auction. In addition, we address the adoption of a rule prohibiting full power and Class A television licensees from communicating with each other or with forward auction applicants about bids or bidding strategies for a specified period of time. Further, we discuss the statutory requirement for two participants to compete in the reverse auction and the processing of pre-auction applications to participate in the reverse auction.

a. Eligibility

350. We identify which broadcast television licensees will be eligible to participate in the reverse auction and the spectrum usage rights eligible for relinquishment by those licensees. We limit reverse auction participation to the licensees of full power and Class A television stations that we will protect in the repacking process.[1031] For each station, the rights eligible for voluntary relinquishment will be the same as those associated with the facilities that we will protect in the repacking process absent relinquishment of those rights.

(Continued from previous page)
estimated costs of relocation. We do not construe the Spectrum Act to repeal the Commission's broad authority under § 309(j)(3) to promote the public safety goals outlined in § 1 of the Communications Act, which is the basis for our inclusion of FirstNet support in the final stage rule.

[1027] *See* § IV.C.2.b (Forward Auction Bid Assignment Procedures).

[1028] *See id.*; *see also* § IV.C.2.c (Forward Auction Procedures to Determine Payments).

[1029] *See* §§ IV.B.2.b (Reverse Auction Bid Assignment Procedures), IV.B.2.c (Reverse Auction Procedures to Determine Payments).

[1030] *See* § III.B.1 (Repacking Process Overview).

[1031] *See* Spectrum Act § 6403(b)(2) (mandating the Commission to "make all reasonable efforts to preserve, as of the date of the enactment of this Act, the coverage area and population served of each broadcast television licensee"); *see also* § III.B.3 (Facilities to Be Protected).

(i) Licensees Eligible to Participate

351. *Background*. In the *NPRM*, the Commission tentatively concluded that the Spectrum Act limits reverse auction participation to full power and Class A licensees.[1032] It also tentatively decided that stations operating on a noncommercial educational ("NCE")-reserved channel or with NCE status on a non-reserved channel will be eligible to participate in the reverse auction.[1033] Although the Spectrum Act requires all reasonable efforts to preserve a full power or Class A licensee's coverage area and population served as of February 22, 2012,[1034] it does not establish an analogous date for reverse auction eligibility. In the *NPRM*, the Commission proposed to create parity between repacking protection and reverse auction eligibility by limiting eligibility to stations that would be protected in the repacking process.[1035]

352. *Discussion*. We adopt the proposal to limit reverse auction participation to licensees of commercial and NCE full power and Class A stations.[1036] Limiting reverse auction eligibility in this manner comports with the plain language of the Spectrum Act as well as the policies underlying it. Section 6403(a)(1) directs the Commission to conduct "a reverse auction to determine the amount of compensation that each broadcast television licensee would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights." The Spectrum Act defines "broadcast television licensee" as "the licensee of (A) a full-power television station; or (B) a low-power television station that has been accorded primary status as a Class A television licensee."[1037] Because this definition does not exclude NCE licensees, we find that the Spectrum Act extends reverse auction eligibility to NCE licensees of full power and Class A stations.[1038] The definition of "broadcast television licensee" does not include LPTV and TV translator stations, however.[1039] Accordingly, licensees of such stations will not be eligible to participate in the reverse auction.[1040] Our decision to limit reverse auction eligibility to licensees of commercial and NCE full power and Class A stations is consistent with our mandate to make

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[1032] *NPRM,* 27 FCC Rcd at 12380–81, para. 74.

[1033] *Id.* at 12381, para. 76. We do not designate Class A television station licenses as NCE, although a Class A licensee may operate its station on a noncommercial educational basis.

[1034] *See* Spectrum Act § 6403(b)(2).

[1035] *NPRM,* 27 FCC Rcd at 12382–83, para. 79.

[1036] *Id.* at 12380–81, paras. 73–74.

[1037] Spectrum Act §§ 6001(6)(A)–(B).

[1038] *NPRM,* 27 FCC Rcd at 12381, para. 76; *see also* Spectrum Act § 6001(6)(A). Furthermore, the statute protects the cable and satellite carriage rights of channel sharing NCE stations, implying the eligibility of NCEs to participate in the reverse auction. Section 6403(a)(4) protects the "carriage rights under section . . . 615 of the Communications Act" of licensees that relinquish spectrum usage rights in order to share a channel. Section 615 of the Communications Act applies only to NCE stations. *See* 47 U.S.C. § 535. The Communications Act exempts NCE stations from the FCC's general authority to grant "initial licenses or construction permits" through competitive bidding. *Id.* § 309(j)(2)(C); *see NPR v. FCC*, 254 F.3d 226, 228–229 (D.C. Cir. 2001) ("[T]he [Communications] Act unambiguously forbids the Commission from requiring NCEs to participate in auctions to obtain licenses for any channel, reserved or unreserved."). That exemption, however, does not apply to the voluntary relinquishment of spectrum usage rights pursuant to § 6403(a) of the Spectrum Act. Some commenters specifically support the conclusion that NCE stations are eligible to participate in the reverse auction. *See* EOBC Comments at 15; T-Mobile Comments at 37. Although commenters do not contest our tentative decision to permit NCE stations to participate in the reverse auction, some express concern about the impact of reverse auction participation on NCE coverage. *See* § IV.B.1.b (Reverse Auction Bid Options).

[1039] *NPRM,* 27 FCC Rcd at 12380, para. 73.

[1040] Several commenters note that LPTV stations are excluded from reverse auction eligibility. *See* CTIA Comments at 33; Spectrum Bridge Comments at 7; MSGPR Comments at 5; NRB Comments at 5; TechAmerica Reply at 5–6; *cf.* M. Gravino Comments at 2 (requesting that Congress allow reverse auction participation by LPTV stations). We note that, as with TV translators, digital replacement translators (DRTs) will not be reverse auction eligible.

all reasonable efforts to preserve the coverage area and population served of only these stations in the repacking process.[1041] It also comports with our decision not to exercise our discretionary authority to extend repacking protection to LPTV and TV translator stations. As discussed below in connection with spectrum usage rights, harmonizing qualifications for reverse auction eligibility with those for repacking protection will further the goals of the Spectrum Act.

353. Although the Spectrum Act does not define the term "licensee," we interpret "licensee" to mean "the holder of a . . . station license," as it is defined in the Communications Act.[1042] We therefore conclude that to be a "licensee" of a full power or Class A station eligible to participate in the reverse auction, a broadcaster must hold a license for the station it wishes to offer.[1043] Because the Spectrum Act does not mandate a time by which a license must be obtained to be a "licensee," we have discretion to adopt a licensing deadline. We conclude that, in order for a broadcaster to be a reverse auction eligible "licensee," it must hold a license for the full power or Class A station it wishes to offer at auction on or before the Pre-Auction Licensing Deadline.[1044] Thus, the small number of entities that held construction permits but not licenses for new full power television stations as of February 22, 2012 must obtain licenses for these stations on or before the Pre-Auction Licensing Deadline in order to be eligible to participate in the reverse auction. In addition to being consistent with the statutory language, this approach creates consistency between reverse auction eligibility and repacking protections.[1045]

(ii) Spectrum Usage Rights That Will Be Eligible for Relinquishment

354. *Background*. While the Spectrum Act identifies who can participate in the reverse auction (i.e., a full power or Class A "broadcast television licensee"[1046]), it does not describe which "spectrum usage rights"[1047] are eligible for relinquishment. Nor does it establish a date by which a station

[1041] *See* Spectrum Act § 6403(b)(2) (requiring the Commission to make "all reasonable efforts" to preserve the coverage area and population served of full power and Class A television licensees only); *id*. § 6403(b)(4)(A)(i) (requiring reimbursement of certain "broadcast television licensee[s]").

[1042] 47 U.S.C. § 153(30).

[1043] An entity building a new broadcast station first receives a construction permit authorizing construction of the facility, at which point the entity becomes a "permittee." It does not become a "licensee," however, until the Commission grants the entity its initial license after the facility has been constructed.

[1044] *See* § III.B.3 (Facilities to Be Protected) (delegating authority to the Media Bureau to issue a Public Notice specifying the Pre-Auction Licensing Deadline). This subsection addresses only who may participate in the reverse auction. We address what rights may be relinquished in the next subsection. For example, licensees authorized to change channels or communities of license and Class A licensees authorized to convert to digital are reverse-auction-eligible "licensees" even if they do not obtain a license for their authorized modification by the Pre-Auction Licensing Deadline. With limited exceptions, however, such licensees must at least have a license-to-cover application for their modified facility on file by the Pre-Auction Licensing Deadline in order for the spectrum usage rights covered by such facility to be recognized for relinquishment. *See* § IV.B.1.a.ii (Spectrum Usage Rights That Will Be Eligible for Relinquishment).

[1045] This consistency will further the statutory goal of making spectrum available for the forward auction. Denying reverse auction eligibility to a licensee whose station we will make all reasonable efforts to preserve in repacking would make it impossible to reclaim this spectrum through the mechanism established in the Spectrum Act, thereby undermining the goal of using market forces to repurpose UHF spectrum for new uses. Conversely, allowing the licensee of a non-protected station to participate in the reverse auction could undermine the success of the auction since such facilities may be displaced in the repacking process without compensation. *See* §§ III.B.3.d.iii (LPTV and TV Translator Stations), V.D.1 (Transition Procedures for LPTV and TV Translator Stations).

[1046] Spectrum Act § 6403(a)(1).

[1047] *Id*.

must secure such rights in order to relinquish them in the reverse auction.[1048] In the *NPRM*, the Commission linked the proposals regarding the spectrum usage rights it would recognize for bidding purposes with the facilities being protected in the repacking process.[1049] Consistent with its proposals for repacking protections, the Commission proposed to limit eligible relinquishment to licensed facilities.[1050] It also proposed not to entertain bids to relinquish spectrum usage rights associated with construction permits or pending applications for construction permits for which a license was not granted as of February 22, 2012.[1051]

355. *Discussion*. We will recognize for voluntary relinquishment in the reverse auction those spectrum usage rights associated with facilities entitled to repacking protection, including those that we must protect under the Spectrum Act and those that we will afford discretionary protection. As discussed earlier, we conclude that a facility must be licensed by the Pre-Auction Licensing Deadline in all but a few cases in order to be protected in the repacking process.[1052] We reach the same conclusion here: in all but the same few cases, a facility must be licensed by the Pre-Auction Licensing Deadline in order for the spectrum usage rights covered by that facility to be recognized for relinquishment.[1053]

356. As stated above, although section 6403(a)(1) requires a reverse auction in which broadcasters may accept compensation for "voluntarily relinquishing some or all of [their] broadcast television spectrum usage rights,"[1054] the Spectrum Act does not define the term spectrum usage rights. Under the Communications Act, however, only a station license confers on the holder the right to "use"

[1048] *Id*.

[1049] *See NPRM*, 27 FCC Rcd at 12382, para. 77 n.110 (proposing parity between a full power station's spectrum usage rights protected in the repacking process and recognized for relinquishment) and 12383, para. 80 n.120 (proposing parity between a Class A station's spectrum usage rights protected in the repacking process and recognized for relinquishment).

[1050] In the *NPRM*, the Commission proposed to entertain bids to relinquish spectrum usage rights associated with: (1) full power licenses held as of February 22, 2012; (2) the original license for new stations granted construction permits by February 22, 2012, if licensed by the date of submission of the pre-auction application; (3) the initial digital license of a digitally transitioning Class A station regardless of whether the Commission granted it before or after February 22, 2012; and (4) the analog license of a Class A station that has not received a digital license prior to the auction. *NPRM,* 27 FCC Rcd at 12381–83, para. 77–80.

[1051] *Id.* at 12382–83, para. 79.

[1052] As discussed in § III.B.3 (Facilities to Be Protected), "licensed" facilities for purposes of protection in the repacking process include those subject to a license-to-cover application. Facilities subject to a license-to-cover application that will be protected in the repacking process also will be eligible for relinquishment in the reverse auction.

[1053] As discussed above, with one exception, we will not protect LPTV stations that were eligible for a Class A license but that did not file an application for such license until after February 22, 2012. *See* § III.B.3.d.ii (Out-of-Core Class A Eligible LPTV Stations). Although such entities may hold Class A licenses before the Pre-Auction Licensing Deadline, their facilities will not be protected in the repacking process, and thus the spectrum usage rights covered by such facilities will not be recognized for relinquishment.

[1054] Spectrum Act § 6403(a)(1). Section 6403 of the Spectrum Act references "spectrum usage rights" or simply "usage rights." *See* Spectrum Act §§ 6403(a)(1) ("broadcast television spectrum usage rights"), 6403(a)(2)(A)–(C) ("usage rights"), 6403(a)(4) ("spectrum usage rights"), 6403(b)(4)(A)(ii)(II)-(III) ("spectrum usage rights"), and 6403(g)(1)(A) ("spectrum usage rights"); *see also* Spectrum Act § 6001(30) ("broadcast television spectrum usage rights"). Section 6402 refers to "*licensed* spectrum usage rights," as well as "spectrum usage rights." *Compare* Spectrum Act § 6402, adding 47 U.S.C. § 309(j)(8)(G)(i) (referring to "licensed spectrum usage rights") *with id.* § 309(j)(8)(G)(i)–(ii) (referring to "spectrum usage rights"). Because we are conducting the broadcast television spectrum incentive auction under § 6403, we need not address the meaning of "licensed spectrum usage rights" in § 6402.

the station to transmit signals.[1055] We similarly interpret the term "spectrum usage rights" in the Spectrum Act to mean the rights of a broadcaster to use spectrum pursuant to a station's license.[1056] Under our interpretation, spectrum usage rights may include a licensee's existing or prospective licensed rights to use spectrum.[1057]

357. Parity between repacking protections and reverse auction eligibility will further the goals of the incentive auction.[1058] If the Commission protected rights in the repacking process that a broadcaster could not be compensated for relinquishing in the reverse auction, broadcasters' incentive to bid in the reverse auction would be reduced because they would not be eligible for compensation for the full value of their rights. This, in turn, could undermine Congress's goals for the incentive auction.[1059] At the same time, it would be meaningless for us to recognize for relinquishment broader rights than those which we would protect in the repacking process. Unprotected usage rights will not affect our repacking flexibility or our ability to repurpose spectrum and thus will have no value in the reverse auction.

(iii) Pending Renewal and Enforcement Proceedings

358. *Background*. In the *NPRM*, the Commission sought comment on how to treat a station offered in a license relinquishment bid in the reverse auction that is the subject of a pending renewal application or enforcement matter.[1060] The Commission has a longstanding policy restricting the sale of

[1055] *See* 47 U.S.C. § 153(49) (defining "license" as an "instrument of authorization . . . for the use or operation of apparatus for transmission of energy, or communications, or signals by radio"). A construction permit merely authorizes the "construction of a station" for the transmission of signals. 47 U.S.C. § 153(13).

[1056] We conclude that STAs and experimental licenses do not qualify as "spectrum usage rights" for purposes of § 6403(a)(1) for the same reasons discussed above with respect to protection in the repacking process. *See* § III.B.3.d.iv (Special Temporary and Experimental Authorizations).

[1057] The Spectrum Act does not specify a date by which a broadcaster must secure its spectrum usage rights in order to be able to relinquish them at auction, and we do not believe the statute requires that these rights be licensed by a specific date. To maintain consistency with our repacking approach, we will recognize for relinquishment, even if they are not licensed by the Pre-Auction Licensing Deadline, the facilities authorized in a construction permit to modify the existing licenses of stations affected by the destruction of the World Trade Center that seek to relocate to the new 1 World Trade Center site if they elect to have such facility protected in the repacking process and a construction permit for a new full power station on channel 3 at Middletown Township, New Jersey that was allotted pursuant to a court order. *See* § III.B.3.b.v (Additional Cases). All other facilities must be licensed by the Pre-Auction Licensing Deadline for the usage rights covered by that facility to be recognized for relinquishment. Some commenters assert that they should not have to expend funds to construct a facility that they will offer in the reverse auction. *See* Vision Comments at 8. We reject this argument for the same reasons that we generally decline to protect facilities in the repacking process that are not licensed by the Pre-Auction Licensing Deadline.

[1058] Consistent with our repacking approach, the rights eligible for relinquishment will include those reflected in permits granted by the April 5, 2013 issuance of the Media Bureau's *Freeze PN*, so long as the relevant facilities are licensed by the Pre-Auction Licensing Deadline. Class A licensees that received initial authorizations for their digital facilities prior to April 5, 2013 are subject to the *Freeze PN*, while such licensees obtaining initial digital authorizations after this date are not. *See* § III.B.3.b.iii (Facility Modifications). Contrary to the arguments of some commenters, this approach does not impermissibly provide disparate treatment to similarly situated entities. *See* Polnet Reply at 1–3; Local Media Reply at 2–4 (citing *Melody Music, Inc. v. FCC*, 345 F.2d 730, 733 (D.C. Cir. 1965)). Rather, our approach ensures that all initial Class A digital conversion applications will be processed consistently, using the same standards and procedures regardless of the timing of the application, so long as the application complies with our existing rules.

[1059] *See Morton v. Ruiz*, 415 U.S. 199, 237 (1974) ("In order for an agency interpretation to be granted deference, it must be consistent with the congressional purpose.") (citation omitted).

[1060] This issue is not relevant for winning UHF-to-VHF, high-VHF-to-low-VHF, or channel sharing bidders because they will remain Commission licensees after the reverse auction and, therefore, would remain subject to a pending license renewal or enforcement proceeding regardless of the outcome of the reverse auction.

stations in these situations.[1061] While noting the importance of preventing a licensee from evading the consequences of wrongdoing through a station sale, thus undermining the deterrent effect of our rules, the Commission stated that the public interest in maximizing participation in the reverse auction may justify permitting license relinquishment bids in such situations.[1062] It also noted that, although it generally does not permit the sale of a broadcast license in the face of unresolved complaints involving the license, exceptions have been made to this practice in order to serve competing public objectives.[1063] When it has permitted such exceptions, the Commission often has placed conditions on grant of the transaction. For example, if the seller will hold other broadcast licenses after a sale, the Commission has conditioned its grant on the seller's agreement to remain liable for the outcome of a renewal proceeding or enforcement action involving the station sold.[1064] If the seller no longer will hold any broadcast licenses upon consummation of the sale, the Commission has required the seller to place funds into escrow pending the outcome of the proceeding.[1065]

359. *Discussion*. We will allow a broadcaster with a pending enforcement matter or a pending license renewal application that raises an enforcement issue to participate in the reverse auction,[1066] on condition that such a broadcaster who no longer would hold any broadcast licenses upon acceptance of a license relinquishment bid agrees that a share of its reverse auction proceeds be placed by the Commission in escrow to cover potential forfeiture costs.[1067] This escrow approach is based on procedures already familiar to broadcasters in the sales context. It also will streamline reverse auction participation by allowing broadcasters to participate without first fully resolving license renewal or enforcement matters. Furthermore, as indicated below, this approach will provide certainty concerning

[1061] *See NPRM*, 27 FCC Rcd at 12383–84, paras. 81–82; *see also Questions Concerning Basic Qualifications of Broadcast Applicants*, Public Notice, 28 R.R.2d (P&F) 705, 706 (1973) (providing for "deferral of action on transfer applications, where the prospective seller is involved in a pending renewal, revocation or investigative proceeding regarding the particular station to be sold"); *Jefferson Radio Co. v. FCC*, 340 F.2d 781 (D.C. Cir. 1964) (resolution of outstanding question concerning the seller's qualifications is a condition precedent to consideration of a transfer application).

[1062] *See NPRM*, 27 FCC Rcd at 12383–84, paras. 81–82.

[1063] For example, the Commission has permitted a bankrupt licensee to sell a station involved in an enforcement proceeding in order to protect creditors, provided the seller does not retain the proceeds of the sale. *See, e.g., Second Thursday Corp.,* 25 F.C.C.2d 112, 113–115, paras. 1–7 (1970). Similarly, the Commission has permitted the sale of stations to protect innocent stockholders even outside the context of bankruptcy on condition that the malefactor will receive no benefit from the sale and will not hold other licenses. *Mountain View Communications, Inc.*, 24 FCC Rcd 13516, 13521, para. 18 (2009).

[1064] *See, e.g., Applications of Comcast Corp., General Electric Co., and NBC Universal, Inc.*, MB Docket No. 10-56, Memorandum Opinion and Order,, 26 FCC Rcd 4238, 4349, para. 275 nn.701, 702 (2011).

[1065] *See, e.g., Bela TV, LLC*, Consent Decree, 25 FCC Rcd 400, para. 1 n.3 (2010) (noting that prior to grant of television station assignment, Commission required seller to enter into agreement to place funds in escrow in order to cover potential liability for alleged indecency violation in 2006).

[1066] License renewal applications are subject to a three-month petition to deny period. *See* 47 C.F.R. § 73.3516(e). Other than in unique circumstances, if a renewal application is uncontested and does not raise enforcement issues, the Media Bureau will grant it shortly after the end of this period. Given the unique circumstances involving the incentive auction, we will permit stations to be offered in the reverse auction even if they are subject to a pending renewal application for which the petition to deny period has not yet expired at the commencement of the auction. Any special procedures needed to address stations in this situation will be addressed in the *Procedures PN*.

[1067] Verizon and Entravision support allowing such broadcasters to participate in the reverse auction. Verizon Comments at 35; Entravision Comments at 5–6. We received no comments opposing participation by such stations. As noted above, reverse auction bidders that hold multiple broadcast licenses and will continue to hold at least one Commission license upon acceptance of their bids will remain subject to any pending license renewal, as well as any enforcement action against the station offered at auction. Such participants will be required to acknowledge this continuing liability in their pre-auction application.

maximum enforcement liability, allowing the potential bidder to factor this potential liability into its bid amount. Finally, consistent with longstanding Commission policy, holding a license relinquishment bidder liable for the outcome of an enforcement issue even if it sells its last broadcast license ensures that a broadcaster cannot evade the consequence of its wrongdoing by reverse auction participation.

360. To implement this policy, if a broadcaster indicates in its pre-auction application that (1) it might place one or more license relinquishment bids, and (2) it would not control any other broadcast stations if its bid or bids were accepted, then we will review our records to determine whether any outstanding enforcement matters exist pertaining to the broadcaster's stations, including complaints for which a proceeding has not yet been initiated and violations disclosed during the license renewal process.[1068] If appropriate and feasible under the circumstances, we will dispose of pending enforcement matters prior to the reverse auction, such as in cases that do not require further inquiry and can be dismissed or resolved with the issuance of an admonishment or the execution of a consent decree.[1069]

361. We delegate authority to the Wireless Telecommunications, Media, and Enforcement Bureaus to include information about any pending enforcement matters against a reverse auction applicant that cannot be resolved before the reverse auction when notifying an applicant of its eligibility to participate in the auction. Along with that notice, the Bureaus will indicate the amount of reverse auction proceeds that will be placed in escrow should the broadcaster submit a winning license relinquishment bid. This sum will represent the maximum amount necessary to cover a potential forfeiture based on enforcement matters existing at that time.[1070] The escrow agreement will terminate: (1) at the later of (i) two years after the date on which the licensee relinquishes the station's license, or (ii) after the resolution of a complaint filed to collect a forfeiture;[1071] or (2) when all of the escrow funds are distributed.[1072] At termination of the escrow agreement, any funds remaining in the account will be remitted to the reverse auction winner. The broadcaster must agree to the escrow arrangement in order to participate in the reverse auction. More detailed procedures and the exact form of the escrow agreement will be discussed in the *Procedures PN*. This procedure will streamline the process of handling outstanding enforcement matters and provide a measure of certainty to license relinquishment bidders. It therefore will help us facilitate broadcaster participation, while still ensuring that a licensee cannot avoid

[1068] This includes matters pending in the Media Bureau, such as violations revealed during the license renewal process, as well as complaints being addressed in the Enforcement Bureau.

[1069] *See, e.g.,* Letter from Barbara A. Kreisman, Chief, Video Division to Atlanta Television Station WUPA, Inc., 2013 WL 2146010 (dated May 17, 2013) (admonishing licensee for the station's isolated violation of the children's television commercial limits as reported in station's license renewal application).

[1070] In the rare event that an enforcement matter raises an issue for which license revocation would be the likely outcome of the proceeding, or in a situation where the proceeding likely would result in the modification of a Class A station license to low power status, then the Bureau handling the matter may, at its discretion, require the entire amount of the reverse auction proceeds to be placed in escrow and the procedures outlined in the next subsection for stations involved in such enforcement matters would be followed.

[1071] To the extent necessary, the two-year term of the escrow agreement also will extend the Statute of Limitations applicable to the FCC and to collection actions by the Department of Justice (DOJ). S*ee* 47 U.S.C. § 503(b)(6); 28 U.S.C. § 2462. This limited extension will provide certainty to potential bidders by assuring that the Commission must complete any enforcement action within two years and any collections action by DOJ also must be filed within the two-year period. It also will protect the FCC by allowing the judicial collections process, once started, to continue to completion, thus preventing intentional delay by the subject of an enforcement action in an attempt to avoid payment through expiration of the escrow agreement during the pendency of an action to collect a forfeiture.

[1072] Escrow funds may be distributed to satisfy a forfeiture or a voluntary contribution in connection with a Consent Decree and Order, or may be returned to the former licensee if the pending matters are closed without an enforcement action.

the consequences of violations through reverse auction participation.[1073]

(iv) Relinquishment of Expired or Revoked Licenses and Downgraded Class A Licenses

362. *Background*. In the *NPRM*, the Commission invited comment on how we should treat stations in the reverse auction if a question exists concerning the validity of a license because it has expired,[1074] has been revoked in an enforcement proceeding,[1075] or has been modified from Class A to LPTV status. To prevent a broadcaster from receiving payment for relinquishing spectrum to which it no longer has usage rights, or in connection with a Class A station which has been reclassified to LPTV status, the *NPRM* proposed that such licenses could not be offered in the reverse auction whether or not the expiration, revocation, or downgrade determination has become final and unappealable.[1076]

363. *Discussion*. We will not allow a station to participate in the reverse auction if its license has expired,[1077] is subject to a revocation order (collectively a "license validity proceeding"), or is for a Class A station that is subject to a downgrade order, provided the license validity proceeding or Class A downgrade order has become final and non-reviewable by a date prior to commencement of the auction that will be specified in the *Procedures PN*.[1078] If such a proceeding or order has not become final and non-reviewable by that date, we will allow the licensee to voluntarily relinquish its spectrum usage rights in the reverse auction.[1079] Should the licensee submit a winning bid, we will place its reverse auction proceeds in escrow using the procedures outlined above pending the final outcome of the proceeding or order. If the decision becomes final and non-reviewable, then the money held in escrow will be deposited with the other incentive auction proceeds.[1080] In the event that a winning bidder subject to a pending license validity proceeding or Class A downgrade order prevails in its appeal, we will release from

[1073] Few commenters respond to the questions raised in the *NPRM* about pending enforcement matters, other than to advocate adoption of a streamlined approach for handling these matters. *See* Verizon Comments at 35. Verizon supports settlement of pending enforcement proceedings at a fixed amount based on the nature of the alleged violation in order to provide broadcasters with certainty for bid valuation purposes. *Id.* We conclude, however, that the procedure outlined above provides sufficient information to broadcasters for bid valuation purposes.

[1074] A license expires as a matter of law when the station ceases operations for any consecutive 12-month period. 47 U.S.C. § 312(g). It also expires when a licensee fails to file a license renewal application for its station prior to the license expiration date. *See* 47 U.S.C. § 307(c)(1) (requiring the filing of a license renewal application); *id.* § 307(c)(3) (noting that the filing of a license renewal application continues the effectiveness of the existing license beyond its expiration date).

[1075] Although an exceedingly rare occurrence, the Commission has revoked a television license where the licensee displayed "an egregious lack of candor." *See RKO General, Inc. v. FCC,* 670 F.2d 215, 235 (D.C. Cir. 1981), *cert. denied*, 456 U.S. 927 (1982)..

[1076] *NPRM,* 27 FCC Rcd at 12381, para. 75 & n.105 (Class A downgrade) and 12382, para. 78 & n.112 (license expired, canceled or revoked).

[1077] If the Media Bureau cancels a license because the licensee has failed to file a renewal application or the station has been off the air for more than 12 consecutive months, the licensee has 30 days to file a petition for reconsideration or an application for review requesting reinstatement of the license. *See* 47 C.F.R. §§ 1.106(b), 1.115(d); *see also ETC Communications, Inc.*, 24 FCC Rcd 3021, 3022 (2009) (staff letter determining that television station's license had expired pursuant to § 312(g), and dismissing as moot application to assign that license).

[1078] If the license invalidity determination becomes final between the time a broadcaster is found to be qualified to participate in the reverse auction and commencement of reverse auction bidding, the broadcaster will be excluded from participating in the reverse auction.

[1079] *NRPM,* 27 FCC Rcd at 12382, para. 78 n.112.

[1080] *See* Spectrum Act § 6402.

escrow to the licensee its reverse auction payment less any forfeiture that may result.[1081]

364. Adopting this approach ensures that we do not unfairly deny reverse auction eligibility to a broadcaster that might prevail in its challenge of a license validity proceeding or Class A downgrade decision.[1082] Additionally, it ensures that spectrum usage rights that otherwise would be protected in the repacking process can be relinquished at auction.[1083] Finally, it is consistent with our longstanding policy of preventing a station from avoiding the consequences of its misdeeds through a station sale.[1084]

b. Bid Options

365. Section 6403(a)(2) of the Spectrum Act requires the Commission to make available three voluntary relinquishment options to eligible full power and Class A broadcast television licensees: (1) "all usage rights with respect to a particular television channel without receiving in return any usage rights with respect to another television channel" ("license relinquishment bid"); (2) "all usage rights with respect to an ultra-high frequency television channel in return for receiving usage rights with respect to a very high frequency television channel" ("UHF-to-VHF bid"); and (3) "usage rights in order to share a television channel with another licensee" ("channel sharing bid").[1085] We address these three options below, as well as additional bid options on which the Commission sought comment in the *NPRM*.

(i) License Relinquishment Bid

366. *Background*. In the *NPRM*, the Commission recognized the statutory mandate to offer a license relinquishment bid option.[1086] It also inquired about whether and how it should address the potential loss of service by broadcast television stations as a result of the acceptance of license relinquishment bids in light of section 307(b) of the Communications Act, which requires the Commission to make a "fair, efficient, and equitable" distribution of television service when considering applications for licenses.[1087] The Commission also sought comment on the practical obstacles to factoring into the reverse auction bidding and repacking processes consideration of whether a given broadcaster

[1081] Any forfeiture amount will remain in escrow pending finality of the forfeiture proceeding.

[1082] Several broadcasters assert that precluding reverse auction participation by a Class A station that is downgraded to LPTV status before the modification order becomes final and non-reviewable would effectively cut off a downgraded Class A station's appeal rights. Entravision Comments at 6–7; UVM Reply at 18–20.

[1083] We will protect in the repacking process a station involved in a license validity or Class A downgrade proceeding until the determination becomes final and non-reviewable. *See* § III.B.3.c (Non-Final License Revocation or Downgrade Proceedings).

[1084] *See M&M Broadcasting, Ltd*., 25 FCC Rcd 4942, 4945 (2010)*; see also Cellular System One of Tulsa, Inc.*, Memorandum Opinion and Order, 102 F.C.C.2d 86, 90, para. 7 (1985) ("To permit a licensee to sell out from under a potential disqualification would significantly impair the Commission's ability to police and deter licensee misconduct."); *Jefferson Radio*, 340 F.2d at 783 ("It is the recognized policy of the Commission that assignment of broadcast authorization will not be considered until the Commission has determined that the assignor has not forfeited the authorization.")*.*

[1085] Spectrum Act § 6403(a)(2).

[1086] *See NPRM,* 27 FCC Rcd at 12385, para. 84.

[1087] *See* 47 U.S.C. § 307(b) ("In considering applications for licenses, and modifications and renewals thereof, when and insofar as there is demand for the same, the Commission shall make such distribution of licenses, frequencies, hours of operation, and of power among the several States and communities as to provide a fair, efficient, and equitable distribution of radio service to each of the same."). Pursuant to this mandate, the Commission has strongly disfavored modification of a station's facilities that would create a "white" or "gray" area (an area where the population does not receive any over-the-air television service or only one over-the-air service, respectively), or an "underserved" area (where the population in the loss area would receive fewer than five over-the-air television signals). *See Channel Sharing NPRM*, 25 FCC Rcd at 16507, para. 26.

going off the air would lead to loss of service.[1088]

367. *Discussion*. We will offer a license relinquishment bid option as required by the statute regardless of whether it may lead to a loss of service.[1089] We decline to restrict acceptance of such bids based on the potential loss of television service or specific programming. Any such restrictions could reduce the amount of spectrum available to carry out the forward auction, and undermine our goal of allowing market forces to determine the highest and best use of spectrum.[1090] Any such restrictions would also be inconsistent with the statutory mandate to offer a license relinquishment bid option. The decision whether to participate in the reverse auction and to submit a license relinquishment bid is a voluntary, market-based decision left to broadcast stations under the Spectrum Act. Declining to consider a station's license relinquishment bid because of a potential loss of service would force that station to involuntarily forgo this opportunity. In mandating that the Commission accept license relinquishment bids, Congress adopted no restrictions on such bids, thus recognizing that loss of service might be a potential outcome of the reverse auction.[1091] Moreover, neither section 307(b) nor our policies disfavoring loss of service require us to restrict bids based on loss of service.[1092]

368. Accordingly, we reject the proposal to consider on a case-by-case basis the extent to which acceptance of a license relinquishment bid would create loss of service, including whether the loss involves specialized programming.[1093] Likewise, we disagree that we should reject a bid if it would leave

[1088] *See NPRM,* 27 FCC Rcd at 12375–76, para. 48.

[1089] *See* Spectrum Act § 6403(a)(2)(A).

[1090] In addition, any such restrictions would undermine the speed and certainty that are critical to the success of the incentive auction. *See* § III.B (Repacking the Broadcast Television Bands). Consideration of service losses during the reverse auction bidding would slow the auction and the repacking process by complicating the feasibility check. *See* § III.B.1 (Repacking Process Overview). For example, under APTS's proposal that we reject bids that would leave a DMA unserved by any NCE stations eligible to receive a community service grant from the Corporation for Public Broadcasting (CPB) (*see* Letter from Lonna Thompson, Association of Public Television Stations, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2–3 (filed Jan. 23, 2014)), the feasibility check would have to take into account whether acceptance of a license relinquishment bid would cause another participating station to be the only "qualified NCE station" in a DMA. On the other hand, consideration of service losses after the bidding is complete would undermine the certainty of the reverse auction outcome.

[1091] *See* Spectrum Act § 6403(a)(2)(A). *See* Anon. Broadcaster 3 Comments at 4 ("While the Commission has previously disfavored loss of service in city of license change proceedings, Congress has determined that service losses, which are an inescapable byproduct of the incentive auction, are required to address a critical national need for alternative communications services.").

[1092] As an initial matter, § 6403 of the Spectrum Act contains no reference to § 307(b). Moreover, § 307(b) applies only when the Commission is "considering applications for licenses, and modifications and renewals thereof," which are not presented during the reverse auction and repacking process. 47 U.S.C. § 307(b). In addition, neither § 307(b), nor our implementing policies that have disfavored service losses, are inflexible mandates. As the courts have explained, the Commission "has a broad measure of discretion in dealing with the many and complicated problems of allocation and distribution of service." *Television Corp. of Michigan v. FCC*, 294 F.2d 730, 733 (1961) ("Neither [§ 307(b)] nor the [allotment priorities] express rigid and inflexible standards."). On balance, the public interest benefits of allowing stations to submit license relinquishment bids, thereby utilizing market forces to repurpose spectrum for new, flexible use, outweigh the detriments of potential service losses. We also note that, in addition to the goals of the Spectrum Act and § 307(b), we are obligated under § 303(g) to "generally encourage the larger and more effective use of radio in the public interest," which will be furthered by the incentive auction. 47 U.S.C. § 303(g); *Loyola University v. FCC*, 670 F.2d 1222, 1226 (D.C. Cir. 1982) (rejecting claim that Commission decision to allow additional sharing of clear channels rather than allowing higher power and exclusivity on existing channels violated § 307(b); stating that "this is precisely the sort of determination Congress intended, through §§ 307(b) and 303(g), to leave to the broad discretion of the Commission").

[1093] NRB Comments at 11–12. Examining potential loss of specific programming formats as a factor in bid acceptance could run afoul of the long-standing policy of not considering formats in the analogous context of reviewing an assignment application. *WDCU(FM)*, 12 FCC Rcd 15242 (1997); *see also Changes in the*

(continued….)

a DMA unserved by any NCE stations eligible to receive a community service grant from the CPB.[1094] Nevertheless, we remain committed to the goals of section 307(b). To the extent that any loss in service results from the reverse auction, we will consider appropriate actions to address such losses, such as by inviting applications to serve areas that have lost service.[1095]

(ii) UHF-to-VHF Bid

369. *Background*. In the *NPRM,* the Commission recognized the statutory mandate to offer a UHF-to-VHF bid option, and invited comment on whether to refine the option to allow bidders to limit their bids to a "high VHF channel" (channels 7-13).[1096] The Commission stated that doing so might encourage UHF-to-VHF bids because broadcasting on "low VHF channels" (channels 2-6) is often difficult due to increased signal interference caused by the higher levels of ambient noise from electronic devices operating on or near the low VHF frequency range.[1097] To make this bid option more attractive, the Commission also proposed to favor grant of post-incentive auction requests for waivers of the VHF power and height limits for winning UHF-to-VHF bidders that experience unusual coverage problems on their new VHF channels.

370. *Discussion.* In addition to allowing bids to move from a UHF to a VHF channel as required by the Spectrum Act, we adopt refinements to the UHF-to-VHF bid option that will allow bidders to limit their bid to the high VHF band or the low VHF band. In order to preserve needed flexibility in the repacking process, however, a bidder will not be able to specify the exact channel in the high- or low-VHF band to which it will be reassigned. Allowing licensees to specify the upper VHF band or lower VHF band will not unduly constrain our repacking flexibility. A number of commenters agree that offering the option to specify the low VHF band or the high VHF band would make it more attractive to submit a UHF-to-VHF bid.[1098] Although some commenters express concern that additional bid options would introduce unwanted complexity to the reverse auction,[1099] we conclude that this option is simple enough to avoid undue complexity. Allowing broadcasters to select either the high VHF band or the low VHF band will encourage reverse auction participation by granting potential bidders greater control over

(Continued from previous page)
Entertainment Formats of Broadcast Stations, 60 FCC 2d 858, 865, para. 21 (1976), *recon. denied*, 66 FCC 2d 78 (1977), *rev'd sub nom. WNCN Listeners Guild v. FCC*, 610 F.2d 838 (D.C. Cir 1970), *rev'd*, 450 U.S. 582 (1981) (regulation of entertainment formats as an aspect of the public interest consideration of a sales application would produce an unnecessary and menacing entanglement in matters that Congress meant to leave to private discretion).

[1094] PTV Comments at 6–7. PTV suggests that, because the Public Broadcasting Act of 1967 that created the CPB notes the importance of ubiquitous access to public telecommunications services, the Commission has a duty to prevent loss of such service through reverse auction relinquishments. This reading incorrectly elevates the Public Broadcasting Act's declaration of policy into a binding mandate. *See id*. (citing 47 U.S.C. § 396(a)(5), (a)(7)). Moreover, because Congress designed the laws governing the CPB to provide financial and developmental assistance for public broadcasting free from government control, reading those laws as dictating Commission policy with respect to public broadcasting stations would frustrate this purpose. *Revision of Programming Policies and Reporting Requirements Related to Public Broadcasting Licensees*, BC Docket No. 81-496, Notice of Proposed Rulemaking, 87 FCC 2d 716, 730–31, para. 34 (1981); Report and Order, 98 FCC 2d 746 (1984); *see also* 47 U.S.C. § 398(a) (expressing intent of Congress that the Commission shall have no direct jurisdiction over the CPB).

[1095] As discussed in § V.D.1 (Transition Procedures for LPTV and TV Translator Stations), because we recognize the importance of minimizing service disruption to viewers, we adopt expedited processing standards for displaced LPTV and TV translator stations as part of the post-auction band transition.

[1096] *NPRM,* 27 FCC Rcd at 12385, paras. 84–85. *See* Spectrum Act § 6403(a)(2)(B).

[1097] *NPRM,* 27 FCC Rcd at 12385, paras. 84–85 (citing *Channel Sharing NPRM*, 25 FCC Rcd at 16512, para. 43).

[1098] PTV Comments at 35; PTV Reply at 11–12; R. Brey Comments at 4; Entravision Comments at 9; Mobile Future Reply at 11; US Cellular Comments at 6; Verizon Comments at 32.

[1099] EOBC Comments at 17 (adopting additional bid options risks overcomplicating the reverse auction and undermining its purposes).

the channels to which we ultimately reassign them.[1100] We conclude that this option strikes the correct balance between providing flexibility in the reverse auction process for broadcasters and avoiding unnecessary complexity.

371. In addition, we adopt the proposal to afford favorable consideration to post-incentive auction requests for waivers of the VHF power and height limits for winning UHF-to-VHF bidders that may be necessary to resolve coverage problems on their new channels.[1101] We decline, however, to establish a rebuttable presumption that such waivers are in the public interest, as Entravision requests.[1102] As NPR argues, this type of presumption would not be appropriate because such waivers are granted only when they will not cause interference to adjacent channel services, including NCE FM radio stations that operate adjacent to low VHF channel 6.[1103] Thus, we will consider such waiver requests on a case-by-case basis after the winning bidder has completed construction of its VHF facilities and determined that its viewers are experiencing reception problems. We will afford such requests favorable consideration and grant them where possible.

(iii) Channel Sharing Bid

372. *Background*. The final bid option identified in the Spectrum Act allows broadcasters to relinquish "usage rights in order to share a television channel with another licensee."[1104] The Commission proposed to allow channel sharing bids provided that they would not require changes in a station's community of license or Designated Market Area (DMA).[1105] Under the Commission's rules, a full power television station must locate its transmitter at a site from which it can place a principal community contour over its entire community of license.[1106] Thus, the proposal in the *NPRM* would limit a broadcaster to partnering with a host station from which it could deliver a principal community contour to its community of license.

373. The Commission anticipated that this limitation would not unduly constrain the ability of stations to find a channel sharing partner because the size of the area served by a broadcast signal would allow stations to move their transmission facilities several miles in order to collocate with a channel

[1100] *See NPRM,* 27 FCC Rcd at 12385, paras. 84–85.

[1101] Several commenters support the adoption of such a waiver policy. PTV Comments at 35; Verizon Comments at 32–33; US Cellular Comments at 7; Qualcomm Comments at 25; Motorola Mobility Comments at 7. We granted similar waivers in some circumstances following the conclusion of the DTV transition to assist stations on post-transition VHF channels in resolving reception issues. *See, e.g.*, Letter from Barbara A. Kreisman, Chief, Video Division, Media Bureau, to ABC, Inc. and Freedom Broadcasting of New York Licensee, LLC (dated Mar. 16, 2011) (http://licensing.fcc.gov/cgi-bin/prod/cdbs/forms/prod/getimportletter_exh.cgi?import_letter_id=24963).

[1102] Entravision Comments at 10. Also, we will not adopt WLFM, LLC's request that a licensee which agrees to surrender a UHF channel in return for operation on VHF channel 6 be given additional flexibility to use Axcera's Bandwidth Enhancement Technology (Axcera BET). WLFM Reply at 1. Such a waiver of the Advanced Television Systems Committee (ATSC) transmission standard is beyond the scope of this proceeding other than in the context of a request for a service rule waiver in lieu of reimbursement, as provided in § 6403(b)(4)(B) of the Spectrum Act. *See* § V.C.5.e (Service Rule Waiver in Lieu of Reimbursement); *see also* Letter from Hossein Hashemzadeh, Deputy Chief, Video Division, Media Bureau to Venture Technologies Group, LLC (Aug. 2, 2012) (rejecting request by party to use the Axcera BET because the television signal would not comply with the standards for such transmissions set forth by ATSC in violation of § 73.682(d) of the Commission's rules) (http://licensing.fcc.gov/cgi-bin/prod/cdbs/forms/prod/getimportletter_exh.cgi?import_letter_id=35147).

[1103] NPR Reply at 2–3.

[1104] Spectrum Act § 6403(a)(2)(C).

[1105] *See NPRM,* 27 FCC Rcd at 12386–87, para. 89. A DMA is composed of groups of counties whose largest share of television viewing belongs to stations located in that market area.

[1106] *See* 47 C.F.R. § 73.625 (defining the principal community contour of a full power television station). Class A television stations do not have a contour coverage requirement.

sharing partner while still placing the requisite signal over their licensed communities.[1107] The Commission further suggested that, before accepting a bid that proposed a community of license change, it would have to consider whether the change would result in a "fair, efficient and equitable distribution" of television service under section 307(b) of the Communications Act, and that such consideration could complicate bid acceptance.[1108] In addition, the Commission stated that disallowing DMA changes would minimize the potential impact of channel sharing on MVPDs because carriage rights on a particular MVPD system generally depend on the station's DMA.[1109]

374. *Discussion*. We will allow a channel sharing bidder (i.e., a "sharee") to change its community of license in cases where it cannot satisfy the community of license signal requirement operating from the host (i.e., the "sharer") transmission site, provided that the sharee chooses a new community of license that, at a minimum, meets the same allotment priorities as its current community.[1110] We will not, however, allow a bidder to make a community of license change that will change its DMA.[1111]

375. Neither the Spectrum Act nor the Communications Act requires us to restrict community of license changes in the channel sharing context.[1112] Moreover, an absolute prohibition on changes in communities of license would undermine the goals of the reverse auction. Although a sharee station could move its transmission facility several miles in some cases in order to channel share while still serving its original community of license,[1113] several commenters express concern that as a practical matter a broadcaster's ability to find a channel sharing partner would be severely constrained under this prohibition.[1114] Indeed, one anonymous broadcaster operating on the outskirts of a top market points out that it would have only one potential channel sharing partner absent the flexibility to change its community of license.[1115] Allowing a community of license change likely will help facilitate channel sharing arrangements, thus facilitating broadcaster auction participation.

376. Although an absolute prohibition on changes in communities of license would undermine the goals of the reverse auction, we are imposing reasonable restrictions on such changes in order to

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[1107] *NPRM,* 27 FCC Rcd at 12386–87, para 89.

[1108] *Id*.

[1109] *Id*.; *see also* 47 U.S.C. §§ 325(b), 338, 534(h).

[1110] These allotment priorities are to: (1) provide at least one television service to all parts of the country; (2) provide each community with at least one television broadcast station; (3) provide a choice of at least two television services to all parts of the country; (4) provide each community with at least two television broadcast stations; and (5) assign any remaining channels to communities based on population, geographic location, and the number of television services available to the community from stations located in other communities. *Amendment of Section 3.606 of the Commission's Rules and Regulations*, Sixth Report and Order, 41 F.C.C. 148, 167 (1952).

[1111] Thus, to prevent a DMA change, a channel sharee may not select a community of license located in another DMA. Moreover, as discussed § VI.A.1.a (Media Ownership Rules), absent a waiver of the rules, we will not accept a channel sharing bid in the reverse auction that would cause a media ownership rule violation by a party to the channel sharing arrangement based on the rules and facts as they exist at the time of filing of the pre-auction application.

[1112] *See* Spectrum Act § 6403(i) (stating that nothing in § 6403(b) "shall be construed to expand or contract the authority of the Commission, except as otherwise expressly provided"); *see also* n.1092 (explaining the relationship between the Spectrum Act and §§ 307(b) and 303(g) of the Communications Act). On balance, the public interest benefits from allowing stations to submit channel sharing bids that would result in a change in community of license subject to the conditions we describe outweigh the detriments of potential service losses.

[1113] *NPRM,* 27 FCC Rcd at 12386–87, para 89.

[1114] *See* Anon. Broadcaster 3 Comments at 3–5; Entravision Comments at 10–12; EOBC Comments at 20–22.

[1115] *See* Anon. Broadcaster 3 Comments at 3–4.

promote the goals underlying section 307(b) while at the same time avoiding any detrimental impact on the speed and certainty of the auction or discouraging reverse auction participation. First, a bidder may not make a community of license change that will result in a change in its DMA.[1116] Second, a sharee may change its current community of license only in cases where it cannot satisfy the community of license signal requirement operating from the host (i.e., the "sharer") transmitter site. A channel sharee will be asked to indicate in its pre-auction application whether it can meet its community of license requirements from the proposed sharer's site. An applicant that indicates its inability to do so must provide the name of the new community of license it proposes to select if its channel sharing bid is accepted, and certify in the application that the new community meets the same, or a higher, allotment priority as its current community.[1117] This approach will take account of our allotment policies under section 307(b) in advance of the auction while providing flexibility and certainty to channel sharing bidders. This approach may result in service loss in some areas, but the public interest benefits that will stem from maximizing broadcasters' participation in the reverse auction through channel sharing outweighs the detriment of potential service losses.[1118]

377. In addition, the record does not support the argument made by some MVPDs that allowing community of license changes will cause capacity problems and increased carriage costs.[1119] The impact on MVPDs resulting from community of license moves in limited circumstances will be minimal due to our requirement that sharee stations remain within their existing DMAs.[1120] Because satellite and cable carriage rights on a particular MVPD system generally depend on the station's DMA,[1121] prohibiting moves that would result in a change of DMA will minimize the potential impact of channel sharing on MVPDs.[1122] Moreover, MVPDs will be eligible for reimbursement from the

[1116] We received no comments asserting the need to allow DMA changes in order to increase the likelihood of a broadcaster availing itself of the channel sharing bid option. We note, however, that the Spectrum Act does not restrict us from allowing DMA changes in the channel sharing context.

[1117] For example, if a sharee is serving community of license X prior to the auction, to which it provides a second local television service (allotment priority 4), and it proposes a channel sharing arrangement with a sharer from whose transmission site it can no longer meet the community of license coverage requirements over X, then the sharee must choose a new community of license to which it will provide a second local television service, or which meets a higher allotment priority (such as the provision of a first local service, priority 2). In the unlikely event that the sharee cannot identify any community that meets the same or a higher allotment priority at its new shared site, it must choose a new community of license to which it will provide the next highest priority. Thus, if a sharee serving a community to which it provides allotment priority 2 moves to a channel sharing site from which it cannot meet the community of license coverage requirements over any allotment priority 1 or 2 communities, then it must choose an allotment priority 3 community.

[1118] In the case of channel sharing, we note that service loss to one area (i.e., all or a portion of the area previously served by the sharee) necessarily will result in a gain in service to a different area (i.e., that served by the sharer).

[1119] NCTA Reply at 16. We note that DIRECTV/DISH assert that "any change to a station's DMA would also have substantial costly consequences for DBS operators," but make no such similar assertion for a community of license change. DIRECTV/DISH Comments at 4.

[1120] In § VI.A.2 (Channel Sharing Operating Rules), we discuss in more detail the impact that station relocations made to implement a channel sharing arrangement may have on a station's MVPD carriage rights.

[1121] *See* 47 U.S.C. §§ 534 (cable carriage of a commercial station), 338 (satellite carriage of a commercial or NCE station). As implemented, the references to local markets in these provisions are defined as a station's DMA. 47 C.F.R. §§ 76.66(e), 76.55(e)(2). Cable carriage of NCE and "qualified low power stations" does not depend on DMA; rather, it depends on, among other things, the distance between the cable headend and either the station's community of license or transmission facility. *See* 47 U.S.C. §§ 534(h)(2) (cable carriage of qualified low power stations), 535(l)(2) (cable carriage of NCE stations).

[1122] In some instances, an NCE or a Class A station may gain carriage on some cable systems, but lose carriage on other systems, as a result of a change of location within a DMA. Likewise, a full power commercial station that moves within its DMA may gain or lose carriage on a cable system as a result of a market modification request. *See*

(continued….)

Reimbursement Fund for any reasonably incurred costs associated with implementing carriage changes resulting from channel sharing.[1123] We also note that any concerns about capacity problems arising from new carriage obligations occurring as a result of channel sharing could be more than offset by license relinquishment bidders going off air and vacating their space on the satellite transponders or cable systems.[1124] Thus, allowing certain community of license changes, while precluding DMA changes, strikes an appropriate balance between enabling broadcasters to take advantage of the opportunity to channel share and limiting the impact of channel sharing on MVPDs.

378. Finally, we clarify that we will allow VHF-to-UHF channel sharing bids.[1125] Neither the Spectrum Act's channel sharing provision, nor any other statutory provision, precludes such a bid.[1126] This option is consistent with our goal of allowing market forces to determine the highest and best use of spectrum. Allowing a UHF station that does not wish otherwise to participate in the reverse auction to be a channel sharer by hosting a VHF station that is willing to vacate its existing spectrum will also facilitate the clearing of additional spectrum by creating an opportunity for another UHF station to submit a UHF-to-VHF bid.[1127]

(iv) Additional Bid Options

379. *Background.* In the *NPRM*, the Commission sought comment on additional bid options not specified in the Spectrum Act.[1128] We already have discussed our decision to enable a bidder opting to move from UHF to VHF, as provided in the Spectrum Act, to specify that it will move only to either a high VHF channel or a low VHF channel. In addition, the Commission asked in the *NPRM* whether to offer reverse auction participants other possibilities. Specifically, the Commission asked for comment on enabling high VHF stations to move to a low VHF channel.[1129] The Commission also asked more broadly for comment on potential ways to incorporate bidding in exchange for accepting such broadcast limitations as additional interference or a smaller service area.[1130]

(Continued from previous page)
§ VI.A.2 (Channel Sharing Operating Rules). Whether a channel sharing station will be able to exercise its carriage rights also will depend on whether it can meet the relevant Part 76 requirements, including the provision from its channel sharing site of a good quality signal to the cable operator's principal headend or the satellite provider's receive facility. *See* 47 C.F.R. §§ 76.55(c)(3) & 76.66(g), respectively.

[1123] *See* § V.C.5 (Reimbursement of Relocation Costs).

[1124] DIRECTV/DISH express concern about the impact of market moves given the lack of excess satellite transponder capacity in "virtually all markets," as well as the cost of switching a station from one market to another. DIRECTV/DISH Comments at 4–5.

[1125] *See* PTV Comments at 35 (supporting VHF-to-UHF channel sharing bids).

[1126] Spectrum Act § 6403(a)(2)(C). The *NPRM* did not suggest foreclosing this option. *NPRM*, 27 FCC Rcd at 12385–87, paras. 84–90.

[1127] The Commission will not develop a confidential program for matching stations interested in channel sharing arrangements, as suggested by one commenter. *See* Anon. Broadcaster 4 Comments at 5. First, it would be difficult for the Commission to devise a system to help pair broadcasters interested in placing channel sharing bids given the Spectrum Act mandate that the Commission withhold the identity of licensees participating in the reverse auction. Spectrum Act § 6403(a)(3). Beyond this impediment, we do not believe it would be practical or prudent for the Commission to become involved in establishing complex and long-term private business relationships.

[1128] *NPRM*, 27 FCC Rcd at 12385–86, paras. 85–88.

[1129] *Id.* at 12386, para. 86.

[1130] *Id.* at 12386, paras. 87–88.

380. *Discussion.* We will offer an option for high VHF stations to move to low VHF channels.[1131] This option does not create any new complexity from the perspective of auction participants. Rather, it simply expands the set of stations that will have the option of moving to a low VHF station, and in so doing, may facilitate greater efficiency in repacking existing VHF stations and repurposing 600 MHz spectrum.[1132]

381. Harris Broadcast opposes making this option available, based on its alternative proposal for different uses of the low VHF band, which is premised on its view of the best use of the relevant frequencies.[1133] We need not resolve here Harris Broadcast's claims regarding the most effective use of low VHF channels. We concur with Verizon's view that Harris Broadcast's vision for low VHF channels would unduly restrict our ability to use market forces to repurpose 600 MHz spectrum for new uses.[1134]

382. With respect to any additional bid options beyond going off the air, channel sharing, or moving to a lower band, we conclude that, whatever merits any particular option might have for any particular licensee, the complexity created for auction participants would outweigh potential benefits. The record as a whole supports our conclusion. While parties voice support for various options, such as agreeing to accept additional interference, a smaller service area, or reduced population coverage,[1135] almost all agree on the overriding importance of auction simplicity in order to facilitate broadcaster participation.[1136] Almost all commenters are in agreement that additional options must not be offered if they will result in excessive complexity. T-Mobile asserts that allowing broadcasters to have additional bidding options would complicate the auction process, introduce uncertainty that could chill broadcaster participation in the auction, and make it difficult for forward auction participants to understand what items are available for bid.[1137] Others note the difficulty in making sufficiently accurate forecasts of interference environments to enable offering detailed levels of additional interference as a meaningful option.[1138]

383. The reverse auction bidding options afforded by the Spectrum Act, together with allowing broadcasters moving from a UHF channel to specify a high or low VHF channel and allowing broadcasters to move from a high to a low VHF channel, provide meaningful options for broadcasters that will achieve the goals of the auction. We conclude that the complexity and cost of introducing additional bid options would outweigh any benefits.

[1131] As with UHF-to-VHF bids, we will afford favorable consideration to post-incentive auction requests for waivers of the VHF power and height limits for winning high-VHF-to-low-VHF bidders that may be necessary to resolve coverage problems on their new channels. *See* § IV.B.1.b.ii (UHF-to-VHF Bid).

[1132] As noted in the *NPRM*, we are expressly prohibited by the Spectrum Act from involuntarily reassigning a station from a high to a low VHF channel as part of the repacking process. *See NPRM*, 27 FCC Rcd at 12386, para. 86; Spectrum Act § 6403(b)(3)(B). By offering this bid option, we create a mechanism by which high VHF stations may volunteer to be reassigned, as well as an incentive for doing so. Although the Spectrum Act does not specifically list high-VHF-to-low-VHF bids as one of the reverse auction bid options, it does not preclude the Commission from adopting this additional bid option pursuant to its broad spectrum management authority.

[1133] *See* Harris Broadcast Comments at 23–24, 27–29; Harris Broadcast Reply at 12.

[1134] *See* Verizon Reply at 37.

[1135] *See, e.g.*, Tribune Comments at 4 (listing various options). *See also* Entravision Comments at 13; Harris Broadcast Comments at 23; Mobile Future Comments at 8; Mobile Future Reply at 11–12; Qualcomm Comments at 24–25; TIA Comments at 14; US Cellular Reply at 11–12.

[1136] *See, e.g.*, TIA Comments at 15; Verizon Reply at 35–37 (citing additional comments).

[1137] T-Mobile Reply at 75–77. *See also* Sprint Comments at 6 (arguing that additional bidding options would make the auction more confusing for forward auction participants).

[1138] EOBC Comments at 17–18.

c. Confidentiality and Prohibition of Certain Communications

(i) Confidentiality

384. *Background*. Section 6403(a)(3) of the Spectrum Act requires the Commission to "take all reasonable steps necessary to protect the confidentiality of Commission-held data of a licensee participating in the reverse auction . . . including withholding the identity of such licensee until the [spectrum] reassignments and reallocations (if any) . . . become effective, as described in subsection (f)(2)."[1139] That subsection provides that these reassignments and reallocations may not become effective "until the completion" of both the reverse and forward auctions.[1140]

385. In the *NPRM*, the Commission proposed to incorporate the confidentiality requirement into the competitive bidding rules for the broadcast television spectrum reverse auction and sought comment on the parameters of such a rule,[1141] including what types of information the Commission should withhold from public disclosure in order to protect the identities of participating licensees; what "reasonable steps" the Commission should take to protect confidentiality and for how long; whether any exemptions from disclosure under the Freedom of Information Act ("FOIA") would apply; whether applicants should be prohibited from disclosing information regarding their own or other licensees' participation in the reverse auction; and whether participants may have any legal reporting obligations, such as the disclosure requirements of the Securities and Exchange Commission ("SEC"), that would create any conflict with the Commission's confidentiality obligations under the Spectrum Act.[1142]

386. *Discussion*. We will take all reasonable steps necessary to protect the confidentiality of Commission-held data of broadcast television licensees participating in the reverse auction. The Spectrum Act provides that at a minimum, the Commission must withhold the identities of participating broadcast television licensees until the spectrum reassignments and reallocations (if any) become effective.[1143] We will protect the confidential information of all reverse auction applicants, whether or not the Commission determines that their applications are complete and in compliance with our rules. In addition, we will continue to protect confidential information pertaining to unsuccessful bids until two years after the effective date.[1144] We also amend the Commission's FOIA disclosure rules to accommodate the confidentiality rules that we adopt today. We note that the Commission may disclose confidential information if it is required to do so by law, such as by court order.

387. Consistent with PTV's suggestion, we will protect the confidential information of all reverse auction applicants, whether or not the Commission determines that their applications are complete and in compliance with our rules.[1145] We note that, as described below, for the purpose of the statutory requirement that at least two competing licensees "participate" in the reverse auction,[1146] we will consider a broadcast television licensee to be a participant only if its application is found to be complete and in

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[1139] Spectrum Act § 6403(a)(3).

[1140] *Id.* § 6403(f)(2). In addition, no reassignments or reallocations of broadcast television spectrum may become effective unless the proceeds of the forward auction exceed the sum specified in Spectrum Act § 6403(c)(2).

[1141] *NPRM*, 27 FCC Rcd at 12446, para. 258.

[1142] *Id.* at 12446–48, paras. 258–63.

[1143] Spectrum Act § 6403(a)(3).

[1144] In the event that there is no effective date, *see id.* § 6403(c)(2), we will continue to protect confidential information pertaining to the reverse auction until two years after the completion of the reverse auction.

[1145] *See* PTV Comments at 20; *see also NPRM*, 27 FCC Rcd at 12445, para. 253 (asking whether broadcast television licensees whose pre-auction applications are dismissed should be considered "participants" for purposes of the proposed confidentiality rule).

[1146] *See* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(ii)).

compliance with our application rules.[1147] However, for the purpose of the statutory confidentiality requirement, we interpret the protections afforded to broadcast television licensees "participating" in the reverse auction more broadly in order to facilitate broadcaster participation. The difference in our interpretation of the terms "participate" (section 6402) and "participating" (section 6403(a)(3)) arises from the difference between the underlying purpose of each provision.[1148] Whereas section 6402 ensures a minimum level of competition in the reverse auction, a purpose which weighs in favor of including only those applicants that will be permitted to submit bids in the reverse auction, section 6403(a)(3) promotes broadcaster participation by ensuring that licensees' identities will not be revealed until after the auction, a purpose which weighs in favor of protecting any applicant whether or not it is permitted to submit bids in the auction. In any event, we exercise our discretion to treat such information as confidential consistent with the principle that disclosure of this information would likely "cause substantial harm to the competitive position of the person from whom the information was obtained."[1149]

388. From the time a broadcast television licensee applies to participate in the reverse auction until the spectrum reassignments and reallocations become effective,[1150] we will deem the following information confidential and subject to protection by the Commission: the name of the applicant licensee; the licensee's channel number, call sign, facility identification number, and network affiliation; and any other information that may reasonably be withheld to protect the identity of the licensee, as determined by the Commission.[1151] When the spectrum reassignments and reallocations become effective, the Commission will disclose the identities of the winning bidders and their winning bid amounts. Until two years after the effective date,[1152] the Commission will continue to protect the above-referenced confidential information pertaining to any unsuccessful bid.

389. As noted above, the Spectrum Act provides that at a minimum, the necessary, "reasonable steps" the Commission must take to protect the confidentiality of licensee data include withholding the identities of participating broadcast television licensees until the spectrum reassignments and reallocations become effective.[1153] The additional steps set forth here are necessary and are

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[1147] *See* § IV.B.1.d (Two Competing Participants Requirement).

[1148] *See, e.g., Gen. Dynamics Land Sys., Inc. v. Cline*, 540 U.S. 581, 595 (2004) (explaining that the presumption that identical words used in different parts of same statute are intended to be read the same way "readily yields whenever there is such variation in the connection in which the words are used as reasonably to warrant the conclusion that they were employed in different parts of the act with different intent") (quoting *Atl. Cleaners & Dyers, Inc. v. United States*, 286 U.S. 427, 433 (1932)).

[1149] *Examination of Current Policy Concerning the Treatment of Confidential Information Submitted to the Commission*, GC Docket No. 96-55, Report and Order, 13 FCC Rcd 24816, 24819, para. 4 (1998) (quoting *Nat'l Parks and Conservation Ass'n v. Morton*, 498 F.2d 765, 770 (D.C. Cir. 1974)).

[1150] *See* § V.A (Auction Completion and Effective Date of the Repacking Process).

[1151] *See, e.g.*, Tribune Comments at 6–7 (listing types of broadcaster information that should be withheld from public disclosure). We note that other than a broadcast television licensee's actual identity, any particular information about an individual characteristic of a licensee may or may not facilitate identification of the licensee. Some commenters request that we protect non-identifying information about licensees in addition to clearly identifying information. *See, e.g.*, Anon. Broadcaster 4 Comments at 4; Entravision Comments at 7; PTV Comments at 20 (advocating protection of any information that does not directly identify the licensee's identity but could lead to disclosure of its identity). We will protect non-identifying information to the extent that it may reasonably be withheld to protect the identity of the licensee, as determined by the Commission.

[1152] As we noted above, in the event that there is no effective date, *see* Spectrum Act § 6403(c)(2), we will continue to protect confidential information pertaining to the reverse auction until two years after the completion of the reverse auction. In that event, the Commission may release data aggregating confidential information if needed to explain the outcome of the auction—e.g., the aggregate share of proceeds unsuccessfully sought by reverse auction bidders.

[1153] Spectrum Act § 6403(a)(3).

reasonable under the circumstances to protect the confidentiality of licensee data.[1154] Participants in the reverse auction will submit bids to exit an ongoing business, or to make significant changes to that business (e.g., by changing the channels on which they operate or agreeing to share a channel).[1155] Section 6403(a)(3) of the Spectrum Act recognizes the potential competitive sensitivities of the information that such existing licensee bidders provide to the Commission in this context.[1156]

390. Although the Spectrum Act requires that we protect the identities of participating broadcasters only until the spectrum reassignments and reallocations become effective, several commenters argue in favor of maintaining confidentiality beyond the effective date, particularly for unsuccessful bidders.[1157] Broadcasters point out that if an unsuccessful bidder's participation were made public, it could be construed by competitors, investors, advertisers, employees, viewers, and others as a statement by the licensee that it is no longer committed to investing in the station's programming and operations going forward.[1158] PTV argues that disclosure of reverse auction applicants' information could be particularly harmful immediately after the incentive auction is complete and reassignments and reallocations are effective, as unsuccessful bidders are working diligently to continue their businesses while they adjust their facilities for new channel assignments, if necessary.[1159] Several commenters suggest that concern about this eventual, potentially harmful disclosure could ultimately discourage broadcasters from participating in the reverse auction.[1160] State Broadcaster Associations argue that in the event that a broadcaster is unsuccessful in its bid to relinquish its spectrum usage rights, the Commission must ensure that its decision to participate in the reverse auction process will remain confidential in perpetuity unless the licensee self-discloses its participation or otherwise authorizes the Commission to disclose its identity.[1161]

391. Delaying the release of confidential information regarding unsuccessful bids until two years after the effective date will permit sufficient time to pass to ameliorate the potential competitive harms identified by commenters. Two years after the incentive auction, after substantial market changes have occurred and as the post-auction relocation process nears completion, competitors, investors, and others will be less likely to make assumptions based solely on a particular broadcast television licensee's participation in the reverse auction or the bid amounts that it submitted at that time. For example, if the information released two years after the auction indicates that a currently operating broadcaster participated in the auction two years previously and submitted a license relinquishment bid, it is unlikely that third parties would presume that the station is no longer committed to investing in the station's

[1154] *See* § III.B.2.a ("All Reasonable Efforts").

[1155] A broadcaster that opts to participate in the forward auction will not be subject to the same competitive sensitivities. Thus, we decline to adopt a confidentiality provision that would apply to broadcasters participating in the forward auction. *See* Tribune Comments at 6–7 & n.12 (requesting some similar accommodation for broadcasters seeking to participate as bidders in the forward auction).

[1156] *See NPRM*, 27 FCC Rcd at 12446, para. 257.

[1157] PTV Comments at 20–21; *see also* CCA Reply at 17 (arguing that the Commission should take steps to protect the identities of reverse auction bidders and their bid amounts, both during and after the incentive auction); Verizon Comments at 29 (arguing that the identity of reverse auction bidders and their bids should be exempt from public disclosure both during and after the incentive auction); Belo Comments at 21–22 (stating that once a bid is accepted, the terms of such bid may be appropriately considered public information, but noting that public disclosure of bids submitted by unsuccessful bidders could create unintended negative consequences).

[1158] *See, e.g.*, State Broadcaster Associations Comments at 16; Tribune Comments at 7.

[1159] PTV Comments at 20–21.

[1160] *See, e.g.*, EOBC Comments at 22; PTV Comments at 19, 21; Verizon Comments at 29; Verizon Reply at 30 & n.99 (listing commenters that support broad confidentiality protections in order to encourage broadcaster participation).

[1161] State Broadcaster Associations Comments at 16.

programming and operations going forward, and it is unlikely that potential investors would find the amount of the losing bid to be particularly relevant to the station's current value. Moreover, the record contains no evidence contradicting this conclusion. By providing confidentiality protection regarding unsuccessful bids beyond the effective date, we hope to facilitate participation by broadcast television licensees that are eligible to participate in the reverse auction but that may be concerned about the consequences of public disclosure of their participation.

392. We will not keep confidential the identities of unsuccessful reverse auction participants in perpetuity, as State Broadcaster Associations suggest.[1162] Protecting the identities of unsuccessful bidders in perpetuity would not be a "reasonable step[]" necessary to protect the confidentiality of participating broadcasters' data.[1163] Protecting confidentiality is an important statutory objective that will facilitate broadcaster participation and promote the success of the incentive auction. But in determining what steps to protect participants' information are "reasonable" to take, we also consider the other objectives of the Spectrum Act, including the goal of using market forces to repurpose spectrum for mobile broadband—an objective that requires public trust in the auction process, and therefore militates in favor of transparency into the process.[1164] As Anon. Citizen argues, particularly given the novelty and complexity of this new system of competitive bidding, it is imperative that we eventually release as much information as possible about the bids and the bidding process.[1165] The bidding information that we release will allow winning bidders, unsuccessful bidders, and other interested third parties to review and test the auction results bid-by-bid. By committing to releasing this information in the future, we hope to facilitate participation in the auction by providing assurance that the process will be fair and in accordance with Commission rules.[1166] Although it is appropriate to delay the opportunity for such analysis given the unique circumstances here, it would not be reasonable to prevent this analysis entirely.[1167] Further, the full transparency of the auction process should not be delayed for a lengthier period of time given the public interest in transparency and public trust and confidence in the auction system. Delaying the availability of specific bidding information for two years is a reasonable step necessary to protect participants' confidentiality in light of the circumstances, including our interest in promoting broadcaster participation in the reverse auction and the public interest in transparency.

393. We amend our FOIA disclosure rules to accommodate the confidentiality rules that we adopt in this Order. Specifically, the information that is protected by the confidentiality rules described above will be added to the list of materials accepted by the Commission on a confidential basis.[1168] Thus, if reverse auction applicants are satisfied with the scope of the protection afforded by these confidentiality rules, it will be unnecessary for them to submit a request for non-disclosure.[1169] We also amend section 0.457(d) of our rules to include such records in the list of those not routinely available for public

[1162] *Id.*

[1163] *See* § III.B.2.a ("All Reasonable Efforts").

[1164] *See id.*

[1165] Anon. Citizen Comments at 3–4, 8.

[1166] The Commission routinely releases bidding information after auctions to allow for such analyses to take place. *See, e.g., Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73*, Public Notice, 23 FCC Rcd 4572, 4573–74, para. 5 (2008) (announcing availability of auction results files including the identities of bidders and the net amounts of bids); *see also* FCC, Round Results for Auctions Held From July 2005–Present, http://wireless.fcc.gov/auctions/default.htm?job=round_results_all (last visited Apr. 3, 2014) (providing bidding results for each round of FCC spectrum license auctions).

[1167] *See, e.g.*, Anon. Citizen Comments at 3–4, 8 (emphasizing the importance of transparency).

[1168] *See* 47 C.F.R. § 0.457(d)(1).

[1169] *Id.*

inspection. Because FOIA exemption three is inapplicable to such records,[1170] we will permit disclosure of such records under FOIA only pursuant to a "persuasive showing" under section 0.457(d), and note that in this context any response by a reverse auction participant within the relevant time period will be exempted from our *ex parte* rules to the extent necessary to protect the licensee's confidentiality.[1171] Given the legislative judgment reflected in the Spectrum Act, we would not expect such a showing to succeed unless it included a demonstration either that the relevant time period for protection of the confidential information has passed or that nondisclosure of the particular data sought is otherwise beyond the "reasonable steps necessary" to protect the confidentiality of Commission-held data of a reverse auction participant.[1172]

394. We note that the confidentiality rules that we adopt impose restrictions on the Commission's disclosure of certain information during certain time periods. We decline to extend the confidentiality requirements that we adopt here beyond the Commission to applicants and parties to the auction.[1173] The Commission's confidentiality obligations, along with the rule prohibiting certain communications and auction procedures regarding available information, will provide ample protection to the identities and other confidential information of reverse auction participants. We do not wish to burden auction participants with additional communications prohibitions or other confidentiality requirements after the spectrum reassignments and reallocations (if any) become effective, particularly given that any such restrictions would provide only a minimal benefit to the unsuccessful reverse auction participants—namely, protection from the educated guesses of other auction participants.

395. The confidentiality rules do not prohibit a broadcast television licensee from disclosing before the auction the mere fact that it intends to participate in the auction, or, after the auction, the results of its participation. However, other rules independently may prohibit certain communications relating to auction participation. In particular, pursuant to the rule prohibiting certain communications described below, beginning on the reverse auction application filing deadline and until a public notice announces the results of the incentive auction, all full power and Class A broadcast television licensees are prohibited from directly or indirectly disclosing incentive auction applicants' bids or bidding strategies to any forward auction applicant or to any other full power or Class A broadcast television licensee, subject

[1170] FOIA exemption three permits agencies to withhold "matters that are . . . specifically exempted from disclosure by [a] statute" other than FOIA itself. 5 U.S.C. § 552(b)(3). However, for statutes such as the Spectrum Act enacted after the OPEN FOIA Act of 2009, exemption three applies only if the statute specifically cites to the relevant paragraph of FOIA. 5 U.S.C. § 552(b)(3)(B); *Newport Aeronautical Sales v. Dep't of the Air Force*, 684 F.3d 160, 165 n.2 (D.C. Cir. 2012).

[1171] Ordinarily, FOIA request proceedings are subject to our permit-but-disclose procedures. 47 C.F.R. § 1.1206(a)(7). However, we may modify the applicable *ex parte* rules by order, letter, or public notice. *Id.* § 1.1200(a). In this unique context, where the party's identity itself has been treated as confidential, such a modification is warranted. *See also Media Bureau Issues Limited Modification to* Ex Parte *Requirements for Broadcasters Filing Notices in the Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions Proceeding*, GN Docket No. 12-268, Public Notice, 29 FCC Rcd 2002 (2014).

[1172] We agree with PTV that it is appropriate to adopt a rule to implement FOIA's exemption for confidential trade secrets and commercial or financial information for the purposes of the reverse auction; however, we tailor the amendment to the Commission's FOIA disclosure rules to conform to the scope of the confidentiality rules that we adopt here. *See* PTV Comments at 23 (encouraging the Commission to add to the list of materials in 47 C.F.R. § 0.457(d)(1) of its rules as automatically accepted by the Commission on a confidential basis "the identities of participants (non-qualifying and qualifying) who do not submit winning bids in the 600 MHz Reverse Auction . . . , as well as all identifying and non-identifying information provided therein").

[1173] *See, e.g.*, J. Pratt Comments at 24–25 ("Reverse auction participants should not have to adopt burdensome confidentiality processes in order to avoid disclosing their own participation in the reverse auction unless they desire anonymity."); *but see* Entravision Comments at 7–8 (supporting restrictions on applicants and parties to the auction prohibiting disclosure of any confidential identifying information that could reveal the confidential information and identities of other applicants participating in the auction); Anon. Broadcaster 4 Comments at 4.

to certain specific exceptions.[1174]

396. As the Commission noted in the *NPRM*, participants in the reverse auction may have legal obligations to disclose information that the Commission may be required to keep confidential.[1175] For example, the SEC requires that a public company disclose on Form 8-K any "Material Definitive Agreement."[1176] We decline to design the competitive bidding rules solely to avoid disclosure obligations imposed by other governmental entities. Tribune argues that the Commission could eliminate the need for broadcasters to report auction-related contracts on SEC Form 8-K by ruling that no bid, channel sharing agreement, or other auction-related contract shall be binding on, or enforceable against, a broadcaster until the Commission has accepted the bid by paying the compensation due to a broadcaster for its winning bid.[1177] Rather, we agree with T-Mobile and CTIA that we should treat reverse auction bids as irrevocable, binding offers to relinquish spectrum usage rights in order to ensure that broadcasters will bid truthfully in the reverse auction and to provide certainty to forward auction bidders.[1178] Furthermore, we note that notwithstanding the irrevocable nature of a broadcaster's offer, the offer has no consequence unless the Commission accepts it.[1179] But neither we, nor the commenters, have the power to determine parties' precise obligations under rules enforced by other agencies.

(ii) Prohibition of Certain Communications

397. *Background*. The Commission's existing rule prohibiting certain communications in spectrum license auctions is intended to reinforce existing antitrust laws, facilitate detection of collusive conduct, and deter anticompetitive behavior, without being so strict as to discourage pro-competitive arrangements between auction participants.[1180] The rule attempts to avoid harms that antitrust enforcement may only address in retrospect. It also helps assure participants that the auction process will be fair and objective, and not subject to collusion.

398. In the *NPRM*, the Commission proposed to prohibit applicants in the reverse auction from

[1174] *See* § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications). Given the importance of the confidentiality protections to promote broadcaster participation in the reverse auction, we decline to adopt the proposal to render information publicly released by a licensee about its participation in the reverse auction no longer confidential and therefore no longer subject to protection by the Commission. *See NPRM*, 27 FCC Rcd at 12447, para. 262. However, we caution licensees that although the confidential information that they file with the Commission in their pre-auction applications will not be made available publicly while the confidentiality rule applies, documents that are filed through the Commission's Electronic Comment Filing System (ECFS) and other FCC databases are publicly available.

[1175] *NPRM*, 27 FCC Rcd at 12447–48, para. 263; *see also* PTV Comments at 19 n.43 ("Of course, stations should be permitted to waive these [confidentiality] protections where, for example, they are required to disclose such information under law, including state open records laws and laws governing the disposition of station assets.").

[1176] *NPRM*, 27 FCC Rcd at 12447–48, para. 263; *see* SEC, Form 8-K, http://www.sec.gov/about/forms/form8-k.pdf (last visited Apr. 3, 2014).

[1177] Tribune Comments at 8–9. *But see NPRM*, 27 FCC Rcd at 12444, 12452, paras. 249, 282 (proposing that all bids submitted in the reverse auction are irrevocable, binding offers to relinquish spectrum usage rights, and that reverse auction applicants must certify acknowledgement of this in the pre-auction application).

[1178] *See* § IV.B.2.d (Additional Reverse Auction Bidding Procedures); T-Mobile Reply at 84–85; CTIA Reply at 53; *see also* Verizon Comments at 68 (supporting the Commission's proposal that all reverse auction bids be deemed irrevocable, binding offers).

[1179] In addition, even if the Commission accepts a broadcaster's irrevocable, binding offer, this offer has no consequence unless the final stage rule is satisfied and the reallocations and reassignments based on the bidding become effective.

[1180] *See* 47 C.F.R. § 1.2105(c); *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Second Report and Order, 9 FCC Rcd 2348, 2386–88, paras. 221, 225 (1994) (*Competitive Bidding Second R&O*).

directly or indirectly disclosing to one another the substance of their bids or bidding strategies during a time period commencing on or after the pre-auction application deadline and ending on a date specified by public notice.[1181] The Commission sought comment on how to define "applicant" for these purposes; whether to limit the prohibition to applicants within the same geographic region and, if so, how to define such regions; whether to adopt any specific exceptions where an applicant has attributable and/or controlling interests in, or cooperative arrangements with, other stations, or a more general exception allowing parties to communicate about bids and bidding strategies so long as they disclose to the Commission the existence of any relevant agreements between them; how the rule should address channel sharing relationships; whether and how any applicable antitrust laws should affect the prohibition; whether to apply the prohibition to communications by reverse auction applicants with applicants in the forward auction; and the effect of the Commission's obligation to maintain the confidentiality of reverse auction participants' identities.[1182]

399. *Discussion*. Beginning at the deadline for submitting applications to participate in the reverse auction and until the results of the incentive auction have been announced by public notice,[1183] all full power and Class A broadcast television licensees (collectively "covered television licensees") are prohibited from communicating directly or indirectly any incentive auction applicant's bids or bidding strategies to any other covered television licensee or to any forward auction applicant,[1184] subject to certain exceptions described below.[1185] The rule that we adopt here is intended to reinforce existing antitrust laws, facilitate detection of collusive conduct, and assure incentive auction participants that the auction process will be fair and objective.[1186] The rule applies solely to communications that directly or indirectly disclose an incentive auction applicant's bids or bidding strategies to any covered television licensee or to any forward auction applicant. Business discussions and negotiations that are *unrelated* to bids and bidding strategies or to post-auction market structure are not prohibited by the rule.[1187] The prohibition applies during a limited period of time, which we expect will be only a matter of months. We anticipate that the rule will serve our purposes with minimal intrusion into broadcasters' routine business practices, since covered television licensees may structure their business practices as needed to avoid violations, such as by instituting internal controls with respect to any information about incentive auction applicants' bids and bidding strategies.[1188]

[1181] *NPRM*, 27 FCC Rcd at 12448, para. 264.

[1182] *Id.* at 12448–50, paras. 264–70.

[1183] *See* § V.A (Auction Completion and Effective Date of the Repacking Process).

[1184] For the purposes of the rule that we adopt here, we will apply the same definition of forward auction "applicant" that applies to the rule for spectrum license auctions generally. *See* 47 C.F.R. § 1.2105(c)(7)(i); *see also* § IV.C.1.c (Forward Auction Prohibition of Certain Communications).

[1185] "Covered television licensees" include all broadcast television licensees that are or could become eligible to participate in the reverse auction, *see* § IV.B.1.a (Eligibility), as well as all channel sharers.

[1186] *See Competitive Bidding Second R&O*, 9 FCC Rcd at 2386–88, paras. 221, 225.

[1187] *See NPRM*, 27 FCC Rcd at 12448, para. 264 & n.405; *see also* § IV.C.1.c (Forward Auction Prohibition of Certain Communications) (discussing Commission precedent regarding the scope of the prohibition). *Cf.* Verizon Comments at 51 (suggesting with respect to analogous forward auction rule that there is "uncertainty as to whether discussions not related to bids or bidding strategies or post-auction market structure could violate the rule").

[1188] *See* Verizon Comments at 52–53; *see also Application of Nevada Wireless for a License to Provide 800 MHz Specialized Mobile Radio Service in the Farmington, NM-CO Economic Area (EA-155) Frequency Band A*, Memorandum Opinion and Order, 13 FCC Rcd 11973, 11977–78, paras. 11–13 (1998) (*Nevada Wireless MO&O*) (strongly recommending that where competing applicants' authorized bidders are different individuals employed by the same organization—e.g., the same law firm—those applicants each certify in their applications what measures have been taken to prevent communications between authorized bidders, but cautioning that merely filing a

(continued….)

400. This provision prohibits certain communications between covered television licensees, not just reverse auction applicants. Given the Commission's statutory obligation to protect the identities of reverse auction participants, it is not practicable to limit the prohibition to communications between reverse auction applicants, since doing so would require disclosing their identities.[1189] Nor is the rule limited to communications between covered television licensees within the same geographic area.[1190] Reverse auction participants will compete on a national basis for the limited funds that forward auction participants will contribute for new flexible-use licenses, and, due in part to the consequences that the repacking of broadcast television licensees may have across multiple geographic areas, all reverse auction participants will compete with each other for the auction system to accept their offers to relinquish spectrum usage rights.[1191] Thus, it is appropriate to limit communications between covered television licensees on a national level.[1192]

401. The rule also prohibits specified communications between a covered television licensee and a forward auction applicant. Verizon asserts that there is "no reason why discussions between reverse and forward auction applicants could make either auction less competitive."[1193] However, we agree with Sprint that "any information that reache[s] forward auction participants could create dangerous and anti-competitive informational asymmetries among bidders."[1194] And as T-Mobile points out, "allowing unfettered communications between forward and reverse auction participants could generate opportunities for inequitable gaming of the auction framework."[1195] To promote a fair and competitive auction, the prohibition against communicating information regarding incentive auction applicants' bids and bidding strategies will apply across the reverse and forward auctions.[1196]

402. This prohibition across the reverse and forward auctions applies regardless of the geographic license areas where forward auction applicants intend to bid. As noted above, the results of the reverse auction for one participant may have effects across multiple geographic areas. This restriction will inhibit the ability of covered television licensees and forward auction applicants to form side agreements which could have anticompetitive effects and could alter the outcome of the incentive auction.

403. With respect to covered television licensees, the prohibition includes all controlling

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certifying statement as part of an application will not outweigh specific evidence that collusive behavior has occurred nor will it preclude the initiation of an investigation when warranted).

[1189] Spectrum Act § 6403(a)(3).

[1190] *See, e.g.*, Anon. Broadcaster 4 Comments at 4–5; Entravision Comments at 7–8 (supporting a prohibition of communications between reverse auction applicants located within the same DMA).

[1191] *See* § IV.B.1.d (Two Competing Participants Requirement).

[1192] *Cf. Mobility Fund Phase I Auction Scheduled for September 27, 2012; Notice and Filing Requirements and Other Procedures for Auction 901*, AU Docket No. 12-25, Public Notice, 27 FCC Rcd 4725, 4742, para. 49 (2012) (applying a similar rule prohibiting certain communications to all bidders, regardless of the geographic areas where they sought support, because all bidders were competing with all other bidders for support from limited funds).

[1193] Verizon Comments at 54; *see also* Verizon Reply at 29.

[1194] Sprint Comments at 5–6 n.11.

[1195] Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene Dortch, Secretary, FCC, GN Docket No. 12-268 at 1 (filed Apr. 23, 2013) (T-Mobile Apr. 23, 2013 *Ex Parte* Letter).

[1196] In the *NPRM*, the Commission sought comment on whether to require reverse auction applicants to identify in their pre-auction applications any relationships with wireless companies. *NPRM*, 27 FCC Rcd at 12449, para. 269. The rules that we adopt below regarding the ownership disclosures required in the pre-auction application to participate in the reverse auction include disclosures regarding certain relationships with other FCC-regulated entities. *See* § IV.B.1.e.iii (Information and Certifications Required in Application to Participate in Reverse Auction); *see also* 47 C.F.R. § 1.2112(a)(7).

interests in the licensee,[1197] and all directors, officers, and governing board members of the licensee.[1198] That is, for purposes of this rule, such parties will be considered to be the covered television licensee based on their relationship with such a licensee.[1199] Members of the licensee's governing board are included in recognition that NCE stations and certain other stations may be operated by non-profit entities.[1200] There is not a sufficient justification for excluding governing board members from the prohibition. The prohibition that we adopt is narrowly tailored in that it is limited in time and applies only to communications that may disclose incentive auction applicants' bids and bidding strategies. Contrary to PTV's view, we do not anticipate that the prohibition will be so burdensome as to prevent volunteer board members from continuing to serve on the board solely to avoid being subject to the rule.[1201] Members of a governing board may be apprised of incentive auction applicants' bids and bidding strategies, and they should not be permitted to communicate such information to other covered television licensees or to forward auction applicants unless an exception to the prohibition applies.

404. We note that the list of parties deemed to be the covered television licensee is not an exclusive list of parties that might engage in prohibited communications on behalf of a licensee. While communications by a listed party will necessarily be attributed to the associated covered television licensee, whether any potentially prohibited communications by other associated parties (or employees) are attributed to a licensee would be a fact-based determination. Specifically, a covered television licensee may not use agents or other conduits to convey information to any other covered television licensee or to any forward auction applicant that would otherwise be prohibited if communicated by the covered television licensee.[1202] For example, an employee who is involved in the bidding process and who is acting with the authority of a covered television licensee may not communicate any incentive auction applicant's bids or bidding strategies to another covered television licensee or to a forward auction applicant during the auction process unless an exception to the prohibition applies.

[1197] Controlling interests include individuals or entities with positive or negative *de jure* or *de facto* control of the licensee. *De jure* control includes holding 50 percent or more of the voting stock of a corporation or holding a general partnership interest in a partnership. Ownership interests that are held indirectly by any party through one or more intervening corporations may be determined by successive multiplication of the ownership percentages for each link in the vertical ownership chain and application of the relevant attribution benchmark to the resulting product, except that if the ownership percentage for an interest in any link in the chain meets or exceeds 50 percent or represents actual control, it may be treated as if it were a 100 percent interest. *De facto* control is determined on a case-by-case basis. Examples of *de facto* control include constituting or appointing 50 percent or more of the board of directors or management committee; having authority to appoint, promote, demote, and fire senior executives that control the day-to-day activities of the licensee; or playing an integral role in management decisions.

[1198] This approach is analogous to the definition of "applicant" that applies to spectrum license auctions and that was proposed for purposes of the rule prohibiting certain communications in the reverse auction. *See* 47 C.F.R. § 1.2105(c)(7)(i); *see also NPRM*, 27 FCC Rcd at 12448, para. 265. We note that broadcast television licensees are required to electronically file Ownership Reports (Form 323) with the Commission. *See* 47 C.F.R. § 73.3615.

[1199] This includes the controlling interests, directors, officers, and governing board members of a covered television licensee as of the deadline for submitting applications to participate in the reverse auction, and any additional such parties at any subsequent point prior to the date when the prohibition ends. For example, if a covered television licensee appoints a new officer after the application deadline, that new officer would be subject to the prohibition.

[1200] *See NPRM*, 27 FCC Rcd at 12448, para. 265.

[1201] *See* PTV Comments at 33–34; Public TV Licensees Reply at 7.

[1202] *See, e.g., Wireless Telecommunications Bureau Responds to Questions About the Local Multipoint Distribution Service Auction*, Public Notice, 13 FCC Rcd 341, 347–48 (1998) (explaining that public statements may give rise to collusion concerns, and that a violation of the anti-collusion rule could also occur if an individual acts as the authorized bidder for two or more competing applicants); *see also Nevada Wireless MO&O*, 13 FCC Rcd at 11976–81, paras. 8–19 (assessing facts regarding alleged improper communications where different individuals from the same law firm were listed as authorized bidders for two auction applicants).

405. We adopt two exceptions to this rule prohibiting certain communications. First, covered television licensees that share a common controlling interest, director, officer, or governing board member as of the deadline for submitting applications to participate in the reverse auction may communicate with each other regarding incentive auction applicants' bids and bidding strategies without violating the prohibition. Similarly, if a controlling interest, director, officer, or governing board member of a covered television licensee is also a controlling interest, director, officer, or holder of any 10 percent or greater ownership interest in a forward auction applicant, communications between the covered television licensee and the forward auction applicant will qualify for this exception.[1203] An overly broad prohibition restricting communications between a broadcast television licensee and its controlling interests during the reverse auction could unduly restrict bidders' flexibility.[1204] This exception to the prohibition recognizes various interrelationships that may exist between covered television licensees and permits communications between such licensees that will facilitate strategic decisions regarding multiple licensees in real time as various contingencies unfold during the auction. Thus, the exception will allow such licensees to participate more fully, particularly in a multiple-round auction, such as a descending clock auction.

406. Second, all parties to a channel sharing agreement disclosed on a reverse auction application may communicate with each other about reverse auction applicants' (but not any forward auction applicants') bids and bidding strategies. Allowing such communications will encourage channel sharing relationships, allowing potential channel sharers to fully engage as various options are presented during the auction process.[1205] Our exception takes into account EOBC's point that once a station has entered into a channel sharing agreement, it should be permitted to communicate with parties to that agreement about auction strategy in preparation for and throughout the course of the reverse auction.[1206] However, allowing channel sharing negotiations to commence during the auction, as PTV requests, presents too high of a risk of agreements to reduce competition in response to auction conditions.[1207] Thus, the exception to the prohibition for parties to a channel sharing agreement will apply only if the agreement has been executed prior to the reverse auction application filing deadline and has been disclosed on the application.

407. We decline to adopt any exceptions based on the existence of other particular types of agreements or arrangements between covered television licensees, such as local marketing agreements ("LMAs"), joint sales agreements ("JSAs"), shared services agreements ("SSAs"), network affiliation agreements, or any other similar cooperative arrangements.[1208] As described above, covered television

[1203] This exception only applies to controlling interests, directors, officers, and governing board members of a covered television licensee *as of the deadline for submitting applications to participate in the reverse auction*, and to controlling interests, directors, officers, and holders of any 10 percent or greater ownership interest in a forward auction applicant *as of the deadline for submitting short-form applications to participate in the forward auction*. Consequently, if a covered television licensee appoints a new officer after the application deadline, that new officer would be subject to the rule and *not* included within the exception.

[1204] *Cf.* EOBC Comments at 24 (arguing that the prohibition should account for the myriad broadcast ownership and management structures that may require communications regarding auction strategy, such as communications between licensees and their investors or other commercial partners).

[1205] *See* Spectrum Act § 6403(a)(2)(C) (permitting broadcasters to relinquish spectrum usage rights in order to share a television channel with another licensee); *see also Channel Sharing Report and Order*, 27 FCC Rcd at 4622, para. 12 (describing potential benefits of channel sharing for participating broadcasters).

[1206] EOBC Comments at 24; *see also* PTV Comments at 32–33 (cautioning the Commission to avoid chilling good faith discussions regarding channel sharing arrangements); Sprint Comments at 5 & n.11 (supporting a carefully targeted relaxation of the rule prohibiting certain communications to facilitate productive communications between channel sharing partners).

[1207] PTV Comments at 34; *see also* Public TV Licensees Reply at 7.

[1208] *See NPRM*, 27 FCC Rcd at 12448, para. 266.

licensees with such agreements may continue to communicate during the relevant time period so long as their communications do not directly or indirectly disclose incentive auction applicants' bids or bidding strategies.[1209]

408. We also decline to adopt an exception based on any pre-auction agreement, other than a channel sharing agreement, disclosed on an application to participate in the reverse auction. Although, as PTV points out,[1210] the Commission's rules apply an exception for disclosed agreements in our typical spectrum license auctions,[1211] the reverse auction warrants a different approach. The purpose of this exception in the spectrum license auction context is to permit the formation of legitimate efficiency-enhancing bidding consortia, which reduce entry barriers for smaller firms and improve their ability to compete in the auction process and in the provision of service.[1212] But in the reverse auction, participants are relinquishing spectrum usage rights, not seeking licenses, and there is not the same need for agreements to promote competition. Accordingly, and in light of the exceptions discussed above, a general exception for other disclosed agreements is not warranted in the reverse auction.

409. We disagree with EOBC that the *NPRM* "does not include sufficient information to allow for comment on how to apply the Commission's anti-collusion rules to the reverse auction context."[1213] The Commission both discussed the proposed prohibition at length and included the language of a proposed rule in the *NPRM*.[1214] Furthermore, the proposed rule and the associated discussion in the *NPRM* were based on the Commission's existing rule for spectrum license auctions, with respect to which there is ample precedent.[1215] As noted above, the *NPRM* also explicitly asked how the rule might be adjusted in light of the specific features unique to the reverse auction, including the geographic scope of the rule and its application to channel sharing and other cooperative arrangements with other stations. The purpose of the *NPRM* was precisely to solicit comment on whether the reverse auction context warrants any changes to the Commission's established rule.

410. Any party that makes or receives a communication regarding an incentive auction applicant's bids or bidding strategies that may violate this rule must report such communication in writing to the Commission immediately, and in no case later than five business days after the communication occurs. The obligation to make a report continues until the report is made and a failure to make a timely report constitutes a continuing violation.[1216] Parties must adhere to any applicable antitrust laws, including any additional communications restrictions. Where specific instances of collusion in the competitive bidding process are alleged, the Commission may conduct an investigation or refer such

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[1209] We did not receive any comments specifically supporting an exception based on the existence of an LMA, JSA, SSA, network affiliation agreement, or other similar cooperative arrangement, or addressing why broadcasters with these sorts of arrangements would need to discuss bidding information during the reverse auction.

[1210] PTV Comments at 33; *see also* Anon. Broadcaster 4 Comments at 4–5; Entravision Comments at 7–8; Public TV Licensees Reply at 7.

[1211] *See* 47 C.F.R. § 1.2105(c)(1) (exempting members of a bidding consortium or other joint bidding arrangement identified on the bidder's short-form application from the rule prohibiting certain communications).

[1212] *See Competitive Bidding Second R&O*, 9 FCC Rcd at 2387, para. 223.

[1213] EOBC Comments at 23; *see also* PTV Comments at 34–35 (encouraging the Commission to issue a further notice of proposed rulemaking that proposes specific language for the rule prohibiting certain communications and provides clearer guidance on how the rule might be applied).

[1214] *NPRM*, 27 FCC Rcd at 12448–50, paras. 264–70; *id.* at 12507 (proposed rule 47 C.F.R. § 1.22005).

[1215] *See* § IV.C.1.c (Forward Auction Prohibition of Certain Communications).

[1216] *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Second Report and Order, 22 FCC Rcd 15289, 15403–04, paras. 285–86 (2007).

complaints to DOJ for investigation.[1217] Parties who are found to have violated the antitrust laws or the Commission's rules in connection with participation in the auction process may, among other things, be subject to forfeiture of their winning bid incentive payments and revocation of their licenses, where applicable, and may be prohibited from participating in any other auctions.[1218]

411. We recognize that many broadcasters are new to auction processes, and that all are new to the reverse auction process.[1219] We have conducted and will continue to conduct extensive efforts to educate broadcasters about important aspects of the auction process, including the prohibition of certain communications we adopt here.

d. Two Competing Participants Requirement

412. *Background*. Pursuant to the Spectrum Act, the Commission cannot accept the relinquishment of spectrum usage rights unless at least two competing licensees participate in the reverse auction. Specifically, section 6402 of the Spectrum Act provides that "[t]he Commission may not enter into an agreement for a licensee to relinquish spectrum usage rights in exchange for a share of auction proceeds . . . unless . . . at least two competing licensees participate in the reverse auction."[1220] In the *NPRM*, the Commission proposed to incorporate this requirement into the competitive bidding rules for the broadcast television spectrum reverse auction and sought comment on the parameters of the rule, including what should constitute "participation" and "competing" for the purposes of this requirement.[1221]

413. *Discussion*. We conclude that "two competing licensees participate" in the reverse auction portion of the broadcast television spectrum incentive auction if more than one broadcast television licensee's pre-auction application is found to be complete and in compliance with the application rules, and if at least two such licensees are not commonly controlled. Our conclusion is based on two supporting conclusions. First, we conclude that a broadcast television licensee will be a "participant" if it has submitted a pre-auction application to be able to bid in the reverse auction that is found to be complete and in compliance with the application rules.[1222] The fact that an applicant has the ability to submit a bid in the reverse auction as designed under our rules, regardless of whether it ultimately chooses to do so, is sufficient to satisfy the "participation" component of this statutory requirement.[1223] As discussed below, the knowledge that another party might bid will create competitive pressure for a second bidder to accept lower incentive payments than it would absent any competition.

[1217] *See Competitive Bidding Second R&O*, 9 FCC Rcd at 2388, para. 226; *see also* Press Release, DOJ, *Justice Department Sues Three Firms Over FCC Auction Practices: Coded Bids Used to Signal Competitors* (Nov. 10, 1998), *available at* http://www.justice.gov/opa/pr/1998/November/536at.htm (announcing lawsuits against bidders that allegedly agreed not to bid against each other and used coded bids to communicate during the auction).

[1218] *See Competitive Bidding Second R&O*, 9 FCC Rcd at 2388, para. 226.

[1219] *See* PTV Comments at 35 (asking the Commission to work closely with DOJ to issue guidance on how the antitrust laws will apply in the context of the incentive auction).

[1220] *See* 47 U.S.C. § 309(j)(8)(G)(ii).

[1221] *NPRM*, 27 FCC Rcd at 12446, para. 256.

[1222] For the purpose of the competing participants requirement, we decline to consider applicants whose applications are found incomplete as "participants" because they will not be permitted to submit bids during the reverse auction and, thus, cannot "participate." *But see* Vision Comments at 9–10 (arguing that the two competing participants requirement should be satisfied "if there are at least two broadcasters nationwide that *elect* to participate in the reverse auction") (emphasis added). *Cf.* § IV.B.1.c.i (Confidentiality) (interpreting statutory confidentiality protections afforded to "participating" licensees more broadly in order to facilitate broadcaster participation).

[1223] We agree with Anon. Broadcaster 2 that applicants who submit applications that are deemed complete need not place bids to be considered participants for the purpose of this requirement. *See* Anon. Broadcaster 2 Comments at 11 (supporting the approach to define a "participant" as "any licensee that submits an application to participate in the reverse auction and is deemed qualified to bid").

414. Second, we conclude that any broadcast television licensees that participate in the reverse auction and that are not commonly controlled will "compete" with one another. Under our auction design framework, regardless of their pre-auction geographic or channel location, all participants in the reverse auction will compete to receive incentive payments from the same limited source—the aggregate proceeds of the forward auction.[1224] Bidders in the reverse auction would prevent the incentive auction from closing if together they were to request compensation exceeding amounts available from the forward auction proceeds. Hence, one bidder's request for compensation affects what other bidders can be paid and, indeed, whether the final stage rule can be satisfied. Moreover, the interdependent nature of the repacking process, where repacking one station may have widespread effects across geographic areas with possible nationwide band plan implications, means that participants will be affecting, and competing with, licensees far beyond their contour, DMA, or channel. This competition for the forward auction proceeds satisfies the Spectrum Act's requirement that "at least two competing licensees participate in the reverse auction."[1225]

415. The comments submitted in the record support our interpretation. For example, Anon. Broadcaster 2, T-Mobile, and Vision all agree that the Commission should construe the participation requirement broadly by requiring at least two competing licensees across all markets to participate in the reverse auction, and reject a reading of the statute that would define competing licensees by reference to their competition in the provision of television service, such as operating in the same DMA, rather than their competition in the reverse auction.[1226] Further, we agree with T-Mobile that a rule requiring at least two bidders to participate in the same market, however defined, could mean that an otherwise willing and eligible broadcast television licensee would not be allowed to bid in the reverse auction if it is the only participant in its DMA.[1227] Such an approach would limit the Commission's ability to allow market forces to determine the highest and best use of spectrum, and to satisfy the final stage rule. Sinclair nevertheless argues in favor of a narrower interpretation of the statute, asserting that "licensees 'compete' only when they have substantially overlapping contours."[1228] The competition among broadcast television licensees to which Sinclair apparently refers is not relevant to how participants will compete in the reverse auction, and therefore the Spectrum Act does not require such a construction of the participation requirement.[1229]

[1224] *See* Spectrum Act § 6403(c)(2). We note that the two competing participants requirement applies to any reverse auction component of an incentive auction conducted under § 6402 of the Spectrum Act, including the broadcast television spectrum incentive auction. *See* Spectrum Act § 6402. It was therefore not crafted with specific reference to the design of the broadcast television spectrum incentive auction, much less to the reverse auction design framework adopted by the Commission here. The above analysis is based on the statutory conditions applicable to the broadcast television spectrum incentive auction and, thus, may not apply to different incentive auctions. *See* Spectrum Act § 6403. As the two competing participants requirement is a "generic" provision applicable to any incentive auction conducted under § 6402 of the Spectrum Act, the Commission may apply this requirement differently in other reverse auctions, depending upon the particular eligibility criteria, auction design, and other circumstances involved in such reverse auctions.

[1225] *See* Anon. Broadcaster 2 Comments at 11 (explaining that "[a]s long as multiple licensees are bidding for payments from the same source of funds, no single licensee can unilaterally dictate the amount of money to which it is entitled").

[1226] T-Mobile Comments at 37–38; Vision Comments at 9–10; Anon. Broadcaster 2 Comments at 10–11.

[1227] *See* T-Mobile Comments at 37–38.

[1228] Sinclair Comments at 14.

[1229] *See* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(ii)). *See also* Anon. Broadcaster 2 Comments at 11 ("A narrower interpretation, such as requiring multiple licensees in the same market, is not supported by the language of the statute and would unnecessarily restrict the FCC's ability to maximize the amount of spectrum auctioned."); T-Mobile Comments at 37 (explaining that same-market competition is not essential for determining the amount of compensation owed to a broadcaster for voluntarily relinquishing its spectrum); Vision Comments at 9–10 ("The legislative history of the Spectrum Act is silent on this provision. . . . [T]here does not appear to have been any Congressional deliberation on whether the intent was to withhold payment if only one broadcaster in a

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e. Information and Certifications Required in Application to Participate

416. *Background*. In the *NPRM*, the Commission proposed to require submission of a pre-auction application by entities interested in participating in the reverse auction, explaining that information provided on the pre-auction application would allow it to evaluate whether the parties are qualified to participate in accordance with the auction rules.[1230] The Commission sought comment on proposed rules regarding the contents of the pre-auction application for the reverse auction, such as the appropriate party to consider as the applicant.[1231] In addition, the Commission sought comment on what information applicants should be required to provide and what certifications they should be required to make regarding their qualifications to participate.[1232]

417. *Discussion*. We adopt the proposal to require potential bidders to submit a pre-auction application to establish their eligibility to participate in the reverse auction. This requirement will provide an appropriate screen to ensure serious participation without being unduly burdensome. Based on our experience with spectrum license auctions, such a requirement balances the need to collect essential information with administrative efficiency. We envision that the pre-auction application would be due on the dates specified by the *Procedures PN* and would be filed electronically as in Commission spectrum license auctions.

418. In addition, we adopt the proposals regarding the types of information broadcast television licensees should be required to disclose in the pre-auction application. Thus, as discussed in more detail below, we will require that each auction applicant submit information to establish its identity, information concerning the relevant license(s) and associated spectrum usage rights, and information regarding the parties with ownership interest in the applicant. Additionally, an applicant that is proposing to share a channel with another station must confirm that the proposed arrangement will not violate the Commission's media ownership rules[1233] and provide information concerning the channel sharing arrangement, including a copy of the executed channel sharing agreement. Based on our experience with spectrum license auctions, such information is needed to determine whether an applicant is qualified to participate and to implement rules that are fundamental to the auction, such as the prohibition of certain communications. And the information relied upon for the auction must be up-to-date, making it appropriate to require submission in the period leading up to the auction.

419. We emphasize that we seek to make participation in the reverse auction as easy as possible for broadcasters. However, the need for sufficient and up-to-date information regarding broadcast television licensees that may make binding bids to relinquish spectrum usage rights leads us to decline various suggestions to further streamline or simplify the pre-auction application process.[1234] As US Cellular notes, applicants to participate in the reverse auction already have certain information on file because they hold Commission-issued authorizations.[1235] Nevertheless, as noted below, information

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market participates in the reverse auction . . . . In the absence of a clear directive from Congress, the Commission is free to interpret intent.").

[1230] *NPRM*, 27 FCC Rcd at 12442, para. 242.

[1231] *Id*. at 12442, paras. 242, 244–45.

[1232] *Id*. at 12443–45, paras. 246–52.

[1233] *See* § VI.A.1.a (Post-Transition Media Ownership Rules).

[1234] *See, e.g.*, CTIA Comments at 32–33 (suggesting that the Commission consider whether any "application" process is necessary at all for the reverse auction and, instead, only require "the filing of any agreements by reverse auction participants"); Motorola Mobility Comments at 7 (arguing that preparation of the pre-auction application package would be costly and time consuming and could deter some participation, and that simplified certifications and notifications should suffice); TechAmerica Reply at 5; US Cellular Comments at 10; US Cellular Reply at 10.

[1235] *See* US Cellular Comments at 10.

required by the Commission for other purposes is not necessarily sufficient for the reverse auction. Moreover, significant changes may have taken place in the applicant, or in the parties with ownership interests in the applicant, since the most recent submission of such information to the Commission. Any attempt to rely on other filings would necessitate requiring potential participants to confirm that all information on file with the Commission is current and, if necessary, update any information that is outdated. Even then, such updates may not obviate the need for an auction application. Consequently, requiring parties to file an application to participate in the reverse auction that is focused on the relevant information is more efficient and less burdensome for potential participants.

420. Commission experience with spectrum license auctions indicates that a pre-auction application process is critical to ensuring the success of the incentive auction. Completing an application helps an applicant focus on the significance of any actions it may take should it choose to bid. Similarly, requiring a potential bidder to submit an application and to affirmatively make the various certifications required helps to ensure that the applicant is sincere about its intent to participate.

421. We decline to require applicants to provide a two year program history log in order to help the Commission consider the ramifications of accepting a particular relinquishment bid.[1236] We will not consider whether acceptance of such bids will result in loss of service for the reasons discussed above in the License Relinquishment Bid Section.[1237] Therefore, a bidder's two-year program history log will be irrelevant.

422. We also decline to adopt NHMC and the Leadership Conference's suggestion to require applicants to provide additional information about their ownership interests for the purpose of determining the potential impact of the incentive auction on broadcast ownership diversity.[1238] We recognize the importance of diversity in broadcast ownership and support efforts to maintain such diversity. The suggested requirement, however, would go beyond the scope of information necessary to determine whether an applicant is qualified to participate in the reverse auction or to implement the Commission's auction rules. Our interest in simplifying and thereby facilitating participation and reducing burdens associated with the application process militates against imposing broader information collection requirements than are necessary for the purposes of such a collection. In addition, these proposals would not provide a complete or reliable picture of broadcast ownership diversity, even for television, because they would not include any broadcast station electing not to participate in the reverse auction. For a more detailed discussion concerning public interest and diversity considerations, see the Diversity of Media Ownership Section below.[1239]

423. We will require an applicant to make certain certifications on its pre-auction application as to its legal, technical, and other qualifications and eligibility to participate in the reverse auction, including a certification as to the applicant's compliance with the national security restriction in section 6004 of the Spectrum Act. Requiring a certification of an applicant's qualifications will help to ensure that applicants submit accurate information.[1240] Applicants making false certifications to the Commission expose themselves to liability. Applicants should take care to review their licenses and the information in

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[1236] *See* Anon. Citizen Comments at 8–9 (arguing that this information will be helpful to consider if any stations face local backlash for voluntary relinquishment of rights).

[1237] *See* § IV.B.1.b.i (Reverse Auction License Relinquishment Bid).

[1238] *See* NHMC Comments at 5–6; NHMC Reply at 2–3; Leadership Conference Comments at 1, 5 (urging the Commission to collect data that track ownership diversity in broadcasting now and after the auction).

[1239] *See* § VI.A.1.b (Post-Transition Diversity of Media Ownership).

[1240] *See Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures*, WT Docket No. 97-82, *Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use*, ET Docket No. 94-32, Third Report and Order and Second Further Notice of Proposed Rule Making, 13 FCC Rcd 374, 391, para. 24 (1997) (*Part I Third Report and Order*).

their pre-auction applications before making the required certifications and be prepared to document their review confirming that they meet the applicable requirements, if necessary.

424. We note that for spectrum license auctions, the Commission typically releases an interactive auction tutorial. The tutorial typically demonstrates the Commission's web-based auction application. Consistent with prior practice, we anticipate offering a similar type of tutorial for the incentive auction so that potential participants have the opportunity to become familiar with the auction application system prior to the pre-auction application deadline.

(i) Applicant

425. *Background.* The Commission proposed that the applicant identified on the pre-auction application for the reverse auction must be the licensee.[1241] As the Commission explained in the *NPRM*, under this approach, a corporate parent would not be able to file one application for licenses held by different licensee subsidiaries; however, a licensee holding multiple licenses would only be required to file one application for all such licenses for which it wishes to submit bids in the reverse auction.[1242]

426. For broadcast television licensees that would relinquish spectrum usage rights in exchange for an incentive payment and subsequently share a channel with another broadcaster, the Commission proposed that only the sharee(s)—the station(s) that would relinquish their frequencies in order to move to the sharers' frequencies—must apply to participate in the reverse auction.[1243]

427. *Discussion.* We adopt the above proposals as set forth in the *NPRM*. Requiring the applicant to be the licensee will promote accountability and transparency since the licensee is the entity that holds the spectrum usage rights that may be relinquished in the reverse auction.[1244] This decision is consistent with the Spectrum Act's use of the term "broadcast television licensee."[1245]

428. With respect to channel sharers, since the sharer station will not change channels as part of the channel sharing arrangement,[1246] it is unnecessary for the sharer to submit an application to participate in the reverse auction with respect to the shared station unless it intends to submit its own bid.[1247] We will, however, require prospective sharers to provide any necessary certifications with respect to the channel sharing agreement in addition to sharees.[1248] It is reasonable and not unduly burdensome to

[1241] *NPRM,* 27 FCC Rcd at 12442, para. 244.

[1242] *Id.*

[1243] *Id.* at 12442, para. 245. More than two stations may share a channel. Thus, although there would be only one sharer in each channel sharing relationship, there could be multiple sharees.

[1244] No commenter addressed this issue directly. EOBC proposes volume credits to encourage multi-station owners to participate in the auction and submit bids for stations in several highly-desirable markets. *See* EOBC Reply at 21, Eisenach Declaration at paras. 21–24. EOBC does not explain how the proposed volume credits would work, however, or address how the credits would affect the pre-auction application process, including whether the multi-station owner would be the licensee (i.e., the applicant) or the licensee's parent company or affiliate. Thus, it is unclear what type of information the Commission would need to request from an applicant during the pre-auction application process to implement EOBC's proposal.

[1245] *See, e.g.*, Spectrum Act §§ 6001(6) (defining "broadcast television licensee" as "the licensee" of the relevant station), 6403(a)(1) (directing the Commission to conduct a reverse auction to determine the amount of compensation that each "broadcast television licensee" would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights).

[1246] We note that a sharer station may be reassigned a new channel during the repacking process. *See* § III.B (Repacking the Broadcast Television Bands).

[1247] The limited comment we received on this issue supports our decision. *See, e.g.*, ITI Comments at 6 (arguing that the Commission should not require both parties to file pre-auction applications).

[1248] *See* §§ IV.B.1.b.iii (Reverse Auction Channel Sharing Bid), IV.B.1.e.iv (Channel Sharing Agreement) (identifying specific certifications required with respect to channel sharing agreements).

require sharers to make such certifications because, as Commission licensees, they are required to comply with all applicable Commission rules and regulations, including the rules we adopt in this Order concerning channel sharing arrangements. Further, as a sharer voluntarily enters into a channel sharing arrangement, it is reasonable to require a sharer to make certifications in exchange for the ability to share a channel with another broadcaster. We acknowledge ITI's concern that overly burdensome certifications relating to channel sharing agreements could have a negative effect on participation in the reverse auction.[1249] We do not anticipate, however, that requiring a sharer to make basic certifications about a channel sharing agreement that it voluntarily negotiated and entered into will be overly burdensome to the sharer or to any sharees that are parties to the agreement. Moreover, the benefit of requiring a sharer to make certifications that are designed to ensure compliance with the Commission's rules and regulations concerning channel sharing arrangements outweighs the unlikely risk of potentially deterring broadcaster participation in the reverse auction.

(ii) Spectrum Usage Rights to Be Offered

429. *Background.* In the *NPRM*, the Commission proposed to require information in the pre-auction application concerning the license(s) and associated spectrum usage rights that may be offered in the reverse auction, including station and channel information, full power or Class A status, and NCE status, and whether the applicant intends to bid to relinquish all of its spectrum usage rights, to channel share, to move from UHF to VHF frequencies, and/or to offer any other permissible relinquishments.[1250]

430. *Discussion*. We adopt the proposal to require reverse auction applicants to specify which license(s) and associated spectrum usage rights they might offer in the reverse auction. We further require that a reverse auction applicant shall provide any information needed to assure that the offered relinquishment pursuant to the application is consistent with any applicable Commission rules or action to enforce its rules.[1251] The Commission needs this information in order to evaluate bids and run the various repacking algorithms. In addition, the Commission can utilize the information to assist in identifying auction participants offering spectrum usage rights subject to a pending license renewal application or an enforcement action, which may subject participants to liabilities that will have to be addressed before such participants can relinquish their licenses in exchange for an incentive payment.[1252]

(iii) Ownership Information

431. *Background*. The Commission proposed to require a potential bidder to include in its pre-auction application its ownership information as set forth in section 1.2112(a) of the rules, and for NCE stations, information regarding the licensee's governing board and any educational institution or governmental entity with a controlling interest in the station, if applicable.[1253] The Commission also asked whether, in lieu of the information set forth in section 1.2112(a), it should require reverse auction applicants to provide different ownership information.[1254] In particular, the Commission asked if it should request ownership information based on the attribution rules for broadcast television licensees, or whether it should require applicants to provide updated information to supplement existing disclosures on file with the Commission, such as the information contained in the licensee's most recently filed Biennial Ownership Report Forms 323 or 323-E.[1255]

[1249] *See* ITI Comments at 6.

[1250] *NPRM*, 27 FCC Rcd at 12443, para. 247.

[1251] Such information may include but is not limited to anything related to ownership of, or an enforcement action concerning, the license(s) identified in the application to participate.

[1252] *See* § IV.B.1.a.iii (Pending Renewal and Enforcement Proceedings).

[1253] *NPRM*, 27 FCC Rcd at 12443, para. 247.

[1254] *Id.*

[1255] *Id.*

432. *Discussion*. We adopt the proposed rule requiring a reverse auction applicant to include in its pre-auction application its ownership information as set forth in section 1.2112(a) of the Commission's rules. In recognition that NCE stations and certain other stations may be operated by non-profit entities, we will require a non-profit licensee to submit information regarding its governing board and to identify any educational institution or governmental entity with a controlling interest in the applicant, if applicable. For the purpose of the incentive auction, the Commission needs to be informed of an applicant's ownership structure for several reasons, including: (1) to confirm that the applicant is who it claims to be and actually has rights to the license(s) it may offer to relinquish; and (2) to implement the prohibition of certain communications adopted above.[1256] Thus, the integrity and success of the auction require that reverse auction applicants submit current ownership information in their pre-auction applications.[1257]

433. The ownership information we currently have on file under our existing broadcast television rules is inadequate for the purposes of evaluating an applicant's eligibility to participate in the broadcast television spectrum reverse auction and for implementing the competitive bidding rules. Broadcasters file existing Forms 323 and 323-E only biennially, and thus are required to update ownership information in the event of a license assignment or transfer of control.[1258] The existing rules governing competitive bidding participants and the new rules we adopt in this proceeding similarly require current information regarding any ownership interests in an applicant, in this case for the purposes of conducting the reverse auction and enforcing the rules associated therewith.[1259] Consequently, we cannot utilize information on file in an applicant's most recent Form 323 or 323-E without, at a minimum, requiring the applicant to review and update the information. Moreover, as those forms were not designed to collect information for competitive bidding purposes, the forms may be over- and/or under-inclusive for auction purposes, even if an applicant's form is up-to-date.

434. We also decline to adopt NHMC's proposal to collect the same ownership information required by Forms 323 and 323-E.[1260] While we appreciate that broadcast television licensees are familiar with these forms and the information required, more streamlined ownership information is warranted solely for the purpose of the reverse auction. For further discussion regarding ownership diversity issues, see the Diversity of Media Ownership Section below.[1261]

(iv) Channel Sharing Agreement

435. *Background*. In the *NPRM*, the Commission sought comment on what information regarding channel sharing agreements it should require in order to assess an applicant's eligibility to participate in the reverse auction, including whether to require submission of the channel sharing agreement with the pre-auction application.[1262]

436. *Discussion*. We will require a channel sharing applicant to provide sufficient information and certifications to enable the Commission to evaluate and accept a channel-sharing bid. For example, a

[1256] *See* § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications).

[1257] Accordingly, we reject CTIA's assertion that there is no need to collect an applicant's ownership information since it is already a Commission licensee. *See* CTIA Comments at 32–33.

[1258] 47 C.F.R. § 73.3615(c).

[1259] *See* 47 C.F.R. §§ 1.2105(a), (c), 1.2112(a).

[1260] *See* NHMC Comments at 5–6 (arguing that the data obtained through this type of collection will allow the Commission to analyze ownership information in a manner consistent with established practices and make trend analysis possible).

[1261] *See* § VI.A.1.b (Post-Transition Diversity of Media Ownership).

[1262] *See NPRM*, 27 FCC Rcd at 12444, para. 248.

channel sharing applicant must submit an executed copy of the channel sharing agreement.[1263] It also must certify whether it can meet its community of license requirements from the proposed sharer's site, and if not, that the new community of license proposed meets the same, or a higher, allotment priority as its current community.[1264] As discussed in the Channel Sharing Operating Rules Section,[1265] and as noted by PTV, public interest considerations demand that the Commission impose certain basic requirements on the terms and conditions of channel sharing agreements.[1266] Therefore, we will require a channel sharing applicant to certify that the channel sharing agreement is consistent with all relevant Commission rules and policies, and that the applicant accepts any risk that the implementation of the channel sharing agreement may not be feasible for any reason, including any conflict with requirements for operation on the shared channel.

437. We disagree with ITI's unsupported assertion that requiring parties to produce information relating to channel sharing agreements could have a negative effect on participation in the reverse auction.[1267] As channel sharing agreements will contain information that identifies broadcast television licensees participating in the reverse auction, the Commission will take all reasonable steps necessary to maintain the confidentiality of such agreements in accordance with section 6403(a)(3) of the Spectrum Act and the rules adopted in this proceeding.[1268] Thus, we do not anticipate that parties will be discouraged from participating in the reverse auction by the requirements we adopt in this Order. Further, it is reasonable to require a channel sharing applicant to submit an executed copy of its channel sharing agreement as an indication of its good faith and intent to follow through with the channel sharing arrangement in the event the Commission accepts its channel sharing bid.

(v) National Security Certification

438. *Background.* To implement the national security restriction in section 6004 of the Spectrum Act,[1269] the Commission proposed that a reverse auction applicant be required to certify, under penalty of perjury, that it and all of the related individuals and entities required to be disclosed on the pre-auction application are not persons who have "been, for reasons of national security, barred by any

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[1263] *See* § VI.A.2 (Channel Sharing Operating Rules). We note that several commenters supported this requirement. *See, e.g.*, Anon. Citizen Comments at 9 (urging the Commission to require applicants to provide their channel sharing agreement with their pre-auction application and arguing that proof of such agreements will provide greater assurance in the repacking and forward auction process); CTIA Comments at 32 (supporting a requirement for applicants to file channel sharing agreements with the Commission one or two weeks prior to the start of the auction). As already discussed, though we will not require prospective channel sharers to apply to participate in the reverse auction, we will require such parties to provide any certifications that are necessary with respect to the channel sharing agreement. *See* § IV.B.1.e.i (Applicant).

[1264] *See* § IV.B.1.b.iii (Reverse Auction Channel Sharing Bid).

[1265] *See* § VI.A.2 (Post-Transition Channel Sharing Operating Rules).

[1266] *See* PTV Comments at 18 (noting that public interest considerations may require some baseline requirements for channel sharing so that one sharing participant's actions would not unduly disrupt the other participant's broadcast services). *See also* § VI.A.2 (Post-Transition Channel Sharing Operating Rules). Ordinarily, the Commission does not involve itself in private contractual agreements between stations, and we agree with ITI that channel sharing agreements should be developed through private negotiations. *See* ITI Comments at 6.

[1267] ITI Comments at 6.

[1268] *See* § IV.B.1.c.i (Confidentiality).

[1269] The Spectrum Act specifies that "a person who has been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant" may not participate in a system of competitive bidding that is required to be conducted by Title VI of the Spectrum Act. Spectrum Act § 6004. This national security restriction applies to the broadcast television spectrum reverse and forward auctions since Title VI requires the Commission to conduct both auctions. *See* Spectrum Act §§ 6403(a), (c). *See also NPRM*, 27 FCC Rcd at 12444–45, para. 251.

agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant."[1270] For purposes of this certification, the Commission proposed to define "person" as an individual, partnership, association, joint-stock company, trust, or corporation.[1271] It also proposed to define "reasons of national security" to mean matters relating to the national defense and foreign relations of the United States.[1272]

439. *Discussion.* No commenters address our proposals for implementing section 6004, and we adopt them.[1273] Requiring potential bidders to make this certification is a reasonable way to implement this statutory restriction. In the context of spectrum license auctions, the Commission has relied successfully on certifications to ensure certain regulatory and legal obligations have been met by the applicants. Such an approach is appropriate here as well. Further, the definitions of "person" and "reasons of national security" we adopt are consistent with how those terms are used in other federal programs and are a reasonable interpretation of those terms in section 6004.[1274]

440. All of the related individuals and entities required to be disclosed on a potential bidder's pre-auction application are "persons" subject to this statutory participation restriction. Where the applicant is a legal entity rather than an individual, it has been the Commission's practice to consider the legal entity's controlling interests, holders of partnership and ownership interests, certain shareholders, and officers and directors to be applicants by extension.[1275] Including these related individuals and entities within the definition of "person" is entirely consistent with the intent of the national security restriction. Indeed, if such related individuals and entities were not considered "persons," parties that are statutorily prohibited from participating in the reverse auction could circumvent the national security restriction simply through the creation of a separate entity to act as the "applicant."[1276]

441. As with other required certifications, a reverse auction applicant's failure to include the required national security certification by the applicable filing deadline would render its pre-auction application unacceptable for filing, and its application to participate in the reverse auction would be dismissed with prejudice.[1277]

[1270] *NPRM*, 27 FCC Rcd at 12445, para. 252. *See* Spectrum Act § 6004.

[1271] *NPRM*, 27 FCC Rcd at 12445, para. 252.

[1272] *Id.*

[1273] We note that in the recent H Block proceeding, the Commission adopted a nearly identical requirement in Part 1 of our rules to implement the national security restriction as required by § 6004 of the Spectrum Act. *See H Block Report and Order*, 28 FCC Rcd at 9578, para. 254. Specifically, the Commission added the new certification to the various other certifications that a party must make in any application to participate in certain statutorily-specified systems of competitive bidding as required under our existing Part 1 rules. *Id.* Thus, as discussed in § IV.C.1.d (National Security Certification), forward auction applicants must certify as to their compliance with the national security restriction in accordance with the Commission's recently adopted certification rule in 47 C.F.R. §1.2105(a)(2)(xii), as amended in this proceeding.

[1274] *See, e.g.*, 47 U.S.C. § 153(39) ("The term 'person' includes an individual, partnership, association, joint-stock company trust or corporation."); 18 U.S.C. App. 3 § 1(b) (defining "national security" as "the national defense and foreign relations of the United States").

[1275] *See* 47 C.F.R. §§ 1.2002(b), 1.2105(c)(7)(i).

[1276] *See, e.g., Implementation of Section 309(j) of the Communications Act — Competitive Bidding*, PP Docket No. 93-253, Fifth Memorandum Opinion and Order, 10 FCC Rcd 403, 453–54, para. 90 (1994).

[1277] *See* 47 C.F.R. § 1.2105(b)(1). As discussed in the following Section, changes to the required certifications are considered to be major amendments to the pre-auction application and, thus, would not be permitted.

f. Procedures for Processing Pre-Auction Application

442. *Background.* In the *NPRM*, the Commission proposed to process applications to participate in the reverse auction in a manner similar to the processing of applications to participate in spectrum license auctions. More specifically, the Commission proposed that no application would be accepted if, by the initial deadline, the applicant had failed to make the required certifications.[1278] Applicants would be afforded an opportunity to cure defects identified by the Commission after an initial review of the application to participate.[1279] If an applicant fails to make necessary corrections before a resubmission deadline, its application would be dismissed.[1280]

443. The Commission further proposed that the applicant must amend or modify the application as promptly as possible, and in any event within five business days, whenever the information furnished in a pending pre-auction application is no longer substantially accurate and complete in all significant respects.[1281] Certain minor changes would be permitted subject to a deadline specified by public notice, but major changes to the pre-auction application would not be permitted.[1282] Major amendments would include, but would not be limited to, changes in ownership of the applicant or the licensee that would constitute a substantial assignment or transfer of control.[1283] In addition, major amendments would include changes to any of the required certifications and the addition or removal of licenses or authorizations identified on the pre-auction application for which the applicant intends to submit bids.[1284] Minor amendments would include any changes that are not major, such as correcting typographical errors and supplying or correcting information requested by the Commission to support the certifications made in the application.[1285] Finally, to protect the confidentiality of the identities of all reverse auction participants,[1286] the Commission proposed to notify the applicants individually as to the status of their applications and whether they are qualified bidders, i.e., are qualified to participate in the reverse auction.[1287]

444. *Discussion.* We adopt the proposals in the *NPRM*. The process we adopt has proven effective in the Commission's experience with spectrum license auctions. Pre-auction application processing provides an opportunity to address concerns regarding information provided by applicants, and helps to assure their eligibility to participate, without unduly limiting participation by qualified parties. Only a few commenters addressed this aspect of the reverse auction. These commenters made suggestions intended to facilitate participation in the reverse auction.[1288] We concur in the purpose behind

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[1278] *NPRM*, 27 FCC Rcd at 12445, para. 253.

[1279] *Id.*

[1280] *Id.*

[1281] *Id.* at 12445, para. 254.

[1282] *Id.*

[1283] *Id.* Precluding such changes in ownership after the submission of the application would ensure that all of the relevant parties are clearly identified for the purposes of applying the reverse auction rules. *Id.*

[1284] *NPRM*, 27 FCC Rcd at 12445, para. 254.

[1285] *Id. See also* 47 C.F.R. § 1.2105(b)(2).

[1286] *See* Spectrum Act § 6403(a)(3).

[1287] *NPRM*, 27 FCC Rcd at 12446, para. 255. *See also* Entravision Comments at 7.

[1288] CTIA suggests that the Commission's information on file regarding broadcast television licensees might obviate the need for any application process. CTIA Comments at 32–33. CIT, a source of financing for broadcast television licensees, suggests eliminating any restrictions on changes in ownership during the course of the auction. CIT Comments at 7. And MetroPCS, as part of its larger proposal to conduct an ascending price reverse auction, urges the FCC to adopt procedures that would allow broadcasters that previously opted not to participate to jump into the auction as it is ongoing, in the event that prices rise above pre-auction expectations. MetroPCS Comments at 8.

these suggestions—facilitating to the greatest extent possible participation in the reverse auction consistent with the Commission's polices—and our action serves this purpose. We decline, however, to adopt the specific suggestions. As discussed above, based on our experience with spectrum license auctions, requiring the submission of an application to participate is important for a number of reasons, including ensuring that the information the Commission relies on is up-to-date. Limiting permissible changes in the ownership of auction applicants likewise assures that the Commission's review of applicant qualifications remains valid over the course of the auction.

445. Finally, we decline to adopt one commenter's suggestion that any otherwise-eligible broadcast television licensee who initially opted not to participate in the reverse auction ought to be able to enter the "ongoing" reverse auction without first applying to participate.[1289] As discussed above, the application process is critical to determining whether a broadcast television licensee is both technically and legally qualified to participate in the reverse auction. Allowing broadcast television licensees who have not applied to participate in the reverse auction, and thus have not been vetted by Commission staff, to enter the "ongoing" auction presents an unwarranted risk that ineligible parties might bid in the auction and would add unnecessary complexity to the reverse auction design.

2. Bidding Process

446. Here, we address the reverse auction bidding process and adopt rules to provide for the necessary bidding procedures. The reverse auction will use a descending clock auction format. The record to date demonstrates several important advantages of a descending clock auction format. Most importantly, it facilitates broadcaster participation by presenting the bidder with a series of simple decisions, rather than requiring a more complicated bidding strategy. The descending clock format makes it easy for bidders to choose among multiple bid options. And the format allows pricing procedures that give the bidder strong incentives to bid straightforwardly, regardless of what other bidders may choose to do. We will discuss these benefits in more detail below.

447. We address the basic structure of our chosen descending clock auction design in terms of three basic elements: (i) bid collection procedures that determine how bids are gathered using a descending clock auction format; (ii) assignment procedures that evaluate bids sequentially, taking into account interference potential, to determine which bids for relinquishment are accepted; and (iii) pricing procedures that determine the payment that a broadcaster relinquishing spectrum usage rights will receive.[1290] Below, we address these three elements from the perspective of a single television station bidding in a single stage of the auction.[1291] The format for reverse auction bidding in each stage will be a descending clock auction incorporating multiple bidding rounds.

a. Bid Collection Procedures: Descending Clock Format

448. *Background*. In the *NPRM*, the Commission discussed two basic reverse auction bid collection procedures.[1292] The first was a single round mechanism, in which a bidder would specify the minimum payment it would be willing to accept in exchange for relinquishing various spectrum usage rights. The second was a multiple round procedure—a descending clock auction—in which the bid collection process would take place in a series of bidding rounds. In each round, a bidder would have a set period of time to indicate whether it would be willing to accept a specific payment amount in exchange for relinquishing rights. The payment amounts generally would decline with each round, or

[1289] MetroPCS Comments at 8.

[1290] *See NPRM*, 27 FCC Rcd at 12372–77, paras. 35–53. Appendix C describes in more detail than the *NPRM* how some of the auction design options could be implemented. *Id.* at 12563–65, 12568–74.

[1291] The incentive auction may include multiple stages, with reverse and forward auction bidding in each stage. *See* § IV.A. (Overview and Integration of the Reverse and Forward Auctions).

[1292] *NPRM*, 27 FCC Rcd at 12373, paras. 38–40; *see also id.* at 12450, para. 272.

each "tick" of the descending clock.[1293] The *NPRM* also discussed an additional bid collection procedure—"intra-round bidding"—that would enable bidders to indicate a specific price, between the opening and closing prices in a round, below which a bid option would not be acceptable.[1294]

449. *Discussion.* The reverse auction will collect bids using a descending clock auction format, and bidders will have the option of making intra-round bids.[1295] We adopt this format because of its advantages for participating bidders. In each round, bidders will be faced with relatively simple choices of determining whether or not they are still willing to accept the current prices for bid options. Observing the sequence of prices over multiple rounds will give bidders an indication of relative values for the different bid options, which will help them refine and feel more confident in their bidding decisions. This process of price discovery will be particularly helpful in the context of this first-time-ever incentive auction, in which there will be no historical results to guide bidder expectations. In contrast, a single round sealed-bid format would require bidders to make price commitments in advance of any information revealed through the auction process. Commenters generally agree with this choice.[1296] Moreover, some commenters favor the multiple round approach because the bidder may never have to reveal its lowest acceptable price, unlike in a single round auction in which a bidder would indicate, at one time, the lowest prices at which it would accept various bid options.[1297]

450. Under the descending clock format, in each round a participating broadcaster will be presented a price for a bid option and will indicate whether it is willing to accept the option at that price.[1298] As explained below, each station will see a price that takes into account objective factors, such as location and potential for interference with other stations, that affect the availability of channels in the repacking process and, therefore, the value of a station's bid to voluntarily relinquish spectrum usage rights.[1299] Thus, a station with a high potential for interference will be offered a price that is higher than a station with less potential for interference to other stations. Setting prices in this manner will encourage stations with more interference potential to remain active in the reverse auction bidding longer, increasing

[1293] Appendix C describes in more detail a descending clock auction in which prices for bidding options—for example, to relinquish all spectrum usage rights or to move to a lower band—would start high and decline during subsequent rounds. *See id.* at 12568.

[1294] *See NPRM*, 27 FCC Rcd at 12572 (Appendix C); *see also id.* at 12378, para. 60 (discussing intra-round bidding in the context of the forward auction).

[1295] As discussed above, the rules we adopt provide the necessary flexibility to vary aspects of the reverse auction bidding process, including the format we now adopt, if circumstances or the record developed in the pre-auction process reflect the need to do so. Again, however, we fully intend to implement the choices we make in this Order.

[1296] *See* Anon. Broadcaster 2 Comments at 5; CEA Comments at 30; EOBC Comments at 6; EOBC Reply at 9; Local Media Reply at 5; Mobile Future Comments at 9–10; TIA Comments at 13–14; Verizon Comments at 28; Vision Comments at 2; *see also* T-Mobile Comments at 39–41 (advocating for a multiple round reverse auction with sealed bidding for each phase). *But see* MetroPCS Comments at 6–7 (suggesting an ascending clock reverse auction where broadcasters choose a reserve price at which they are willing to relinquish spectrum); NRB Comments at 14–15 (recommending that broadcasters submit confidential non-binding bids to supply the Commission with the information necessary to engage in a separate rulemaking once the amount of available spectrum in known). Examination of the record adequately rebuts proposed alternatives to a descending clock auction. *See* EOBC Reply at 8 (explaining that the multi-round ascending reverse auction proposed by MetroPCS would not offer a high initial starting price to attract broadcasters, would make it difficult for broadcasters to determine the price at which to enter the auction, and would not be conducive to meeting the goal of repurposing the maximum amount of spectrum); *see id.* (stating that NRB's suggestion that broadcasters submit confidential, non-binding bids before the repacking process would delay the auction unnecessarily and decrease broadcaster participation).

[1297] *See, e.g.*, EOBC Reply at 9.

[1298] A bidder may see a price for more than one option. *See* § IV.B.1.b (Reverse Auction Bid Options). Whether a bidder can accept a price for more than one option at a time will be determined in the *Procedures PN*.

[1299] *See* § IV.B.2.b (Reverse Auction Bid Assignment Procedures).

the efficiency of the repacking process by reducing the likelihood that such stations will have to be assigned channels, thereby blocking other stations with less interference potential. This, in turn, will reduce the overall cost of clearing spectrum and increase the likelihood of a successful auction.[1300]

451. We will determine the factors to be used in setting prices in the *Procedures PN* based on additional, more focused public input.[1301] We will also determine in the *Procedures PN* the mechanism for applying such factors.[1302] We emphasize that we do not intend to set prices to reflect the potential market or enterprise value of stations, as opposed to their impact on the repacking process. Possible factors include the number of stations that a station would interfere with and block from being assigned channels, the population the station covers,[1303] or a combination of such factors.[1304]

452. We disagree with arguments that using such factors is unnecessary to account for the value of a station's voluntary relinquishment of rights in the reverse auction.[1305] For the reasons explained above, we conclude that such factors will significantly improve the likelihood of a successful auction.[1306] We also disagree with suggestions that using such factors will overly complicate the reverse auction process.[1307] This approach will not be difficult to implement from an auction design perspective, nor will it alter the bidding experience. In each round, each reverse auction bidder will be presented with a price offer that takes into account these factors. As described below, a bidder will be able to indicate whether it is still willing to accept a bid option at the current price. In addition, we are not persuaded that

[1300] For example, suppose station A with an interference potential or "volume" of 10 would relinquish rights for a price of 15, and station B with a volume of 20 would relinquish rights for a price of 20. Without considering volume, station B would drop out first (to assure it receives at least 20), even though assigning a channel to station B would foreclose more channels for other stations than assigning a channel to station A, or impair more spectrum in the wireless band. With the use of volume as a factor, however, when the price per unit of volume drops below 1.50, station A would drop out since it would not accept an incentive payment of less than 15, while station B would remain active until the price per unit of volume falls below 1.00, to assure that it receives an incentive payment of at least 20.

[1301] *See* Select Spectrum Comments at 5–6 (encouraging the Commission to develop any scoring mechanism with a high degree of transparency and some form of dialogue). *See also* CCA Reply at 16; LIN Comments at 2.

[1302] In making this determination we will consider, among other things, whether to utilize optimization techniques.

[1303] We must make all reasonable efforts to preserve the population served of protected stations that will remain on the air, making population served one of the major constraints on the availability of channels in the repacking process. *See* Spectrum Act § 6403(b)(2); § III.B.2 (Implementing the Statutory Preservation Mandate).

[1304] We recognize that some commenters strongly oppose using population served as a factor in setting prices. *See, e.g.* EOBC Comments at 19; Vision Comments at 3; Letter from Ari Meltzer, Counsel for EOBC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Scoring in Reverse Auction Attachment at 2, 19 (filed Dec. 6, 2013) (EOBC Dec. 6, 2013 Cramton Slides) (suggesting that if a scoring mechanism is used, that it should be based on a station's preclusive effect on repacking other stations rather than population coverage or other measures of enterprise value).

[1305] *See* Vision Comments at 3–4; EOBC Dec. 6, 2013 Cramton Slides. *See also* Joint Letter from Julie Kearney, CEA, & Preston Padden, EOBC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Maximizing the Success of the Incentive Auction Attachment at 12 (filed Nov. 6, 2013) (CEA-EOBC Nov. 6, 2013 Maximizing Success Slides). *But see* Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Exhibit dated Dec. 13, 2013 at 10 (filed Dec. 17, 2013) (T-Mobile Dec. 17, 2013 *Ex Parte* Exhibit) (arguing that using such factors will increase the amount of repurposed spectrum, accelerate the bidding process, raise more revenue, and help broadcasters by better distributing funds in the reverse auction).

[1306] *See, e.g.*, T-Mobile Dec. 17, 2013 *Ex Parte* Exhibit; Select Spectrum Comments at 5–6.

[1307] *See* EOBC Comments at 18–19; EOBC Reply at 18; Vision Comments at 3.

using such factors will deter broadcasters from participating in the reverse auction.[1308] No station will be compensated less than the total price that it indicates it is willing to accept.[1309]

453. Generally, the prices for bid options will start high and descend for each station, as long as the station's acceptance of a chosen bid option is not needed to meet the current spectrum clearing target.[1310] Each round will last for a pre-set period of time. The *Procedures PN* will address the timing of rounds and how price decrements will be determined after an opportunity for comment.

454. To illustrate the bidding process under the descending clock auction format we adopt today, consider a participating broadcaster that is willing to relinquish all of its licensed spectrum usage rights if it will receive a sufficiently high incentive payment. In each round in which the offered price is above what the broadcaster considers high enough, the broadcaster will indicate that it is still willing to accept the license relinquishment option at the current price. Once the price becomes too low, the broadcaster will indicate that it is no longer willing to accept the offer and that, at that price, it wishes to drop out of the reverse auction bidding and be assigned a channel in the repacking process. For example, if the bidder's price ticks down from ten to eight between one round and the next, and the bidder is willing to accept a price of ten but not eight, it will indicate that at the new price of eight, it wishes to drop out of the auction and continue broadcasting.

455. We will also provide participating broadcasters with the optional flexibility of "intra-round bidding." Several commenters support this choice.[1311] With intra-round bidding, a bidder will be able to indicate the lowest price at which it is willing to accept an option. Continuing the example from the preceding paragraph, if the price of going off the air ticks down from ten to eight between one round and the next, and the bidder is willing to accept a price of nine but not eight, it can make an intra-round bid of nine, indicating that at a price below nine, it wishes to drop out of the bidding. In addition to giving bidders more control over the bidding process, intra-round bidding will speed the pace of the reverse auction, consistent with our auction design goals, by allowing relatively large round-to-round reductions in prices, but also allowing bidders to identify the precise points at which they want to change bid options or drop out of the auction.

b. Bid Assignment Procedures: Determining Which Bids Are Accepted

456. *Background*. Bid assignment procedures determine which stations receive payments in exchange for relinquishing rights. In addition to considering price information, the bid assignment procedures in the reverse auction must ensure that the stations that drop out of the bidding can feasibly be assigned channels in the repacking process. The *NPRM* identified two general approaches to bid assignment. The first approach would consider all the relevant information at once and try to find the

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[1308] *See, e.g.*, CEA-EOBC Nov. 6, 2013 Maximizing Success Slides at 18–19; Vision Comments at 4. *See also* Letter from Peter Tannenwald, Counsel for WatchTV, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 6 (filed Oct. 29, 2013) (agreeing that scoring can act as a disincentive to broadcaster participation); Letter from Leora Hochstein, Counsel for Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed Feb. 26, 2014) (Verizon Feb. 26, 2014 *Ex Parte* Letter).

[1309] For this reason, we also reject any suggestion that using such factors in setting price offers is contrary to the Spectrum Act. *See* CEA-EOBC Nov. 6, 2013 Maximizing Success Slides at 10. As required by statute, the reverse auction will "determine the amount of compensation that each broadcast television licensee would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights[.]" Spectrum Act § 6403(a)(1).

[1310] *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[1311] *See, e.g.*, CEA Reply at 6; EOBC Comments at 7 (noting that through intra-round bidding the Commission will be able to offer high initial prices, but will be able to decrease the number of rounds efficiently because it will have access to not only the rejected price, but also a price that the broadcaster would accept); *see also* T-Mobile Comments at 43 (noting that, in the context of the forward auction, intra-round bidding may be a way to balance the simplicity and efficiency of a static auction with the price discovery benefits of a dynamic auction).

optimal solution.[1312] Rather than considering all aspects of the problem at one time, the second option would use an iterative or "sequential" approach.[1313] Under the latter approach, when a station decides the price offered for a given bid option is too low and it wishes to drop out of the bidding for that option, the auction system would evaluate the impact of that station's decision, and would determine how assigning that station a channel in a band it considers acceptable would affect the feasibility of assigning channels to the stations that remain active in the bidding at the current prices. Based on that evaluation, determinations would be made as to which bids to accept provisionally at the current prices.

457. *Discussion.* The bid assignment procedures we adopt will evaluate the feasibility of assigning television channels to stations generally using a sequential approach. We adopt the sequential approach because it comports well with the descending clock auction format.[1314] The descending clock auction format, because it has multiple rounds, requires that bid assignment procedures be run in every round, and run quickly, so as not to unduly prolong the auction. Timeliness is especially important in the incentive auction context, where there may be multiple stages, with reverse and forward bidding run in each stage. The sequential approach using a feasibility checker in each round can be run very quickly.[1315] The *Procedures PN* may incorporate some optimization methods into the sequential process after additional public comment, if doing so would improve performance of the feasibility checker and not unduly slow the reverse auction bidding process.[1316]

458. Under the sequential approach, at each point in the bidding process at which a station drops out and must be assigned a channel in its home band, the repacking methodology will determine whether doing so precludes assigning a channel to any of the stations that remain active in the bidding.[1317] If so, the station for which no channel is available will be provisionally selected to receive a payment in exchange for relinquishing rights. Only stations that can still feasibly be assigned a channel in their home

[1312] *NPRM*, 27 FCC Rcd at 12374–75, para. 45 (referring to this concept as "integer programing").

[1313] *Id.* at 12375, para. 46.

[1314] The limited comments directly addressing the choice between the integer programming and sequential approaches dwell on the characteristics of the different approaches without advocating a clear choice between them. For example, NRB states its opposition to the use of integer programming, arguing that this approach lacks transparency, but reserves its opinion with respect to the sequential approach on the grounds that too many uncertainties remain about its implementation. NRB Comments at 9–11. Verizon comments that on balance, the sequential approach may be preferable because it would provide more certainty to broadcasters, but suggests running both methods in parallel, or utilizing different methods during different auction stages, to try to find an optimal solution within a reasonable amount of time. Verizon Comments at 30–31; *see also* AT&T Comments at 68–70 (emphasizing importance of optimizing efficiency of the repacking process and questioning whether a sequential approach could avoid substantial losses in efficiency). As Verizon suggests, we will optimize television channel assignments during a different portion of the incentive auction process. Verizon Comments at 30–31.

[1315] Feasibility checking can produce accurate results in a short amount of time. *See Incentive Auction Task Force Releases Information Related to Repacking; Announces Workshop/Webinar to Provide Additional Detail,* Public Notice, 29 FCC Rcd 47, 47, para. 2 (2013); *see also* FCC, LEARN Workshop on Feasibility Checking During Repacking Process, Feb. 21, 2014, http://www.fcc.gov/events/learn-workshop-feasibility-checking-during-repacking-process (last visited Apr. 10, 2014).

[1316] As discussed above, the repacking methodology will use an integer programming optimization process at various other points in the auction process. *See* § III.B.1 (Repacking Process Overview).

[1317] The methodology for checking the feasibility of assigning channels to television stations during the bidding process is also addressed in § III.B.1 (Repacking Process Overview). When considering channel assignment, the repacking methodology will take into account that a station that drops out of bidding for one relinquishment option may still be bidding to accept another option.

bands will remain active in the bidding as prices decline.[1318] The bidding rounds will continue until every station has dropped out of the bidding and been provisionally assigned a channel in its home band or has been selected to receive a payment to relinquish its rights because no feasible channel could be found for it in the reorganized band.[1319]

c. Procedures to Determine Payments

459. *Background.* The *NPRM* addressed ways of determining the payments that broadcasters would receive in exchange for relinquishing rights under various bid options, including a methodology that the *NPRM* referred to as "threshold" pricing,[1320] which would determine the payment to a winning bidder based on the price at the point the repacking methodology determined that it could no longer find a feasible channel for the bidder's station in its home band because another station had dropped out of the bidding and had to be assigned a channel. By analogy to a simple auction with two bidders in which the winning bidder's price is set when the other bidder drops out, this pricing approach would set the payment for the winning bidder based on the price when the other bidder's decision to drop out leads to the winning bidder's selection.

460. *Discussion.* We will determine payments in the descending clock auction using a threshold pricing approach. Under this pricing approach, a bidder's payment for a relinquishment option generally will be based on the price for the option when another bidder—whose exit from the auction triggers acceptance of the winning bidder's bid, as described above—drops out of the bidding. This payment will be at least as high as the last price the winning bidder agreed to accept for the relinquishment option.

461. We adopt this threshold pricing approach because it will simplify bidding strategy, facilitating broadcaster participation. Under this approach, payments are based on the actions of competing bidders, discouraging bidders from strategically distorting their own bids in an effort to increase their payments. Instead, it encourages a straightforward bidding strategy, in which a bidder indicates that it is willing to accept a price as long as the price is at least as great as the value the bidder ascribes to the bid option. If the bidder drops out before the price reaches its value, the bidder may pass up an opportunity to relinquish rights at a profitable price. If the bidder continues to bid after the price passes its value, it may be selected as a winning bidder, but receive a payment below its value. Since a bidder's drop-out price determines the point at which it exits the auction, but not its payment amount if it wins, the bidder cannot gain by strategically distorting its drop-out price in order to affect its winning payment, as it might with a pay-as-bid approach. The general principle of basing payments on the drop-out behavior of competing bidders is frequently used in auctions because of the strong incentives the approach gives bidders to bid straightforwardly.[1321] Commenters generally support this choice.[1322]

[1318] The statutory mandate to "make all reasonable efforts to preserve . . . the coverage area and population served of each broadcast television licensee" will be incorporated into this feasibility analysis. *See* § III.B.2 (Implementing the Statutory Preservation Mandate); Spectrum Act § 6403(b)(2).

[1319] All assignments will be provisional until the final stage of the auction, when the final stage rule is satisfied. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions). At that point, final channel assignments will be established through the use of optimization techniques. *See* § III.B.1 (Repacking Process Overview).

[1320] *NPRM*, 27 FCC Rcd at 12376, paras. 51–52; *see also id.* at 12450, para. 272.

[1321] This pricing approach is a variation of a well-known principle known generally as "second-pricing" in auction theory, and first described by William Vickery. *See* William Vickrey, *Counterspeculation, Auctions, and Competitive Sealed Tenders*, 16 J. OF FIN. 8 (1961).

[1322] Commenters addressing the issue support threshold pricing rather than pay-as-bid pricing. AT&T Reply, Che & Haile Reply Attachment at 13 (opposing pay-as-bid approach); EOBC Comments at 10; Local Media Reply at 6; Select Spectrum Comments at 6; T-Mobile Comments at 44; US Cellular Reply at 13; Vision Comments at 2.

d. Additional Bidding Procedures

462. In addition to bid collection, bid assignment, and bid payment procedures, we adopt rules proposed in the *NPRM* for additional reverse auction bidding procedures.[1323] The *Procedures PN* will announce final decisions on the reverse auction bidding procedures, following further consideration of the record, including public input received in response to an additional opportunity for comment. Accordingly, we do not address debates within the record to date regarding decisions that will be made in the *Procedures PN*.

463. Among the rules we adopt is a rule that provides for opening or reserve prices.[1324] Before any party applies to participate in the auction, the *Comment PN* will seek comment on the methodology for determining opening prices—the maximum amounts that will be offered to each potentially eligible broadcast licensee for each bidding option in the reverse auction—and the *Procedures PN* will announce this methodology. We also could adopt a dynamic version of reserve prices, a variation on reserve prices that would set dynamic maximum prices based on bidding in the auction.[1325] Under this rule, the amounts offered will be calculated for each licensee based on specific factors that affect the value of its voluntary relinquishment of spectrum usage rights as discussed above.[1326] Thereafter, a licensee interested in potentially exercising any of the bid options will file a pre-auction application to participate in the reverse auction.[1327] Qualified applicants for the reverse auction will then indicate, in the initialization step, the relinquishment options they would be willing to accept at the opening prices.[1328] The record supports adoption of these rules. Parties addressing opening and reserve prices generally express concern that prices be high enough to attract broadcaster participation, and these rules will facilitate the Commission's ability to do so.[1329] In particular, using dynamic reserve prices could address the risk that setting the opening prices too high will prevent the auction from repurposing spectrum by establishing a mechanism that will allow price offers to be reduced in non-competitive areas based on bids in other areas.

464. We also adopt a rule expressly providing that a bid in the reverse auction is an unconditional, irrevocable offer by the bidder to fulfill the terms of the bid. That is, a bidder that indicates it is willing to accept a price for a bid option is obligated to relinquish those rights at that price, if the bid is selected by the auction system as a winning bid. As several commenters note, such a provision is fundamental to the incentive auction process in order to ensure that broadcasters will bid truthfully in the reverse auction and to provide certainty to forward auction bidders.[1330] We decline to adopt opposing proposals that would allow reverse auction bidders to revoke bids after making them.[1331] Accordingly, a bidder will have a binding obligation to fulfill the terms of a winning bid.

[1323] *See NPRM*, 27 FCC Rcd at 12450, para. 272.

[1324] *NPRM*, 27 FCC Rcd at 12377, para. 53.

[1325] *See NPRM*, 27 FCC Rcd at 12574 (Appendix C). *See also* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[1326] *See* § IV.B.2.a (Reverse Auction Bid Collection Procedures); *see also* § IV.B.2.b (Reverse Auction Bid Assignment Procedures).

[1327] *See* § IV.B.1 (Reverse Auction Pre-Auction Process).

[1328] *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions)

[1329] *See, e.g.*, Verizon Comments at 28; US Cellular Comments at 9; T-Mobile Comments at 46.

[1330] T-Mobile Reply at 84–85; CTIA Reply at 53; *see also* Verizon Comments at 68 (supporting the Commission's proposal that all reverse auction bids be deemed irrevocable, binding offers).

[1331] *See, e.g.*, Tribune Comments at 8.

C. Forward Auction

465. The forward auction portion of the incentive auction will identify the prices that potential users of repurposed broadcast television spectrum would pay for new licenses to use the spectrum. This information and the information from the reverse auction will determine the winning bidders for new flexible use licenses and the prices those bidders will pay for the spectrum licenses, provided the requirements of the final stage rule are met. In the first two Sections below, we describe the pre-auction and bidding processes for the forward auction. In a subsequent Section, we address the deletion of a prior, now outdated, auction rule, section 1.2102(c).

1. Pre-Auction Process

466. In this Section, we address a number of issues related to the pre-auction process, some of which we face for the first time in preparing for the forward auction portion of the incentive auction. In particular, we describe how, in this context, we interpret the Commission's authority to conduct competitive bidding in the forward auction of 600 MHz licenses. In addition, we adopt small business size standards consistent with those applicable for 700 MHz licenses and apply the associated size-based bidding credits in our Part 1 competitive bidding rules, which may be utilized by eligible applicants in bidding for 600 MHz licenses. We also adopt modifications to the existing Part 1 competitive bidding rules discussed below to facilitate the forward auction, such as a modification of the prohibition of certain communications among forward auction applicants so that it will also apply to communications by forward auction applicants with potential reverse auction applicants. Finally, we modify the recently adopted national security certification designed to ensure compliance with section 6004 of the Spectrum Act. In all other respects, we will utilize our existing Part 1 rules to govern the pre-auction and post-auction application and payment requirements and processes of the forward auction.[1332]

a. Competitive Bidding Authority

467. *Background*. The Spectrum Act mandates that the Commission shall conduct a forward auction to assign licenses to authorize the use of repurposed spectrum as part of an incentive auction of broadcast television spectrum.[1333] The Spectrum Act did not revise section 309(j)(1) of the Communications Act, which requires the Commission to use competitive bidding to assign licenses when "mutually exclusive applications are accepted for any initial license," subject to the Commission's obligation in the public interest to avoid mutual exclusivity in application and licensing proceedings and subject to specified exemptions not applicable here.[1334]

468. When interpreting section 309(j)(1), the Commission has found—and courts have affirmed—that the Commission has authority to conduct competitive bidding when all applicants to participate in bidding on particular licenses cannot be granted the subject licenses because the applicants seek the same license or different licenses that would interfere with each other,[1335] or when the requests for interchangeable channels exceed the available supply.[1336] The Commission has such authority

[1332] *See* 47 C.F.R. §§ 1.2101–1.2114.

[1333] Spectrum Act § 6403(c)(1); *see also Channel Sharing Report and Order*, 27 FCC Rcd at 4620, para. 8 (noting that the Spectrum Act requires the Commission to conduct an incentive auction to recover a portion of the broadcast television spectrum while preserving that service as a healthy, viable medium).

[1334] 47 U.S.C. §§ 309(j)(1)–(2), (j)(6)(E). These sections and their requirements are distinct from the requirement that at least two competing licensees participate in the reverse auction. *See* § IV.B.1.d. (Two Competing Participants Requirement).

[1335] *Benkelman Tel. Co. v. FCC*, 220 F.3d 601, 603 n.2 (D.C. Cir. 2000).

[1336] *DIRECTV v. FCC*, 110 F.3d 816, 822 (D.C. Cir. 1997).

irrespective of whether each of the parties applying to bid for a license subsequently bids for the subject license.[1337]

469. In the *NPRM*, the Commission sought comment on how to apply the section 309(j)(1) requirement of mutual exclusivity in the context of the broadcast television spectrum forward auction.[1338] Inherent in the forward auction are a number of features that distinguish it from past spectrum license auctions. First, the Spectrum Act expressly ties the success of the reverse auction to generation of specified "minimum proceeds" from the forward auction.[1339] As a result, forward auction bids cannot be used to assign flexible-use wireless licenses unless the sum of all forward auction bids is sufficient to meet the costs and expenses identified by the Spectrum Act, as determined in part by the reverse auction. Second, at the outset of the reverse and forward auctions, there is a conflict between the current use of UHF band spectrum by reverse auction bidders (existing broadcast television licensees) and the future use of any portion of the spectrum by forward auction bidders (new flexible-use licensees), which only the conduct of both the reverse and the forward auctions can resolve. These interdependencies make it unclear at the outset of the forward auction exactly how many (if any) blocks of repurposed spectrum will ultimately be made available in any given market.[1340]

470. *Discussion.* We interpret our competitive bidding authority under section 309(j)(1) in light of these features of the broadcast television spectrum incentive auction mandated by the Spectrum Act, and in a manner that is consistent with, and that will give full effect to, that mandate.[1341] Accordingly, we conclude that the Commission has authority in the section 6403 forward auction to conduct competitive bidding if it accepts any application(s) seeking to bid on initial 600 MHz flexible-use licenses, and any application(s) seeking to bid in the reverse auction.[1342] We reject the suggestion that more than one forward auction bidder must make a bid on specific available reallocated spectrum to satisfy section 309(j)(1).[1343] We conclude that our interpretation best accords with canons of statutory construction requiring that statutes be read in light of their purpose,[1344] and that "normally the specific governs the general."[1345]

[1337] *See Benkelman Tel. Co.*, 220 F.3d at 605–06 (upholding the Commission's finding of mutual exclusivity where applicants merely reserved the option to bid on all available licenses, where "necessary to effectively implement the new [license by auction] scheme"); *see also DIRECTV*, 110 F.3d at 827–28. If only one party applies to bid for a particular license offered in competitive bidding, and that application is not mutually exclusive with any other application, that license is removed from the competitive bidding process and the Commission considers that party's non-mutually exclusive application for the license through a process separate from the competitive bidding. 47 C.F.R. § 1.2102(a); *see Competitive Bidding Second R&O*, 9 FCC Rcd at 2376, para. 165.

[1338] *NPRM*, 27 FCC Rcd at 12454, para. 292; 47 U.S.C. § 309(j)(1).

[1339] Spectrum Act § 6403(c)(2).

[1340] *See* Verizon Comments at 48. Further, the Spectrum Act permits the conduct of reverse and forward auctions "on a contemporaneous basis." Spectrum Act § 6403(f)(1). Pursuant to that authority, the Commission has integrated these two auctions in a series of stages, further illustrating the interdependencies between the forward and reverse auctions.

[1341] *Cf.* Verizon Comments at 48. Our determination does not preclude finding other bases for our competitive bidding authority under § 309(j)(1).

[1342] The Spectrum Act requires that "at least two competing licensees participate in the reverse auction." Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(ii)). As we discuss above in § IV.B.1.d (Two Competing Participants Requirement), we find that this additional requirement will be satisfied if more than one broadcast television licensee's pre-auction application is found to be complete and in compliance with the application rules, and if at least two such licensees are not commonly controlled.

[1343] *See* Anon. Citizen Comments at 2.

[1344] *See, e.g., Zuni Pub. Sch. Dist. No. 89 v. Dep't of Educ.*, 550 U.S. 81, 93 (2007); *Pub. Citizen v. U.S. Dep't of Justice*, 491 U.S. 440, 454–55 (1989) ("[S]tatutes always have some purpose or object to accomplish, whose

(continued….)

471. In section 6403, Congress directed in plain language that the Commission "shall conduct a forward auction" for spectrum reallocated from broadcast use.[1346] With respect to other frequency bands specifically subject to auction pursuant to the Spectrum Act, Congress referred more generally to the use of "a system of competitive bidding under section 309(j)."[1347] We need not address here how to apply section 309(j)(1) in those or other contexts, but the intention of Congress in section 6403 is clear. We also construe that mandate as reflecting a recognition of the features of the incentive auction described above. These include the interdependence of the reverse and forward auctions and our resulting inability to make determinations at the outset about whether and in what markets requests for interchangeable channels exceed supply, due to the mutually exclusive uses of the spectrum presented by existing licensees and any parties licensed based on the forward auction; and the contingency of the success of the reverse auction on the proceeds to be derived from permitting the forward auction to proceed, making our acceptance of forward auction bids dependent on the sum of all forward auction bids. We thus also conclude that our interpretation of the statutory scheme is "necessary to effectively implement" the incentive auction mandate established by Congress.[1348]

b. Bidding Credits

472. *Background*. Section 309(j)(4) of the Communications Act requires that when the Commission prescribes regulations to establish a methodology for the grant of licenses through the use of competitive bidding, it must "ensure that small businesses, rural telephone companies, and businesses owned by members of minority groups and women are given the opportunity to participate in the provision of spectrum-based services, and, for such purposes, consider the use of . . . bidding preferences."[1349] In addition, section 309(j)(3)(B) provides that in establishing eligibility criteria and bidding methodologies, the Commission shall promote "economic opportunity and competition . . . by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women."[1350] One of the principal means by which the Commission fulfills this mandate is through "bidding preferences" in the form of bidding credits to small businesses. The Commission defines eligibility requirements for small businesses on a service-specific basis, taking into account the capital requirements and other characteristics of each particular service in establishing the appropriate threshold.[1351]

473. The Commission proposed in the *NPRM* to adopt the same small business size standards for the forward auction component of the incentive auction as it adopted for the adjacent 700 MHz Band.[1352] The Commission specifically sought comment on whether these small business provisions are

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sympathetic and imaginative discovery is the surest guide to their meaning.") (quoting *Cabell v. Markham*, 148 F.2d 737, 739 (2d Cir. 1945) (Hand, J.), *aff'd*, 326 U.S. 404 (1945)).

[1345] *See, e.g, Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 170 (2007).

[1346] Spectrum Act § 6403(c)(1).

[1347] *Id.* § 6103(a)(2). *See also id.* § 6401(b)(1)(B) ("a system of competitive bidding under such section").

[1348] *See Benkelman Tel. Co.*, 220 F.3d at 605–06.

[1349] 47 U.S.C. § 309(j)(4)(D); *see NPRM*, 27 FCC Rcd at 12454, para. 293.

[1350] 47 U.S.C. § 309(j)(3)(B); *see NPRM*, 27 FCC Rcd at 12454, para. 293.

[1351] *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Second Memorandum Opinion and Order, 9 FCC Rcd 7245, 7269, para. 145 (1994); 47 C.F.R. § 1.2110(c)(1). *See Part I Third Report and Order*, 13 FCC Rcd at 388, para. 18 (continuing a service-by-service approach to defining the eligibility requirements for small businesses).

[1352] *NPRM*, 27 FCC Rcd at 12455, para. 295. Specifically, the Commission proposed to define a small business as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a very small business as an entity with average annual gross revenues for the preceding three years not exceeding $15

(continued….)

sufficient to promote participation by businesses owned by minorities and women, as well as rural telephone companies.[1353] The Commission also proposed to extend any rules and policies adopted in the spectrum over Tribal lands proceeding, including those related to Tribal land bidding credits, to any licenses that may be issued through competitive bidding in the forward auction.[1354]

474. *Discussion*. Certain commenters requested that we modify our existing rules regarding bidding credits specifically for the incentive auction.[1355] As our designated entity rules include generally applicable provisions regarding size-based eligibility and corresponding bidding preference, we decline to adopt modifications specific to the incentive auction. Instead, we will initiate a separate proceeding to examine our designated entity ("DE") program generally. Our goal is to resolve that DE proceeding early enough to allow all parties to account for any changes to the DE rules while planning for the incentive auction.

475. Pending the outcome of the DE proceeding, which will allow the Commission to develop a more complete record, we today adopt the same business size standards and associated bidding credits for small businesses as the Commission did for the 700 MHz Band. In the DE proceeding, we will revisit and consider changing these business size standards and bidding credits. Specifically, for the purpose of the forward auction, we will define a small business as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a very small business as an entity with average annual gross revenues for the preceding three years not exceeding $15 million. For the 600 MHz Band, small businesses will be provided with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent, consistent with the standardized schedule in Part 1 of our rules. We adopt these size standards and associated bidding credits in light of the similarities with wireless licenses already assigned in the 700 MHz Band, based on the record established to date and our existing designated entity rules. Due to their proximity, these bands have similar propagation characteristics. In addition, the technical rules we adopt for the 600 MHz Band are based on the rules for 700 MHz spectrum, with specific additions or modifications designed to protect certain incumbent licensees and unlicensed users.[1356] In light of these similarities, licensees utilizing the 600 MHz Band may face issues and costs similar to licensees utilizing the 700 MHz Band, including issues and costs related to

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million. The Commission also proposed to provide small businesses with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent, consistent with the standardized schedule in Part 1 of our rules. *Id.*

[1353] *NPRM*, 27 FCC Rcd at 12456, para. 296. The Commission instructed that to the extent commenters propose additional provisions to ensure participation by minority-owned or women-owned businesses, they should address how such provisions should be crafted to meet the relevant standards of judicial review. *Id. See also Adarand Constructors, Inc. v. Peña,* 515 U.S. 200 (1995) (requiring a strict scrutiny standard of review for Congressionally mandated race-conscious measures); *United States v. Virginia*, 518 U.S. 515 (1996) (applying an intermediate standard of review to a state program based on gender classification).

[1354] *NPRM*, 27 FCC Rcd at 12456, para. 297.

[1355] *See, e.g.*, RTG Comments at 8 ("Though RTG generally supports the adoption of bidding credits as it has in prior spectrum auctions, RTG urges the Commission to promote participation by rural telephone companies in the Incentive Auction by adopting revised and additional bidding credits."); McBride *Band Plan PN* Reply at 6 (advocating to "[m]aximize the number of small carriers that take part in the [incentive] auction by arming them with generous bidding credits as much as 50 [percent]"). *See also* IAA Comments at 6–7 (noting that "this spectrum incentive auction may be the last opportunity for new entrants in communications to secure spectrum and provide competition to incumbent providers" and arguing that to ensure DEs are able to fully participate in the incentive auction the "Commission should consider a DE plan that restores bidding credits to the 40 [percent] levels used in pre-2006 auctions").

[1356] *See* § VI.B (600 MHz Band Technical and Service Rules).

developing markets, technologies, and services.[1357] Accordingly, at this time it is appropriate to adopt the same size standards and associated bidding credits for the 600 MHz Band as the Commission adopted for the 700 MHz Band.

476. Based on the Commission's prior experience with the use of bidding credits in spectrum license auctions, the use of bidding credits is an effective tool in achieving the statutory objective of offering opportunities for participation by designated entities in the provision of spectrum-based services.[1358] In the absence of small business size standards and bidding credits, designated entities might have less opportunity to obtain spectrum in the 600 MHz Band. Continuing to extend such benefits to forward auction participants would be consistent with the statutory mandate. Moreover, use of the small business size standards and credits set forth in the Part 1 schedule provides consistency and predictability for small businesses.[1359] Commenters, including wireless carriers and trade groups, generally support implementing a system of bidding credits and recognize the related pro-competitive benefits for smaller carriers.[1360]

477. We decline to adopt at this time additional tiers or larger bidding credits than those proposed in the *NPRM*. Several commenters propose adopting additional tiers or increasing the size of bidding credits available to participants in the forward auction.[1361] Commenters in this proceeding have not presented specific and data supported grounds to warrant adopting for the 600 MHz Band additional tiers or larger bidding credits than those adopted for the 700 MHz Band.[1362] As with licenses offered recently in AWS and the 700 MHz Band, a significant number of licenses offered in the forward auction will be for small geographic areas and will provide small businesses with ample opportunities to win

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[1357] *Cf. H Block Report and Order*, 28 FCC Rcd at 9579, 9581, paras. 258, 262 (indicating that similar expectations regarding services to be offered in a band support offering similar bidding credits).

[1358] *See, e.g., AWS-1 R&O*, 18 FCC Rcd at 25219–20, para. 148.

[1359] *See* 47 C.F.R. §1.2110(f)(2).

[1360] *See, e.g.*, CCA Comments at 12; CCA Reply at 8; C Spire Comments at 5 n.11; Leadership Conference Comments at 1, 5–6; Leap Comments at 6; Leap Reply at 3; RTG Comments at 8; Verizon Reply at 27. *But see* NHMC Comments at 8–9 (noting that while bidding credits could increase participation of small competitors and increase competition in the market, it is less clear whether they will lead to increased ownership opportunities for women and people of color).

[1361] For example, KSW and WISPA argue that the Commission should reinstate the 35 percent bidding credit previously available to applicants with average gross revenues of $3 million or less for the last three years. *See, e.g.*, KSW Reply at 7; WISPA Comments at 32–33. Similarly, IAA, MMTC, and Council Tree recommend that the Commission increase bidding credits to 40 percent. *See* IAA Comments at 7; S. Jenell Trigg & Jeneba Jalloh Ghatt for MMTC, *Digital Déjà Vu: A Road Map for Promoting Minority Ownership in the Wireless Industry*, GN Docket No. 12-268 at 32 (filed Feb. 27, 2014) (*Digital Déjà Vu*); Council Tree Comments at 3; *but see* Letter from S. Jenell Trigg, Counsel to Council Tree, to Marlene Dortch, Secretary, FCC, WT Docket No. 13-135, GN Docket No. 12-268 at 1 (filed July 29, 2013) (Trigg July 29, 2013 *Ex Parte* Letter) (advocating for a 45 percent designated entity bidding credit for all future auctions); Council Tree Comments, WT Docket No. 13-135, GN Docket No. 12-268 at 14 (filed July 27, 2013) (advocating for a 25 percent bidding credit to businesses with average annual gross revenues not exceeding $40 million, a 35 percent bidding credit to businesses with average annual gross revenues not exceeding $25 million, and a 45 percent bidding credit to businesses with average annual gross revenues not exceeding $15 million). *See also* RTG Comments at 8 (supporting a 10 percent bidding credit for businesses with average gross revenues not exceeding $75 million for the preceding three years); McBride Comments at 2; McBride *Band Plan PN* Reply at 20–21 (supporting a 50 percent bidding credit for "nano businesses" and a 25 percent bidding credit for "micro businesses"); Leadership Conference at 6 (urging the Commission to consider increasing the bidding credit for small and very small businesses).

[1362] *See, e.g.*, WISPA *PEAs PN* Comments at 6–8 (arguing that the Commission should adopt a third tier of bidding credits as it did for portions of the Lower 700 MHz Band in spectrum license auctions in 2003 and 2005).

licenses with the two bidding credits (i.e., 15 percent and 25 percent) we adopt in this Order.[1363] Due to the similar physical characteristics and similar regulatory treatment of the 600 MHz and 700 MHz Bands, we expect the capital requirements for services in the 600 MHz Band to be very similar to those for 700 MHz services. Accordingly, at this time, we set the revenue threshold (i.e., bidding credit eligibility) at $40 million for small businesses and $15 million for very small businesses.

478. We also decline to adopt at this time proposals to adopt a scale of bidding credits for the 600 MHz Band based on an entity's spectrum holdings in a particular geographic area in lieu of credits based on small business size.[1364] DISH similarly proposes that eligibility for bidding credits in the forward auction could be determined based on either a modified spectrum screen, giving greater weight to spectrum below 1 GHz, or through a standalone spectrum limit applicable below 1 GHz.[1365] These proposals fundamentally involve issues of spectrum aggregation policy because the commenters advocate them to achieve the same purposes as the Commission traditionally has sought to achieve through spectrum aggregation policies. Spectrum aggregation issues are addressed in the separate *MSH Report and Order*.[1366]

479. We also decline to adopt at this time new rural bidding credits for the 600 MHz Band as proposed by RTG and Blooston Rural.[1367] The Commission has previously considered and declined like proposals,[1368] observing that proponents of this type of credit had been unable "to demonstrate a historical lack of access to capital that was the basis for according bidding credits to small businesses, minorities and women,"[1369] and that "large rural telcos have failed to demonstrate any barriers to capital formation

[1363] *See, e.g., Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, WT Docket No. 02-353, Order on Reconsideration, 20 FCC Rcd 14058, 14075–77, paras. 32–36 (2005); *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, *Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, CC Docket No. 94-102, *Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones*, WT Docket No. 01-309, *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, WT Docket 03-264, *Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 06-169, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229, *Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010*, WT Docket No. 96-86, Report and Order and Further Notice of Proposed Rulemaking, 22 FCC Rcd 8064, 8088–90, paras. 59–65 (2007).

[1364] *See, e.g.*, Leap Comments at 6; CCA Comments at 12 n.28; MetroPCS Comments at 26–27. AT&T and Verizon call on the Commission to reject these alternative bidding credit plans. *See* AT&T Reply at 50–52, Katz et al. Reply Declaration at paras. 43–52; Verizon Reply at 27–28.

[1365] DISH Reply at 3, 12–13. DISH suggests that spectrum screen bidding credits could be smaller than those available to other designated entities (i.e., five percent). *Id.* at 13.

[1366] *See MSH Report and Order*. *See also* Leap Reply at 2 (noting that the Commission should move forward with its parallel spectrum aggregation proceeding so it can apply more accurate and more functional eligibility criteria to the auction process).

[1367] RTG Comments at 8 (urging the Commission to adopt additional rural service bidding credits for carriers that currently provide mobile wireless service to rural areas, have a history of offering telecommunications services to rural markets, or are now seeking to serve unserved areas); Blooston Rural *PEAs PN* Comments at 9 (urging the Commission to adopt small business and rural bidding credits for any auction of 600 MHz spectrum).

[1368] *See, e.g., Lower 700 MHz R&O*, 17 FCC Rcd at 1089–91, paras. 175–76 (declining to "adopt a bidding credit or other auction incentive for rural telephone companies, irrespective of how large or well-financed these entities may be"). *See also H Block Report and Order*, 28 FCC Rcd at 9580–81, para. 260; *AWS-3 Report and Order* at 70, para. 187.

[1369] *See Lower 700 MHz R&O*, 17 FCC Rcd at 1090–91, para. 176 (citing *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Fifth Memorandum Opinion and Order, 10 FCC Rcd 403, 457–58, para. 100 (1994)).

similar to those faced by other designated entities."[1370] The record in this proceeding does not provide a sufficient basis to revisit these prior determinations. Further, the record does not support at this time adopting new bidding credits based on past service to rural areas, as proposed by RTG,[1371] which has not demonstrated how such bidding credits would directly serve the forward-looking goals of bidding preferences, or help to avoid excessive concentration of licenses by disseminating licenses among a wide variety of applicants.[1372] Accordingly, we decline at this time to adopt a rural bidding credit in addition to the small business bidding credits for the 600 MHz Band.

480. Further, we decline IAA's request to issue a Further NPRM in this proceeding regarding an Overcoming Disadvantages Preference.[1373] On October 14, 2010, the Advisory Committee on Diversity for Communications in the Digital Age formally recommended that the Commission undertake a notice of proposed rulemaking to consider how to "design, adopt, and implement an additional new preference program in its competitive bidding process."[1374] Under the proposed preference, persons or entities who have overcome substantial disadvantage would be eligible for a bidding credit.[1375] The Media and Wireless Telecommunications Bureaus subsequently issued a Public Notice seeking information to assist the Commission in considering whether to launch a proceeding to further examine the components of the recommended preference.[1376] As acknowledged by the Advisory Committee,[1377] there are "a number of issues concerning the design and implementation of its proposal [that] need to be refined and resolved."[1378] As the proceeding initiated by the Bureaus' Public Notice has not yet resulted in an implementable proposal, we expect that the Commission may consider a new preference for

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[1370] *See Lower 700 MHz R&O*, 17 FCC Rcd at 1091–92, para. 176 (citing *Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures*, WT Docket No. 97-82, Order on Reconsideration of the Third Report and Order, Fifth Report and Order, and Fourth Further Notice of Proposed Rule Making, 15 FCC Rcd 15293, 15320–21, para. 52 (2000)); *Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems*, WT Docket No. 96-18, *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PR Docket No. 93-253, Memorandum Opinion and Order on Reconsideration and Third Report and Order, 14 FCC Rcd 10030, 10091–92, para. 114 (1999); *Amendment of the Commission's Rules to Establish New Personal Communications Services, Narrowband PCS*, GN Docket No. 90-314, ET Docket No. 92-100, *Implementation of Section 309(j) of the Communications Act – Competitive Bidding, Narrowband PCS*, PP Docket No. 93-253, Second Report and Order and Second Further Notice of Proposed Rule Making, 15 FCC Rcd 10456, 10476–77, para. 41 (2000); *Amendment to Parts 1, 2, 87 and 101 of the Commission's Rules to License Fixed Services at 24 GHz*, WT Docket No. 99-327, Report and Order, 15 FCC Rcd 16934, 16968–69, para. 81 (2000). The Commission pointed out that, due to certain financing programs, "rural telephone companies may have greater ability than other designated entities to attract capital." *Lower 700 MHz R&O*, 17 FCC Rcd at 1090-91, para. 176.

[1371] RTG Comments at 8.

[1372] *See* 47 U.S.C. § 309(j)(3)(B). We note that, like other applicants, rural telephone companies may qualify for bidding credits based upon their business size.

[1373] *See* IAA Comments at 8.

[1374] *Media and Wireless Telecommunications Bureaus Seek Comment on Recommendation of the Advisory Committee on Diversity for Communications in the Digital Age for a New Auction Preference for Overcoming Disadvantage*, GN Docket No. 10-244, Public Notice, 25 FCC Rcd 16854 (2010) (*Overcoming Disadvantage Preference PN*). *See also* Advisory Committee on Diversity for Communications in the Digital Age, *Recommendations to Federal Communications Commission: Preference for Overcoming Disadvantage*, Oct. 14, 2010, http://www.fcc.gov/DiversityFAC/meeting101410.html (*Recommendation*).

[1375] *See Overcoming Disadvantage Preference PN*, 25 FCC Rcd at 16854.

[1376] *See id*.

[1377] *See Recommendation* at 7 ("An FCC rulemaking should flesh out similarities and differences and would refine and resolve some of the issues identified below.").

[1378] *See Overcoming Disadvantage Preference PN*, 25 FCC Rcd at 16854.

overcoming disadvantages in the DE proceeding.[1379] As part of that proceeding, the Commission will consider whether any revisions made to the designated entity rules, including any preference for overcoming disadvantages, should apply to auctions, including the broadcast television spectrum incentive auction.

481. We will implement the bidding credit preference we adopt in accordance with Part 1 of our rules and decline at this time to modify other aspects of the Commission's bidding credit program as suggested by T-Mobile.[1380] Based on examination of the current record in this proceeding, we are not persuaded at this time that the additional measures T-Mobile advocates are needed in order to successfully implement the adopted bidding preference for the 600 MHz Band, or that the existing bidding credit rules are insufficient.

482. At this time, we decline to grant the proposals by MMTC,[1381] Council Tree,[1382] and Grain Management to act in this proceeding to modify or eliminate the attributable material relationship ("AMR") rule, in this Order.[1383] The Wireless Telecommunications Bureau recently released a Public Notice seeking comment on Grain Management's request for clarification or waiver of the Commission's AMR rule.[1384] We intend to act on that request in the near term. As discussed above, we expect to

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[1379] For the same reason, we disagree with MMTC's assertion that the *NPRM* is deficient because it failed to solicit comment and provide adequate notice of the Diversity Committee's proposal regarding an Overcoming Disadvantage Preference. *See, e.g.*, Letter from David Honig, President and Executive Director, MMTC, to Marlene Dortch, Secretary, FCC, MB Docket Nos. 09-182, 07-294, IB Docket No. 11-133, GN Docket No. 12-268 at 1–2 (filed Jan. 10, 2013); Letter from David Honig, President, MMTC, to Marlene Dortch, Secretary, FCC, MB Docket Nos. 09-182, 07-294, IB Docket No. 11-133, GN Docket No. 12-268 at 4 (filed Dec. 5, 2012).

[1380] Specifically, T-Mobile argues that if the Commission adopts bidding credits for the 600 MHz Band, it must also adopt detailed eligibility requirements, exhaustive limitations on license transfers, and robust compliance audits, and must swiftly apply meaningful sanctions in the event of non-compliance. T-Mobile Reply at 67.

[1381] *See, e.g., Digital Déjà Vu* at 32 (advocating that the Commission eliminate the attributable material relationship rule because wholesaling and leasing arrangements have become standard and important industry practices).

[1382] In its initial comments, Council Tree proposes to modify the "25 [percent] Wholesale Rule," which prescribes when the revenues of an entity which leases spectrum from an auction applicant are attributed to the applicant in implementing the Part 1 small business bidding credits. Council Tree Comments at 4–5 (arguing that the rule should only apply to "wholesaling transactions" by an applicant "with the top two US [w]ireless carriers" (i.e., AT&T and Verizon)). *See also* 47 C.F.R. § 1.2110(b)(3)(iv)(A). In subsequent *Ex Partes*, Council Tree proposes to waive or eliminate the attributable material relationship rule. *See, e.g.*, Trigg July 29, 2013 *Ex Parte* Letter at 1.

[1383] Letter from Patrick S. Campbell, Counsel for Grain Management, to Marlene Dortch, Secretary, FCC, WT Docket No. 05-211, GN Docket Nos. 12-268, 13-185 at 3–4 (filed March 13, 2014) (arguing that, as written, the attributable material relationship rule is overly broad and advocating that the Commission clarify that the rule does not apply to leasing transactions between designated entities and non-designated entities where "(1) the licenses involved in the transaction were not acquired through the use of [designated entity] benefits and, instead, such licenses were acquired on the secondary market; and (2) the transaction does not involve a structure permitting a non-[designated entity] to exercise undue influence over a [designated entity's] activities or decision making"). *See also Implementation of the Commercial Spectrum Enhancement Act and Modernization of the Commission's Competitive Bidding Rules and Procedures*, WT Docket No. 05-211, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, GN Docket No. 13-185, Grain Management, LLC's Request for Clarification or Waiver of the Commission's "Attributable Material Relationship" Rule (filed Mar. 4, 2014). *But see* T-Mobile Reply at 67 (arguing that the spectrum acquired using bidding credits should be fully attributed to the party who actually uses it whether that spectrum or spectrum capacity is acquired through lease, option, joint venture or any other form of ownership or collaboration).

[1384] *Wireless Telecommunications Bureau Seeks Comment on Request for Clarification or Waiver of the Commission's "Attributable Material Relationship" Rule*, WT Docket No. 05-211, GN Docket Nos. 12-268, 13-

(continued….)

generally re-examine the AMR rule, as well as other potential changes to the designated entity program, as part of the DE proceeding. In light of that proceeding, and limited record support applicable solely to the 600 MHz Band, we therefore decline to modify the AMR rule at this time.[1385] In the DE proceeding we will seek comment on how any revisions to the designated entity rules should apply to the incentive auction.

483. Finally, we adopt the *NPRM*'s proposal to extend any rules and policies adopted in the spectrum over Tribal lands proceeding, including those related to Tribal land bidding credits, to any licenses that may be issued through competitive bidding in the forward auction.[1386] Thus, we defer the application of any rules and policies for facilitating access to spectrum and the provision of service to Tribal lands to the Tribal lands proceeding.[1387] Because that proceeding is specifically focused on promoting greater use of spectrum over Tribal lands, it is better suited than the instant proceeding to reach conclusions on that issue.

c. Prohibition of Certain Communications

484. *Background*. The Commission's existing rules governing spectrum license auctions include a prohibition of certain communications, which is intended to supplement other competitive safeguards incorporated into auction procedures in order to enhance the competitiveness of the auction process.[1388] This is a precautionary measure designed to reinforce existing antitrust laws, facilitate detection of collusive conduct, and deter anticompetitive behavior, without being so strict as to discourage pro-competitive arrangements among auction participants.[1389]

485. In the *NPRM*, the Commission sought comment on how to determine which parties are "competing" in the forward auction for the purposes of enforcing the existing communications prohibition, particularly if the spectrum licenses offered are generic blocks.[1390] The Commission also sought comment on whether to prohibit reverse auction applicants from communicating with forward auction applicants regarding the substance of their bids or bidding strategies, and, given the statutory requirement to protect the confidentiality of the identities of reverse auction participants, whether the prohibition should apply to communications with all broadcast television licensees as opposed to only those licensees that submit applications to participate in the reverse auction.[1391]

(Continued from previous page)
185, Public Notice, 29 FCC Rcd 3179 (2014) (seeking comment on Grain Management's request for clarification or waiver of the Commission's "attributable material relationship" rule, 47 C.F.R § 1.2110(b)(3)(iv)(A)).

[1385] We also reject proposals by MMTC and IAA to conduct designated entity-only closed auctions. *See* IAA Comments at 7 (asking the Commission to examine the desirability of requesting from Congress authority to conduct closed designated entity auctions, if necessary to restore diversity in spectrum ownership); *Digital Déjà Vu* at 33 (stating that the Commission should reinstitute select designated entity-only closed spectrum auctions). *But see* Letter from Jonathan Spalter, Chair, Mobile Future, to Marlene Dortch, Secretary, FCC, GN Docket No. 12-268, WT Docket No. 12-269 at Att. at 4 (filed Nov. 13, 2013) (stating that auction rules, such as set-asides, have caused missed opportunities for innovation and economic growth). These proposals involve policy considerations outside the scope of this proceeding.

[1386] *See NPRM*, 27 FCC Rcd at 12456, para. 297. The Commission received no comments on its proposal to extend any rules and policies adopted in the spectrum over Tribal lands proceeding to any licenses that may be issued through competitive bidding in the forward auction.

[1387] *See Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum Over Tribal Lands*, WT Docket No. 11-40, Notice of Proposed Rulemaking, 26 FCC Rcd 2623 (2011).

[1388] *See* 47 C.F.R. § 1.2105(c); *Competitive Bidding Second R&O*, 9 FCC Rcd at 2387, para. 225.

[1389] *Competitive Bidding Second R&O*, 9 FCC Rcd at 2386–88, paras. 221, 225.

[1390] *NPRM*, 27 FCC Rcd at 12458, para. 304.

[1391] *Id.* at 12449–50, 12458, paras. 269–70, 304 n.456.

486. *Discussion*. We will apply to forward auction applicants the Commission's existing Part 1 rule prohibiting certain communications. Under this rule, after the short-form application filing deadline, all applicants for licenses in any of the same geographic license areas are prohibited from cooperating or collaborating with respect to, discussing with each other, or disclosing to each other in any manner the substance of their own, or each other's, or any other competing applicants' bids or bidding strategies until after the down payment deadline, unless such applicants are members of a bidding consortium or other joint bidding arrangement identified on the bidder's short-form application, subject to certain specified exceptions.[1392] Two forward auction applicants are "competing" for the purposes of this prohibition if they apply for licenses in any of the same geographic license areas, regardless of whether the licenses are for specific frequencies or generic blocks.[1393] Thus, this prohibition applies only to forward auction applicants that apply for licenses in the same geographic license area, and not to those that apply only in different geographic license areas. The plain text of the rule makes clear that business discussions and negotiations that are *unrelated* to bids and bidding strategies or to post-auction market structure are not prohibited by the rule.[1394] The rule's prohibition has always been aimed at the specific content of an applicant's communication to a competing applicant regardless of the context or situation in which such content is communicated. Conversely, if the content of an applicant's communication does not fall within the prohibition, the particular situation in which the communication occurs will not alone make it a violation.

487. In addition, beginning on the short-form application filing deadline for the forward auction and until the results of the incentive auction have been announced by public notice,[1395] all forward auction applicants are prohibited from communicating directly or indirectly any incentive auction applicant's bids or bidding strategies to any covered television licensee.[1396] Applying the prohibition across the reverse and forward auctions will promote a fair and competitive auction.[1397] This restriction will inhibit the ability of forward auction applicants and covered television licensees to form side agreements, which could have anticompetitive effects and could alter the outcome of the incentive auction.[1398]

[1392] 47 C.F.R. § 1.2105(c).

[1393] As the Commission has determined previously, where bidders have not applied for licenses in any of the same geographic license areas, there is little risk of anticompetitive conduct with respect to any of the licenses for which they applied. *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Fourth Memorandum Opinion and Order, 9 FCC Rcd 6858, 6868, para. 55 (1994); *Implementation of Section 309(j) of the Communications Act – Competitive Bidding Narrowband PCS*, PP Docket No. 93-253, Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 10 FCC Rcd 175, 190, para. 31 (1994).

[1394] *Cf.* Verizon Comments at 51 (suggesting that there is "uncertainty as to whether discussions not related to bids or bidding strategies or post-auction market structure could violate the rule").

[1395] *See* § V.A (Auction Completion and Effective Date of the Repacking Process).

[1396] As described in § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications), all broadcast television licensees that are or could become eligible to participate in the reverse auction, *see* § IV.B.1.a (Eligibility), and all channel sharers are "covered television licensees."

[1397] *See* § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications).

[1398] *See* Sprint Comments at 5–6 n.11 ("Given the tremendous *ex ante* uncertainty of forward auction participants about the amount of spectrum and specific frequencies likely to be made available in each market, any information that reache[s] forward auction participants could create dangerous and anti-competitive informational asymmetries among bidders."); T-Mobile Apr. 23, 2013 *Ex Parte* Letter at 1 ("[A]llowing unfettered communications between forward and reverse auction participants could generate opportunities for inequitable gaming of the auction framework."). *But see* Verizon Comments at 54 (asserting that there is "no reason why discussions between reverse and forward auction applicants could make either auction less competitive"); Verizon Reply at 29.

488. Under this restriction, forward auction applicants are prohibited from communicating with all covered television licensees regarding incentive auction applicants' bids and bidding strategies, not just those broadcast television licensees that actually apply to participate in the reverse auction. Given the Commission's statutory obligation to protect the identities of reverse auction participants, it is not practicable to limit the prohibition to communications with reverse auction applicants because doing so would require disclosing the identities of those reverse auction applicants to the forward auction applicants.[1399] This prohibition restricting communications across the reverse and forward auctions is not limited by geographic area. Given that the results of the reverse auction for one participant may have effects across multiple geographic areas,[1400] it is appropriate to prohibit forward auction applicants from communicating prohibited information to any covered television licensee, regardless of the broadcast television licensee's geographic location.

489. We adopt one exception to the rule prohibiting forward auction applicants from communicating with any covered television licensee regarding incentive auction applicants' bids or bidding strategies. In recognition of the practical realities of business ownership and management and to allow strategic coordination within a single enterprise during the incentive auction, if a controlling interest, director, officer, or holder of any 10 percent or greater ownership interest in a forward auction applicant is also a controlling interest, director, officer, or governing board member of a covered television licensee,[1401] the forward auction applicant and the covered television licensee may communicate with each other regarding incentive auction applicants' bids and bidding strategies without violating the prohibition.[1402] As with respect to the reverse auction,[1403] this exception for overlapping interests only applies to controlling interests, directors, officers, and governing board members of a covered television licensee as of the deadline for submitting applications to participate in the reverse auction, and it only applies to controlling interests, directors, officers, and holders of any 10 percent or greater ownership interest in a forward auction applicant as of the deadline for submitting short-form

[1399] Spectrum Act § 6403(a)(3); *see* § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications).

[1400] *See* § IV.B.1.d (Two Competing Participants Requirement).

[1401] As we noted in § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications), controlling interests include individuals or entities with positive or negative *de jure* or *de facto* control of the licensee. *De jure* control includes holding 50 percent or more of the voting stock of a corporation or holding a general partnership interest in a partnership. Ownership interests that are held indirectly by any party through one or more intervening corporations may be determined by successive multiplication of the ownership percentages for each link in the vertical ownership chain and application of the relevant attribution benchmark to the resulting product, except that if the ownership percentage for an interest in any link in the chain meets or exceeds 50 percent or represents actual control, it may be treated as if it were a 100 percent interest. *De facto* control is determined on a case-by-case basis. Examples of *de facto* control include constituting or appointing 50 percent or more of the board of directors or management committee; having authority to appoint, promote, demote, and fire senior executives that control the day-to-day activities of the licensee; or playing an integral role in management decisions.

[1402] This exception would allow communications between a forward auction applicant and a covered television licensee that are commonly owned by the same controlling interest. *Cf.* Tribune Comments at 2, 4–6 (indicating that as a broadcaster interested in flexible spectrum use, it does not know whether it will be a buyer, a seller, or a bystander in the incentive auction).

[1403] *See* § IV.B.1.c.ii (Reverse Auction – Prohibition of Certain Communications).

applications to participate in the forward auction.[1404] We emphasize that this exception applies only to a forward auction applicant's discussions with a covered television licensee.[1405]

490. We decline to adopt a general exception allowing forward auction applicants to communicate with covered television licensees regarding incentive auction applicants' bids and bidding strategies so long as agreements between the relevant parties are disclosed to the Commission.[1406] Such an exception is not warranted here because no party has advanced any pro-competitive reason why forward auction applicants should be allowed to communicate with covered television licensees regarding bids and bidding strategies during the incentive auction.[1407]

491. For the purposes of the new rule that we adopt here, we will apply the same definition of forward auction "applicant" that applies to the rule for spectrum license auctions generally, and that will apply to communications between forward auction applicants.[1408] That definition provides that the term "applicant" includes all controlling interests in the entity submitting the short-form application, as well as all holders of partnership and other ownership interests and any stock interest amounting to 10 percent or more of the entity, or outstanding stock, or outstanding voting stock of the entity, and all officers and directors of the entity.[1409] We decline to amend the definition of "applicant" so that the prohibition would apply only to controlling equity interest holders, as opposed to 10 percent interest holders. Verizon argues that a non-controlling interest holder is "highly unlikely" to have knowledge regarding the filing entity's bids or bidding strategies.[1410] However, 10 percent interest holders may easily become conduits of information, and as a result, we will continue to apply the prophylactic prohibition of certain communications to such interest holders in order to prevent anticompetitive communications.[1411]

492. Consistent with the approach we have taken in spectrum license auctions generally, forward auction applicants may continue to communicate with covered television licensees and

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[1404] The prohibition across the reverse and forward auctions applies to controlling interests, directors, officers, and holders of any 10 percent or greater ownership interest in the forward auction applicant as of the deadline for submitting short-form applications to participate in the forward auction, and any additional such parties at any subsequent point prior to when the prohibition ends. Thus, if, for example, a forward auction applicant appoints a new officer after the short-form application deadline, that new officer would be subject to the prohibition, but would not be included within this exception.

[1405] This exception does not apply to a forward auction applicant's discussions with a competing forward auction applicant. *See* 47 C.F.R. § 1.2105(c)(1).

[1406] *See, e.g.*, PTV Comments at 33 (arguing that the baseline position should be that participants may communicate as long as there is disclosure); Public TV Licensees Reply at 7 (agreeing with PTV). We note, however, that such a general exception will apply to discussions between competing forward auction applicants. *See* 47 C.F.R. § 1.2105(c)(1).

[1407] *See, e.g.*, Verizon Comments at 54 (arguing in favor of allowing such discussions without providing any pro-competitive reasons for such discussions).

[1408] 47 C.F.R. § 1.2105(c)(7)(i); *cf.* § IV.B.1.c.ii (Reverse Auction Prohibition of Certain Communications) (concluding that with respect to covered television licensees, the prohibition includes all controlling interests in the licensee, and all directors, officers, and governing board members of the licensee).

[1409] 47 C.F.R. § 1.2105(c)(7)(i).

[1410] Verizon Comments at 53; *see also* Verizon Reply at 28.

[1411] *Cf. Review of Foreign Ownership Policies for Common Carrier and Aeronautical Radio Licensees under Section 310(b)(4) of the Communications Act of 1934, as Amended*, IB Docket No. 11-133, Second Report and Order, 28 FCC Rcd 5741, 5768, 5772, paras. 48, 55–56 (2013) (*Foreign Ownership Second R&O*) (adopting a 10 percent threshold for rebuttable presumption that a non-controlling foreign interest in a U.S. parent or licensee is exempt from specific approval requirements in certain circumstances).

competing forward auction applicants regarding matters wholly unrelated to the incentive auction.[1412] Verizon's suggestion that the prohibition should only apply to discussions that "directly" or "expressly" convey information regarding bids or bidding strategies is unnecessarily narrow.[1413] Rather, we rely on existing precedent regarding the types of communications that rise to the level of prohibited communications under the rules.[1414] We emphasize that the rules prohibiting certain communications are limited in scope and only prohibit disclosure of information that affects, or has the potential to affect, bids and bidding strategies. Further, we agree with Verizon that forward auction applicants may structure their auction participation as needed to avoid violating the rules, such as by instituting internal controls with respect to information about bids and bidding strategies.[1415] For instance, although it would not outweigh specific evidence of prohibited communications, a forward auction applicant could reduce the possibility of a violation by preventing employees with information about bids and bidding strategies from communicating such information to other employees who are engaging in unrelated negotiations with competing forward auction applicants or with covered television licensees.[1416]

493. The rules prohibiting certain communications that we adopt in this Order and the existing Part 1 rule all apply during a limited period of time, which we expect will be a matter of months at most. The new rules prohibiting certain communications across the reverse and forward auctions apply until the results of the incentive auction have been announced by public notice. Allowing communications between forward auction applicants and covered television licensees after the announcement of auction results will facilitate the UHF band transition. The existing Part 1 rule prohibiting certain communications between competing forward auction applicants applies until after the down payment

[1412] *See, e.g., Application of Todd Stuart Noordyk for a New FM Station on Channel 260A at Manistique, Michigan*, Memorandum Opinion and Order, 16 FCC Rcd 18113, 18116–17, para. 12 (2001) ("Our rules do not require the suspension of all relations among auction participants while an auction is pending."). *See NPRM*, 27 FCC Rcd at 12448, para. 264 n.405; *see also* Verizon Comments at 54–55 (arguing that in no event should the Commission prohibit business discussions between broadcaster and mobile broadband providers unrelated to an auction applicant's bids or bidding strategies, or the post-auction market structure).

[1413] Verizon Comments at 51–52 (requesting clarification that routine business discussions including those regarding management, resale, roaming, interconnection, and partitioning and disaggregation agreements are not prohibited, unless the participants "expressly" convey information regarding their bids or bidding strategies or post-auction market structure); *see also* Verizon Reply at 28; MetroPCS Comments at 15–16.

[1414] *See, e.g., Part I Third Report and Order*, 13 FCC Rcd at 467–68, para. 163 (explaining that as a general matter, the anti-collusion rule does not prohibit non-auction-related business negotiations, but cautioning applicants that "discussions concerning, but not limited to, issues such as management, resale, roaming, interconnection, partitioning and disaggregation may all raise impermissible subject matter for discussion because they may convey pricing information and bidding strategy"); *see also Wireless Telecommunications Bureau Provides Guidance on the Anti-Collusion Rule for D, E and F Block Bidders*, Public Notice, 11 FCC Rcd 10134 (1996); *Wireless Telecommunications Bureau Responds to Questions About the Local Multipoint Distribution Service Auction*, Public Notice, 13 FCC Rcd 341, 347 (1998); *Auction of H Block Licenses in the 1915-1920 MHz and 1995-2000 MHz Bands Scheduled for January 14, 2014; Notice and Filing Requirements, Reserve Price, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 96*, AU Docket No. 13-178, Public Notice, 28 FCC Rcd 13019, 13026–27, paras. 15–18 (2013); *AWS-3 Report and Order* at 67, para. 179 (noting that although competing applicants must affirmatively avoid all communications with each other that affect, or have the potential to affect, their bids or bidding strategy, this does not mean that all business negotiations between such applicants are prohibited).

[1415] Verizon Comments at 52–53.

[1416] *See Nevada Wireless MO&O*, 13 FCC Rcd at 11977–78, paras. 11–13 (strongly recommending that where competing applicants' authorized bidders are different individuals employed by the same organization—e.g., the same law firm—those applicants each certify in their applications what measures have been taken to prevent communications between authorized bidders, but cautioning that merely filing a certifying statement as part of an application will not outweigh specific evidence that collusive behavior has occurred nor will it preclude the initiation of an investigation when warranted).

deadline.[1417] We decline to shorten the period during which the prohibition applies to communications between forward auction applicants, as Verizon suggests.[1418] We disagree with Verizon's contention that "[o]nce the bidding closes, communications between auction applications [sic] cannot, by definition, affect participants' bids or bidding strategies, and cannot disadvantage other bidders."[1419] Rather, the expectation of potential side deals that could occur between the close of bidding and the down payment deadline could spur a forward auction applicant to place bids during the auction that do not reflect that bidder's value assessment and resources, absent such speculation, and could thus alter the auction outcome. Discussions among applicants after the close of bidding and prior to the down payment deadline could also convince some winning bidders to default when they otherwise would not have, disrupting the outcome of the bidding process.[1420] Applying the prohibition to communications between forward auction applicants for the limited additional time period from the effective date until after the down payment deadline will protect the outcome of the auction and will impose only a minimum additional burden on forward auction applicants.

494. Any party that makes or receives a prohibited communication regarding bids or bidding strategies shall report such communication in writing to the Commission immediately, and in no case later than five business days after the communication occurs.[1421] A failure to make a timely report constitutes a continuing violation.[1422] Parties must adhere to any applicable antitrust laws, including any additional communications restrictions. Where specific instances of collusion in the competitive bidding process are alleged, the Commission may conduct an investigation or refer such complaints to DOJ for investigation.[1423] Parties who are found to have violated the antitrust laws or the Commission's rules in connection with participation in the auction process may be subject to forfeiture of their upfront payment, down payment, or full bid amount and revocation of their license(s), and may be prohibited from participating in future auctions.[1424]

495. Additional information regarding the rule prohibiting certain communications will be provided during the pre-auction process, including in the *Incentive Auction Procedures PN*. As with the reverse auction, we anticipate offering an interactive auction tutorial for the forward auction that guides potential auction applicants through the auction process from beginning to end and gives potential applicants an opportunity to become familiar with the auction application prior to the application deadline.

[1417] 47 C.F.R. § 1.2105(c)(1).

[1418] Verizon Comments at 53–54; *see also* Verizon Reply at 28; MetroPCS Comments at 15 (suggesting that the Commission shorten the period of time that applicants are subject to the rule prohibiting certain communications "by holding to a minimum the time between the filing of the short form application and the auction commencement date").

[1419] Verizon Comments at 53–54.

[1420] Although, as Verizon points out, the Commission may assess default penalties if winning bidders default on their final payments, *see* Verizon Comments at 54, the prohibition is intended in part to prevent bidders from changing their course of action based solely on information gained from other bidders.

[1421] *See* 47 C.F.R. § 1.2105(c)(6).

[1422] *See id.*; *see also Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Second Report and Order, 22 FCC Rcd 15289, 15403–04, paras. 285–86 (2007).

[1423] *See Competitive Bidding Second R&O*, 9 FCC Rcd at 2388, para. 226; *see also* Press Release, DOJ, *Justice Department Sues Three Firms Over FCC Auction Practices: Coded Bids Used to Signal Competitors* (Nov. 10, 1998), *available at* http://www.justice.gov/opa/pr/1998/November/536at.htm (announcing lawsuits against bidders that allegedly agreed not to bid against each other and used coded bids to communicate during the auction).

[1424] 47 C.F.R. § 1.2109(d); *see also Competitive Bidding Second R&O*, 9 FCC Rcd at 2388, para. 226.

d. National Security Certification

496. *Background.* To implement the national security restriction set forth in section 6004 of the Spectrum Act, the Commission proposed that on the short-form application for the forward auction, the applicant must certify, under penalty of perjury, that it and all of the related individuals and entities required to be disclosed on the short-form application are not "person[s] who [have] been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant."[1425] The Commission proposed to add the new certification to the various other certifications that a party must make in any application to participate in competitive bidding as required under our existing Part 1 rules.[1426] The Commission noted that any changes made to its general competitive bidding rules in other Commission proceedings would apply to the forward auction for new licenses made available through the incentive auction, including changes to applicants' certification requirements.[1427] In a recent proceeding, the Commission adopted a national security certification applicable to subsequent auctions similar to the one proposed in the *NPRM* in this proceeding,[1428] thereby amending the certification requirements under the existing Part 1 rules.[1429]

497. *Discussion*. In accordance with the *NPRM,* we revise the recently adopted national security certification to comprehensively include all of the auctions within the scope of section 6004 of the Spectrum Act.[1430] As the Commission will conduct the forward auction under its general competitive bidding rules and the forward auction is subject to the national security restriction in section 6004 of the Spectrum Act,[1431] forward auction applicants must certify as to their compliance with the national security restriction in 47 C.F.R. § 1.2105(a), as amended. As with other required certifications, a forward auction applicant's failure to include the required certification by the applicable filing deadline would render its short-form application unacceptable for filing, and its application would be dismissed with prejudice.[1432]

2. Bidding Process

498. Below, we address the forward auction bidding process. We will conduct the forward auction using an ascending clock auction, with bidding for licenses in categories of generic licenses during the clock bidding rounds, followed by an assignment process to resolve preferences for frequency-

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[1425] *NPRM*, 27 FCC Rcd at 12458, para. 305. *See also* Spectrum Act § 6004.

[1426] *NPRM*, 27 FCC Rcd at 12458, para. 305. *See also* 47 C.F.R. § 1.2105(a).

[1427] *NPRM*, 27 FCC Rcd at 12453, para. 289.

[1428] The certification adopted in the H Block proceeding applies to auctions required to be conducted under Title VI of the Middle Class Tax Relief and Job Creation Act of 2012. 47 C.F.R. § 1.2105(a)(2)(xii). *See* Spectrum Act § 6004(b)(1).

[1429] *See H Block Report and Order*, 28 FCC Rcd at 9578, para. 254. *See also AWS-3 Report and Order* at 68, para. 182 (requiring AWS-3-auction applicants to certify as to their compliance with the national security restriction in 47 C.F.R. § 1.2105(a)(2)(xii)).

[1430] We amend the certification to extend its applicability to auctions "in which any spectrum usage rights for which licenses are being assigned were made available under [47 U.S.C. § 309(j)(8)(G)(i)]." *See* Spectrum Act § 6004(b)(2).

[1431] The national security restriction in § 6004 of the Spectrum Act applies to the broadcast television spectrum reverse and forward auctions since Title VI requires the Commission to conduct both auctions. *See* Spectrum Act §§ 6004(b)(1), 6403(a), (c). The forward auction is also subject to the national security restriction because the spectrum usage rights offered in the auction will be made available under 47 U.S.C. § 309(j)(8)(G)(i). *See* Spectrum Act § 6004(b)(2).

[1432] *See* 47 C.F.R. § 1.2105(b)(1).

specific licenses.[1433] An ascending clock auction is simple for bidders to understand and participate in confidently. Bidding for categories of generic licenses will facilitate a speedier auction than if bidding were conducted for multiple, substitutable, frequency-specific licenses.

499. The Part 1 rules regarding competitive bidding for spectrum licenses will apply to the auction of new flexible-use 600 MHz licenses. We modify those rules to provide a framework for the forward auction that is consistent with our approach to auction design generally, in the reverse and forward portions of an incentive auction as well as in conventional spectrum license auctions.[1434]

500. Below, we discuss the forward auction design in terms of three high level auction design elements: (i) bid collection procedures that will determine how bids for generic licenses are gathered in the ascending clock auction, (ii) assignment procedures to select winning bids and determine specific license assignments, and (iii) pricing procedures to determine final license prices. As with the reverse auction bidding process, we generally address the forward auction bidding process in a single stage.[1435]

a. Bid Collection Procedures: Auction Format, Generic License Categories, Etc.

501. *Background*. Bid collection procedures determine how participants will bid for licenses during the auction. Unlike previous spectrum license auctions the Commission has conducted, the *NPRM* noted that where multiple blocks of spectrum are available in a geographic area, as is expected to be the case in the forward auction, the Commission could collect bids for generic licenses in one or more categories in a geographic area.[1436] A subsequent assignment mechanism would resolve bidder preferences for specific frequencies within the categories of such generic licenses.[1437]

502. The *NPRM* also proposed to collect bids using one of two multiple round auction format options: a simultaneous multiple round ("SMR") ascending auction, which typically has been used for spectrum license auctions, or an ascending clock auction.[1438] Under the clock auction format, the auction system would announce a price for the licenses in each category within a geographic area and a bidder would indicate the number of licenses it was interested in at that price in that category. In a clock auction, the Commission proposed to permit intra-round bidding, in which a bidder could indicate a specific price

[1433] In referring to "generic licenses" we are not referring to the actual licenses that will be assigned to winning bidders, but to standardized blocks of spectrum that will be used to represent quantities of licenses for a time during the bidding process.

[1434] The rules we adopt today provide the flexibility to vary aspects of the forward auction, including the format we now adopt, if the record developed in the pre-auction process reflects the need to do so, but we fully intend to implement the choices that we make today. We also note that the Wireless Bureau has delegated authority with respect to the administration of spectrum license auctions, including both the reverse auction component of incentive auctions under the new Part 1 rules adopted in this Order and the forward auction component of incentive auctions pursuant to the Part 1 rules as modified by this Order. As noted above, in the unique context of the broadcast television spectrum incentive auction we will establish certain final auction procedures at the Commission level. *See* § I (Introduction). The Commission's determination of final auction procedures in this context does not diminish the authority generally delegated to the Wireless Bureau.

[1435] Each stage of the incentive auction will incorporate both forward auction bidding and reverse auction bidding. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions). Prior to the beginning of bidding in any stage, forward auction bidders will be informed of the licensing band plan (the quantity of generic licenses in each category and the frequencies they will cover for each geographic area) corresponding to the stage's spectrum clearing target.

[1436] *NPRM*, 27 FCC Rcd at 12377, para. 56. For example, rather than bidding for a specific frequency block in an area, bidders would indicate their interest in one or more paired 5+5 megahertz blocks. *Id.*

[1437] *Id.* at 12378, para. 64; *see also id.* at 12565, 12575 (Appendix C).

[1438] *Id.* at 12377, paras. 57–58.

at which its demand for licenses in a category would change, instead of simply accepting or rejecting the clock price.[1439] The Commission also asked about providing for package bidding, which would allow bidders to bid on all-or-nothing packages of licenses.[1440] The *NPRM* noted that extended bidding could be implemented if proceeds were insufficient to meet the requirements to close the auction.[1441]

503. Noting that auction design has evolved since the existing Part 1 rules for competitive bidding with respect to spectrum licenses were adopted, the Commission also proposed to revise the rules, in part to provide explicitly for auction procedures directly addressing bid collection.[1442]

504. *Discussion*. For the forward auction, we adopt an ascending clock auction to collect bids for categories of generic licenses, to be followed by a separate assignment mechanism to assign frequency-specific licenses.[1443] We also adopt the proposal for extended round bidding under certain circumstances. In addition, we adopt the proposed Part 1 rule revision with respect to bid collection procedures to update our rules and create a consistent framework for addressing these procedures in reverse and forward auctions.[1444]

505. Most commenters agree that the ascending clock mechanism offers many potential benefits, including simplicity and efficiency, and that the multiple round approach will facilitate price discovery.[1445] Speed is of particular concern in the incentive auction.[1446] Because the components of the auction are interrelated, a more expeditious forward auction benefits reverse auction bidders as well as forward auction bidders, and lowers participation costs for all. Conducting bidding for generic licenses has the potential to significantly speed up the clock rounds of the forward auction bidding process, since bidders will not need to bid iteratively across rounds on several substitutable license blocks, as they would if they were bidding for frequency-specific licenses. The clock auction format we adopt easily incorporates bidding for categories of generic licenses, and because it has multiple rounds, will allow bidders to observe changes in relative prices for different types of licenses and across different geographic areas, and to adjust their bidding strategies accordingly.

506. Although commenters generally support bidding for generic licenses,[1447] some caution that the blocks of spectrum within a license category must be truly fungible, or at least sufficiently

[1439] *Id.* at 12378, para. 60; *see also id.* at 12565 (Appendix C).

[1440] *Id.* at 12378, para. 62.

[1441] *See id.* at 12567 (Appendix C).

[1442] *NPRM*, 27 FCC Rcd at 12456, para. 299.

[1443] Bids also may be collected in subsequent assignment rounds, as part of the process of assigning licenses for specific frequencies. *See* § IV.C.2.b. (Forward Auction Bid Assignment Procedures).

[1444] The bid collection procedures we adopt for the forward auction are not inconsistent with the Commission's existing competitive bidding rules. We find, however, that the revised rules provide greater clarity with respect to the options likely to be used. For example, as revised in this proceeding, § 1.2103(b)(1)(ii) expressly provides for procedures allowing for, among other things, bids for a number of generic items in one or more categories of items. *See* Appendix A. We make a corresponding revision expressly providing that an application may identify categories of licenses on which the applicant wishes to bid.

[1445] *See, e.g.*, AT&T Comments at 6, 40–41; CEA Comments at 32 & n.78; T-Mobile Comments at iv; Verizon Comments at 44; Verizon Reply at 40. *Contra* Metro PCS Comments at 14 (supporting the use of the SMR auction format used during Auction 66 to allow carriers to engage in price discovery and more effectively select their bids). We note that the clock auction format we adopt is also a multiple round mechanism that will permit price discovery.

[1446] *See* §§ I (Introduction), III.B (Repacking the Broadcast Television Bands).

[1447] *See, e.g.*, AT&T Comments at 6, 40–41; CEA Comments at 20; Mobile Future Reply at 5; T-Mobile Reply at 4 n.5; Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, The 600 MHz Incentive Auction Attachment (filed Feb. 1, 2013) (T-Mobile Feb. 1, 2013 *Ex Parte* Letter, Attachment) (suggesting that bidding for generic licenses will accelerate the auction and reduce its complexity,

(continued….)

similar.[1448] While we agree that it is important for licenses in a category to be similar, they need not be entirely interchangeable, as the assignment round will take into account specific bidder preferences for licenses within a category. We recognize that we may need to consider a number of factors, such as proximity to television stations or guard bands, in order to define whether particular licenses are "similar enough" to be included in a single bidding category.[1449] During the pre-auction process, in response to the *Comment PN*, potential bidders will be able to provide input on specific standards for categories of generic licenses.

507. Like the SMR auction format the Commission typically has used, the ascending clock auction format will proceed in a series of rounds, with bidding being conducted simultaneously for all licenses available in the auction.[1450] The initial price for generic licenses in a category and geographic area will be the minimum opening bid. Hence, in the initial round, a bidder will indicate how many generic licenses in a category in an area it demands at the minimum opening bid price. Bidding rounds will be open for predetermined periods of time, during which bidders will indicate their demands for licenses at the clock prices associated with the current round. As in SMR auctions, bidders will be subject to activity and eligibility rules that govern the pace at which they participate in the auction.[1451]

508. In each geographic area, the clock price for a license category will increase from round to round if bidders indicate total demand that exceeds the number of licenses available in the category. The clock rounds will continue until, for all categories of licenses in all geographic areas, the number of licenses demanded does not exceed the supply of available licenses. At that point, those bidders indicating demand for a license in a category at the final clock price will be deemed winning bidders, contingent upon the incentive auction process closing after the current stage of the forward auction.[1452]

509. We will incorporate intra-round bidding into the ascending clock auction. Intra-round bidding will allow a bidder not willing to accept the next round's clock price to indicate a point between

(Continued from previous page)
which in turn will encourage diverse participation and reduce the time and therefore the cost of participation); Verizon Comments at 44. We disagree with US Cellular that offering generic licenses would add undue complexity. *See* US Cellular Comments at 20.

[1448] *See, e.g.*, AT&T Comments at 41 (stating that the Commission must ensure that categories of generic licenses are "genuinely interchangeable spectrum assets of comparable value"); AT&T Reply at 54; CTIA Comments at 15–16 (stating Commission must carefully study this issue to make sure that generic licenses are truly fungible); Qualcomm Comments at 2; Verizon Comments at 44. *Cf.* US Cellular Reply at 24 (stating it does not support use of generic licenses, but stipulating if they are used the Commission must ensure they are fungible).

[1449] We are mindful that the nature and extent of inter-service interference may differ substantially across spectrum blocks in an area. *See* § III.A.2.d (Market Variation). Some commenters express concern that interference from guard band operations could affect fungibility. *See, e.g.*, Intel Reply at 21–22; Qualcomm Comments at 2; Qualcomm Reply at 3–4 (stating that the Commission must "ensure that the spectrum blocks that are adjacent to the duplex gap and guard bands are protected to the same level as the non-adjacent spectrum blocks"). *See also* Joint Letter from Kevin Krufky, Joan Marsh, Mark Racek, Peter Pitsch, Risk Kaplan, Dean Brenner, & Charla Rath, for Alcatel-Lucent, AT&T, Ericsson, Intel, NAB, Qualcomm & Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 1 (filed May 3, 2013) (Alcatel-Lucent et al. May 3, 2013 *Ex Parte* Letter) (stating that if the Commission offers generic licenses at auction, utilizing a sufficient duplex gap to avoid interference to adjacent spectrum blocks is essential to ensure the generic spectrum blocks are essentially fungible).

[1450] Section 1.2103(b)(1)(i), as revised in this proceeding, provides for collecting bids in a single round or in multiple rounds. *See* Appendix A.

[1451] Activity and eligibility rules, as with other detailed procedures and mechanisms, will be established in the *Procedures PN*.

[1452] In the context of the forward auction, we use the term "provisional winner" to indicate that winning bid status depends upon the final stage rule of the incentive auction being satisfied. The clock auction will not assign explicit provisionally winning bid status, as in an SMR auction, to indicate a standing high bid.

the previous round's price and the next clock price at which its demand for licenses in the category changes.[1453] Intra-round bidding will allow the auction to proceed more quickly, by making it possible to use relatively large clock price increments without running the risk that a large jump in price will overshoot bidders' demands for licenses in a category. Commenters agree that this approach will help to speed up the auction and offer bidders flexibility to express their bids more precisely.[1454]

510. We do not intend to incorporate package bidding procedures into the forward auction because of the additional complexity that package bidding would introduce into the auction.[1455] The forward auction will offer multiple blocks of licenses in multiple categories in many hundreds of geographic areas. To permit bidders to bid on combinations of those licenses would considerably complicate the bidding process and the procedures to determine clock prices and winning bids. Commenters are split on the issue of package bidding, with the larger carriers generally supporting package bidding[1456] and the smaller carriers generally opposing it.[1457] Opponents argue that package bidding will hinder participation by smaller carriers and new entrants;[1458] supporters argue that it will increase participation.[1459] Likewise, opponents contend that package bidding will decrease revenues,[1460]

[1453] For example, a bidder can indicate that it will bid five percent more than the previous clock price for a license, even if it is not willing to bid at a ten percent clock increment.

[1454] *See, e.g.*, T-Mobile Comments at 43–44 (asserting that intra-round bidding offers bidders greater flexibility to respond to price changes, would allow the Commission to use larger bid increments, and would reduce the number of bidding rounds, which would decrease the time required by a traditional SMR auction without placing additional burdens on bidders); CEA Comments at 32 n.78 (agreeing that intra-round bidding could greatly speed up the auction process, which is important given the interdependence of the reverse and forward auctions).

[1455] Package bidding procedures would permit bidding on all-or-nothing groups of licenses as well as on individual items within those groups.

[1456] A number of commenters, particularly larger carriers, support package bidding, or at least the use of limited package bidding, in part to address "exposure risk." *See, e.g.*, CEA Comments at 19; Mobile Future Comments at 5; AT&T Comments at 7, 51; Letter from Joan Marsh, Vice President Regulatory Affairs for AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Apr. 2, 2014) (AT&T Apr. 2, 2014 *Ex Parte* Letter); T-Mobile Reply at 62; Verizon Comments at 49–50; Letter from Tamara Preiss, Vice President Regulatory Affairs for Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 3–4 (filed Mar. 20, 2014) (Verizon Mar. 20, 2014 *Ex Parte* Letter). The exposure problem exists when a bidder may win less than the number of licenses needed to support the aggregate bid. *But see* T-Mobile Reply at 64–65; T-Mobile Apr. 23, 2013 *Ex Parte* Letter at 2 (proposing limited bid withdrawals as an alternative to offering package bidding to address the risk of geographic exposure).

[1457] *See, e.g.*, C Spire Reply at 4–5; CCA Comments at 18; Letter from Jonathan Foxman, President of Cellular One, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 1 (filed Oct. 17, 2013) (Cellular One Oct. 17, 2013 *Ex Parte* Letter); KSW Reply at 6–7; Leap Comments at 2, 9; MetroPCS at 10; RTG Comments at 9; US Cellular Reply at 38–40.

[1458] *See* C Spire Reply at 4–5; CCA Comments 18; KSW Reply at 6–7; Leap Comments at 9; MetroPCS Comments at 10, 14; US Cellular Reply at 39–40.

[1459] *See, e.g.*, T-Mobile Reply at 63. *But see* Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Promoting Competition, Curtailing Excessive Market Power Attachment at 12 (filed Jan. 24, 2014) (T-Mobile Jan. 24, 2014 *Ex Parte* Letter, Attachment) (stating that package bidding raises complex questions and creates problems like creating excess supply).

[1460] *See, e.g.*, CCA Reply at 10 ("[C]ombinatorial bidding can enable larger carriers to acquire a particular license at sub-optimal valuation by packaging it with other licenses, which not only would generate lower auction proceeds, but also would risk excluding smaller carriers that would place a higher valuation on the license."); US Cellular Reply at 41 ("It is a well-settled economic principle that decreased participation leads to lower auction revenues . . . [and] package bidding would in fact decrease the odds of meeting the closing conditions.").

and supporters argue the opposite.[1461] We agree with small carriers that package bidding could bring unnecessary complexity into an already complex auction.[1462]

511. An alternative to package bidding on which the *Comment PN* will seek input may strike a compromise between the larger carriers' interests in ensuring a minimum scale of operations in urban areas and smaller bidders' interests in smaller markets.[1463] Under this alternative, the Commission would create an aggregation of the largest PEA licenses.[1464] A bidder could indicate interest in the aggregated PEAs or in individual PEAs not included in the aggregation. Unlike package bidding formats that would give a bidder the option of placing an all-or-nothing package bid on a group of licenses or bidding separately on the licenses comprising the package, bids would not be accepted for the individual PEAs included in the aggregation of PEAs.

512. We may conduct an extended round of bidding after the clock bidding rounds to increase the likelihood that the auction will conclude at the end of the current stage, thereby avoiding the need to move to another stage in which less spectrum would be available for licensing in the forward auction.[1465] If, at the end of the clock bidding rounds, the proceeds raised are insufficient to satisfy the final stage rule, but are within some range of the required amount, an extended bidding round would allow the provisionally winning bidders to indicate willingness to accept higher prices to close the gap.[1466] The current record supports the use of extended rounds to close a proceeds gap, but commenters disagree as to when and how to implement such rounds.[1467] We will determine those implementation details in the *Procedures PN* based on additional public input, including the particular circumstances under which extended rounds would be implemented during the forward auction.

[1461] *See, e.g.*, AT&T Comments at 7; AT&T Reply at 56 ("Because of the exposure problem, the absence of a package-bidding mechanism would reduce forward-auction revenues and increase the risk of auction failure.").

[1462] *See* CCA Reply at 10; KSW Reply at 6–7; Leap Comments at 2; MetroPCS Comments at 13; US Cellular Comments at 51–52. *Contra* AT&T Reply at 58; Verizon Reply at 45.

[1463] RWA and NTCA support a proposal by NERA that suggests conducting forward auction bidding in two phases, with bidding in the first phase for licenses in urban areas and bidding in the second phase for licenses in non-urban, smaller geographic areas. *See* NERA *PEAs PN* Comments at 32; RWA/NTCA *PEAs PN* Comments at 10–13. Several small carriers support NERA's two-phase proposal, *see, e.g.*, Pioneer *PEAs PN* Reply at 6; Copper Valley *PEAs PN* Reply at 5, which is primarily directed at facilitating a geographic licensing scheme with areas smaller than EAs, and as such, is addressed above, where we determine that we will use a scheme based on smaller PEAs. *See* § III.A.2.c (Geographic Area Licensing). Hence, we do not here address the merits of the two-phased bidding proposals, but note that we agree with other commenters that they would add significant complexity to the forward auction bidding process. *See* AT&T *PEAs PN* Comments at 9; CCA *PEAs PN* Comments at 2–3; C Spire *PEAs PN* Comments at 4–5; T-Mobile *PEAs PN* Reply at 12–13.

[1464] PEAs are discussed in § III.A.2.c (Geographic Area Licensing).

[1465] Section 1.2103(b)(1)(v), as revised in this proceeding, provides for collecting bids in any needed additional stage or stages following an initial single or multiple round auction, such as an extended bidding round or an assignment stage for generic items. *See* Appendix A.

[1466] *See NPRM* 27 FCC Rcd at 12567 (Appendix C). The specific circumstances, including the range of proceeds, that will trigger an extended bidding round will be discussed in more detail and established in the pre-auction process. Any such subsequent bidding will not by itself change the set of provisional license winners.

[1467] Verizon generally supports the use of extended rounds in the forward auction to help meet revenue requirements, whereas AT&T proposes extended bidding rounds in both the forward and reverse auctions once excess supply and demand are eliminated. *See* Letter from Leora Hochstein, Counsel for Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 1 (filed July 2, 2013) (Verizon July 2, 2013 *Ex Parte* Letter); AT&T Comments at 11–12, 71. T-Mobile argues that the use of extended rounds may best be combined with its proposed "last-call" approach to address any revenue shortfall in the forward auction. T-Mobile Reply at 80. Under this proposal, the Commission would offer wireless carriers an opportunity to cover a shortfall before any extended rounds. *See* T-Mobile Reply at 82–83.

b. Bid Assignment Procedures: Determining Winning Bidders and Assigning Frequency-Specific Licenses

513. *Background*. The bid assignment procedures for the forward auction will determine which bidders win which new licenses. As discussed above, under the ascending clock format, winning bidders for generic licenses in the categories offered would be determined during the clock bidding rounds, contingent on the incentive auction closing at that stage. An assignment mechanism then would assign corresponding frequency-specific licenses, and could take into account the need for bidders winning multiple licenses to obtain frequency or geographically contiguous blocks, as well as any bidding contingencies such as a package bidding alternative. The Commission proposed in the *NPRM* to revise its existing rules, in part, to provide explicitly for auction procedures directly addressing bid assignment procedures.[1468]

514. Commenters suggest several approaches to assigning specific frequencies to winners of generic licenses, including competitive bidding procedures[1469] and administrative or non-competitive procedures.[1470] Several commenters advocate assignment procedures that will ensure contiguous frequency blocks to bidders that win multiple blocks of spectrum in the same category within an area.[1471] On the other hand, some commenters warn that facilitating contiguity will exacerbate interoperability concerns.[1472]

515. *Discussion*. We adopt a two-step assignment procedure for the forward auction: the clock rounds will first determine that a bidder will win one or more generic licenses in a category, and an assignment mechanism subsequently will determine specific frequency assignments. This two-step process will give bidders the benefits of price discovery in the clock rounds, permitting them to shift bidding strategies as the relative prices of different categories of licenses change, while still realizing the speed advantages of bidding for generic licenses. Knowing that the assignment mechanism will enable them to express preferences for frequency-specific licenses, bidders will be able to bid more confidently for generic licenses in the clock rounds. We also revise the Part 1 rule concerning bid assignment

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[1468] *NPRM*, 27 FCC Rcd at 12456, para. 299.

[1469] *See*, *e.g.*, AT&T Comments at 8–9 ("To the extent the rules do not specify complete assignment outcomes, the Commission should allow for supplemental bids during a subsequent 'assignment phase.'").

[1470] *See, e.g.*, US Cellular Reply at 25 (advocating completely random assignment and opposing subsequent bidding); T-Mobile Comments at 21–22; CCA Reply at 9; Verizon Comments at 46 (supporting administrative assignment with market correction); WSA Comments at 26–27 (recommending a type of administrative scheme under which winning bidders would not receive a specific frequency allocation until deployment, at which time frequency allocations would be implemented dynamically based on "actual use and deployment in a given geographic area").

[1471] Commenters supporting this type of contiguity sometimes refer to it as "vertical" contiguity. *See, e.g.*, Mobile Future Reply at 5; Sprint Comments at 10; Verizon July 2, 2013 *Ex Parte* Letter at 1; RIM Comments at 6–7; Qualcomm Comments at 21–22; Alcatel-Lucent Comments at 25; AT&T Comments at 8, 59–61. Many commenters also support horizontal contiguity across geographic areas. For instance, AT&T notes that bidders' valuation of spectrum will increase to the extent assignment rules yield as much horizontal contiguity as possible. AT&T Comments at 59. Verizon argues that "[n]o parties dispute the merits of contiguous and consistent blocks across EAs." Verizon Reply at 49. *But cf.* T-Mobile Reply at 51 (supporting a quasi-random assignment structure that would facilitate vertical contiguity for winning bidders with more than one block within a Metropolitan Economic Area (MEA), and horizontal contiguity for winning bidders with licenses throughout an MEA, but opposing horizontal contiguity across multiple MEAs).

[1472] *See, e.g.*, US Cellular *Band Plan PN* Comments at 13 n.51 (recommending an entirely random assignment process that would not prioritize contiguity); T-Mobile Reply at 51 (arguing that the Commission should limit the amount of contiguous spectrum it assigns across EAs in light of interoperability concerns). *See* § VI.B.1.e (Interoperability Rule).

procedures to create a consistent framework for addressing these procedures in the reverse and forward auctions.[1473]

516. The first step of the assignment procedure, which takes place in the clock rounds, is discussed in the preceding Section. The clock rounds will end in a stage with bidders winning generic licenses in each category of licenses in each geographic area, contingent on the final stage rule being satisfied. If the final stage rule is satisfied, the second step of the assignment procedure will assign specific frequencies to the winning bidders through the special assignment mechanism. If the rule is not satisfied in a stage of the forward auction, then the special assignment mechanism will not be run in that stage.

517. The assignment mechanism will consist of a single bidding round, or a series of separate bidding rounds, in which bidders will bid for priority in selecting bands or for a preferred frequency within a geographic area.[1474] The frequency preferences of the bidders willing to pay the highest premiums will be honored, to the extent technically possible. The payment rule for the assignment round will be determined in the *Procedures PN*.

518. There is support in the record for our choice of assignment mechanism.[1475] The use of a competitive bidding round will give bidders an opportunity to indicate their preferences for specific frequencies, facilitating the assignment of specific frequencies to the highest-valuing users.[1476] An administrative, random, or quasi-random assignment process would not have this advantage of taking users' particular preferences into account and thus may undermine the efficiency of the ultimate license assignments. To the extent that some commenters would prefer an administrative assignment mechanism in order to facilitate interoperability, we note that we will require interoperability throughout the 600 MHz Band, which ensures interoperability regardless of how many band classes are created for the 600 MHz Band.[1477] We choose to address interoperability concerns directly through this requirement rather than indirectly through auction design.

c. Procedures to Determine Payments

519. *Background*. In addition to an assignment round to determine which frequencies are assigned to winning bidders, the Commission proposed an additional bidding opportunity—an extended round—beyond the clock phase of the forward auction to permit bidders to increase their bids if necessary

[1473] The assignment procedures likely to be used in the forward auction are consistent with the Commission's existing competitive bidding rule. We find, however, that the revised rule provides greater clarity with respect to the options likely to be used. For example, as revised in this proceeding, § 1.2103(b)(2) expressly authorizes an auction in which the assignment of winning bids is based on a variety of factors in addition to the submitted bid amount, including but not limited to bids submitted in a separate competitive bidding process, such as an auction to establish incentive payments for the relinquishment of spectrum usage rights—i.e., the reverse auction. *See* Appendix A.

[1474] The winning clock price could include a payment determined in an extended round of bidding. *See* § IV.C.2.c (Forward Auction Procedures to Determine Payments).

[1475] *See* AT&T Comments at 8–9, 42, 62 (stating that supplemental assignment-round bidding "may indeed be an efficient and appropriate means of assigning actual licenses"); Verizon Comments at 46 (noting it is not categorically opposed to competitive bidding to assign forward auction licenses); *see also* NERA *PEAs PN* Comments at 32 (describing a bifurcated forward auction and noting that "[t]he assignment round for award of specific frequencies to winning bidders from the Forward Auction could take place as planned after completion of the two bidding phases"). Some commenters, however, contend that bidding in an assignment phase will give bidders an incentive to make lower bids in the clock auction phase. *See, e.g.*, T-Mobile Comments at 21; T-Mobile Reply at 50.

[1476] *See* Verizon Comments at 46 (arguing that the assignment phase "must be transparent, predictable, and reflect bidder preferences to the extent possible").

[1477] *See, e.g.*, T-Mobile Reply at 51. *See also* § VI.B.1.e (Interoperability Rule).

to meet final stage rule, thereby avoiding the need for a new stage with less spectrum available.[1478] The Commission proposed to revise the existing Part 1 competitive bidding rules to provide explicitly for procedures to determine payments through the extended and assignment rounds.[1479]

520. *Discussion*. We determine that the final prices winning bidders in the forward auction will pay for spectrum licenses will be based on the final clock prices for generic licenses, modified by any additional payments determined in an extended round aimed at satisfying the final stage rule and in the assignment round to assign frequency-specific licenses.[1480] As discussed above, the assignment round will serve important auction goals by allowing bidding on generic licenses during the clock rounds, thereby expediting the forward auction bidding process. Likewise, the extended bidding round may help to expedite the incentive auction by giving forward auction bidders the opportunity to satisfy the final stage rule and thereby avoid the need to run another stage of the auction.

521. We also revise the Commission's Part 1 rules governing payment determination procedures. Although the procedures in the forward auction will be consistent with the existing competitive bidding rule, the revised rule provides greater clarity with respect to the tools available to the Commission.[1481]

d. Additional Bidding Procedures

522. *Background.* As noted in the *NPRM*, the Commission's existing Part 1 competitive bidding rules include, in addition to provisions regarding bid collection, bid assignment, and bid payment procedures, additional competitive bidding mechanisms for sequencing or grouping licenses offered; reserve prices, minimum opening bids and minimum or maximum bid increments; stopping or activity rules; and payments in the event of bid withdrawal, default, or disqualification.[1482] Noting that the rules did not exhaustively list all potential bidding mechanisms, the Commission proposed in the *NPRM* to revise the list of options set forth in section 1.2103.[1483] It further proposed to revise its rules for stopping an auction to permit it to terminate multiple round auctions within a reasonable time and in accordance with the goals, statutory requirements, and rules for the incentive auction, including the reserve price or prices.[1484]

523. *Discussion.* We adopt the proposal to revise the Commission's competitive bidding rules with respect to auction design options and competitive bidding mechanisms.[1485] These revisions are

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[1478] *NPRM*, 27 FCC Rcd at 12379, para. 65.

[1479] *Id.* at 12456, para. 299.

[1480] We received no comments directly addressing how to determine final license prices in response to the *NPRM*, but commenters will be able to provide input on final, specific auction procedures in the pre-auction process.

[1481] Section 1.2103(b)(3), as revised in this proceeding, highlights the need for auction design to address payment rules and does so in terms that can be used consistently across Commission competitive bidding, including the forward auction component of incentive auctions and standard spectrum license auctions. *See* Appendix A.

[1482] *See NPRM*, 27 FCC Rcd at 12457, para. 300 (citing applicable rule sections).

[1483] *Id.* at 12456, para. 299. The Commission also noted that the procedures established to implement these broad auction design elements should take into account sound economic principles and practices and the needs of the Commission and the bidders. *Id.*

[1484] *Id.* at 12457, para. 301.

[1485] We make clarifying edits to the text of the proposed rules set forth in the *NPRM* without changing their substance. As discussed elsewhere, we also change the rule regarding the contents of applications to participate in the forward auction regarding the identification of categories of licenses on which the applicant wishes to bid and with respect to certifications the application must include. *See* §§ IV.C.1.d (Forward Auction – National Security Certification); IV.C.2.a (Forward Auction Bid Collection Procedures). Likewise, we modify the language of the rule regarding upfront payments so that it can be applied to circumstances in which an applicant identifies categories of licenses on which it wishes to bid rather than particular licenses, we move language regarding bid apportionment

(continued….)

essential to assuring consistency in the framework for the reverse and forward auctions. Many of the auction procedures and mechanisms addressed in the revised rules will be the subject of more fully informed discussion during the upcoming pre-auction process.[1486]

3. Deletion of Outdated 1.2102(c)

524. In the *NPRM*, the Commission proposed deleting section 1.2102(c), a list specifically exempting from competitive bidding identified services, such as UHF Television.[1487] This rule was adopted prior to the Balanced Budget Act of 1997, which mandated the use of competitive bidding in circumstances where it was previously discretionary, while also adopting specified exemptions from that mandate.[1488] The Commission codified the statute's current categorical exemption in section 1.2102(b).[1489] Anon. Part 90 contends that the proposed deletion would subject Part 90 Private Land Mobile services to competitive bidding notwithstanding the exemption from competitive bidding provided by the Communications Act, specifically section 309(j)(2).[1490] However, that argument overlooks the fact that section 1.2102(b) separately codifies the protections afforded under section 309(j)(2) of the Communications Act. Thus, the proposed deletion would not change the extent to which the Part 90 licensees are subject to competitive bidding. Instead, it simply brings the Commission's rules into accord with the statute.[1491] Accordingly, we delete section 1.2102(c).

V. THE POST-INCENTIVE AUCTION TRANSITION

525. In this Section, we address the post-auction transition in the reorganized UHF band for each of the services and operations that currently operate in the band, as well as post-auction broadcast regulatory issues and 600 MHz Band technical and service rules. Following completion of the reverse and forward auctions, the Media and Wireless Bureaus will announce the results of the incentive auction and the repacking process in the *Channel Reassignment PN*. The Public Notice will establish a 39-month transition period, and identify new channel assignments for full power and Class A television stations that have been reassigned to different channels. These stations will have three months to file their initial construction applications relating to their channel reassignments. Following the close of this three-month period, there will be a period of no more than three years during which time all full power and Class A television stations that are relocating, and all successful reverse auction bidders that have agreed to

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previously contained in 1.2103 to 1.2104, and we update cross-references contained in other sections as needed. *See also* §§ IV.C.1.c (Forward Auction), IV.C.3 (Deletion of Outdated 1.2102(c)).

[1486] The Commission's rules provide for the applicable procedures to be finalized in the pre-auction process, including procedures for bid withdrawal. *See* Appendix A revising §§ 1.2103(b)(vi) (procedures for modifying bids during the auction), 1.2104(g) (potential liabilities for bid withdrawal); *see also* MetroPCS Comments at 16 (arguing that the Commission's bid withdrawal rules must guard against a circumstance where a legitimate, but stranded, bidder is forced to pay a penalty for what was a bona fide bid when entered).

[1487] *NPRM*, 27 FCC Rcd at 12454, para. 291 n.423. Footnote 423 should have read "propose to delete," rather than "delete" given the procedural context. *See id.* at 12498 (Appendix A) (proposed change to § 1.2102). Further, given the statutory limitations on competitive bidding, the footnote should have noted that "the services" listed in § 1.2102(c) "are subject to competitive bidding" *and exceptions therefrom* "under current law."

[1488] *Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended*, WT Docket No. 99-87, Report and Order, 15 FCC Rcd 22709 (2000).

[1489] *See* 47 C.F.R. § 1.2102(b).

[1490] 47 U.S.C. § 309(j)(2). *See* Anon. Part 90 Comments at 5–7.

[1491] B. Kobb expresses concern about the effect on the exemption from competitive bidding of Personal Radio Services under Part 95 if § 1.2102(c)(8) is deleted. B. Kobb Reply at 1. As detailed above, § 1.2102(c) has been superseded by revisions to §§ 309(j)(1) and (2) of the Communications Act, codified in 47 C.F.R. §§ 1.2102(a), (b). The deletion of § 1.2102(c) therefore will not change the extent to which services, including Part 95 Personal Radio Services, are subject to competitive bidding under the current statute, contrary to B. Kobb's concern. *Id.*

voluntarily relinquish some or all of their spectrum usage rights, must cease operations in those portions of the current broadcast UHF television bands that are being repurposed. During this transition period, 600 MHz licensees will be able to commence operations.

526. Below, we first address when the reverse and forward auctions will be "complete," and when the repacking process will be "effective," within the meaning of the Spectrum Act. We next address the processing of bid payments. We then turn to transition procedures for full power and Class A television stations, as well as reimbursement procedures for full power and Class A stations and MVPDs. We next describe transition procedures concerning the various secondary services and unlicensed operations—LPTV and TV translator stations, BAS, LPAS and unlicensed wireless microphones operations, and TVWS device and other unlicensed operations—in the UHF band. The Commission has overseen complex transitions before, including the transition from analog to digital television completed in 2009 ("DTV transition"). The Commission's experience in overseeing the DTV transition informs our implementation of the channel reorganization necessitated by the Spectrum Act. Based on this experience as well as the extensive record in this proceeding, we believe that we have created a framework for completing the post-auction transition as smoothly and efficiently as possible.

A. Auction Completion and Effective Date of the Repacking Process

527. *Background*. The Spectrum Act directs that no reassignments or reallocations may become effective until the completion of the reverse auction and the forward auction.[1492] After the reverse and forward auctions are "complet[e],"[1493] the "effective" date of any spectrum reassignments and reallocations signals the end of the statutory confidentiality requirement for reverse auction participants,[1494] as well as the beginning of the Commission's authority to borrow up to $1 billion from the U.S. Treasury to accelerate relocation payments to broadcasters and MVPDs for repacking expenses.[1495] In addition, the FCC must make any relocation reimbursements from the TV Broadcaster Relocation Fund ("Reimbursement Fund") within three years of the completion of the forward auction.[1496]

528. The Commission proposed in the *NPRM* to interpret completion of the reverse and forward auctions to mean when the Commission publicly announces that each auction has ended. In addition, the Commission proposed to interpret the effective date for reassignments and reallocations to mean when the Commission publicly announces the results of the reverse auction, the forward auction, and the repacking process.[1497] The Commission noted that these announcements could be released sequentially or simultaneously. The Commission sought comment on these proposals and on any alternatives.[1498]

529. *Discussion*. We adopt the proposal that the reverse and forward auctions will each be "complete" within the meaning of the Spectrum Act when a public notice announces that each auction, respectively, has ended.[1499] In addition, the reassignments and reallocations will be "effective" for purposes of the statute when the Media and Wireless Bureaus release the *Channel Reassignment PN* specifying the new channel assignments and technical parameters of any stations that are assigned new

[1492] Spectrum Act § 6403(f)(2). In addition, no reassignments or reallocations of broadcast television spectrum may become effective unless the proceeds of the forward auction exceed the sum specified in § 6403(c)(2).

[1493] *Id.* § 6403(f)(2).

[1494] *Id.* § 6403(a)(3).

[1495] *Id.* § 6403(d)(3).

[1496] *Id.* §§ 6403(b)(4)(D), (d)(4).

[1497] The Spectrum Act provides that to the extent practicable, all reassignments and reallocations shall become effective simultaneously. Spectrum Act § 6403(f)(2).

[1498] *NPRM*, 27 FCC Rcd at 12447, para. 260.

[1499] *Id.*

channels in the repacking process or that become winning bidders in the reverse auction to change channels.[1500] This approach is consistent with the common meaning of the terms complete and effective, with the typical practice of issuing a public notice announcing the results of each auction as soon as the results have been finalized, and with the practical requirements of the UHF band transition. We anticipate that the public announcements regarding completion of the reverse auction, completion of the forward auction, and the effective date of the reassignments and reallocations will occur simultaneously and may be combined in one public notice, if practicable.

530. We decline to adopt broadcasters' suggestion to delay the completion of the forward auction until after broadcast stations reassigned to new channels in the repacking process file applications for construction permits to change channels and forward auction licenses have been issued.[1501] Broadcasters assert that this approach would allow them more time to finish relocating before the end of the three-year deadline for collecting relocation reimbursements from the Reimbursement Fund. Although we recognize that the three-year deadline for reimbursements will be challenging,[1502] the rules that we adopt today for administration of the Reimbursement Fund, which provide for payments to broadcasters and MVPDs based on their estimated costs,[1503] will help to ameliorate concerns about that deadline.[1504] Moreover, we conclude that the term "completion," used in section 6403(b)(4)(D) in the context of conducting the *forward* auction, cannot reasonably be interpreted to refer to when repacked broadcasters file construction permit applications.[1505]

531. The approach suggested by broadcasters also would have a number of negative consequences for the UHF band transition. The Spectrum Act directs that no reassignments or reallocations may become effective until the completion of the reverse auction and the forward auction,[1506] so we would have to require broadcasters to file applications for construction permits to change channels before the reassignments and reallocations become effective, injecting uncertainty into the UHF band transition. In addition, delaying the effective date would delay the Commission's ability to borrow $1 billion from the U.S. Treasury to expedite the reimbursement process.[1507] We do not believe that Congress intended to delay the Commission's access to the $1 billion loan because the very purpose

[1500] *See* § V.C.1.a (Construction Permit Application Filing Requirements).

[1501] Affiliates Associations Comments at 48; Affiliates Associations Reply at 15; NAB Comments at 49–51; State Broadcaster Associations Comments at 15. Similarly, Harris Broadcast argues that the Commission should declare the forward and reverse auctions complete and all reassignments and reallocations effective as of the date when it initiates the distribution of initial payments from the Reimbursement Fund. Harris Broadcast Comments at 21–22.

[1502] *See, e.g.*, NAB Comments at 50 (noting that completing the construction of relocated stations within three years may be challenging, particularly for stations in certain metropolitan areas and border areas).

[1503] *See* § V.C.5.b (Reimbursement Process).

[1504] We also note that, whether the three-year deadline reflects Congress's funding priorities or, as Harris Broadcast maintains, its wish to ensure prompt payment to broadcasters, it is a statutory deadline with which we must comply. *See* Spectrum Act §§ 6403(b)(4)(D), (d)(4); *see* Harris Broadcast Comments at 22 (arguing that Congress added the three-year deadline to the Spectrum Act not to penalize broadcasters or to reduce the likelihood that they would be compensated, but to ensure that broadcasters receive their payments in a timely manner).

[1505] *See* CTIA Reply at 51–53 (arguing that forward auction licensing should not have to await any final broadcast licensing matters); Verizon Reply at 29–30.

[1506] Spectrum Act § 6403(f)(2).

[1507] *Id.* § 6403(d)(3). Broadcast industry associations argue that the $1 billion Treasury loan is not necessary because the Reimbursement Fund could be funded by the down payments provided by winning bidders in the forward auction. *See* Affiliates Associations Reply at 16 n.36; NAB Comments at 49–50 n.72. But as we discuss below, *see* § V.B (Processing of Bid Payments), down payments provided by applicants for new licenses are not disbursed until the associated licenses are granted. Although we expect the licensing process to move forward quickly, the $1 billion Treasury loan may expedite payments to broadcasters and MVPDs.

of the loan is to expedite the availability of relocation funds. Further, delaying the effective date would prolong the statutory requirement that the Commission protect the confidentiality of the identities of reverse auction participants,[1508] thereby delaying the Commission's ability to release publicly the identities of the winning reverse auction bidders—a necessary prerequisite to the release of the channel reassignment information that broadcasters will need in order to file their applications for construction permits.

B. Processing of Bid Payments

532. *Background*. In accordance with section 309(j)(8)(G)(i) of the Communications Act, the Commission will share with successful bidders that voluntarily relinquish licensed spectrum usage rights a portion of the forward auction proceeds "based on the value of [their] relinquished rights as determined in [a] reverse auction."[1509] Section 6403(c) of the Spectrum Act provides that the amount of the proceeds that the Commission will share with a broadcast television licensee will not be less than the amount of the licensee's winning bid in the reverse auction.[1510] The Commission proposed to incorporate these statutory requirements into the competitive bidding rules for the reverse auction and sought comment on this proposal.[1511] The *NPRM* sought comment on timing and procedures for auction proceeds disbursements.[1512]

533. The Commission must disburse winning bid payments by forward auction participants in compliance with statutory requirements. As discussed in connection with the integration of the reverse and forward auctions, we will determine whether the final stage rule for the incentive auction is satisfied and reallocations and reassignments may proceed based on the winning bids in the forward auction.[1513] Payments that bidders then make to honor those bids must be distributed, specifically to fund: (1) payments to broadcasters relinquishing spectrum usage rights; (2) specified FCC administrative costs; (3) relocation costs to be funded through the Reimbursement Fund; and (4) the Public Safety Trust Fund ("PSTF").[1514] The Spectrum Act does not specify a timetable for the distribution of auction proceeds, though it specifies some deadlines before which particular distributions must occur.[1515]

[1508] Spectrum Act § 6403(a)(3).

[1509] *Id.* § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(i)).

[1510] *Id*. § 6403(c)(1)(B).

[1511] *NPRM*, 27 FCC Rcd at 12452, para. 285.

[1512] *Id.* at 12452–53, paras. 283–84, 286–88. *See also* 47 C.F.R. §§ 1.1910(b)(2), 1.2105(a)(2)(x), (b)(1). In part, the Commission sought comment on whether to modify its red light procedures, which require that action on an application be withheld until full payment is made on any non-delinquent debt owed to the Commission, in connection with the incentive auction. *NPRM*, 27 FCC Rcd at 12453, para. 288. We received no comments directly addressing this issue. As a result, we are not modifying those procedures at this time.

[1513] *See* § IV.A (Overview and Integration of Reverse and Forward Auctions).

[1514] *See* Spectrum Act §§ 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)(II)), 6403(c)(2). One of the conditions of the final stage rule is that sufficient proceeds are recovered to meet statutory minimum requirements plus any amount necessary to fund the PSTF for FirstNet. *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions). We note that auction proceeds are comprised only of the payments of winning bids for spectrum licenses by participants in the forward auction. Upfront or pre-auction deposits or payments are applied toward liabilities incurred in the auction, returned to unsuccessful bidders, or applied toward the amount of winning bids and, therefore, do not provide a separate component of auction proceeds. *See* 47 U.S.C. § 309(j)(8)(C); 47 C.F.R. §§ 1.2106(d), (e). *Cf.* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii) ("the proceeds (including deposits and upfront payments from successful bidders) from any auction")).

[1515] *See generally* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)). Deadlines are provided for the transfer of unused funds in the Reimbursement Fund three years after the completion of the forward auction, *see* Spectrum Act § 6403(d)(4), and for making deposits of remaining incentive auction proceeds before the end of fiscal year 2022 into the PSTF and after the end of fiscal year 2022 into the Treasury general fund, *see* Spectrum Act §

(continued….)

534. *Discussion*. Addressing first the issue that attracted the most attention from commenters,[1516] we will share auction proceeds with broadcasters relinquishing spectrum usage rights as soon as practicable following the successful conclusion of the incentive auction, as suggested by several wireless carriers and trade groups.[1517] We will not adopt a rigid deadline for disbursing those proceeds.[1518] In all spectrum license auctions, the Commission disburses auction proceeds only after spectrum licenses associated with winning bids have been granted, absent express statutory direction to do otherwise. That is, only after the Commission grants a spectrum license to a winning bidder does the Commission disburse any payments made in connection with the license to the FCC's administrative account or to the Treasury.[1519] Furthermore, the Commission has granted spectrum licenses post-auction on a rolling basis, as license applications filed by winning bidders are ready to be granted.[1520] Thus, amounts become available for distribution on a rolling basis over time and at intervals tied to the licensing process. Given these facts, a specific deadline for sharing proceeds is not feasible.

535. The Spectrum Act does not permit us to make reimbursement payments to relocated broadcasters before completion of the forward auction using funds collected as down payments from bidders in the forward auction, as suggested by NAB.[1521] Section 6403(b)(4)(A) of the Spectrum Act directs the Commission to reimburse broadcasters "from amounts made available under [section 6403(d)(2)]," which includes two categories of "amounts": (1) "[a]ny amounts borrowed under [section 6403(d)(3)(A)]," and (2) "any amounts in the [Reimbursement Fund] that are not necessary for reimbursement of the general fund of the Treasury for such borrowed amounts."[1522] Neither source of funding will be available to the Commission until the forward auction is complete. With regard to the first category, under section 6403(d)(3)(A), the Commission has no borrowing authority until "the date when any reassignments or reallocations under [section 6403(b)(1)(B)] become effective, as provided in [section 6403(f)(2)]." Section 6403(f)(2) in turn provides that "no reassignments or reallocations under [section 6403(b)(1)(B)] shall become effective until the completion of the reverse auction . . . and the forward auction."[1523] Thus, the statute prohibits reimbursements from the first category prior to the completion of the forward auction. With regard to the second category, there will be no auction proceeds to be deposited in the Reimbursement Fund prior to completion of the forward auction. The Spectrum

(Continued from previous page)
6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)(II)). Neither of these deadlines requires distributions of specific amounts by any particular date.

[1516] Virtually all of the comments submitted with respect to post-auction payments address the timing of payments only.

[1517] *See, e.g.*, EOBC Comments at 23; EOBC Reply at 11–12; Mobile Future Comments at 20; TIA Comments at 16; Tribune Comments at 9; US Cellular Reply at 14; Vision Comments at 11. In contrast, some commenters suggest that the Commission should adopt certain milestones that broadcasters must meet prior to receiving incentive payments and Reimbursement Fund payments. *See, e.g.*, T-Mobile Reply at 94; Sprint Comments at 13.

[1518] Several commenters support establishing a fixed deadline for the Commission to make incentive payments. *See, e.g.*, EOBC Comments at 23 (supporting payments within 45 days after completion); Mobile Future Comments at 20; Vision Comments at 11 (supporting payments within 30 days after the broadcaster surrenders its license).

[1519] The Commission does not disburse the upfront or down payments from winning bidders who default on their post-auction obligations prior to the issuance of their licenses. *See* Tribune Comments at 11 n.19 (arguing that if an auction winner defaults prior to making its final payment, either before or after down payments are due, any monies deposited for the auction should be included in the distribution to reverse auction participants).

[1520] Any single application may cover up to all of the licenses won by the applicant and the associated winning bids may be in any amount, i.e., there is no fixed correlation between the number of applications and the number of licenses granted or the amount of related payments.

[1521] *See* NAB Comments at 49–50 n.72.

[1522] Spectrum Act §§ 6403(b)(4)(A), (d)(2).

[1523] *Id.* § 6403(f)(2).

Act provides that deposits and upfront payments from "successful bidders" constitute auction proceeds,[1524] but such "successful bidders" will not exist prior to the completion of the forward auction.[1525] Therefore, we do not have authority under the Spectrum Act to issue reimbursement payments to relocated broadcasters prior to the completion of the forward auction.

536. We are committed to disbursing auction proceeds as promptly as possible while meeting all of our statutory responsibilities. We do not interpret the Spectrum Act to require or prohibit prioritizing any particular initial distributions of auction proceeds over others.[1526]

537. With respect to relevant procedural matters, we also adopt the Commission's proposed rule incorporating the statutory requirements in section 309(j)(8)(G)(i) of the Communications Act and section 6403(c) of the Spectrum Act concerning incentive payments into our competitive bidding rules.[1527] In addition, we adopt the Commission's proposal to require successful bidders in the reverse auction to submit additional information to facilitate incentive payments.[1528] As mentioned in the *NPRM*, we envision that the information would be submitted on standardized incentive payment forms similar to the Automated Clearing House ("ACH") forms unsuccessful bidders in typical spectrum license auctions use to request refunds of their deposits and upfront payments.[1529] This information collection is necessary to facilitate incentive payments and should not be burdensome to successful bidders. Specifically, without further instruction and bank account information from successful bidders, the Commission would not know where to send the incentive payments.

538. We will disburse payments to the licensee that is the reverse auction applicant when sharing proceeds from the auction.[1530] This approach will ensure that the person who legally holds the license receives forward auction proceeds in return for relinquishing spectrum usage rights. We received

[1524] *Id.* § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)).

[1525] *Cf.* 47 U.S.C. § 309(j)(8)(C)(ii) (generally requiring return of deposits to unsuccessful bidders following the conclusion of competitive bidding).

[1526] *See* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)) (no express prioritization). We note, however, that payments deposited in the Reimbursement Fund must repay any Treasury loan before funding additional relocation reimbursements. *See* Spectrum Act § 6403(d)(2) (reimbursement of relocation to be made from funds borrowed from Treasury or from the Reimbursement Fund); *id*. § 6403(d)(3)(B) (Treasury reimbursement "as funds are deposited" into the Reimbursement Fund). We expect that payments to broadcasters relinquishing spectrum usage rights will be among the first disbursements once amounts become available for distribution. This approach addresses Tribune's contention that broadcasters should not bear financial risks stemming from any forward auction licensing delays or forward auction bidder defaults. *See* Tribune Comments at 9–10; *but see* CTIA Reply at 54 (arguing that the additional financial protections that Tribune seeks for broadcasters participating in the reverse auction are unnecessary and would "unduly complicate the auction process and undermine the auction's efficiency and success"). *Cf.* Spectrum Act § 6413(b) ("As amounts are deposited in the [PSTF], such amounts shall be used to make the following deposits or payments in the following order of priority . . . .").

[1527] *See NPRM*, 27 FCC Rcd at 12452, para. 285.

[1528] *See id.* at 12452, para. 283. We note that the Commission's existing Part 1 competitive bidding rules will govern the post-forward auction process, including the submission of bid payments and long-form applications. *See* 47 C.F.R. § 1.2107. Specific details concerning forward auction bid payments and long-form filing requirements, including related deadlines, will be set forth in a public notice. *See* Tribune Comments at 9 (suggesting that the Commission require full payment from forward auction winners within a short time after the forward auction closes).

[1529] *See* 27 FCC Rcd at 12452, para. 283. We received no comments directly commenting on this proposal. The Commission intends to follow winning reverse auction bidders' payment instructions as set forth on their respective standardized incentive payment forms to the extent permitted by applicable law. *See* CIT Comments at 4 ("The Commission can also honor its payees' instructions specifying how, and to what accounts, payments are to be directed.").

[1530] *See NPRM*, 27 FCC Rcd at 12452, para. 286.

no comments from broadcast television licensees suggesting an alternative approach.[1531] Further, our decision is consistent with the Spectrum Act, which repeatedly refers to sharing forward auction proceeds with licensees.[1532]

C. Transition Procedures for Television Stations and Reimbursement Procedures for Television Stations and MVPDs

539. As the Commission recognized in the *NPRM*, implementing the results of the incentive auction will be a complex and challenging undertaking for broadcasters.[1533] After the auction concludes and the results of the repacking process are announced, stations changing channels must be able to transition to their new channels in a manner that will minimize disruption to their viewers as well as other stations, wireless operators, and multichannel video programming distributors ("MVPDs").[1534] With this overarching goal in mind, we adopt rules and procedures with respect to: (1) the method by which station licensees will submit, and the Commission will process, applications for construction permits for newly assigned channels; (2) the opportunity stations will have to request alternate channels or expanded facilities on their newly assigned channels; (3) the schedule for stations to transition to new channels and the deadline by which stations must clear their pre-auction channels; (4) stations' consumer education requirements; and (5) stations' obligations to notify MVPDs.

540. We also address in this Section the process for reimbursing eligible broadcasters and MVPDs for reasonably incurred costs from the Reimbursement Fund. The Spectrum Act specifies that reimbursements from the Fund must occur within three years of the completion of the forward auction,[1535] and this finite period necessitates a prompt and efficient reimbursement process. Moreover, to provide the greatest possible assurance that broadcasters and MVPDs will receive reimbursement for all eligible expenses, the transition and reimbursement schedules must work in concert.

541. The Commission has overseen complex transitions before, including the transition from analog to digital television completed in 2009. The Commission's experience in overseeing the DTV transition informs our implementation of the transition necessitated by the Spectrum Act. Based on this experience as well as the extensive record in this proceeding, we believe that we have created a practical and efficient framework for completing the post-auction transition.

[1531] This question was addressed by CIT, a middle-market lender that regularly obtains and perfects liens on proceeds of its borrowers' FCC-issued licenses. *See* CIT Comments at 4 (recommending that the "Commission adopt payment procedures that could obviate the need for secured creditors to seek judicial remedies"). We decline to intervene between licensees and their creditors. We likewise decline CIT's request to characterize the nature of incentive payments. *See* CIT Comments at 4 ("[T]he Commission should unequivocally acknowledge that its payments to winning reverse auction bidders will be functional equivalents of proceeds derived from transactions among private parties."). Without taking issue with CIT's position, we find that characterizing the nature of incentive payments is a fact-specific determination that should be conducted on a case-by-case basis. *See also* Tribune Comments at 12–13; T-Mobile Reply at 97–98 (discussing the categorization of payments to broadcasters for tax purposes).

[1532] *See, e.g.*, Spectrum Act § 6402 (allowing the Commission to "encourage a *licensee* to relinquish voluntarily some or all of its licensed spectrum usage rights . . . by sharing with such *licensee* a portion . . . of the proceeds") (emphasis added); *id.* § 6403(a)(1) (requiring the Commission to "conduct a reverse auction to determine the amount of compensation that each *broadcast television licensee* would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights") (emphasis added).

[1533] *See NPRM*, 27 FCC Rcd at 12458, para. 308.

[1534] No broadcaster will be required to change the location of its transmission facility, but operation on a new channel will require modifications to existing facilities, ranging from relatively minor adjustments to more substantial changes depending on various factors.

[1535] *See* Spectrum Act § 6403(b)(4)(D).

1. License Modification Procedures

a. Construction Permit Application Filing Requirements

542. *Background*. Section 316 of the Communications Act authorizes the Commission to modify any broadcast television license in order to promote the public interest, convenience, and necessity.[1536] In addition, section 6403(h) of the Spectrum Act provides that the right that a broadcast television licensee ordinarily has to protest a modification to its license pursuant to section 316 does not apply in the case of a modification made in connection with the incentive auction.[1537] The Commission proposed in the *NPRM* to modify the licenses of stations that are assigned new channels in the reverse auction or repacking process based on the authority provided in these statutory provisions.[1538]

543. Channel allotments for full power television stations currently are codified in the Table of Allotments.[1539] Under the Commission's existing rules, a station must engage in a two-step process, including a rulemaking proceeding and a subsequent application process, to change the channel allotted to it in the Table of Allotments.[1540] In order to enable broadcasters to transition efficiently to their post-auction channels, the Commission proposed in the *NPRM* not to use the Table of Allotments and to use a simple minor change application process instead of the ordinary two-step process to change stations' channels.[1541] Specifically, the Commission proposed that, once the reverse and forward auctions are complete and the results of the repacking process are announced, stations that are assigned new channels would be required to file minor change applications for construction permits.[1542] The Commission sought comment on an appropriate construction permit application filing deadline.[1543] In order to encourage stations to file applications as promptly as possible, the Commission also proposed expedited processing for applications that are timely filed and comply with certain technical requirements.[1544]

544. *Discussion*. We adopt the proposal in the *NPRM* to modify the licenses of stations assigned new channels in the reverse auction or repacking process pursuant to section 316 of the Communications Act and section 6403(h) of the Spectrum Act. We will not use a codified Table of Allotments or rulemaking procedures to implement post-auction channel changes, and we will classify construction permit applications for post-auction channels as minor changes.[1545] We delegate authority to the Media and Wireless Telecommunications Bureaus to release the *Channel Reassignment PN* upon the conclusion of the auction specifying the new channel assignments and technical parameters of any stations that are assigned new channels in the repacking process or that submit winning bids to change

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[1536] 47 U.S.C. § 316; *see NPRM*, 27 FCC Rcd at 12461, para. 314.

[1537] *See* Spectrum Act § 6403(h).

[1538] *See NPRM*, 27 FCC Rcd at 12461, para. 314.

[1539] *See id.* at 12459, para. 309; *see also* 47 C.F.R. § 73.622(i).

[1540] *See NPRM*, 27 FCC Rcd at 12459, para. 309.

[1541] *See id.* at 12461-62, paras. 314-315.

[1542] Unlike major change applications, minor change applications are not subject to local public notice requirements or a 30-day petition to deny filing window. 47 C.F.R. §§ 73.3580, 73.3584.

[1543] *See NPRM*, 27 FCC Rcd at 12462, para. 316.

[1544] *See id.* at 12462-63, para. 317.

[1545] After the Commission completes the repacking and channel substitution process, the Media Bureau will resume using the current rulemaking process to make new channel allotments and intends to initiate a proceeding to amend § 73.622 of the rules to reflect all new full power channel assignments in a revised Table of Allotments. 47 C.F.R. § 73.622; *see also* 47 C.F.R. § 0.283(a) (delegating rulemaking authority to the Media Bureau regarding allotment of television channels). The revised Table of Allotments will reflect shared channel status and continue to reflect NCE status.

channels in the reverse auction.[1546] Stations that are reassigned in the repacking process or that submit winning UHF-to-VHF or high-VHF-to-low-VHF bids will be required to file minor change applications for construction permits using FCC Form 301, 301-CA, or 340.[1547]

545. No commenters urge us to use rulemaking or major change application procedures in this context. We note that issues that would be considered through the use of those procedures, such as preservation of service to existing viewers and compliance with our interference and other technical rules, will be addressed through the repacking methodology we will use to generate new channel assignments. Use of a rulemaking process also would be burdensome, cause delays, and would be inconsistent with the goal of expeditiously implementing the results of the auction and repacking process. In addition, the use of minor change applications will help facilitate an expeditious post-auction transition because they can be processed more quickly than major changes.[1548]

546. We will require stations to file their minor change applications during a three-month filing window that will begin upon the release of the *Channel Reassignment PN*.[1549] This period will provide stations with significantly more time to prepare their applications than the 45-day deadline that typically follows the conclusion of a channel change rulemaking proceeding.[1550] A longer filing period is appropriate because, in contrast to situations in which licensees petition the Commission to change channels, stations that are assigned new channels in the repacking process will have no prior input into the

[1546] The *Channel Reassignment PN* also will specify winning channel sharing bids. Channel sharing stations are required to file license applications as discussed in § V.B.1.c. (Channel Sharing Stations). Any application for a construction permit or license filed in accordance with the requirements discussed in § V.C.1 (License Modification Procedures) will not trigger the filing of competing applications. Consideration of competing applications would not serve the public interest in the unique context of the broadcast television spectrum incentive auction because it would create uncertainty for potential bidders, thereby chilling auction participation, and would delay the post-auction transition and the introduction of new services on repurposed spectrum. As discussed below, however, applications for expanded facilities or alternate channels filed during an applicable window may be mutually exclusive with one another.

[1547] These initial minor change applications for construction permits, including applications that propose permissible contour extensions, will be exempt from filing fees because affected stations will be filing to modify their existing authorizations solely in order to effectuate new channel assignments resulting from the repacking process. *See* paras. 553–555; 47 C.F.R. § 1.1116(a). We note, however, that an applicant requesting any additional modification will be subject to the appropriate fee.

[1548] This approach is consistent with our implementation of channel assignments during the DTV transition. *See Third DTV Periodic Review*, 23 FCC Rcd at 3059, para. 135 n.405.

[1549] This filing deadline will apply to all stations that are reassigned to a new channel in the repacking process or via a winning UHF-to-VHF or high-VHF-to-low-VHF bid, even if they wish to apply for an alternate channel or expanded facilities as discussed below.

[1550] We disagree with Univision that all stations should be given a 180-day period to file their construction permit applications. *See* Univision Comments at 15-16. Univision argues that a lengthy filing period is necessary because "third-party technical consultants . . . will need to load new databases for each client" in order to prepare engineering exhibits for construction permit applications. *Id.* This is not correct. Consistent with the Commission's action in adopting the Table of Allotments, we will load the technical parameters of newly assigned channels into our engineering database when we announce the new channel assignments. This information will be accessible through the Commission's CDBS Public Access Link (http://www.fcc.gov/encyclopedia/media-bureau-filing-systems-and-databases). Because technical consultants will be able to access and use this information, it will not be necessary for them to create individualized databases. We also disagree with Univision's other arguments in favor of a lengthier filing period. Three months should provide adequate time for antenna companies to evaluate the feasibility of achieving specified radiation patterns for most stations. Moreover, because the auction timing will be known well in advance of the commencement of the auction, antenna manufacturers, consultants, and other third parties involved in the application process should have adequate notice regarding the likely beginning of the transition process to make any staffing adjustments necessary to handle the resulting increase in business.

choice of channel. While we recognize that stations may need more time to prepare their applications than is typically afforded for voluntary channel changes, a three-month filing period will be adequate because the technical facilities stations must apply for will be specified in the *Channel Reassignment PN* and, consequently, the amount of engineering work stations will need to do before filing their applications will be limited. Stations unable to meet the three-month deadline for submission of their minor change application will have the option to seek a waiver no later than 30 days prior to the deadline.[1551] Because of the finite reimbursement period established in the Spectrum Act and the deadlines under which stations will be required to complete their transitions, however, we strongly encourage all stations to submit their applications by the three-month deadline, if possible.

547. Stations reassigned to different channels within their existing band will have the flexibility to propose transmission facilities in their initial construction permit applications that would slightly extend their coverage contour, as defined by the technical parameters specified in the *Channel Reassignment PN*.[1552] Our repacking methodology will preserve stations' existing antenna azimuth patterns and locations (i.e., their geographic coordinates and antenna height). However, some stations may need to request a slightly different antenna pattern or slightly different location than specified in the *Channel Reassignment PN* that necessarily may result in a slightly larger coverage contour in some directions. Such deviations may be necessary, for example, because the original antenna model is not available on the reassigned channel or because the dimensions of the new antenna necessitate a slightly different mounting location on a tower. Also, some stations reassigned to a different channel within their band may experience some loss in coverage area due to propagation differences between channels.

548. Accordingly, we will allow such stations to propose transmission facilities in their initial construction permit applications that will increase their coverage contour if such facilities: (1) are necessary to achieve the coverage contour specified in the *Channel Reassignment PN* or to address loss of coverage area resulting from their new channel assignment; (2) will not extend a full power station's noise limited contour or a Class A station's protected contour by more than one percent in any direction; and (3) will not cause new interference, other than a rounding tolerance of 0.5 percent, to any other station.[1553] We conclude that a one percent coverage contour increase is *de minimis* and that providing this flexibility will assist broadcasters in engineering their facilities and quickly transitioning to their new channels. Stations reassigned to a channel within the same band that wish to extend their contour area by more than one percent may do so as discussed below.[1554]

549. We decline to permit all reassigned stations to file initially for facilities that would extend

[1551] 47 C.F.R. § 1.3 (Rules may be "waived for good cause shown"). Any stations that are granted a waiver of the construction permit application deadline nonetheless will be required to complete their transition pursuant to the process and by the deadlines established in § V.C.2 (Construction Schedule and Deadlines*)*. Moreover, the fact that a station intends to file for an alternate channel or expanded facility as set forth in § V.C.1.b (Alternate Channel and Expanded Facilities Opportunities*)* would not constitute "good cause" for failing to meet the three-month filing deadline, except in those instances where it is impossible for the station to apply for the facility assigned in the repacking process. This could occur, for example, if a station is unable to construct the facility specified in the *Channel Reassignment PN* on the tower on which it is operating at the time the Public Notice is released.

[1552] *See NPRM*, 27 FCC Rcd at 12391, para. 101. Belo supports the proposal to allow broadcasters flexibility in selecting their post-auction facilities. Belo Comments at 8. Affiliates Association proposes that the Commission provide stations with greater flexibility in applying for their newly assigned channels in order to account for propagation differences between a station's current channel and its newly assigned channel, and the likelihood that a station will be unable to specify an antenna with a radiation pattern that precisely matches the antenna characteristics derived by the Commission's repacking software. Affiliates Associations Comments at 29.

[1553] In proposing facilities under this option, we will require stations to use an antenna that has a pattern that closely conforms to the coverage area based on the technical parameters in the *Channel Reassignment PN*.

[1554] *See* § V.C.1.b (Alternate Channel and Expanded Facilities Opportunities).

their coverage areas up to five miles in any direction.[1555] Although the Commission allowed expedited processing of certain expansion applications that satisfied this standard during the DTV transition,[1556] the circumstances are different here.[1557] In addition, such a large extension will not be necessary for stations reassigned to different channels within their existing band to achieve the coverage area defined by the technical parameters specified in the *Channel Reassignment PN*. We also find that adopting this proposal would create a significant potential for mutually exclusive applications, which would result in delays in the processing of initial construction permit applications.

550. We will not, however, impose a one-percent contour increase restriction on winning UHF-to-VHF or high-VHF-to-low-VHF bidders. Due to antenna pattern variations between UHF and VHF antennas and between high VHF and low VHF antennas, it is likely that some stations voluntarily moving from the UHF to the VHF band or from the high VHF to the low VHF band will not be able to obtain an antenna that replicates the coverage contour reflected in the *Channel Reassignment PN*. Accordingly, stations moving to or between the VHF bands may specify an antenna that would result in a larger coverage contour than that resulting from the technical parameters specified in the *Channel Reassignment PN*, as long as the proposed facility will not cause new interference, other than a rounding tolerance of 0.5 percent, to any other station.

551. In order to help transitioning broadcasters begin construction of their new facilities as quickly as possible, we also will provide expedited processing for certain applications.[1558] Specifically, we will provide expedited processing if a station's application meets all three of the following requirements: (1) it does not seek to expand the coverage area, as defined by the technical parameters specified in the *Channel Reassignment PN*, in any direction;[1559] (2) it seeks authorization for facilities that are no more than five percent smaller than those specified in the *Channel Reassignment PN* with respect to predicted population served; and (3) it is filed within the three-month deadline for submission of minor change applications. The Commission adopted the same expedited processing procedure with the same criteria during the DTV transition, which enabled the Media Bureau to quickly process a large percentage of the post-transition digital construction permit applications it received after adopting the post-transition Table of Allotments.[1560] The same approach will have similar benefits here. We anticipate that the Media Bureau generally will be able to process qualified applications within 10 days after filing.

b. Alternate Channel and Expanded Facilities Opportunities

552. *Background*. Anticipating that some stations receiving new channel assignments may wish to change their channels, the Commission proposed in the *NPRM* to announce an opportunity for stations to request an alternate, or substitute, channel after the staff substantially completes its processing

[1555] Univision Comments at 16-17.

[1556] Univision's proposal is based on a filing freeze waiver policy the Commission adopted during the DTV transition for stations that were returning to their pre-transition analog channels for post-transition DTV operations. *See Third DTV Periodic Review*, 23 FCC Rcd at 3065-66, paras. 151-52.

[1557] The filing freeze waiver policy used during the DTV transition was meant to address the fact that many stations returning to their analog channels would face the prospect of significant service losses if unable to expand because of the "unbuildable, theoretical pattern" specified in the DTV Table Appendix B, *Third DTV Periodic Review*, 23 FCC Rcd at 3065, para. 151, which required greater application flexibility. In addition, the Commission concluded that the waiver standard served the public interest because it would encourage a station's use of its existing analog channel antenna and therefore "reduc[ed] the demands on equipment supplier and installation crews during a critical time as the transition date nears," a benefit that is not present here. *Id*. at 3065-66, para. 152.

[1558] *See NPRM*, 27 FCC Rcd at 12462–63, para. 317.

[1559] Stations that propose transmission facilities in their initial construction permit applications that extend the coverage contour specified in the *Channel Reassignment PN* will not qualify for expedited processing.

[1560] *Third DTV Periodic Review*, 23 FCC Rcd at 3060, para. 140.

of initial minor change applications, provided that the station is able to identify an available channel.[1561] The Commission also proposed that, consistent with existing rules, grant of an alternate channel application would not extend the construction deadline in the station's initial construction permit for its reassigned channel.[1562] The Commission asked whether it should treat applications for alternate channels as major change applications.[1563] It also sought comment on which licensees should be eligible for the proposed alternate channel opportunity and under what circumstances a winning reverse auction bidder should be allowed to apply.[1564] Finally, the Commission sought comment on appropriate processing of such applications, including whether to provide "cut-off" protection from subsequently filed applications and means to avoid mutual exclusivity among channel substitution applications.[1565]

553. *Discussion*. We will provide stations assigned to new channels in the repacking process as well as winning UHF-to-VHF and high-VHF-to-low-VHF bidders with an opportunity to seek an alternate channel.[1566] We recognize that, in some cases, a broadcaster may determine that a different channel will be more desirable or will make the transition process simpler and less costly.[1567] As some commenters request,[1568] we also will allow stations assigned to new channels and winning UHF-to-VHF and high-VHF-to-low-VHF bidders to apply for construction permits for "expanded facilities"[1569] on their new channels. These filing opportunities are appropriate for, and will be limited to, stations that will not have input into their post-auction channel assignments. We note that, as a practical matter, stations' ability to identify an available alternate channel or to expand their facilities may be limited as a result of the repacking process.[1570]

[1561] *See NPRM*, 27 FCC Rcd at 12463, para. 318. Belo, Entravision, and LIN support the Commission's proposal to allow stations to seek alternate channels. Belo Comments at 8-9; Entravision Comments at 13-14; LIN Comments at 5.

[1562] 47 C.F.R. § 73.3533(b); *NPRM*, 27 FCC Rcd at 12463, para. 318.

[1563] *See NPRM*, 27 FCC Rcd at 12463, para. 318.

[1564] *Id.* at para. 319.

[1565] *Id.*

[1566] As proposed in the *NPRM*, we conclude that stations moving from a UHF to a VHF channel will not be permitted to request an alternate UHF channel. *See NPRM*, 27 FCC Rcd at 12463, para. 319. Allowing such requests would be directly contrary to the premise of UHF-to-VHF bids—for the station to transition from UHF to VHF service. For the same reason, stations submitting winning UHF-to-VHF bids that specify the high-VHF band or the low-VHF band, and stations submitting winning high-VHF-to-low-VHF bids, will not be permitted to request a channel outside of their assigned band.

[1567] Belo explains that a newly assigned channel may be technically feasible and preserve a station's coverage area and population served as contemplated by the Spectrum Act, yet still be undesirable for a number of reasons, such as because it will require excessively expensive and time-consuming facility modifications. Belo Comments at 9. Belo believes that "broadcasters and their station engineers are in the best position to understand their stations' technical equipment and unique signal propagation characteristics," and "may be able to suggest alternative facility modifications that will make channel changes easier and less disruptive to viewers." Belo Comments at 8-9.

[1568] *See* Tribune Comments at 26 n.53; Univision Comments at 16-17.

[1569] For purposes of this filing opportunity, we define "expanded facilities" as those that propose a change in height above average terrain (HAAT), effective radiated power (ERP), or transmitter location that (i) would be considered a minor change under the Commission's rules (*see* 47 C.F.R. § 73.3572(a)(1)–(3); 47 C.F.R. § 74.787(b)); and (ii) in the case of a station reassigned to another channel within its existing band, would result in a change in such station's contour beyond one percent in any direction from the coverage area defined by the technical parameters specified in the *Channel Reassignment PN*.

[1570] In general, if an application for an alternate channel or expanded facilities is granted, the deadline in the construction permit for the alternate channel or expanded facilities will be the same as the deadline in the station's

(continued….)

554. In view of the anticipated scarcity of available broadcast spectrum to accommodate proposals for alternate channels and expanded facilities following the repacking process, we will give a filing priority to certain stations. Specifically, we will provide a priority to any station that demonstrates that it is unable to construct facilities that meet the technical parameters specified in the *Channel Reassignment PN*, or the permissible contour coverage variance discussed above, for reasons beyond its control.[1571] In addition, we delegate authority to the Media Bureau to define other categories of stations that may be eligible for a filing priority due to extraordinary circumstances beyond a station's control. Stations qualifying for a priority may request either an alternate channel or expanded facilities on their newly assigned channel.[1572] A second filing opportunity will be offered to all other stations that are assigned new channels in the repacking process or that are winning UHF-to-VHF or high-VHF-to-low-VHF bidders to file for alternate channels or expanded facilities.[1573]

555. A station seeking an alternate channel must submit a construction permit application on FCC Form 301, 301-CA, or 340.[1574] Unlike new channel assignments generated by the Commission in the repacking process, these alternate channel requests will be initiated by licensees without the benefit of our repacking methodology. Thus, applications for alternate channels will be considered major change applications and thus will be subject to local public notice requirements and a 30-day petition to deny filing window.[1575] Applications for expanded facilities on the channel assigned to a station in the *Channel Reassignment PN*, which may be filed at the same time that we accept applications for alternate channels, are limited to minor changes.[1576]

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initial construction permit. However, we will consider granting longer construction periods for alternate channels or expanded facilities in situations where extenuating circumstances justify such an extension.

[1571] We anticipate that such stations would include those that cannot submit a construction permit application for their assigned channel because they are unable to construct at their current tower site due to technical or legal issues. These stations would be required to demonstrate in a request for a waiver of the three-month filing deadline for initial construction permit applications that it was not possible to file an application that was in compliance with the technical parameters in the *Channel Reassignment PN* or with the flexibility to propose alternative transmission facilities discussed above, which require that a station apply for its new channel at its current transmission site.

[1572] As is the case with all major and minor modification applications, we emphasize that stations filing for alternate channels or expanded facilities will be required to demonstrate that their proposals meet all existing technical and interference requirements and would serve the public interest. Moreover, modification applications filed by Class A stations will not be accepted if they fail to comply with the interference protection rules for Class A stations. *See* 47 C.F.R Part 73, Subpart J; *see also* 47 C.F.R. §§ 74.707, 74.792.

[1573] Consistent with the Media Bureau's past practice in lifting filing freezes, applications filed during the first filing opportunity would be treated as cut-off as of the end of that filing period, and would be entitled to interference protection from subsequently filed applications. *See, e.g., Commission Lifts Freeze on Filing of Maximization Applications and Petitions for Digital Channel Substitutions, Effective Immediately*, Public Notice, 23 FCC Rcd 8330 (2008).

[1574] Some priority stations will not have an opportunity to submit an application for a construction permit during the initial three-month filing window. The initial construction permit applications of these stations for alternate channels or expanded facilities will not be subject to filing fees. We note, however, that an applicant requesting any additional modification will be subject to the appropriate fee. Moreover, non-priority stations seeking alternate channels or expanded facilities will be subject to applicable filing fees.

[1575] 47 C.F.R. § 73.3572(a)(1),(2); 47 C.F.R. § 74.787(b). We clarify that stations filing alternate channel requests will not be subject to the current two-step rulemaking process for new channel allotments.

[1576] *See* 47 C.F.R. § 73.3572(a)(1)–(3); 47 C.F.R. § 74.787(b)). As discussed in § V.C.5 (Reimbursement of Relocation Costs), costs reasonably incurred by priority stations that are associated with constructing alternate channels or expanded facilities will be reimbursable from the Reimbursement Fund. For non-priority stations, any additional costs incurred in constructing alternate channels or expanded facilities, beyond those that the station

(continued….)

556. We delegate authority to the Media Bureau to issue public notices announcing filing opportunities for alternate channels and expanded facilities applications and specifying appropriate processing guidelines, including the standards to qualify for priority filing, "cut-off" protections, and means to avoid or resolve mutual exclusivity between applications.[1577] We anticipate that the first filing opportunity to be established by the Media Bureau will open after the staff substantially completes its processing of initial minor change construction permit applications following the release of the *Channel Reassignment PN*. After all stations that are reassigned new channels in the repacking process and winning UHF-to-VHF and high-VHF-to-low-VHF bidders have been given an opportunity to apply for alternate channels or expanded facilities, we anticipate that the Media Bureau will lift certain filing freezes that are now in place,[1578] allowing other stations the opportunity to apply for such facilities.

c. Channel Sharing Stations

557. *Background*. The Commission sought comment in the *NPRM* on the licensing process for stations that enter into channel sharing arrangements as a result of winning reverse auction bids.[1579] Because the implementation of a channel sharing arrangement does not involve construction that will require Commission pre-approval, the Commission suggested that there would be no need for these stations to apply for construction permits and proposed that each channel sharing station (both the "sharer" and any "sharee" stations)[1580] simply be required to file a Form 302 application for a license upon commencement of shared operations. In the event that a "sharer" station is assigned a new channel in the repacking process, the Commission proposed to require all sharing stations to file license applications to share the original, pre-auction channel until the new facility is constructed.[1581]

558. *Discussion*. We will require the licensees of channel sharing stations (i.e., both the sharer station and the sharee station(s)) to submit license applications within three months after the sharee stations receive their auction proceeds.[1582] As discussed below,[1583] sharee stations will be required to

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reasonably would have incurred to construct the facilities assigned in the *Channel Reassignment PN*, will not be reimbursable.

[1577] With the one exception noted in § III.B.3.c.ii (Out-of-Core Class A-Eligible LPTV Stations), we will not protect stations that were eligible for Class A status but did not file an application for a Class A license until after February 22, 2012. If such station obtains a Class A license and is displaced in the repacking process, it may file a displacement application during one of the filing opportunities for alternate channels. Except as indicated here, our existing displacement rules will apply to such applications. *See* 47 C.F.R. §§ 73.3572(a)(4) and 74.787(a)(4). We delegate authority to the Media Bureau to determine whether such stations should be permitted to file for new channels along with priority stations or in the second filing opportunity.

[1578] *See Channel Substitution Freeze*, 26 FCC Rcd 7721 (2011); *Freeze PN*, 28 FCC Rcd 4364 (2013); *Freeze on the Filing of Certain TV and DTV Requests for Allotment or Service Area Changes*, Public Notice, 19 FCC Rcd 14810 (2004).

[1579] *See NPRM*, 27 FCC Rcd at 12463-64, para. 320.

[1580] We use the term "sharee" to refer to a station that relinquishes its frequency to move to the frequency of a "sharer" station. As noted in the *NPRM*, more than two stations may share a channel. Thus, although there would be only one sharer in each channel sharing relationship, there could be multiple sharees. *See NPRM*, 27 FCC Rcd at 12442, para. 245 n.382.

[1581] For example, if a bid proposing that Station A on channel 50 share Station B's channel 30 facility is accepted, and Station B is reassigned channel 20 as part of the repacking process, Station A would be required to vacate channel 50 within the time frame we adopt for implementation of channel sharing agreements and commence sharing channel 30 with Station B. *See id*. at 12464, para. 320 n.494. In addition to filing license modification applications, Stations A and B would be required to file minor change applications for construction permits for channel 20 and separate applications for a license when construction of that facility is completed. *See id*.

[1582] We delegate authority to the Media Bureau to amend FCC Forms 302 and 302-CA prior to the commencement of the auction to add a category for the licensing of shared channels.

terminate operations on their pre-auction channels by this deadline. This is the appropriate deadline for stations in a channel sharing relationship to submit their license applications and to commence shared operations pursuant to program test authority. This same deadline will apply regardless of whether the sharer station is assigned a new channel in the repacking process. While channel sharing stations that are reassigned to a new channel will be afforded a construction period before they must transition to their reassigned channel, we find no basis to delay the commencement of shared operations or the clearing of the sharee's channel.[1584] Upon grant of such license applications, the staff will issue each station in a sharing arrangement a new license indicating "shared" status through the use of an "S," designating the shared channel as the operating frequency for each station, specifying each station's class of service (i.e., commercial full power, NCE, or Class A), and indicating a sharee station's new community of license where appropriate.

2. Construction Schedule and Deadlines

559. The record in this proceeding shows the need for a post-incentive auction transition timetable that is flexible for broadcasters and that minimizes disruption to viewers.[1585] At the same time, the transition schedule must provide certainty to wireless providers and be completed as expeditiously as possible.[1586] With these goals in mind, we adopt a 39-month transition period (the "Post-Auction Transition Period") for broadcasters that are assigned new channels in the repacking process and winning UHF-to-VHF and high-VHF-to-low-VHF bidders. The Post-Auction Transition Period will include (1) the three-month period beginning upon the release of the *Channel Reassignment PN*, during which broadcasters will complete and file their construction permit applications,[1587] followed by (2) a 36-month period consisting of varied construction deadlines (the "Broadcast Construction Period").

560. Post-auction, the Media Bureau, on delegated authority, will establish a set of construction deadlines that will apply during the Broadcast Construction Period. While some stations will be given 36 months to complete construction, other stations will be given shorter deadlines. At the end of the 39-month Post-Auction Transition Period, all stations must cease operating on their pre-auction channels regardless of whether they have completed construction of the facilities for their post-auction channel.

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[1583] *See* § V.C.2 (Construction Schedule and Deadlines).

[1584] In the event the sharer station is assigned a new channel in the repacking process, all sharing stations will be required to jointly file a Form 301 minor change construction permit application consistent with requirements in the Construction Permit Application Filing Requirements Section. *See* § V.C.1.a. We delegate authority to the Media Bureau to amend FCC Forms 301, 301-CA, and 340 prior to the commencement of the auction to add a category for the licensing of shared channels.

[1585] *See*, *e.g.*, State Broadcaster Associations Comments at 15; Affiliates Associations Comments at 49; PTV Comments at 24-25; PTV Reply at 5; Belo Comments at 25; Disney Comments at 35-36; Harris Broadcast Comments at 12-14; KLCS Comments at 2-3; LIN Comments at 7; NAB Comments at 50; R. Mertz Comments at 3; SBBC Comments at 2; Tribune Comments at 25-26; Univision Comments at 17-18.

[1586] *See*, *e.g.*, AT&T Comments at 78-79; AT&T Reply at 67; CEA Comments at 34-35; CTIA Comments at 35; Leap Comments at 10; Mobile Future Comments at 20; Mobile Future Reply at 10; Nokia Comments at 20; Sprint Comments at 12-14; TIA Comments at 8; T-Mobile Reply at 94; Verizon Comments at 67-68; Verizon Reply at 47; US Cellular Comments at 37; US Cellular Reply at 49-50.

[1587] *See* § V.C.1.a (Construction Permit Application Filing Requirements). Stations eligible for reimbursement from the Reimbursement Fund also will be required to file their estimated cost forms by this deadline. *See* § V.C.5.b (Reimbursement Process). We note again that no broadcaster will be required to change the location of its transmission facility as a result of the reverse auction and repacking processes, but operation on a new channel will require modifications to existing facilities. *See* n.1534.

561. We adopt a three-month deadline from the receipt of auction proceeds by winning license relinquishment bidders and channel sharing "sharee" bidders[1588] to terminate operations on their pre-auction channels. We will offer stations the flexibility to seek a single extension of their construction deadlines and to operate temporary facilities during construction. Although we will consider extensions of stations' individual construction deadlines for new post-auction channels, no station with a new channel assignment will be permitted to operate on its pre-auction channel after the end of the Broadcast Construction Period. This approach will provide sufficient flexibility to both broadcasters and the Commission to ensure a successful, expeditious transition, while minimizing disruption to consumers and providing appropriate certainty to the wireless industry.

a. Construction Period for Stations with New Channel Assignments

562. *Background*. In the *NPRM,* the Commission sought comment on reasonable deadlines for stations that must change channels as a result of the repacking process to transition to their new channel assignments.[1589] The Commission asked whether it should adopt a uniform transition period for such stations and, if so, whether an 18-month deadline after the conclusion of the incentive auction would be reasonable for all stations to transition to their new channel assignments.[1590] Alternatively, the Commission invited input on whether it should consider a phased transition timetable in which it would establish deadlines according to region, individual station circumstances, or other factors.[1591]

563. *Discussion.* We adopt a 36-month Broadcast Construction Period that will begin upon the filing deadline for construction permit applications for new channel assignments (i.e., three months after the release of the *Channel Reassignment PN*). We conclude that a phased construction schedule, with the assignment of varying construction deadlines within this 36-month period, is most likely to ensure a successful transition for all broadcasters. Accordingly, we delegate authority to the Media Bureau to establish a set of deadlines within the Broadcast Construction Period to all stations that are reassigned to a new channel in the repacking process and all winning UHF-to-VHF and high-VHF-to-low-VHF bidders.[1592] The deadlines may vary by region, by the complexity of construction tasks, or by other factors the Media Bureau finds appropriate. This tailored approach will ensure that stations have the time they need to complete construction while making spectrum available for new uses as rapidly as possible.

564. Regardless of a station's individual construction schedule, no station will be permitted to continue to operate on its pre-auction channel beyond the end of the Broadcast Construction Period. Any station that has not completed construction by the end of the Broadcast Construction Period must go dark on its pre-auction channel and cease operations until it finishes construction of its new facilities.[1593] In addition, as soon as a station begins operating on its post-auction channel, it must terminate operations on its pre-auction channel.

[1588] A "sharee" station is a full power or Class A television station that agrees to relinquish its channel and share with another station (the "sharer") pursuant to a channel sharing bid in the reverse auction.

[1589] *See NPRM*, 27 FCC Rcd at 12464, para. 321.

[1590] *See id.* at 12464–65, para. 322.

[1591] *See id.* at 12465, para. 323.

[1592] *See* CEA Reply at 20 ("The Commission should take any action necessary, including delegating authority to the Media Bureau, to expedite this process . . . ."). In light of the 36-month Broadcast Construction Period, these deadlines will necessarily be less than the standard three-year construction period in most cases. *See* 47 C.F.R. § 73.3598(a).

[1593] We note that if a station is granted an extension of its construction permit that allows it to continue construction after the end of the Broadcast Construction Period, the station nonetheless must cease operations on its pre-auction channel on or before that deadline.

565. As soon as possible after the filing of construction permit applications, we direct the Media Bureau to announce both the phased construction schedule and stations' construction deadlines in a public notice. We expect that the Media Bureau will work with the Wireless Telecommunications Bureau to coordinate the construction deadlines of stations transitioning to new channels, taking into account the needs of forward auction winners and their construction plans. Stations need not wait until their construction deadlines are formally assigned to take certain necessary steps.[1594] Rather, there are actions stations can begin to take after their new channel assignments are announced and before they receive a construction permit.[1595]

566. The record in this proceeding persuades us that establishing a single deadline by which all stations must complete construction is infeasible. Many commenters maintain that reasonable construction deadlines will depend on a number of factors that will vary among stations and that cannot be fully evaluated before the conclusion of the auction.[1596] For example, commenters point out that, depending on the outcome of the reverse auction and the repacking process, the post-auction transition may exhibit "daisy chains," in which one station may not be able to begin operations on its new channel until another station ceases operation on its pre-auction channel because of interference issues.[1597] Commenters also note that stations on shared tower sites may have to coordinate construction and station downtime in order to complete their transitions.[1598] In addition, a number of commenters argue that there are a limited number of tower crews that will be qualified to construct stations' new facilities and that, in

[1594] Below, we adopt expedited processing procedures for construction permit applications that meet certain requirements. *See* § V.C.1 (License Modification Procedures). We anticipate that a number of applications will be grantable before the Media Bureau has completed the process of establishing these stations' construction deadlines. We believe it important, however, to grant these applications as quickly as possible so that stations can begin constructing their new facilities. *See, e.g., California State University, Sacramento*, Memorandum Opinion and Order, 13 FCC Rcd 17960, para. 16 (1998) (activities constituting construction that require a permit before commencing include installation of an antenna, transmitter, transmission line, and related inside wiring linking these facilities). Any permit issued before the Media Bureau establishes the pertinent construction deadlines will be conditioned on the Media Bureau's subsequent adoption of such deadlines. As soon as a station's deadline is determined, the Media Bureau will reissue the station's authorization with the construction deadline.

[1595] Such steps may include construction planning, installation of a new power line, equipment purchases, and on-site storage of equipment. These types of actions "generally having no intrinsic radio communications use related to a proposed facility" do not constitute construction, thus allowing prospective permittees to take these actions before the grant of a construction permit. *See Wendell & Associates*, Memorandum Opinion and Order, 14 FCC Rcd 1671, 1679-80, para. 24 (1998).

[1596] *See*, *e.g.*, Affiliates Associations Comments at 49; Affiliates Associations Reply at 15; Belo Comments at 6; Disney Comments at 36-38; FMBC Comments at 1-2; Harris Broadcast Comments at 10-11; NYSBA Comments at 19; *Media Bureau Seeks Comment on Widelity Report and Catalog of Potential Expenses and Estimated Costs*, GN Docket No. 12-268, Public Notice, 29 FCC Rcd 2989, 2993–3078 (2014) (*Reassignment Costs Report PN*); Transmit *Reassignment Costs Report PN* Comments at 17.

[1597] For example, the pre-auction UHF channel of a successful UHF-to-VHF bidder may become the post-auction channel of another station, requiring the UHF-to-VHF bidder to vacate its pre-auction UHF channel before the other station can use that channel. As Belo points out, this type of interconnected construction is further complicated by the fact that "broadcasters must continue to provide service to their communities during the transition." Belo Comments at 12. Thus, stations will face "logistical hurdles, such as renting and installing temporary equipment and obtaining FCC authority to operate on an interim channel." *Id*. We also recognize that close cooperation often will be needed between stations in order for reassigned stations to commence post-auction operations. For example, station A may need to begin testing its facility on its post-auction channel in order to be ready to operate by its construction deadline, but station B is currently using the channel. We expect that broadcasters will make all possible accommodations to ensure that all stations will be able to provide service on their post-auction channels by their respective construction deadlines. *See Third DTV Periodic Review*, 23 FCC Rcd at 3012, para. 29.

[1598] *See* NYSBA Comments at 22-23; *see also* DIRECTV/DISH Reply at 12 ("DBS Providers cannot accommodate several hundred broadcast stations implementing changes in a single day without the risk of significant disruption").

order to permit these crews to operate more efficiently, construction schedules should be coordinated on a regional basis, thereby enabling crews to operate in one area at a time.[1599] Similarly, a number of commenters claim that the Commission must consider weather and seasonal issues in establishing a post-auction construction schedule.[1600] We conclude that the flexibility to evaluate and address all of the relevant variables through a phased construction schedule based on the actual outcome of the auction will be critical to the success of the transition. This approach will enable the Media Bureau to take each of the above factors, as well as any others that may be relevant, into account.

567. In light of the complexity of the factors that may be involved in post-auction construction and the varying impact these factors will have on individual broadcasters, we also conclude that the proposal in the *NPRM* to complete the entire post-auction transition within 18 months would not provide sufficient time for all stations to complete the transition process.[1601] We agree with commenters that a universal 18-month transition deadline would not adequately take into account the many factors that will have to be considered when determining station construction deadlines, and we therefore disagree with commenters who assert that an overall 18-month deadline likely would provide broadcasters "more than enough time" to complete construction.[1602] Although we recognize that some stations will be able to transition to new facilities relatively quickly, these commenters underestimate the amount of time that will be necessary for all broadcasters to complete their transitions.[1603] For these reasons, we find that a longer construction period is necessary to ensure a smooth channel transition for all stations.

568. We find that a 36-month Broadcast Construction Period will provide sufficient time to complete a phased transition of all stations assigned to new channels. Many commenters suggest that a construction period of up to 36 months will be sufficient to complete the transition.[1604] In addition, 36

[1599] Harris Broadcast Comments at 10-11; PTV Comments at 27; Belo Comments at 6-7; NYSBA Comments at 19; Univision Comments at 18. Commenters also argue that a similar problem may occur with respect to equipment suppliers and that equipment orders will need to be staggered for the demand to be met. Harris Broadcast Reply at 9; *see also* PTV Comments at 27 (18-month timetable could strain manufacturer or installer resources).

[1600] *See*, *e.g.*, PTV Comments at 26; Belo Comments at 6; NYSBA Comments at 19; Vermont Broadcasters Reply at 7. In addition, we recognize that stations owned by governmental or public entities may need additional time to complete their construction because they are required to follow a mandatory competitive bid process that could delay their ability to purchase equipment or hire a tower crew. *See* KLCS Comments at 2; *see also* SBBC Comments at 2.

[1601] The *Reassignment Costs Report PN* discusses the many steps required to successfully complete the transition. *See, e.g., Reassignment Costs Report PN*, 29 FCC Rcd at 3002–03.

[1602] US Cellular Comments at 57; *see also* Leap Comments at 10; US Cellular Reply at 49-50.

[1603] Although the Commission noted in the *NPRM* that many stations granted construction permits toward the end of the DTV transition completed construction of their facilities within 12 months, we agree with Harris Broadcast that there are important differences between the DTV transition and this transition that would make a similar deadline inappropriate here. *See NPRM*, 27 FCC Rcd at 12464, para 322; Harris Broadcast Comments at 12. For example, some stations that completed their final digital facilities in the period immediately before the final DTV transition deadline did not switch channels, so that their construction tasks were simpler than those of a station reassigned to a new channel. *See* Harris Broadcast Comments at 12. In addition, the number of stations reassigned to new channels in the repacking process could be significantly greater than the number that converted to digital service during the final months of the DTV transition. *Id*. Unlike stations that participated in the DTV transition, stations assigned new channels in the repacking process will not be able to select their channel and "will have had little to no input regarding the technical parameters for their repacked facilities." Disney Comments at 36. Further, the Commission was able to allow a number of stations to transition early during the DTV transition, "thereby alleviating some of the challenges involved with potentially thousands of stations seeking the same equipment and support at once," an option that is not available here. PTV Comments at 25.

[1604] *See* State Broadcaster Associations Comments at 15 (advocating a 30-month construction deadline); Belo Comments at 6 (advocating a 30-month construction deadline); LIN Comments at 7 (advocating a 36-month construction deadline); NAB Comments at 50 (advocating a 30-month construction deadline); PTV Reply at 16

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months is the period afforded under our rules for stations to complete construction of new or modified facilities after the grant of a construction permit, including in situations where construction is complicated or especially challenging. Therefore, we conclude that 36 months is the appropriate maximum time period for stations to complete construction after they request permits for their post-auction facilities.[1605] Moreover, adopting a construction period that closely coincides with the three-year period established in the Spectrum Act to reimburse broadcasters for their repacking expenses will best ensure that stations are successfully reimbursed for their reasonably incurred expenses.[1606]

569. While we recognize that the transition will be complex and time-consuming for a number of stations, we conclude that it is not necessary to afford all reassigned broadcasters 36 months or longer to construct post-auction facilities.[1607] We disagree with commenters who argue that the 36-month Broadcast Construction Period will prove infeasible for a large proportion of stations.[1608] We recognize that some stations will face significant challenges in completing the post-auction transition to their new facilities. The Media Bureau will take such challenges into account when assigning individual construction deadlines. We expect that stations facing more challenging construction tasks will be granted longer construction periods, up to the full 36 months. In addition, although all stations reassigned to new channels will be required to cease operations on their pre-auction channels at the end of the 36-month period, the Commission will work diligently with stations to ensure that service disruptions are minimized to the fullest extent possible through the use of a variety of mechanisms. For example, if a station has not completed construction of its new facilities by the end of the Broadcast Construction Period, it may remain on the air while it completes construction by requesting authority to operate on temporary facilities. Further, as outlined in more detail below, the Media Bureau may to grant extensions of construction permit expiration dates of up to six months to those stations that encounter delays or unexpected challenges, thus providing stations flexibility in the amount of time they are afforded to transition to their new channels.

570. Moreover, we expect that some stations will have to make only modest changes to their facilities in order to transition to new channels. For example, some stations will be able to switch channels simply by re-tuning their existing equipment, a process that can be completed in a short period of time.[1609] Such stations should be able to complete their construction relatively quickly after grant of their construction permits. Thus, not all stations will need or be given the full 36 months to complete construction, and many will be assigned earlier construction deadlines.

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(advocating a three-year construction period); PTV Comments at 24-27 (advocating a construction period of at least three years); *Reassignment Costs Report PN*, 29 FCC Rcd at 2993-3078.

[1605] *See* 47 C.F.R. § 73.3598(a).

[1606] *See* § V.C.5 (Reimbursement of Relocation Costs).

[1607] *See* PTV Comments at 24-27 (advocating construction period of at least three years).

[1608] *See, e.g.*, Sinclair *Reassignment Costs Report PN* Comments at 2; GatesAir *Reassignment Costs Report PN* Comments at 1; APTS *Reassignment Costs Report PN* Reply at 9-10. Some commenters argue that many stations will face a complicated construction process or unanticipated delays and costs, and that such stations will not be able to complete construction in a 36-month timeframe. *See* Sinclair *Reassignment Costs Report PN* Comments at 2-8; NAB *Reassignment Costs Report PN* Comments at 14-25; Block Stations *Reassignment Costs Report PN* Comments at 6; Cohen *Reassignment Costs Report PN* Comments at 3; GatesAir *Reassignment Costs Report PN* Comments at 1, 4, 8-9; Dielectric *Reassignment Costs Report PN* Comments at 1, 6; American Tower *Reassignment Costs Report PN* Comments at 3, 6-7; NATE *Reassignment Costs Report PN* Comments at 2; Transmit Consultancy *Reassignment Costs Report PN* Comments at 5, 17; Stainless *Reassignment Costs Report PN* Comments at 2-3. Commenters further claim that "forc[ing] stations off the air" at the end of the 36-month Broadcast Construction Period for "reasons outside of their control" is contrary to the public interest. GatesAir *Reassignment Costs Report PN* Comments at 8-9.

[1609] *Reassignment Costs Report* at 47-53.

571. A number of commenters also argue that there will be insufficient equipment sources and qualified tower crews to complete the post-auction transition in 36 months.[1610] We recognize that resources needed for the transition process are limited. By structuring a phased transition, our goal is to mitigate the impact of these limitations by eliminating the need for all stations to obtain their equipment or schedule a tower crew at the same time. Further, we expect that the equipment manufacturing and tower installation industries will respond to the greatly increased demand resulting from the post-auction transition and will take advantage of this unique opportunity to provide equipment and construction services.[1611] We also intend to work closely with the industry to help ensure that these resources are allocated efficiently.

572. Finally, adopting a lengthier Post-Auction Transition Period could depress forward-auction participation or the value of investments made by forward auction winners.[1612] As several wireless commenters point out, an unduly long transition period also could delay the launch of innovative services and cause uncertainty both for providers and consumers.[1613] Our tailored approach will help to ensure that each station reassigned to a new channel transitions to its new channel as soon as possible, and that forward auction winners have access to their newly acquired spectrum as quickly as possible, thus ensuring a successful incentive auction.

573. Realizing that we must balance various stakeholder concerns, we again emphasize that the end of the Broadcast Construction Period will mark the latest date on which broadcasters will be permitted to cease operations on their pre-auction channels. Moreover, as discussed below, license relinquishment bidders and sharee stations that are parties to winning channel sharing bids will be required to cease operations within three months of receiving their auction proceeds. Thus, it is likely that many full power and Class A stations will vacate spectrum repurposed for flexible wireless use well before the end of the Broadcast Construction Period. Our approach will ensure that all wireless users will

[1610] *See* Block Stations *Reassignment Costs Report PN* Comments at 6; Dielectric *Reassignment Costs Report PN* Comments at 6; GatesAir *Reassignment Costs Report PN* Comments at 7; NAB *Reassignment Costs Report PN* Comments at 13; NATE *Reassignment Costs Report PN* Comments at 2; Sinclair *Reassignment Costs Report PN* Comments at 4; Stainless *Reassignment Costs Report PN* Comments at 3; Transmit Consultancy *Reassignment Costs Report PN* Comments at 5.

[1611] *But see* Dielectric *Reassignment Costs Report PN* Comments at 3 ("there is simply not enough certainty to allow the broadcast engineering, tower, and manufacturing industries to plan or allocate human capital and equipment to ensure the successful completion of transition in a thirty-six month period").

[1612] *See* AT&T Comments at 78-79 (arguing that "[g]iven the time value of money, therefore, the broadcasters' proposal for the 'maximum possible' delay would depress forward-auction bids and exacerbate the risk of auction failure"); *see also* Leap Comments at 10; Verizon Comments at 67-68; Verizon Reply at 47; AT&T Reply at 67; Sprint Comments at 12.

[1613] For example, AT&T points out that "permitting stations to remain in their existing channels as long as possible . . . would greatly lengthen the interval between the date of the forward auction and the date on which forward-auction winners can make use of the relevant spectrum for the provision of mobile broadband services." AT&T Comments at 78-79; *see also* AT&T Reply Comments at 67. AT&T also warns that "every additional month that goes by, however, is a month that those winners will have tied up billions of dollars of capital in prospective assets that are not yet producing any revenues for them." AT&T Reply at 67. Leap similarly argues that "[i]t is essential that the spectrum be made available for wireless uses as quickly as possible, and in the wireless industry, which is characterized by rapid change and innovation, three years is an eternity." Leap Comments at 10; *see also* Sprint Comments at 10. Verizon echoes those comments arguing that "[r]equiring winning forward auction participants to pay billions of dollars in winning bid amounts immediately after the auction concludes, while holding their license grants in abeyance or prohibiting them from deploying and launching service for years afterward, is not only inequitable but risks regulatory uncertainty to such a degree as to suppress forward auction bids." Verizon Comments at 67-68; *see also* Verizon Reply Comments at 47.

have access to their spectrum no later than 36 months after close of the construction permit filing window.[1614]

b. Winning Bidders for License Relinquishment and Channel Sharing

574. *Background*. The Commission invited comment in the *NPRM* on whether winning license relinquishment and channel sharing bidders should be afforded less time than other stations to cease operations on their pre-auction channels.[1615] The Commission noted that, in contrast to stations assigned new channels, successful license relinquishment bidders will not need to modify technical facilities in order to continue broadcasting. At the same time, the Commission recognized that these stations may be shifting programming to another station or transitioning to cable, satellite, or Internet-based operations and, accordingly, that their transitions "may not be as simple as flipping off a switch."[1616] With respect to winning channel sharing bidders, the Commission similarly noted that these stations may have to make less complicated technical changes than other stations and will have access to auction proceeds to help fund any necessary modifications.[1617]

575. *Discussion*. We require that all winning license relinquishment bidders terminate operations on their pre-auction channels within three months of receipt of their reverse auction proceeds.[1618] We agree with CEA and US Cellular that requiring license relinquishment bidders to quickly terminate their operations "will facilitate and expedite the subsequent changes that will have to be made by both reverse auction winners and repacked stations that remain on the air,"[1619] thus "accelerat[ing] the entire repacking process."[1620] We further agree that it is appropriate to require winning license relinquishment bidders to complete their transition earlier than other stations because the "future plans . . . of these types of winning bidders do not require the construction of new or substantially modified broadcast facilities."[1621]

576. We agree with Vision that we should provide winning license relinquishment bidders with sufficient regulatory flexibility to easily transition their stations off the air.[1622] In particular, we will allow these stations to seek special temporary authority or waiver of our operating rules, including our rules on minimum operating hours, in order to facilitate the final termination of their operations.[1623]

[1614] *See* CEA Comments at 34 (stating that "the Commission should establish a streamlined and efficient post-auction process, with concrete milestones and hard deadlines, and should hold auction participants and new licensees to those milestones and deadlines"); *see also* T-Mobile Reply at 94. We also note that wireless users will not have to wait until spectrum is actually cleared before constructing wireless facilities; construction may begin any time after a forward auction winner files its long-form license application. *See* 47 C.F.R. § 1.2113.

[1615] *See NPRM*, 27 FCC Rcd at 12465, para. 325.

[1616] *Id*.

[1617] *See NPRM*, 27 FCC Rcd at 12465, para. 326.

[1618] Prior to termination, winning license relinquishment bidders must comply with the consumer and MVPD notification requirements set forth below. *See* §§ V.C.3 (Consumer Education), V.C.4 (Notice to MVPDs). In addition, stations must notify the Commission of the termination of operations. *See* 47 C.F.R. § 73.1750.

[1619] CEA Comments at 34.

[1620] US Cellular Comments at 58; US Cellular Reply at 49-50.

[1621] US Cellular Comments at 58-59; US Cellular Reply at 49-50.

[1622] Vision Comments at 11-12.

[1623] The television minimum operating rule requires that stations operate a minimum number of hours per day. 47 C.F.R. §§ 73.1740(a)(2), 73.6001(b). Winning license relinquishment bidders may need the flexibility to vary the number of hours they operate during the three months they are wrapping up the operations of their stations.

577. In addition, we adopt a three-month deadline from receipt of reverse auction proceeds for sharee stations that are party to a winning channel sharing bid to terminate operations on their pre-auction channel and transition to their shared channel.[1624] Because these stations will not have to construct new facilities in order to effectuate their channel change, three months is sufficient for them to cease operations on their pre-auction channels. This deadline will apply regardless of whether or not the sharer station to which the sharee station is transitioning is reassigned to a new channel in the repacking process. If a sharer station is reassigned to a new channel, all broadcasters with shared status will be required to cease operations on the sharer's pre-auction channel and transition to the new channel in accordance with the phased post-auction transition procedures adopted in this Order[1625] and the construction permit issued for the new channel.

578. Although a three-month period for winning license relinquishment and channel sharing bidders to cease operations should provide adequate time, we recognize that some stations may encounter difficulties meeting this deadline.[1626] Therefore, we will permit such stations to submit a waiver request pursuant to section 1.3 of the rules. We will view requests for up to three additional months to terminate operations most favorably, and we anticipate that requests for any additional time will be unlikely to meet our waiver standard.[1627]

c. Additional Flexibility for Stations with New Channel Assignments

579. *Background*. The Commission sought comment on the possibility of providing additional flexibility to broadcasters to complete the transition to their new channel assignments.[1628] The Commission asked whether extensions of construction deadlines should be permitted, whether any extensions should be limited to six months, and what criteria should apply to such extensions.[1629] In addition, it invited comment on whether to allow stations to operate with temporary facilities while they

[1624] Sharee stations must comply with the consumer and MVPD notification requirements set forth in the Consumer Education Section and Notice to MVPDs Section. *See* §§ V.C.3 (Consumer Education); V.C.4 (Notice to MVPDs). In addition, sharee stations will be required to notify the Commission of the termination of operations on their pre-auction channel pursuant to the established procedures. *See* 47 C.F.R. § 73.1750. We expect that the termination of operations of the sharee's pre-auction channel and transition to a shared channel will occur on the same day and thus not result in any gap in service.

[1625] Winning channel sharing bidders whose shared channel is reassigned in the repacking process will be required to share on the sharer's pre-auction channel prior to construction of their newly assigned channel. *See* § V.C.1 (License Modification Procedures).

[1626] For example, license relinquishment bidders may need to shift programming to another station or transition to cable, satellite, or Internet-based operations. Similarly, in addition to programming-related difficulties, it is possible that winning channel sharing bidders will encounter technical issues that may delay the transition to their shared channel.

[1627] Section 1.3 of the rules states that a waiver will be granted if "good cause" is shown. *See* 47 C.F.R. § 1.3. The Commission may exercise its discretion to waive a rule where the particular facts make strict compliance inconsistent with the public interest. *See Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (*Northeast Cellular*). In addition, the Commission may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis. *See WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969); *Northeast Cellular*, 897 F.2d at 1166. Waiver of the Commission's rules is appropriate only if both (i) special circumstances warrant a deviation from the general rule, and (ii) such deviation will serve the public interest. *See id*. Such waiver requests must be filed electronically in CDBS as a request for a legal Special Temporary Authority (STA), provide the above-described waiver showing, and include a proposed termination date, not to exceed three additional months. Stations should file such requests as soon as it becomes apparent that they will not be able to meet the three-month termination deadline. In addition, no winning license relinquishment or channel sharing bidder will be granted a waiver beyond the end of the Broadcast Construction Period.

[1628] *See NPRM*, 27 FCC Rcd at 12465-66, para. 327.

[1629] *Id*.

complete construction and, if so, what criteria should be used to evaluate such requests and the maximum amount of time that should be allowed for any such temporary operations.[1630]

580. *Discussion*. Given the complexity of the post-auction transition process and the variety of delays that may occur in completing construction, we recognize that some stations will require additional flexibility in order to transition successfully to new channels.[1631] The Commission granted six-month construction extensions during the DTV transition, and these extensions proved to be a successful method of providing stations additional time, where truly warranted, to complete a successful transition to digital service. Some stations similarly may experience unexpected and uncontrollable delays during the post-auction transition that warrant a brief extension of time. Accordingly, we will permit stations assigned new channels in the repacking process and winning UHF-to-VHF and high-VHF-to-low-VHF bidders to seek a single extension of up to six months of their original construction deadlines. Although a construction deadline may be extended beyond the end of the Broadcast Construction Period, stations may not operate their pre-auction channels after that date.[1632]

581. We will evaluate requests for extensions using procedures similar to those used during the DTV transition, based on criteria tailored to the types of construction stations will need to undertake during the post-auction transition.[1633] Stations anticipating the need for an extension will be required to submit an extension application no less than 90 days before the expiration of their construction permit and demonstrate that, despite all reasonable efforts, they are unable to complete construction of their new facilities on time due to circumstances that were either unforeseeable or beyond their control.[1634] The following circumstances may justify an extension of a station's construction deadline: (1) weather-related delays, including a tower location in a weather-sensitive area;[1635] (2) delays in construction due to the unavailability of equipment or a tower crew;[1636] (3) tower lease disputes;[1637] (4) "unusual technical

[1630] *Id.* at 12466, para. 328.

[1631] *See* R. Mertz Comments at 4 (arguing that deadline extensions should be allowed where "additional time will be needed, and particularly for complications such as zoning issues, construction crew shortages, and problems with equipment availability"); FMBC Comments at 1-2 (arguing that extensions will be needed because "it is impossible to know today what types of construction challenges broadcasters will face in repacking" and that adopting strict construction deadlines without an opportunity for extension could adversely impact construction costs and requests for reimbursement); *Reassignment Costs Report PN*, 29 FCC Rcd at 3010 ("Depending on how the transition is phased, it could be necessary to operate with an interim facility for an extended time due to resource scheduling issues").

[1632] Stations that are still constructing after the end of the Broadcast Construction Period will have to go dark on their pre-auction channels while they complete construction of their new channel facilities. In addition, we note that reimbursements from the Reimbursement Fund will only be available until three years after completion of the forward auction. *See* § V.C.5 (Reimbursement of Relocation Costs).

[1633] *See Review of the Commission's Rules and Policies Affecting the Conversion to Digital Transition,* MB Docket No. 00-39, Memorandum Opinion and Order on Reconsideration, 16 FCC Rcd 20594, 20610-11, para. 46 (2001) (adopting extension criteria including financial hardship); *see also Third DTV Periodic Review*, 23 FCC Rcd at 3030-31, para. 69; 47 C.F.R. § 73.624(d)(3)(ii) (2001), wherein the Commission adopted and subsequently revised the DTV extension criteria. In the *Third DTV Periodic Review*, the Commission revised the criteria for stations seeking an extension during the remaining months of the DTV transition. *See Third DTV Periodic Review*, 23 FCC Rcd at 3030-34, paras. 71-79.

[1634] Extension requests must be filed electronically in CDBS using FCC Form 337. Although that Form has not been used by full power stations since completion of the DTV transition in June 2009, it continues to be used by LPTV, TV translator, and Class A stations seeking extension of their digital construction permits and will be made available for use by full power and Class A stations during the post-incentive auction band transition.

[1635] *See* PTV Comments at 26; Belo Comments at 6; NYSBA Comments at 19; Vermont Broadcasters Reply at 7.

[1636] *See* Harris Broadcast Comments at 10-11; PTV Comments at 27; Belo Comments at 6-7; NYSBA Comments at 19; Univision Comments at 18.

challenges," such as a top-mounted or side-mounted antenna or the need to coordinate channel changes with another station;[1638] or (5) delays faced by broadcast stations that must obtain government approvals, such as land use or zoning approvals, or that are subject to competitive bidding requirements prior to purchasing equipment or services.[1639] We will permit licensees to rely on other circumstances to support an extension only if the licensee is able to show that the circumstance was unforeseeable or beyond its control and that it took all reasonable efforts to resolve the issue.

582. We will permit stations to rely on "financial hardship" as a criterion for seeking an extension of time only in limited circumstances. In the past, the Commission has allowed stations to support an extension request based on a showing that "the cost of meeting the minimum build-out requirements exceeds the station's financial resources."[1640] In this case, because stations will be eligible for an initial allocation of estimated construction costs, stations should not have to rely significantly on self-financing or outside financing for their construction. In addition, a station transitioning to a new channel as a result of a winning UHF-to-VHF or high-VHF-to-low-VHF bid will have access to auction proceeds to fund new construction. Accordingly, we will allow stations that are subject to an active bankruptcy or receivership proceeding to seek an extension based on financial hardship, provided that the station makes an adequate showing that it has filed requests to proceed with construction in the relevant court proceedings. The existence of such proceedings, and the restrictions that may be imposed on the use of funds, justify allowing such stations to seek additional time to complete construction, if necessary. Any other station that seeks an extension of time based on financial hardship must demonstrate that, although it is not subject to an active bankruptcy or receivership proceeding, rare and exceptional financial circumstances nevertheless warrant granting additional time to complete construction of their facilities.

583. While we recognize that extensions may be necessary for a variety of reasons, we agree with US Cellular that we should not permit multiple or prolonged extensions and that we should limit extensions to no longer than six months.[1641] Thus, stations will be allowed, if granted, only a single extension of up to six months beyond their original construction deadline before being subject to our stricter tolling provisions.[1642] This limitation will help ensure that stations continue to dutifully pursue all means to complete construction, transition to their new channel, and terminate operations on their pre-

(Continued from previous page)

[1637] *See* Affiliates Associations Comments at 49; Affiliates Associations Reply at 15; NYSBA Comments at 18-19; R. Mertz Comments at 4.

[1638] *See* Harris Broadcast Comments at 11; NYSBA Comments at 18-19; Belo Comments at 12.

[1639] *See* KLCS Comments at 2; SBBC Comments at 2.

[1640] *Review of the Commission's Rules and Policies Affecting the Conversion to Digital Transition,* 16 FCC Rcd at 20610-11, para. 46; *see also Third DTV Periodic Review*, 23 FCC Rcd at 3030-31, para. 69; 47 C.F.R. § 73.624(d)(3)(ii) (2001). Although the Commission adopted stricter extension criteria in the *Third DTV Periodic Review*, including revising its financial hardship criteria, it continued to allow stations to seek an extension if they were subject to a bankruptcy or receivership proceeding. *See Third DTV Periodic Review*, 23 FCC Rcd at 3031-32, paras. 74-75.

[1641] *See* US Cellular Comments at 38.

[1642] *See* 47 C.F.R. § 73.3598(b), which provides that "[t]he period of construction for an original construction permit shall toll when construction is prevented by the following causes not under the control of the permittee: (i) construction is prevented due to an act of God, defined in terms of natural disasters (e.g., floods, tornados, hurricanes, or earthquakes) or (ii) the grant of the permit is the subject of administrative or judicial review (i.e., petitions for reconsideration and applications for review of the grant of a construction permit pending before the Commission and any judicial appeal of any Commission action thereon), or construction is delayed by any cause of action pending before any court of competent jurisdiction relating to any necessary local, state or federal requirement for the construction or operation of the station, including any zoning or environmental requirement."

auction channel. US Cellular urges us to apply our stricter "tolling" criteria to any extension requests.[1643] We decline to do so. Given the variety of challenges that stations may face in connection with the post-auction transition, stations that are able to demonstrate that they have experienced uncontrollable and unexpected delays in construction should be allowed a single extension of up to six months before being subject to our stricter tolling provisions. To the extent that a legal impediment or an "act of God" prevents a station from meeting its construction deadline even after a six-month extension, we will consider whether any additional time is warranted based on the stricter tolling criteria.[1644]

584. In order to facilitate timely construction of new facilities and to minimize any time broadcasters may be off the air, we also adopt the proposal in the *NPRM* to allow stations to operate with temporary facilities while they complete construction. We agree with commenters that affording this flexibility may make it more feasible for some stations to continue serving viewers throughout the transition and therefore will serve the public interest.[1645] Absent special temporary authority ("STA"), no station will be permitted to operate on its pre-auction channel past the station's individual construction deadline, and the Commission will not grant STAs to operate on pre-auction channels past the end of the Broadcast Construction Period. We will allow stations, on a case-by-case basis, to seek STAs for technical solutions that are similar to those permitted during the DTV transition.[1646] For example, we will consider granting an STA to operate for a short period of time on a channel relinquished by a license relinquishment bidder or from a temporary antenna location.[1647] We will examine all such requests to determine whether they would serve the public interest, and we will require that all temporary authorizations not cause impermissible interference to other broadcast or wireless licensees. All STAs granted in connection with the post-auction transition will be for a maximum of 180 days, the amount of time provided under the Communications Act and the Commission's rules for STA requests.[1648] In addition, the Media Bureau will reserve the right to modify or cancel an STA at any time without prior notice at its sole discretion.[1649]

585. Finally, we note that the license of any station that is dark for any consecutive 12-month period expires at the end of that period, except that the Commission can extend or reinstate such license

[1643] *See* US Cellular Comments at 38.

[1644] *See* 47 C.F.R. § 73.3598(b). Stations must notify the Commission as promptly as possible, and in any event within 30 days of any pertinent tolling event, and provide supporting documentation. *See* 47 C.F.R. § 73.3598(c). Whether or not the Media Bureau will toll a station's construction permit will depend on whether additional time to construct is required after the conclusion of the initial six-month extension period discussed above. With respect to tolling based upon administrative or judicial review, stations must notify the Commission promptly when such review is resolved. *See* 47 C.F.R. § 73.3598(d). Tolling resulting from an act of God automatically will cease six months from the date of the notification required by § 73.3598(c), unless the station submits additional notifications at six month intervals detailing how the act of God continues to cause delays in construction, any construction progress, and the steps the station has taken and proposes to take to resolve any remaining impediments.

[1645] *See* Harris Broadcast Comments at 15; PTV Comments at 30; Anon. Broadcaster 1 Comments at 5. We also concur with US Cellular that temporary authority may "allow a station to transition to its newly-assigned channel, and thus clear the 600 MHz band, even though construction of its fully-authorized post-transition facilities may not be complete." US Cellular Comments at 59; *see also* US Cellular Reply at 50. We note that allowing stations to operate with temporary facilities was a key element to successful completion of the DTV transition.

[1646] Stations seeking an STA must satisfy the notice and filing requirements of § 73.1635 of the rules and file an electronic request through CDBS. *See* 47 C.F.R. § 73.1635.

[1647] *See* Harris Broadcast Comments at 15. In evaluating such STA requests, the Media Bureau will take into consideration whether the channel in question has been reallocated for flexible wireless use and, if so, the projected construction timetable for the new wireless facilities.

[1648] *See* 47 U.S.C. § 309(f); 47 C.F.R. § 73.1635(a)(4).

[1649] *See* 47 C.F.R. § 73.1635(b) ("An STA may be modified or cancelled by the FCC without prior notice or right to hearing").

"to promote equity and fairness."[1650] Stations with new channel assignments that remain dark for any consecutive 12-month period may seek an extension or reinstatement of their license and a waiver of the pertinent Commission rules. In considering such requests, we will take into account the extent to which a station has been involuntarily forced to remain dark as a result of the repacking process and whether, in light of the facts presented, equity and fairness dictate a license extension or reinstatement and a waiver.

3. Consumer Education

586. *Background*. The Commission invited comment in the *NPRM* on the types of consumer outreach it should conduct in connection with the post-auction transition.[1651] In particular, the Commission asked whether it should require broadcasters that will cease broadcasting or transition to new channels to air viewer notifications and, if so, the form such notifications should take and when they should be aired.[1652] Noting that stations were required to periodically file reports with the Commission on their consumer education efforts during the DTV transition, the Commission also asked whether such formal reporting requirements would be necessary or advisable during the forthcoming transition.[1653] In addition, the Commission asked to what extent it should use its own resources to inform consumers about the transition, including whether it should expand and update its existing call center to provide consumer assistance and whether and how to provide guidance to consumers through the Commission's website.[1654]

587. *Discussion*. Consumer education will be an important element of an orderly post-auction band transition. Consumers will need to be informed if stations they view will be changing channels, encouraged to rescan their receivers for new channel assignments, and educated on steps to resolve potential reception issues. Thus, we will require stations to take certain actions to adequately notify consumers and minimize any potential disruption.[1655] Specifically, as discussed below, we will require all "Transitioning Stations"[1656] to air viewer notifications for a minimum of 30 days prior to the date that the station will terminate operations on its pre-auction channel. The requirements we are adopting are similar

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[1650] *See* 47 U.S.C. § 312(g). The Commission's rules also provide that the "license of a broadcasting station that fails to transmit broadcast signals for any consecutive 12-month period expires as a matter of law at the end of that period, notwithstanding any provision, term, or condition of the license to the contrary." 47 C.F.R. §§ 73.1020(c). *See also* 73.1615(c)(2), 73.1635(a)(4), 73.1740(c), 73.1750.

[1651] *See NPRM*, 27 FCC Rcd at 12466-67, paras. 330-332.

[1652] *Id.* at 12466-67, para. 332.

[1653] *Id*.

[1654] *Id.* at 12466, para 331.

[1655] We reject as unnecessary NAB's suggestion that the Commission commit to seek funding from Congress for consumer education. *See* Letter from Rick Kaplan, Executive Vice President, Strategic Planning, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 16 (NAB Apr. 23, 2014 *Ex Parte* Letter). We note that stations reassigned to a new channel in the repacking process may submit reasonably incurred costs (other than lost revenues) associated with compliance with consumer education requirements for reimbursement from the Reimbursement Fund. *See* § V.C.5 (Reimbursement of Relocation Costs). Although winning reverse auction bidders are not eligible for such reimbursement, they will have access to auction proceeds to cover the cost of consumer education requirements. We also reject NAB's argument that the Commission should not impose consumer education requirements on broadcasters. *See id*. Because broadcasters will have unique access to the viewers that will be affected by the auction and repacking process, consumer education requirements will be a critical means to avoid unnecessary service disruptions. As explained herein, we are adopting flexible requirements that can be catered to a station's individual transition circumstances.

[1656] For purposes of this requirement and the requirement of notice to MVPDs, discussed below, we define "Transitioning Stations" as full power and Class A television stations that are: (1) reassigned to new channels by the Commission, (2) winning UHF-to-VHF and high-VHF-to-low-VHF bidders, (3) winning license relinquishment bidders, or (4) parties to a winning channel sharing bid. Channel sharer stations will be required to participate in consumer education only if they are reassigned to a new channel in the repacking process.

to those the Commission imposed during the DTV transition as well as the ongoing LPTV transition.[1657] We agree with NHMC that these measures are necessary to "mitigate any consumer disruption caused by lack of consumer understanding."[1658] As commenters correctly note, in contrast to the DTV transition, in which all stations were required to cease analog broadcasts on the same day, stations assigned new channels in the repacking process and winning auction bidders will be transitioning under varying circumstances and on different schedules.[1659] Accordingly, as commenters suggest, we will provide stations with flexibility to target their messages to their specific situations in order to minimize public confusion and the effect of any service disruptions.[1660]

588. *Viewer Notifications for Commercial Full Power Stations and Class A Stations.* Transitioning Stations that operate on a commercial basis will be required to air a mix of Public Service Announcements ("PSAs") and crawls.[1661] Such stations must air at least one transition PSA and run at least one transition crawl in every quarter of every day for 30 days prior to the date that the station terminates operations on its pre-auction channel.[1662] Further, one of the required PSAs and one of the required crawls must be run during primetime hours each day.[1663] Crawls must run during programming for no less than 60 consecutive seconds across the bottom or top of the viewing area[1664] and be provided in the same language as a majority of the program carried by the station. Although we do not dictate the exact content of crawls, they must include the date that the station will terminate operations on its pre-auction channel, inform viewers of the need to rescan if the station has received a new channel assignment, and explain how viewers may obtain more information by telephone or online.[1665] PSAs must have a duration of at least 15 seconds,[1666] and each PSA must provide, at a minimum, the same information as required for crawls. For stations relocating to new channels, PSAs also must provide instructions to both over-the-air and multichannel video programming viewers regarding how to continue

[1657] *See DTV Consumer Education Initiative*, MB Docket No. 07-148, Report and Order, 23 FCC Rcd 4134 (2008) (*Consumer Education R&O*); *LPTV DTV Second R&O*, 26 FCC Rcd at 10756, paras. 49-50.

[1658] NHMC Reply at 5.

[1659] *See* Disney Comments at 39-40. For example, Disney notes, "some stations will seek to transition to their new channels very quickly whereas other stations may be required to take time to construct facilities on their repacked channels. Moreover, the nature of the relocation will vary among stations, as some stations may be moving from a UHF channel to a VHF channel, others may be sharing channels, and others may be ceasing broadcasts." *Id.*

[1660] *See* Disney Comments at 39-40; *see also Consumer Education R&O*, 23 FCC Rcd at 4138, para. 6; *LPTV DTV Second R&O*, 26 FCC Rcd at 10755-56, para. 50.

[1661] A "crawl" is "text that advances very slowly across the bottom or top of the screen." *See In the Matter of Review of the Emergency Alert System*, EB Docket No. 04-296, First Report and Order and Further Notice of Proposed Rulemaking, 20 FCC Rcd 18625, 18657 n.222 (2005). Stations may use alternative forms of crawls, including a text "flipper," which is a message on the screen that flips to a new line of text instead of crawling across the screen.

[1662] For the purposes of these requirements, each broadcast day can be broken into four quarters: 6:01 am to 12:00 pm, 12:01 pm to 6:00 pm, 6:01 pm to 12:00 am, and 12:01 am to 6:00 am.

[1663] For the purposes of this requirement, "primetime" is defined as the hours between 8:00 pm and 11:00 pm in the Eastern and Pacific time zones, and between 7:00 pm and 10:00 pm in the Mountain and Central time zones.

[1664] The crawls should not block any closed captioning or emergency information. *Cf.* 47 C.F.R. § 79.2(b)(3) (prohibiting closed captioning from blocking emergency information, and vice versa).

[1665] For example, viewers could be given the option of calling the station at a number provided, visiting the station's website, calling the Commission at 1-888-CALL-FCC, or visiting the Commission's website.

[1666] Broadcasters are free to air additional PSAs that do not meet all of these requirements, as long as the information included is accurate and not misleading.

watching the station. In addition, we require that transition PSAs be closed-captioned.[1667] We expect that broadcasters will air transition PSAs in addition to, and not in lieu of, PSAs on other issues of importance to their local communities. We encourage stations to include any other details about their transition that they believe to be important in their notifications, and stations are free to air additional notifications regarding the transition that they deem beneficial to their viewers.

589. *Viewer Notifications for NCE Stations*. During the DTV transition, NCE full power stations were given the option of complying with consumer education requirements through an alternate plan suggested by APTS.[1668] We conclude that a similar alternative is appropriate here.[1669] NCE stations may choose to comply with notification requirements either through the framework set forth above or by airing 60 seconds per day of on-air consumer education PSAs for 30 days prior to termination of operations on their pre-auction channel. NCE stations choosing the alternate plan will have the discretion to choose the timeslots for these PSAs. The NCE transition PSAs must include the same information as noted above and must be closed-captioned. We expect NCE stations electing this alternative to air these PSAs in addition to, and not in lieu of, PSAs on other issues of importance to their local communities.

590. *Certification of Compliance.* We will not impose periodic reporting requirements on Transitioning Stations. Although stations were required to periodically file FCC Form 388 reporting on their education efforts during the DTV transition, such requirements will not be necessary during the forthcoming transition given the less extensive nature of the consumer education requirements we are adopting. Instead, we will require that stations transitioning to a new channel place a certification of compliance with consumer notification requirements in their online public files within 30 days after beginning operations on their post-auction channels. In the case of winning license relinquishment bidders, we will require that stations include the certification in their notifications of discontinuation of service.[1670] A certification will ensure compliance with our consumer education requirements while minimizing the recordkeeping and reporting burden on Transitioning Stations.

591. *Commission Outreach Efforts*. The Commission directs the Consumer and Governmental Affairs Bureau ("CGB"), working in coordination with the Media Bureau and the Wireless Bureau, to develop a comprehensive consumer outreach plan to enhance consumer awareness regarding the transition. These efforts should be coordinated with stakeholder groups' outreach efforts. For example, CGB should consider updating the Commission's existing call center capabilities to offer consumer assistance on such matters as rescanning and other means to resolve potential reception issues. We also direct CGB to encourage the development of third-party call centers, such as one that might be established by a group of Transitioning Stations working together. In addition, CGB should examine the possibility of providing additional information and guidance to consumers on how to prepare for the transition through the Commission's website (www.fcc.gov). For example, the staff could post maps online to inform consumers regarding the station signals that will be affected by the transition, as it did during the DTV transition. CGB also should endeavor, where staff and resources are available, to conduct in-person outreach at the most relevant consumer events. We agree with NHMC that, by

[1667] We recognize that our rules exempt PSAs that are shorter than 10 minutes in duration from the captioning requirements. *See* 47 C.F.R. § 79.1(d)(6). Due to the critical information to be included in these PSAs, however, we expressly require that transition PSAs be closed captioned regardless of their duration.

[1668] *See Consumer Education R&O*, 23 FCC Rcd at 4150-51, para. 34.

[1669] *See id*. (citing Letter from Lonna Thompson, Senior Vice President and General Counsel, Association of Public Television Stations, to Honorable Kevin J. Martin, Chairman, FCC, MB Docket No. 07-148 (filed Feb. 12, 2008) (explaining that consumer education requirements must "recognize the many differences between commercial and noncommercial stations" and "take into account the unique constraints—financial, personnel- and content-related—that Public Television stations face")).

[1670] *See* 47 C.F.R. § 73.1750.

devoting resources to public outreach and education and engaging multiple stakeholders in those efforts, we will help ensure that all communities across the country are well informed.[1671]

4. Notice to MVPDs

592. *Background*. The Commission sought comment in the *NPRM* on whether to require stations that receive new channel assignments or cease broadcasting as a result of the auction to provide notice to affected MVPDs of channel changes and other technical changes that could affect carriage.[1672] Assuming such notice requirements are adopted, the Commission also asked what information should be provided, what form the notice should take, and what the timeframe for providing notice should be.[1673]

593. *Discussion*. We adopt the proposal in the *NPRM* to require all Transitioning Stations to provide notice to relevant MVPDs.[1674] We conclude that the notice requirements set forth below will minimize the impact of the transition on MVPDs and their subscribers by providing MVPDs with sufficient time to make changes to their systems and notify subscribers of upcoming channel or other technical changes. Commenters reinforce the importance of adequate notice obligations.[1675]

594. We require Transitioning Stations to provide notice to those MVPDs that: (1) no longer will be required to carry the station because it will cease operations or because of the relocation of a channel sharing sharee station; (2) currently carry and will continue to be obligated to carry a station that will change channels; or (3) will become obligated to carry a station due to a channel sharing relocation.[1676] Although MVPDs will receive notice of relevant channel changes from the *Channel Reassignment PN*, the Public Notice will not inform MVPDs of the timing of channel changes. As DIRECTV/DISH notes, this broad announcement "may not fully reflect broadcasters' plans."[1677]

[1671] *See* NHMC Reply at 5 (citing PTV Comments at 30).

[1672] *See NPRM*, 27 FCC Rcd at 12467, para 333. In addition, in the *Channel Sharing Report and Order*, the Commission stated that, following the conclusion of the reverse auction and the repacking process, it will be important that MVPDs be "apprised of any potential disruption to current operations, allowing MVPDs to properly alert their subscribers." *Channel Sharing Report and Order*, 27 FCC Rcd at 4633, para. 34 (quoting Dish Network Comments, ET Docket No. 10-235 at 3).

[1673] *See NPRM*, 27 FCC Rcd at 12467, para. 333.

[1674] *See* n.658 (defining Transitioning Stations). Although channel sharer stations will not be required to participate in consumer education efforts unless they are reassigned to new channels in the repacking process, they will be required, in conjunction with sharee stations, to notify affected MVPDs prior to initiation of shared operations. For purpose of the notice requirement, we use the statutory definition of MVPD. *See* Spectrum Act § 6001(19) (defining a "multichannel video programming distributor" as having the meaning given such term in § 602 of the Communications Act); 47 U.S.C. § 522 (defining an MVPD as "an entity such as, but not limited to, a cable operator, a multichannel multipoint distribution service, a direct broadcast satellite service, or a television receive-only satellite program distributor, which makes available for purchase, by subscribers or customers, multiple channels of video programming.").

[1675] *See* NCTA Comments at 19 n.58; DIRECTV/DISH Comments at 13; *Reassignment Costs Report PN*, 29 FCC Rcd at 3030. Several MVPD commenters detail the types of changes necessary to accommodate new channel assignments. *See* Comcast Comments at 28 (installation of additional antennas and receivers at headends); DIRECTV/DISH Comments at 6 (new and modified local receiver facility equipment including retuning of existing receiver equipment and adding or replacing tower mounted antennas and associated receiver equipment); NCTA Comments at 20 (installation of new antennas to receive the new channel allocation or new equipment to transport the broadcast signal via fiber, microwave or satellite distribution).

[1676] *See* § VI.A.2 (Channel Sharing Operating Rules) (addressing potential changes in MVPD carriage obligations).

[1677] DIRECTV/DISH Comments at 13. For example, "with respect to channel sharing stations, an MVPD may not easily know which programming stream is associated with each call sign with carriage rights." *Id.*

Therefore, specific individual notices from stations to affected MVPDs are necessary to provide adequate information to MVPDs and avoid disruptions of service.[1678]

595. The required notice must be provided in the form of a letter notification.[1679] We adopt the DIRECTV/DISH suggestion that the letter contain the following information: (1) date and time of any channel changes; (2) pre-auction and post-transition channel assignments; (3) modification, if any, to antenna position, location, or power levels; (4) stream identification information for channel sharing stations; and (5) engineering staff contact information.[1680] Should any of this information change during the station's transition, an amended notification must be sent. For cable systems, the letter must be addressed to the system's official address of record provided in the cable system's most recent filing in the Cable Operations and Licensing System ("COALS") Form 322.[1681] For all other MVPDs, the letter must be addressed to the official corporate address registered with their State of incorporation.

596. Further, we require that stations provide notice within the following time frames: (1) for winning license relinquishment bidders, not less than 30 days prior to terminating operations; (2) for channel sharing sharee stations, not less than 30 days prior to terminating operations of the sharee's pre-auction channel; (3) for all channel sharing stations (i.e., both the sharer station and sharee station(s)), not less than 30 days prior to initiation of operations on the sharer channel; and (4) for all other stations transitioning to a new channel, including stations that are assigned to new channels in the repacking process and winning UHF-to-VHF and high-VHF-to-low-VHF bidders, not less than 90 days prior to the date on which they will begin operations on their reassigned channel.[1682] In addition, should a station's anticipated transition date change due to an unforeseen delay or change in transition plan, the station must send a further notice to affected MVPDs informing them of the new anticipated transition date. We reject the longer notice periods proposed by DIRECTV/DISH (120 days)[1683] and NCTA (180 days).[1684] It is not likely that stations will know that far in advance when construction will be completed and operation on a new channel will begin. In addition, the timeframes outlined above, as well as the requirement to notify MVPDs of any change to anticipated transition dates, will provide ample time for MVPDs to make the necessary changes to their systems.

597. In addition, we waive the 30-day advance notice requirement in section 76.1603(c) of our rules with respect to deletions from a cable system's channel line up resulting from a winning license relinquishment bid.[1685] Section 76.1603(c) requires cable operators to provide 30 days written notice to

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[1678] Stations assigned to a new channel in the repacking process may submit the cost of preparation and mailing of MVPD notices for reimbursement from the Reimbursement Fund. However, winning reverse auction bidders are not eligible for such reimbursement.

[1679] Although § 76.57(e) of the Commission's rules already provides that television stations must notify cable systems of their choice of channel positions, in this Order we adopt more specific notification requirements to be used in connection with the post-auction band transition. 47 C.F.R. § 76.57(e).

[1680] DIRECTV/DISH Comments at 13.

[1681] Additional information on COALS is available on the FCC's website: https://apps.fcc.gov/coals.

[1682] Channel sharing sharer stations that are assigned a new channel in the repacking process will be required to send two notifications—one before they begin channel sharing on their pre-auction channel and a second before they begin operations on their reassigned channel. Sharee stations that share with a station that is assigned a new channel in the repacking process also will be required to send these notifications.

[1683] *See* DIRECTV/DISH Comments at 13; DIRECTV/DISH Reply at 4.

[1684] *See* NCTA Comments at 19 n.58.

[1685] 47 C.F.R. § 76.1603(c). Section 76.1603(b) requires cable operators to provide written notice to subscribers of changes in channel positions "as soon as possible." 47 C.F.R. § 76.1603(b). Notice must be given to subscribers a minimum of 30 days in advance of channel changes if the change is within the control of the cable operator. *Id*. Because channel changes resulting from the reverse auction or the repacking process will not be within the control of the cable operator, the minimum notice period does not apply to such changes.

both subscribers and local franchising authorities before implementing any service change, including the deletion of a channel. Because license relinquishment bidders must notify MVPDs only 30 days prior to terminating operations, it may not be feasible for cable operators to provide the required advance notice of the resulting channel deletion. We instead require them to provide such notice as soon as practical. We note that significant advance notice from cable operators to subscribers is not necessary in this context because of the consumer education requirements we adopt for license relinquishment stations, which will require them to notify viewers that they will terminate operations through PSAs and crawls.[1686]

5. Reimbursement of Relocation Costs

598. The Spectrum Act requires the Commission to reimburse broadcast television licensees for costs "reasonably incurred" in relocating to new channels assigned in the repacking process and MVPDs for costs reasonably incurred in order to continue to carry the signals of stations relocating to new channels as a result of the repacking process or a winning reverse auction bid.[1687] As explained in the *NPRM*,[1688] Congress specified that these reimbursements be made from the TV Broadcaster Relocation Fund (the "Reimbursement Fund"),[1689] and that the amount available for reimbursement of relocation costs is $1.75 billion.[1690] In addition, under the Spectrum Act, the Commission must make all reimbursements within three years after completion of the forward auction (the "Reimbursement Period").[1691]

599. In this Section, we discuss the implementation of the Reimbursement Fund. We discuss the entities that will be eligible for reimbursement, the procedure we will use to provide reimbursements, and how the Commission will determine the expenses that will be eligible for reimbursement. We also mandate the use of various measures to protect the Reimbursement Fund against waste, fraud, and abuse. In addition, we conclude that the record in this proceeding is not yet sufficient to make final decisions regarding some aspects of the reimbursement process. Accordingly, we delegate rulemaking authority to the Media Bureau to address additional aspects of the reimbursement process at the appropriate time.

a. Television Station Licensees and MVPDs Eligible for Reimbursement

600. *Background*. The entities eligible for reimbursement are set forth in section 6403(b)(4)(A) of the Spectrum Act. With respect to broadcasters, the Commission tentatively concluded

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[1686] *See* para. 586. We also conclude that section 76.1601 of our rules and section 614(b)(9) of the Communications Act, which require cable operators to provide written notice to broadcast television stations prior to deleting the station from carriage or repositioning its channel, does not apply to channel changes or deletions resulting from the reverse auction or repacking process. 47 C.F.R. § 76.1601; 47 USC 534(b)(9).

[1687] Spectrum Act § 6403(b)(4)(A)(i), (ii).

[1688] *See NPRM*, 27 FCC Rcd at 12467-68, paras. 335-336.

[1689] *See* Spectrum Act § 6403(d).

[1690] *See* Spectrum Act § 6402 (adopting 47 U.S.C. § 309(j)(8)(G)(iii)(I), (II)). We disagree with arguments that the $1.75 billion Reimbursement Fund is a cap on or limits our repacking authority. *See* § V.C.5.f (Other Reimbursement Issues). Of this $1.75 billion, the Commission is authorized to borrow up to $1 billion from the United States Treasury to use toward the reimbursement of relocation costs pursuant to § 6403(b)(4)(A), but must reimburse the Treasury for any amounts borrowed as funds are deposited into the Reimbursement Fund. *See* Spectrum Act §§ 6403(d)(3)(A)–(B). The statute provides for deposits from the forward auction proceeds into the Reimbursement Fund in new Communications Act § 309(j)(8)(G)(iii). That provision mandates that, from the forward auction proceeds that are not distributed to winning bidders in the reverse auction and that are not retained by the Commission to cover its administrative costs, $1.75 billion shall be deposited into the Reimbursement Fund.

[1691] Spectrum Act § 6403(b)(4)(D). As discussed in § V.A (Auction Completion and Effective Date of the Repacking Process), the forward auction will be complete when a public notice announces that the auction has ended.

that the statute requires reimbursement only for full power and Class A television licensees that are reassigned to new channels in the repacking process, not winning reverse auction bidders.[1692] The Spectrum Act also requires the FCC to reimburse costs reasonably incurred by an MVPD "in order to continue to carry the signal of a broadcast television licensee" reassigned to a new channel either in the repacking process or as a result of a winning reverse auction bid, including a channel sharing bid.[1693]

601. *Discussion.* With respect to broadcasters, we adopt the tentative conclusion that the reimbursement mandate applies only to full power and Class A television licensees that are involuntarily reassigned to new channels in the repacking process pursuant to section 6403(b)(1)(B)(i). We will not reimburse winning reverse auction bidders (i.e., winning UHF-to-VHF, high-VHF-to-low-VHF, or channel sharing bidders) for voluntary frequency changes.[1694] This interpretation is both consistent with the language of section 6403(b)(4) and reasonable, in that successful reverse auction bidders can be expected to cover any relocation costs stemming from their successful bids out of auction proceeds. As proposed in the *NPRM*, sharer stations that participate in a channel sharing arrangement will be eligible for reimbursement only if they are reassigned to a new channel in the repacking process.[1695] Moreover, consistent with the proposal in the *NPRM*, and as required by section 6403(b)(4)(A)(i), we will reimburse any station formerly on channel 51 that must relocate again because its new channel is reassigned in the repacking process, even if it previously relocated from channel 51 pursuant to a private agreement.[1696]

602. Stations that are not reassigned to a new channel will not be eligible for reimbursement. Section 6403(b)(4)(A)(i) expressly mandates reimbursement only for television licensees "that [are] reassigned under [section 6403(b)(1)(B)(i)]" in the repacking process, and does not require reimbursement for stations that are not reassigned to new channels. Some commenters argue that the Commission has discretionary authority to reimburse such broadcasters.[1697] Even assuming that we have

[1692] *See NPRM*, 27 FCC Rcd at 12468, para. 337.

[1693] Spectrum Act § 6403(b)(4)(ii). The Spectrum Act defines an "MVPD" in the same manner as it is defined in § 602 of the Communications Act, 47 C.F.R. § 522. *See* Spectrum Act § 6001(19).

[1694] The Spectrum Act mandates reimbursement of broadcast television licensees only for the following three types of channel reassignments, none of which include a reassignment from UHF to VHF channels: (1) a UHF channel to a different UHF channel, (2) a VHF channel to a different VHF channel, or (3) a VHF channel to a UHF channel. *See* Spectrum Act § 6403(b)(4)(A)(i). We also conclude that the Spectrum Act does not mandate reimbursement of stations submitting winning high-VHF-to-low-VHF bids in the reverse auction. As discussed in § IV.B.1.b.iv (Additional Bid Options), while the statute does not provide for high-VHF-to-low-VHF bids, it does not preclude the FCC from adopting this bid option. The reference to VHF-to-VHF reassignments in § 6403(b)(4)(A)(i), however, is best read as referring to the involuntary reassignments contemplated in the Spectrum Act, not to reassignments resulting from additional bid options the Commission may allow. Because the Spectrum Act contemplates only involuntary VHF-to-VHF reassignments, we conclude that § 6403(b)(4)(A)(i) does not refer to voluntary VHF-to-VHF reassignments resulting from successful bids. We find this interpretation is consistent with other provisions of the Spectrum Act, which provide for only voluntary UHF-to-VHF reassignments and do not provide reimbursement for such reassignments. *Compare* Spectrum Act § 6403(a)(2)(B) (UHF-to-VHF bid option) *with id*. § 6403(b)(3)(A) (precluding involuntary UHF-to-VHF reassignments); *id*. § 6403(b)(4)(A)(i) (excluding UHF-to-VHF reassignments from reimbursement). This interpretation also avoids a result where winning high-VHF-to-low-VHF bidders receive cost reimbursement, yet winning UHF-to-VHF bidders do not, without any apparent purpose consistent with the policies underlying the Spectrum Act.

[1695] *See NPRM*, 27 FCC Rcd at 12468, para. 337. A "sharer" is a station that does not relinquish its spectrum, but shares its frequencies with one or more "sharees" that relinquish their frequencies in order to move to the sharer's frequencies. *Id.* at 12442, para. 245.

[1696] *See id.* at 12472, para. 349. Because the Lower 700 MHz A Block is adjacent to television broadcast channel 51, there have been some arrangements between wireless licensees and channel 51 broadcasters to relocate stations currently on channel 51 to avoid interference. Channel 51 stations that relocated pursuant to a private arrangement may or may not need to relocate a second time as a result of the repacking process.

[1697] *See, e.g.*, Affiliates Associations Comments at 52-53; NAB Comments at 57-58.

such authority, we decline to exercise it. In light of the limited amount of money Congress made available to reimburse broadcasters and MVPDs for relocation costs, we will limit reimbursements to those provided for by the Spectrum Act. We note that, in some cases, stations that are not reassigned to new channels but that sustain expenses due to the repacking process may be reimbursed indirectly.[1698] For example, where multiple stations share a tower, a reassigned station that makes changes may be required to cover certain expenses incurred by other tower occupants.[1699] In such circumstances, the Commission will consider a claim from the reassigned station for reimbursement of such costs, so long as the reassigned broadcaster has a contractual obligation to pay these expenses through a contract entered into on or before the release date of this Order.[1700] We also note that there may be instances in which a non-reassigned station may benefit indirectly from a reimbursement to a reassigned station.[1701]

603. MVPDs will be eligible for reimbursement when they reasonably incur costs in order to continue to carry broadcast stations that are reassigned as a result of the auction.[1702] We anticipate that the vast majority of MVPD carriage expenses will be due to channel changes made by broadcast stations that an MVPD already carried prior to the auction. Moreover, we anticipate that most MVPD carriage costs will result from broadcasters being reassigned to new channels, and not from a successful channel sharing bid.[1703] However, there may be a limited number of situations in which an MVPD incurs a new carriage obligation due to the relocation of a sharee station.[1704] We conclude that MVPDs that must fulfill any such new carriage obligations will be eligible for reimbursement of their reasonably incurred costs, just as they will be eligible for reasonably incurred costs to continue carrying other reassigned stations and winning bidders.[1705]

604. We interpret section 6403(b)(4)(A)(ii)(III), which mandates reimbursement of MVPDs' costs "in order to continue to carry" a broadcaster that relinquishes its spectrum to share with another licensee, to cover costs an MVPD reasonably incurs so that a broadcaster continues to be carried on an

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[1698] We note, however, that in such a situation only the reassigned station would be eligible to seek reimbursement from the Reimbursement Fund for any such costs.

[1699] *See* NAB Comments 57-58 and Appendix A; Affiliates Associations Comments at 52-53. We note that many towers used by television stations have multiple occupants, including other television and radio stations as well as non-broadcast facilities. Changes to the facilities of one station may affect other broadcast stations on the tower if, among other things, other station antennas must be moved to accommodate the change.

[1700] Parties may receive such reimbursement with respect to contracts entered into after that date if they can show good cause for such reimbursement.

[1701] This would occur if, for example, a reassigned station is reimbursed for new equipment that is shared with a non-reassigned station.

[1702] Spectrum Act § 6403(b)(4)(A)(ii) (requiring the Commission to reimburse MVPDs for their eligible costs without regard to whether the carriage obligation results from must-carry obligations or a retransmission consent agreement).

[1703] In the case of an involuntary channel reassignment or a winning UHF-to-VHF or high-VHF-to-low-VHF bid, an MVPD that already carried the station in question will need to accommodate its new channel assignment. In the case of most channel sharing arrangements where the MVPD likely already carries the sharer station, we expect that the MVPD's transition costs will be relatively inexpensive because it will not be required to accommodate a new channel assignment. *See* NCTA Comments at 19-20.

[1704] *See* § VI.A.2 (Channel Sharing Operating Rules) (describing the impact of channel sharing on MVPD carriage obligations).

[1705] The Spectrum Act does not expressly mandate reimbursement for costs to continue to carry stations that submit winning high-VHF-to-low-VHF bids. *See* Spectrum Act § 6403(b)(4)(A)(i). However, we conclude above that the Spectrum Act does not preclude the Commission from adopting this additional bid option, and we similarly conclude that the Spectrum Act does not preclude us from reimbursing MVPDs for the reasonably incurred costs to continue carrying winning high-VHF-to-low-VHF bidders. *See* § IV.B.1.b. (Reverse Auction Bid Options).

MVPD service after the auction, regardless of whether that particular MVPD or a different one previously carried the station. Although the statute does not directly address this issue, section 6403(a)(4) guarantees that a channel sharee that had carriage rights before the auction will have the carriage rights that apply at its new shared location rather than its original location. Since Congress expressly preserved channel sharing broadcasters' carriage rights at their new locations regardless of whether an individual MVPD's carriage obligations are changed, it is reasonable to infer that Congress intended for MVPDs to be eligible for reimbursement when they incur costs in accommodating those rights. As NCTA explains, reading the statute as "precluding reimbursement of a cable operator acting to fulfill the broadcaster's right to carriage would create an asymmetry" that would penalize MVPDs.[1706] We agree with NCTA that such an outcome would be contrary to Congress' intent.

b. Reimbursement Process

605. *Background*. Our goals in developing a reimbursement process are threefold. First, the process must be as simple and straightforward as possible to minimize the costs associated with reimbursement as well as the burdens on both affected parties and the Commission. Second, the process must be prompt and efficient in light of the three-year statutory deadline for issuing reimbursements.[1707] Third, the process must be fair: it must cover broadcasters' and MVPDs' eligible costs reasonably incurred and maximize the funds available for reimbursement by avoiding waste, fraud, and abuse.

606. The Commission proposed in the *NPRM* to allow broadcasters to elect reimbursement of their eligible relocation costs based on either their estimated costs or their actual, out-of-pocket expenditures.[1708] Under that proposal, stations choosing to receive reimbursement based on the estimated cost approach would receive their reimbursement through an advance payment based on a predetermined amount, while stations choosing reimbursement based on actual costs would receive reimbursement only after paying and documenting their costs. The Commission also invited comment on alternative reimbursement procedures.[1709] In addition, the Commission sought comment on whether to allow MVPDs to be reimbursed through advance payments based on estimated costs[1710] and whether the Commission should appoint a third-party auditor to oversee the Reimbursement Fund.[1711]

607. *Discussion*. We adopt a reimbursement process that provides initial allocations of funds to broadcasters and MVPDs based on their estimated costs. The funds will be available for draw down as the broadcasters and MVPDs incur expenses, followed by a subsequent allocation to the extent necessary.[1712] As discussed more fully below, all entities seeking reimbursement will be required to provide an estimate of their eligible costs following the release of the *Channel Reassignment PN*. The Media Bureau will review the estimates based on the Catalog of Eligible Expenses being developed by the Bureau.[1713] Eligible entities will be issued an initial allocation from the Reimbursement Fund equal to

[1706] Letter from Rick Chessen, Senior Vice President, NCTA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed July 29, 2013).

[1707] *See* Spectrum Act § 6403(b)(4)(D).

[1708] *See NPRM*, 27 FCC Rcd at 12468-70, para. 338-341.

[1709] *Id*. at 12470, para. 342.

[1710] *Id*. at 12472, para. 350.

[1711] *Id.* at 12473, para. 354.

[1712] These allocations of funds will be placed in designated individual accounts in the U.S. Treasury.

[1713] The Media Bureau has developed and released for public comment a Catalog of Eligible Expenses, which is a preliminary list of the expenses broadcasters and MVPDs will incur during the repacking process that may be eligible for reimbursement. *See Media Bureau Seeks Comment on Catalog of Eligible Expenses and Other Issues Related to the Reimbursement of Broadcaster Channel Reassignment Costs*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 13787 (2013) (*Reassignment Costs PN*). In addition, the Media Bureau is developing a set of

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a set percentage of their estimated eligible costs.[1714] Prior to the end of the three-year Reimbursement Period, entities will provide information regarding their actual and remaining estimated costs and will be issued a final allocation, if appropriate, to cover the remainder of their eligible costs. If an overpayment is discovered after the end of the Reimbursement Period, entities will be required to return the excess to the Commission.

608. *Reimbursement Period*. As discussed above, the Spectrum Act requires the Commission to make all required reimbursements no later than three years after completion of the forward auction.[1715] We conclude above that the forward auction will be "complete" when a public notice announces that the auction has ended.[1716] Accordingly, all required reimbursements must be made within three years of the date of that announcement. The Commission will not issue any reimbursements before completion of the forward auction.[1717]

609. *Estimated Versus Actual Cost Approach.* We decline to adopt our proposal in the *NPRM* to give broadcasters and MVPDs a choice between an estimated cost approach with advance payments or an actual cost approach with reimbursement after eligible entities pay and document their costs. Rather, a uniform approach to reimbursement will simplify the reimbursement process and reduce the chance that entities will be unable to finance necessary relocation changes.[1718] Therefore, instead of offering a choice, we will issue all eligible broadcasters and MVPDs an initial allocation of funds based on estimated costs, which will be available for draw down (from individual accounts in the U.S. Treasury) as the entities incur expenses, followed by a subsequent allocation to the extent necessary. All commenters who address the issue support providing advance payments.[1719] Although the process we establish is similar to an approach based on advance payments, we have concluded that such advances would not be permissible under Title 31 of the United States Code and applicable U.S. Treasury regulations and guidance thereunder.[1720] Specifically, in order to comply with U.S. Treasury requirements, we must allocate funds

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predetermined cost estimates for these expenses that will be included in a final Catalog of Eligible Expenses. *See Reassignment Costs Report PN*, 29 FCC Rcd 2989.

[1714] The amount available to be issued as initial allocations will depend, in part, on the total amount of repacking expenses reported on the estimated cost forms. In addition, the timing of the initial allocations will depend on when money in the Reimbursement Fund becomes legally available for obligation to eligible entities. *See* para. 615.

[1715] Spectrum Act § 6403(b)(4)(D).

[1716] *See* § V.A (Auction Completion and Effective Date of the Repacking Process).

[1717] *See* § V.B (Processing of Bid Payments).

[1718] We agree with those commenters who argue that we should permit MVPDs to access money from the Reimbursement Fund in the same manner as broadcasters. While DIRECTV and DISH Network agree that the Commission will be able to identify estimated costs for MVPDs in advance, NCTA argues that the majority of costs likely to be incurred by cable operators will be labor costs that are highly variable, making it difficult for the Commission to establish tiers of estimated costs in advance for cable operators. *See* DIRECTV/DISH Comments at 7; NCTA Comments at 21. As discussed below, the reimbursement process we adopt permits entities to provide their own cost estimates if the Commission's predetermined estimate does not fully account for the entity's transition circumstances and provides ultimately for reimbursement based on actual relocation costs. This approach addresses the concerns raised by NCTA.

[1719] *See* PTV Comments at 27–28 (providing advance payment based on estimated costs will allow the Commission to meet the statutory mandate to make all payments within three years) and US Cellular Comments at 58 (offering advance payment for broadcaster relocation costs will expedite clearing of the 600 MHz Band). *See also* NAB Comments at 53-55; Comcast Comments at 24-25; CEA Comments at 35; Belo Comments at 19–20; Entravision Comments at 14; Harris Broadcast Comments at 18–19; Vision Comments at 13; ION Reply at 5; Capitol Reply at 7.

[1720] *See, e.g.*, 31 U.S.C. § 3321(a) (granting disbursement authority to the Department of Treasury); 31 U.S.C. § 3322(a)(2)(A) (requiring disbursing officials to draw money from the Treasury only as needed to make payments);
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to designated individual accounts within the U.S. Treasury that will be available for draw down as broadcasters and MVPDs incur eligible expenses. Under this approach, consistent with an advance payment approach, entities will be able to use federal funds initially to pay their expenses as they are incurred. The process we adopt allows us to comply with our statutory obligations both to reimburse costs reasonably incurred under section 6403(b)(4)(A) and to provide entities with the funds to implement their relocation changes within the statutory three-year reimbursement period under section 6403(b)(4)(D). In addition, it preserves the integrity of the Fund by reducing the likelihood of waste, fraud, and abuse.

610. *Submission of Estimated Costs*. No later than three months following release of the *Channel Reassignment PN*, all broadcasters and MVPDs[1721] that are eligible for reimbursement will be required to file a form providing an estimate of their channel relocation costs.[1722] These forms will be due at the same time that broadcasters assigned new channels must file their construction permit applications to implement the channel reassignments. Entities must update the form if circumstances change substantially.[1723] The estimated cost forms, along with the submissions discussed below, will be filed with the Commission electronically and will be publicly available.[1724]

611. On the estimated cost form, eligible broadcasters will provide an estimate of the costs they expect to reasonably incur to change channels, and MVPDs will estimate the costs they expect to reasonably incur to accommodate new channel assignments.[1725] The estimated cost form for television stations will reference the final Catalog of Eligible Expenses, which will contain a list of many, but not

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31 U.S.C. § 3324(b) (restricting agency authority to issue advances); 31 U.S.C.§ 3302(c) (requiring, as part of the Miscellaneous Receipts Act, 31 U.S.C. § 3302(b), that persons possessing public money not needed for current expenditure must deposit same into the Treasury).

[1721] MVPDs must review the *Channel Reassignment PN* to determine whether stations they currently carry are changing channels.

[1722] If an entity that did not file an estimated cost form becomes aware of an expense eligible for reimbursement after the three-month deadline, it may file a late estimated cost form together with an explanation of why the form could not be timely filed. The Media Bureau will consider any late-filed forms on a case-by-case basis.

[1723] For example, such an updated form would be required if entities later become aware of substantial expenses that were not identified on the initial form or if they make a subsequent determination that money from the Reimbursement Fund should be expended for equipment or other expenses different from those outlined in the initial estimated cost form.

[1724] The Media Bureau will develop one or more forms, discussed below, and seek public comment prior to the commencement of the reimbursement process. Any submissions will contain provisions designed to protect against waste, fraud and abuse, including, *inter alia,* a certification pursuant to 18 U.S.C. § 1001. Entities requesting confidential treatment of information included in either form should submit a request under § 0.459 of the Commission's rules. Even if some forms or documents are confidential, the Media Bureau will make public the amounts distributed from the Reimbursement Fund to each broadcaster and MVPD.

[1725] Eligible broadcasters will also have to list their current equipment on their estimated cost form. We decline to adopt the suggestion that we require all broadcasters, prior to the reverse auction, to provide us with an inventory of their equipment and facilities that would be affected by the repacking process as well as a preliminary estimate of their relocation costs. *See* Sprint Comments at 11–12; CTIA Comments at 35–36; Comcast Comments at 28; AT&T Reply at 66–67; T-Mobile Reply at 92–93. Relocation costs will depend on a variety of factors, including the type of equipment the station uses and whether that equipment can be used on the new channel. Because of the complexity of the transition and the number of variables that cannot be determined in advance, we decline to impose a burdensome inventory requirement. As stated in § III.B.3 (Facilities to Be Protected), we will require broadcasters to certify the accuracy of the technical information in the Commission's CDBS database prior to the auction. In addition, we decline to ask broadcasters to estimate their individual relocation costs prior to the auction because such estimates generally cannot be made accurately until post-auction channel assignments have been made and we will not know before the auction which stations will incur reimbursable expenses.

necessarily all, of the modifications a station may have to make in order to change its channel, as well as the predetermined estimate of the cost, or range of costs, for equipment and other expenses associated with those modifications.[1726] Similarly, the estimated cost form for MVPDs will contain a list of many, but not necessarily all, of the cable or satellite system changes an MVPD may be required to make to accommodate new station channel assignments, as well as the predetermined estimate of the cost or cost range for most of those changes. For equipment or other changes for which there is a predetermined cost estimate, stations and MVPDs may select either the predetermined cost estimate or provide their own individualized estimate if they believe the predetermined estimate does not fully account for their specific circumstances. Entities that reject the predetermined estimate as too low will be required to justify the higher cost. For any expenses for which there is not a predetermined cost estimate, the station or MVPD will be required to provide an individualized cost estimate. We will require entities that provide such individualized cost estimates to submit supporting evidence and to certify that the estimate is made in good faith.

612. Regardless of whether they are claiming predetermined cost estimates or their own individualized estimated costs, each broadcaster and MVPD will be required to certify, *inter alia*, that: (1) it believes in good faith that it will reasonably incur all of the estimated costs that it claims as eligible for reimbursement on the estimated cost form, (2) it will use all money received from the Reimbursement Fund only for expenses it believes are eligible for reimbursement, (3) it will comply with all policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the Reimbursement Fund,[1727] (4) it will maintain detailed records, including receipts, of all costs eligible for reimbursement actually incurred, and (5) it will file all required documentation of its relocation expenses as instructed by the Media Bureau.[1728]

613. After the estimated cost forms have been submitted, the Media Bureau will review them. For entities that choose to provide their own cost estimate (i.e., either a cost estimate higher than the predetermined cost estimate or an individualized cost estimate for an expense for which the Commission does not provide a predetermined cost estimate), the Bureau will review the required justification for the estimate and may accept it or substitute a different amount for purposes of calculating the initial allocation. Regardless of the basis for the estimate, the Bureau may determine, based on its reasonableness review of an estimated cost form and any submitted documentation, that a station or MVPD should receive a different allocation from that claimed on the form.

614. *Initial Allocation Stage*. Once the Media Bureau completes its review, it will issue an initial allocation from the Reimbursement Fund to the broadcaster or MVPD, which will be available to the entity to draw down as expenses are incurred.[1729] Subject to timing constraints on allocations from the Fund that are discussed below, we intend to issue NCE broadcasters initial allocations equivalent to up to 90 percent of their estimated costs eligible for reimbursement, and all other broadcasters and MVPDs initial allocations equivalent to up to 80 percent of their estimated costs eligible for reimbursement. We will issue initial allocations to NCEs equivalent to a higher percentage of their estimated costs due to their unique funding constraints.[1730] For other broadcasters and MVPDs, a slightly smaller initial allocation will be sufficient to permit them to fund construction or other reimbursable costs until a subsequent

[1726] The Catalog of Eligible Expenses is discussed below. *See* § V.C.5.c (Expenses Eligible for Reimbursement).

[1727] *See* para. 619 (delegating authority to the Media Bureau to adopt necessary policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the Reimbursement Fund to protect against waste, fraud, and abuse and in the event of bankruptcy).

[1728] Eligible broadcasters and MVPDs also must make certifications on the estimated cost form pertaining to reimbursements for new equipment. *See* § V.C.5.f (Other Reimbursement Issues).

[1729] The issuance of an initial allocation from the Reimbursement Fund based on these estimates does not create an obligation on the part of the Commission to pay the entity's total estimated or actual relocation costs.

[1730] *See* PTV Comments at 28–29.

allocation phase, when all stations and MVPDs can request an additional allocation from the Reimbursement Fund if necessary to cover the remainder of their costs eligible for reimbursement.[1731] It is appropriate to withhold at least 10 percent (for NCEs) or at least 20 percent (for other stations and for MVPDs) of estimated costs until a subsequent allocation phase. We conclude that this approach should ensure that broadcasters and MVPDs do not face an undue financial burden while also reducing the possibility that we allocate more funds than necessary to cover actual relocation expenses.

615. The amount available to be issued as initial allocations will depend, in part, on the total amount of repacking expenses reported on the estimated cost forms. In addition, the timing of initial allocations will depend on when money in the Reimbursement Fund becomes legally available for obligation to eligible entities. The Spectrum Act authorizes the Commission to borrow up to $1 billion from the U.S. Treasury, upon the effectiveness of any reassignments or reallocations under section 6403(b)(1)(B), to use toward reimbursement of relocation expenses,[1732] but the Commission must reimburse the Treasury for any amounts borrowed as funds are deposited into the Reimbursement Fund from forward auction proceeds.[1733] Thus, the amount available for initial allocations from the Reimbursement Fund may be limited initially to $1 billion. The remainder of the $1.75 billion will not be legally available for allocation until at least some wireless licenses have been granted to forward auction winners and sufficient forward auction proceeds are deposited into the Reimbursement Fund. If necessary, the initial allocations of funds to broadcasters and MVPDs will be made in tranches as funds become legally available.

616. *Final Allocation Stage*. Upon completing construction or other changes that are eligible for reimbursement, or by a specific deadline prior to the end of the of the Reimbursement Period to be announced by the Media Bureau, whichever is earlier, all stations and MVPDs that received an initial allocation from the Reimbursement Fund must provide the Commission with information and documentation regarding their actual expenses incurred, plus any remaining estimated expenses for entities that have not yet completed their transition. After reviewing this information, the Media Bureau will determine whether the broadcaster or MVPD incurred or will incur eligible relocation costs that are not covered by the initial allocations from the Reimbursement Fund and issue a final allocation, if appropriate, to the broadcaster or MVPD. If any allocated funds remain in an entity's Treasury account in excess of the entity's actual costs determined to be eligible for reimbursement, those funds will revert back to the Reimbursement Fund. The Media Bureau will provide additional details on the filing and process requirements, including filing deadlines, for this final allocation stage in a subsequent public notice.

617. *Final Accounting Stage*. Any entities that have not completed their transition by the deadline announced by the Media Bureau during the final allocation stage must submit their final expense documentation to the Commission shortly after completing their transition and regardless of whether this occurs after the Reimbursement Period.[1734] This documentation will contain actual costs for all eligible expenses and will serve as a final accounting of all actual expenses incurred to complete the transition. The Media Bureau will provide additional details on the filing and process requirements, including filing deadlines, for this final accounting stage in a subsequent public notice.

[1731] *See* Harris Broadcast Comments at 19.

[1732] *See* Spectrum Act § 6403(d)(3)(A); *see also id*. § 6403(f)(2) ("no reassignments or reallocations under subsection (b)(1)(B) shall become effective until the completion of the reverse auction . . . and the forward auction").

[1733] *See* Spectrum Act §§ 6403(d)(2), (d)(3)(B).

[1734] Entities that have finished construction and have submitted all actual expense documentation by the final allocation stage deadline (to be determined by the Media Bureau) will not be required to file anything at the final accounting stage.

618. *Reimbursement Contractor and Delegation of Authority.* We direct the Media Bureau to engage a contractor to assist in the reimbursement process and administration of the Reimbursement Fund. We note that commenters who address the issue of whether we should hire a third-party to assist with administering reimbursements generally are supportive, so long as administrative costs are carefully controlled.[1735] We conclude that the costs associated with administering the Reimbursement Fund are appropriately included in the Commission's overall costs to "mak[e] any reassignments or reallocations" under section 6403(b)(1)(B).[1736] Accordingly, administrative costs will not be deducted from the Reimbursement Fund.[1737] The Commission delegates authority to the Media Bureau to engage a third-party contractor to assist in the reimbursement process, which will be overseen by the Bureau.

619. The Commission also delegates authority to the Media Bureau to create one or more forms to be used by entities to claim reimbursement from the Reimbursement Fund, as well as to report on entities' use of money disbursed from the Fund and the status of their construction efforts, and for any other Reimbursement Fund-related purposes. We also delegate authority to the Media Bureau to establish the timing and calculate the amount of the allocations to eligible entities from the Reimbursement Fund, develop a final Catalog of Eligible Expenses, and make other determinations regarding eligible costs and the reimbursement process. Finally, we delegate authority to the Media Bureau to adopt the necessary policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the Reimbursement Fund in order to protect against waste, fraud, and abuse and in the event of bankruptcy.[1738] Given the importance of maintaining the integrity of the Fund, the Media Bureau will consult with the Office of General Counsel and the Office of the Managing Director in acting pursuant to this delegation.

c. Expenses Eligible for Reimbursement

620. *Background*. In order to implement the Spectrum Act's reimbursement provisions, we must determine which expenses will be eligible for reimbursement from the Reimbursement Fund and how to quantify those expenses. The Commission sought comment in the *NPRM* on the types of relocation costs that broadcast stations and MVPDs are likely to incur, and how to determine which costs are "reasonable" for purposes of the reimbursement mandate.[1739] The Commission also sought comment on how to estimate relocation costs and whether cost estimates should be the same for all stations or based on tiers of fixed rates related to specific criteria including, among others, the type of channel change and

[1735] *See* Affiliates Associations Comments at 49; Belo Comments at 20; CTIA Reply at 41–42; NAB Comments at 60–61; Sprint Comments at 16. We have received one comment arguing that hiring a third-party to assist with administering reimbursements would result in additional expense and delay. Block Stations *Reassignment Costs Report PN* Comments at 8. We disagree. Rather, a third-party contractor will help streamline the process of administering reimbursements thereby making it more efficient. And, importantly, the costs associated with such administration will not be deducted from the Reimbursement Fund.

[1736] The Commission is required to cover its administrative expenses related to the auction. *See* Spectrum Act § 6403(c)(2)(C). The statute provides further that the proceeds of the forward auction must exceed the total of the amount the Commission must pay the successful bidders in the reverse auction, the cost of conducting the forward auction, and the estimated relocation costs the Commission must reimburse. *See* Spectrum Act §§ 6403(c)(2)(A)–(B).

[1737] Commenters agree with this interpretation. *See* Affiliates Associations Comments at 49; Belo Comments at 20-21; NAB Comments at 60.

[1738] *See* para. 612 (requiring broadcasters and MVPDs to comply with all policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the Reimbursement Fund).

[1739] *See NPRM*, 27 FCC Rcd at 12470-71, para. 340.

the extent of the technical modifications involved.[1740] Because the Spectrum Act prohibits reimbursements for "lost revenues,"[1741] the FCC also sought comment on how to interpret this restriction.

621. In addition, in September 2013, the Media Bureau released a Public Notice seeking comment on a preliminary Catalog of Eligible Expenses as well as strategies to mitigate the cost of channel relocations.[1742] The Media Bureau released a subsequent Public Notice seeking comment on a revised Catalog of Potential Expenses and Estimated Costs that a contractor, Widelity, Inc., developed for the Media Bureau, and which is based on the results of Widelity's interviews with broadcast engineers, radiofrequency and structural engineers, suppliers, support companies, manufacturers, attorneys, and network engineers.[1743] The Catalog is intended to identify reimbursable costs with as much specificity as possible, provide guidance to entities seeking reimbursement, streamline the reimbursement process, and increase accountability. The creation of the Catalog is highly complex.[1744] The Media Bureau has taken significant steps in compiling a detailed and robust record to assist in this effort[1745] and will release, prior to the commencement of the reverse auction, a final Catalog of Eligible Expenses, which will include predetermined estimates or ranges for reimbursable costs.

622. *Discussion.* We cannot, at this juncture, forecast all types of reasonable expenses. The appropriate scope of "costs reasonably incurred" necessarily will have to be decided on a case-by-case basis. Moreover, as discussed above, we delegate authority to the Media Bureau to make reimbursement determinations and to finalize the Catalog of Eligible Expenses. However, we provide guidance in response to issues that were raised by commenters.[1746] We discuss our interpretation of the "costs reasonably incurred" standard and make general findings regarding whether certain categories of costs will be reimbursable. In addition, we outline the kinds of expenses that will be considered "lost revenues" and thus not eligible for reimbursement. While this discussion and a final Catalog of Eligible Expenses are intended to provide specific guidance regarding the kinds and amounts of expenses that will be reimbursed, they are not a guarantee of reimbursement for any individual expense claimed by a broadcaster or MVPD. All claimed expenses are subject to review by the Media Bureau to ensure that each expense is reasonable.

[1740] *Id*.

[1741] Spectrum Act § 6403(b)(4)(C).

[1742] *See Reassignment Costs PN*, 28 FCC Rcd 13787.

[1743] *See Reassignment Costs Report PN*, 29 FCC Rcd 2989.

[1744] *See, e.g.*, Harris Broadcast Comments at 13–14 (noting that costs will depend on a range of factors including whether transmission equipment can be reused with modifications or must be replaced and the cost of modified versus new equipment); NCTA Comments at 19 (noting that cost to cable operators to continue to carry a station with a new channel assignment will depend upon numerous factors at each of the thousands of headends where broadcast stations are received including, among other things, whether stations are assigned to new channels not already carried by the cable system, or are sharing a channel already carried on the system); DIRECTV/DISH Comments at 8–9 (listing the kinds of equipment and services they argue should be reimbursed, including retuning of receive equipment, the cost of new antennas, tower crews, electricians, and any lease modifications or other facility changes to accommodate a new antenna or antenna location).

[1745] The Commission retained Widelity, Inc., as a contractor to assist in developing the Catalog of Eligible Expenses, including determination of a predetermined estimated cost or range of costs for equipment and other expenses. The contractor also identified resources that will be needed to complete the broadcast transition process, including tower crews, engineering services, and equipment vendors, and recommended strategies to ensure that available resources are used efficiently. The Media Bureau also held two workshops on the reimbursement process. *See FCC Announces Panelists for September 30, 2013 Workshop on Issues Surrounding the Reassignment of TV Stations After the Incentive Auction*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 13805 ((2013); "FCC Announces Details for June 25, 2012 TV Broadcaster Relocation Fund Workshop," GN Docket No. 12-268, News Release, 2012 WL 1965368 (rel. June 1, 2012).

[1746] Spectrum Act §§ 6403(b)(4)(A)(i)–(ii).

623. *Costs Reasonably Incurred.* We interpret the Spectrum Act's mandate to reimburse "costs reasonably incurred" to require that we reimburse costs that are reasonable to provide facilities comparable to those that a broadcaster or MVPD had prior to the auction that are reasonably replaced or modified following the auction, as a result of the repacking process, in order to allow the broadcaster to operate on a new channel or to allow the MVPD to carry the signal of a broadcaster on a new channel. We will permit broadcasters and MVPDs to be compensated for both "hard" expenses, such as new equipment and tower rigging, and "soft" expenses, including legal and engineering services.[1747] We will allow reimbursement for modification or replacement of facilities on the post-auction channel consistent with the technical parameters identified in the *Channel Reassignment PN*.[1748] We reserve the right to require broadcasters to take reasonable steps to mitigate costs and share resources where possible, as such efforts may save overall Reimbursement Fund resources or contribute to more efficient use of the broadcast spectrum.[1749]

624. *Equipment Upgrades.* As a general matter, we expect stations and MVPDs to obtain the lowest-cost equipment that most closely replaces their existing equipment.[1750] We do not anticipate providing reimbursement for optional features beyond those already present. However, we also expect that some stations and MVPDs will not be able to replace older, legacy equipment with equipment that is comparable in terms of functionality and cost because of advances in technology and because manufacturers often cease supporting old equipment when newer products become available. We disagree with Sprint that entities with older, more inefficient equipment should not be reimbursed for an upgrade to equipment that meets current technical standards.[1751] If the cost to replace certain equipment is reasonably incurred as a result of the repacking process, we intend to reimburse for the cost of that equipment and recognize that this equipment necessarily may include improved functionality. We do not, however, anticipate providing reimbursement for new, optional features in equipment unless the station or MVPD documents that the feature is already present in the equipment that is being replaced.[1752] Eligible stations and MVPDs may elect to purchase optional equipment capability or make other upgrades at their own cost, but only the cost of the equipment without optional upgrades is a reimbursable expense.

[1747] The Media Bureau will exercise its discretion in determining the reasonableness of legal and other professional fees, as well as other transition costs.

[1748] Specifically, we will permit broadcasters to be reimbursed for eligible costs reasonably incurred in constructing transmission facilities for channels assigned in the repacking process if such facilities do not extend the coverage area by more than one percent in any direction based on the technical parameters for the channel assignment specified in the *Channel Reassignment PN*. *See* § V.C.1 (License Modification Procedures).

[1749] In the *NPRM*, the Commission sought comment on using the "Minimum Necessary Cost Standard" as it did in the 800 MHz rebanding program. *NPRM*, 27 FCC Rcd at 12470–71, para. 343. We decline to adopt this standard, which may conflict in some instances with our statutory mandate to reimburse for costs "reasonably incurred." *See* Affiliates Associations Comments at 50–51; NAB Comments at 58–59. The standard we adopt, which ties reimbursement to facilities comparable to those in use prior to the auction, will ensure that entities can continue to operate facilities post-auction that are similar to those in operation pre-auction. For example, a full power or Class A station presently using distributed transmission system (DTS) technology will be eligible for reimbursement for a DTS. A DTV DTS employs multiple synchronized transmitters spread around a station's service area, rather than a single transmitter.

[1750] *NPRM*, 27 FCC Rcd at 12471, para. 343.

[1751] *See* Sprint Comments at 15–16 (arguing that, to avoid windfalls to licensees, the Commission should reimburse only those meeting a minimum system standard and not those who intentionally have chosen not to invest in efficient technology).

[1752] For example, a station whose current antenna or other facilities contain components enabling the transmission of ATSC Mobile/Handheld signals and that reasonably incurs the cost to replace this equipment may claim reimbursement for replacement equipment with mobile capability. A station that does not have mobile capability, however, may not claim reimbursement for the cost of adding that capability in its replacement equipment.

625. *Alternate Channels and Expanded Facilities*. We will reimburse costs associated with requests for an alternate channel assignment or expanded facilities for eligible stations that receive priority processing, as described below.[1753] Such stations will be able to apply for, and receive, reimbursement for eligible costs associated with constructing alternate channels or expanded facilities modifications. In the case of priority stations, such costs are "reasonably incurred . . . in order for the licensee to relocate its television service" to another channel because, absent construction of the alternate channel or expanded facility, such stations will be unable to relocate their service.[1754]

626. We will not provide additional reimbursement to other, non-priority stations that apply for an alternate channel or expanded facilities; we will reimburse these stations only for the eligible costs of relocating to the channel and facilities specified in the *Channel Reassignment PN*. In the case of non-priority stations, costs related to alternate channels or expanded facilities are not "reasonably incurred . . . in order for the licensee to relocate its television service" to another channel. Such stations will be able to continue to serve their coverage area and population served on the channel and pursuant to the technical parameters assigned in the repacking process without having to rely on an alternate channel or expanded facilities.[1755]

627. *Interim Facilities.* Stations that are assigned a new channel in the repacking process may need to use interim facilities to avoid prolonged periods off the air during the transition.[1756] Some stations currently have licensed auxiliary facilities or own backup equipment that may be used for interim operations post-auction, while others may need to purchase or rent equipment or facilities. We will treat interim facilities as a relocation expense eligible for reimbursement and will reimburse costs for such facilities that are reasonably incurred in order for a station to meet its construction deadline or to avoid prolonged periods off the air while repacking changes are made.[1757] We will also reimburse for the costs

[1753] *See* § V.C.1.b (Alternate Channels and Expanded Facilities Opportunities) (explaining the possibility that some stations will be unable to construct facilities for newly assigned channels as defined by the technical parameters specified in the *Channel Reassignment PN* for reasons beyond their control).

[1754] Spectrum Act § 6403(b)(4)(A)(i). Stations that apply for priority processing will not be required to file an estimated cost form within three months after the release of the *Channel Reassignment PN*, as other stations eligible for reimbursement must do. Instead, they must file an estimated cost form within 30 days of receiving a construction permit for an alternate channel or expanded facilities, as set forth in § V.C.1.b (Alternate Channels and Expanded Facilities Opportunities).

[1755] Spectrum Act § 6403(b)(4)(A)(i). For example, non-priority stations that wish to move to an alternate channel or to construct expanded facilities may incur certain costs twice during the post-auction transition process, such as the cost of completing an engineering study or preparation of a Form 301; however, we will reimburse such duplicative costs only once. Even if they intend to apply for alternate channels or expanded facilities, these stations will be required to file an estimated cost form based on the facility specified in the *Channel Reassignment PN* three months after the release of the PN. Stations will receive up to 80 or 90 percent (depending on the type of station) of their estimated expenses. Ultimately, these stations will be required to make a showing that any costs for which they are seeking reimbursement are not greater than those they would have incurred if they had constructed the facility originally assigned. If a station can show that it would have incurred a particular cost regardless of the facility being constructed, and the Media Bureau determines that the cost is "reasonably incurred," the cost will be eligible for reimbursement.

[1756] The use of interim facilities may be appropriate in the following situations, among others: (1) a station may need an additional transmitter or antenna for interim use on either its pre- or post- auction channel; (2) a station with a top mounted antenna may need to run a side mounted antenna; (3) a station with an antenna at "X" feet on a tower may need to operate at "Y" feet temporarily; (4) a station may need to operate with an antenna mounted on a different tower while it finishes mounting final facilities on its current tower or a new tower; (5) a station may need to operate on a different channel with different facilities than its final channel or facilities; or (6) a station may need to use its auxiliary or back-up facility as its main facility while it finishes final facilities.

[1757] This includes reimbursement for costs reasonably incurred by stations that receive permission to operate, on an interim basis, on a channel relinquished by a winning reverse auction bidder. *See* § V.C.2.c (Additional Flexibility for Stations with New Channel Assignments).

to replace or modify existing interim facilities where such costs are reasonably incurred to accommodate a new channel assignment.

628. *Non-Recurring Signal Delivery Costs*. We also provide guidance on reimbursement for the cost of establishing delivery of a good quality signal to an MVPD in cases where signal delivery is affected by post-auction channel changes. Under our rules, whether an MVPD or broadcast station is responsible for the initial and ongoing cost of delivering a good quality broadcast signal to a cable headend or a satellite receive facility depends on whether the station is carried pursuant to must-carry requirements or a retransmission consent agreement. As a general matter, winning bidders are not eligible for reimbursement of their transition expenses, including any costs they incur to deliver their signal to an MVPD.[1758] However, as stated above, MVPDs will be eligible for reimbursement of their reasonably incurred costs in order to continue to carry broadcast stations that are reassigned as a result of the auction.[1759] Reimbursable MVPD expenses include the reasonable costs to set up delivery of a signal that the MVPD is required to carry under our must-carry rules or by retransmission consent contracts, regardless of whether the station is a winning bidder or is involuntarily reassigned to a new channel in the repacking process.

629. Specifically, if a station is carried pursuant to must-carry requirements, it is required to bear delivery costs and, if it is involuntarily reassigned to a new channel, will be eligible for reimbursement of any non-recurring costs to set up delivery to the cable headend or satellite receive facility that is comparable to the delivery method used prior to the transition.[1760] If an MVPD carries a station pursuant to our must-carry rules, the MVPD will be eligible for reimbursement for any non-recurring costs associated with setting up delivery of the station's signal from the headend or receive facility to its subscribers, because MVPDs may reasonably incur such costs in order to continue to carry stations relocating as a result of a winning reverse auction bid. If a station is carried pursuant to a retransmission consent agreement, the issue of which party is responsible for delivery costs likely will be governed by the relevant contract.[1761] If, under the contract, the MVPD is responsible, it will be eligible for reimbursement of the non-recurring costs to set up delivery. If, under the contract, the broadcast station is responsible for delivery costs, it will be eligible for reimbursement of the non-recurring cost to set up delivery to the headend or receive facility if it was reassigned involuntarily. Further, the MVPD will be eligible for reimbursement of any non-recurring costs associated with setting up delivery of the signal from the headend or receive facility to its subscribers.

630. *Lost Revenues.* As discussed above, the Spectrum Act prohibits reimbursement for "lost revenues."[1762] We define "lost revenues" for purposes of reimbursement to include revenues that a station or MVPD loses as a direct or ancillary result of the reverse auction or the repacking process. For example, we will not reimburse a station's loss of advertising revenues while it is off the air implementing a channel change resulting from the repacking process. In addition, we will not reimburse any refunds a station is required to make for payments for airtime as a result of being off the air in order to implement a

[1758] *See* Spectrum Act § 6403(b)(4)(A)(i).

[1759] *See* para. 603.

[1760] *See* 47 C.F.R. § 76.60(a); *see* 47 U.S.C. § 534(h)(1)(B)(iii); 47 U.S.C. § 535(i)(1); 47 C.F.R. § 76.55(c)(3); *see also* 47 U.S.C § 338(b) (similar requirement applying to satellite carriage); 47 C.F.R. § 76.66(g).

[1761] *See Retransmission Consent and Exclusivity Rules: Report to Congress Pursuant to Section 208 of the Satellite Home Viewer Extension and Reauthorization Act of 2004*, para. 83 (rel. Sept. 8, 2005) available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260936A1.doc; *Carriage of DTV Broadcast Signals*, CS Docket No. 98-120, First Report and Order and Further Notice of Proposed Rulemaking, 16 FCC Rcd 2598, 2654, para. 105 (2001).

[1762] Spectrum Act § 6403(b)(4)(C).

channel change.[1763] Similarly, with respect to MVPDs, we will not provide reimbursement for lost advertising revenues or subscriber fees for any period of time a television station carried by the MVPD is off the air because of channel changes resulting from the reverse auction or repacking process.

d. Measures to Prevent Waste, Fraud, and Abuse

631. *Background.* We are cognizant of the need to establish strong measures to protect against waste, fraud, and abuse with respect to disbursements from the Reimbursement Fund. In addition to our general fiduciary responsibility with respect to management of public funds, mismanagement of the Reimbursement Fund could frustrate our fulfillment of the statutory reimbursement mandate.[1764] The Commission sought comment on how to prevent waste, fraud, and abuse, including how to ensure that reimbursements based on estimated costs are actually used for eligible relocation expenses.[1765]

632. *Discussion.* In addition to the delegation described above to ensure appropriate financial safeguards are applied to the Reimbursement Fund,[1766] we take several additional actions to prevent waste, fraud, and abuse with respect to the Reimbursement Fund. We adopt requirements for entities seeking reimbursement to provide a justification when their estimated costs exceed predetermined cost estimates. We also require entities to document their actual expenses and will conduct audits of, data validations for, and site visits to entities that receive disbursements from the Reimbursement Fund. In addition, to ensure transparency with respect to the Reimbursement Fund, we will make available to the public estimated and actual cost information, as well as information regarding Reimbursement Fund disbursements. These measures accommodate the need to reimburse eligible broadcasters and MVPDs promptly, to impose rigorous accountability requirements, and to ensure transparency regarding the amount of money disbursed to eligible entities.

633. *Documentation Requirements*. We establish several requirements to ensure that disbursements based on estimated costs do not exceed actual costs. As discussed above, eligible broadcasters and MVPDs will be required to submit an estimated cost form and all actual cost information in order to receive any allocations from the Reimbursement Fund. These forms will include certifications that must be made by an owner or officer of the company under penalty of perjury under 18 U.S.C. § 1001 in order to ensure that money from the Reimbursement Fund will be used only for eligible costs.

634. We also require eligible entities to submit detailed records documenting their actual costs, including all relevant invoices and receipts. The record supports requiring recipients to submit actual expense records.[1767] In addition, we require broadcasters and MVPDs to submit progress reports, on a regular basis, to show how the disbursed money has been spent and what portion of their construction is complete.[1768] Further, we adopt a document retention requirement for any entity seeking reimbursement. Although records of expenditures will have been submitted as a condition of receiving reimbursement, each entity must retain all relevant documents (e.g., records documenting the type of equipment a reassigned broadcaster replaced with new equipment) for a period ending 10 years after the

[1763] We note that stations can plan in advance for or mitigate the effects of temporary interruptions in service by, for example, alerting advertisers beforehand, declining to accept advance payments for airtime during relevant post-auction periods, and offering make-ups after the station returns to the air in lieu of refunds of advance payments.

[1764] Spectrum Act § 6403(b)(4)(A); *id.* § 6402, adding 47 U.S.C. § 309(j)(8)(G)(iii)(I).

[1765] *See NPRM*, 27 FCC Rcd at 12473, paras. 353-354.

[1766] *See* para. 619.

[1767] Commenters generally support requiring broadcasters and MVPDs to submit records of their actual costs to guard against waste, fraud, and abuse. *See*, *e.g.*, Belo Comments at 19–20; Capitol Reply at 7; NAB Comments at 54; T-Mobile Reply at 95–96. In addition to preventing waste, fraud, and abuse, maintaining specific records can help broadcasters and MVPDs in case of a dispute with a vendor.

[1768] The Media Bureau will develop a form for progress reports, and seek public comment on these forms prior to the commencement of the reimbursement process.

date it receives its final payment from the Reimbursement Fund.[1769]

635. *Audits, Data Validations, and Site Visits*. We conclude that audits, data validations, and site visits are essential tools in preventing waste, fraud, and abuse, and that use of these measures will maximize the amount of money available for reimbursement. Accordingly, the Commission, or a third-party audit firm on behalf of the Commission, may conduct audits of entities receiving disbursements from the Reimbursement Fund, and these audits may occur both during and following the three-year Reimbursement Period. Entities receiving money from the Reimbursement Fund must make available all relevant documentation upon request from the Commission or its contractor.[1770]

636. In addition to audits, we prescribe data validations, which can be a more efficient way of verifying the accuracy of a disbursement.[1771] Data validations will allow the Media Bureau to ensure quickly the validity of specific claims on an entity's cost form so as to adequately protect the Reimbursement Fund while not inhibiting an entity's construction process. The Bureau can select specific claims for validation, and then a broadcaster or MVPD will be required to provide additional documentation or explanation to verify its claim for a particular type of equipment or service before it can be reimbursed for it. The Bureau or an authorized contractor also may conduct site visits to confirm that equipment paid for from the Reimbursement Fund has been deployed.[1772] Although the statutory reimbursement period is limited to three years, we expect that the Media Bureau or a third-party auditor will continue to validate expenses after that period ends and, where appropriate, recover any money that should be returned, consistent with the Commission's obligation to recover improper payments.[1773] If any of these investigatory measures reveals evidence of intentional fraud, the Commission will refer the matter to its Inspector General's office or to law enforcement for criminal investigation, as appropriate.

[1769] The Commission adopted a 10-year record retention requirement for recipients of high-cost and low-income support from the federal Universal Service Fund after finding that a shorter period is inadequate for purposes of litigation under the False Claims Act, 31 U.S.C. §§ 3729-33. *See, e.g., In the Matter of Lifeline and Link Up Reform and Modernization et al.,* WC Docket No. 11-42 et al., CC Docket No. 96-45, Report and Order and Further Notice of Proposed Rulemaking, 27 FCC Rcd 6656, 6857 (2012) (*Lifeline/Link Up Order*).

[1770] While no reimbursements will be made after the Reimbursement Period, if funds are recovered after the Reimbursement Period from an entity that received payments in excess of its actual costs eligible for reimbursement, the Commission reserves the right to recover those funds and redistribute them to any eligible entity whose actual costs exceed payments received from the Reimbursement Fund, consistent with applicable law. While the Spectrum Act provides that any amounts that remain in the Reimbursement Fund after the three year statutory deadline will be transferred to the Public Safety Trust Fund, we interpret this provision to refer to amounts not disbursed from the Reimbursement Fund prior to the end of the Reimbursement Period, and not to funds (previously disbursed) that are recovered as a result of audit findings after the end of the Reimbursement Period. Spectrum Act § 6403(d)(4)(A).

[1771] The Commission has identified duplication in the Lifeline program by directing that program's administrator, the Universal Service Administrative Company (USAC), to conduct in-depth data validations in addition to audits. *See, e.g., Lifeline/Link Up Order*, 27 FCC Rcd at 6766, 6807.

[1772] We note that the National Telecommunications and Information Administration (NTIA) used site visits as an effective tool to monitor compliance with Broadband Technology Opportunities Program (BTOP) rules. *See, e.g.*, FY12 BTOP Monitoring and Assessment Plan available at http://www2.ntia.doc.gov/files/BTOPFY12MonitoringandAssessmentPlan_111611.pdf.

[1773] The Commission is obligated to recapture funds disbursed in violation of our rules pursuant to applicable rules and statutes including, but not limited to, the Improper Payments Information Act of 2002, Pub. L. No. 107-300, 116 Stat. 2350 (2002), and the Improper Payments Elimination and Recovery Act of 2010 (IPERA), Pub. L. No. 111-204, 124 Stat. 2224. The Debt Collection Improvement Act of 1996 (DCIA) governs the collection of funds owed to the United States. DCIA, Pub. L. No. 104-134, 110 Stat. 1321 (1996). *See also* Memorandum For the Heads of Executive Departments and Agencies (Mar. 22, 2010), *available at* http://www.whitehouse.gov/sites/default/files/omb/assets/a123/a123_appx-c.pdf; Memorandum For the Heads of Executive Departments and Agencies (Apr. 14, 2011), *available at* http://www.whitehouse.gov/sites/default/files/omb/memoranda/2011/m11-16.pdf.

e. Service Rule Waiver in Lieu of Reimbursement

637. *Background*. Section 6403(b)(4)(B) of the Spectrum Act provides that a television licensee may, instead of being reimbursed for relocation costs, receive a waiver of the Commission's "service rules" permitting it to make "flexible use" of its spectrum in order "to provide services other than broadcast television services."[1774] Such waivers are "subject to interference protections" and "shall only remain in effect" while the licensee provides on its spectrum "at least 1 broadcast television program stream . . . at no charge to the public."[1775] Section 6403(b)(4)(B) provides the Commission discretion to grant these waivers "as it considers appropriate."[1776] The Commission sought comment on how to interpret this provision as well as the appropriate process for filing and reviewing waiver requests.[1777]

638. Several parties address issues related to the service rule waiver provision. Sinclair argues that a waiver should permit use of a broadcast transmission standard other than the Advanced Television Systems Committee's ("ATSC") digital television standard.[1778] LIN and Sinclair assert that the Commission should grant a permanent waiver to any broadcaster that requests one.[1779] In *ex parte* filings, Sinclair, Gray Television, and Young Broadcasting urge the Commission to consider adopting a broad approach to the service rule waiver provision that would permit a broadcast television licensee to apply for and receive a service rule waiver for all of its stations prior to the incentive auction regardless of whether the station is ultimately eligible for reimbursement under the Spectrum Act.[1780] In addition, Sinclair, Univision, and SEI urge the Commission to relax its service rules in order to encourage greater

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[1774] Spectrum Act § 6403(b)(4)(B) ("In lieu of reimbursement for relocation costs under subparagraph (A), a broadcast television licensee may accept, and the Commission may grant as it considers appropriate, a waiver of the service rules of the Commission to permit the licensee, subject to interference protections, to make flexible use of the spectrum assigned to the licensee to provide services other than broadcast television services. Such waiver shall only remain in effect while the licensee provides at least 1 broadcast television program stream on such spectrum at no charge to the public.").

[1775] *Id.*

[1776] *Id.*

[1777] *See NPRM*, 27 FCC Rcd at 12471-72, paras. 347-48.

[1778] Sinclair Comments at 8–9; *see* 47 C.F.R. § 73.682(d) (requiring broadcasters to transmit signals using the ATSC digital TV standard).

[1779] Sinclair Comments at 9 (arguing that the Commission should determine that any licensee is entitled to a service rule waiver simply by requesting it); LIN Comments at 6 (arguing that the Commission should grant automatic flexible use waivers). LIN also suggests that waivers should be granted for "the remainder of that station's license term with a renewal expectancy (that can be automatically transferred with the station's license)." LIN Comments at 7; *see also* Letter of Joshua N. Pila, Senior Counsel for LIN Media, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Oct. 25, 2013) (reiterating its support for making the service rule waiver available automatically upon request for the remainder of a station's license term with a renewal expectancy).

[1780] Letter from John K. Hane, Counsel for Sinclair Broadcast Group, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Sept. 4, 2013) (Sinclair Sept. 4, 2013 *Ex Parte* Letter); Letter from Hilton H. Howell, Jr., President and Chief Executive Officer for Gray Television, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Oct. 21, 2013) (Gray TV Oct. 21, 2013 *Ex Parte* Letter); Letter from Robert Peterson, Vice President, Station Operations of Young Broadcasting, LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Oct. 25, 2013) (Young Broadcasting Oct. 25, 2013 *Ex Parte* Letter). Under this approach, the Commission would grant a service rule waiver both to stations that ultimately are assigned new channels in the repacking process, and to those that are not. Sinclair contends that permitting both reassigned and non-reassigned stations to receive a waiver is important from a business perspective because it provides the necessary "critical mass" that will make it practical for large station groups to implement a new broadcast transmission standard and encourage device manufacturers to provide support for the new standard. Sinclair Sept. 4, 2013 *Ex Parte* Letter at 3; *see also* Gray TV Oct. 21, 2013 *Ex Parte* Letter at 2 (stating that it agrees "with Sinclair that the waivers will be of little value to anyone if they are not sought by and granted to a large number of licenses").

spectral flexibility.[1781]

639. *Discussion*. We conclude that broadcasters seeking to take advantage of section 6403(b)(4)(B) may submit a request for a waiver of any of our service rules, including a request to use a transmission technology other than the ATSC standard. We agree with Sinclair that we should interpret this provision broadly in terms of the kinds of service rules we will consider waiving.[1782] This interpretation is supported by the language of section 6403(b)(4)(B), which does not make reference to any specific service rules eligible for a waiver, instead referencing them generally.

640. We delegate authority to the Media Bureau to evaluate and act on these service rule waiver requests on a case-by-case basis. We direct the Bureau to apply our general waiver standard when considering such requests.[1783] We also direct the Bureau to ensure that the applicant will protect against interference and provide at least one broadcast television program stream at no charge to the public, as required by section 6403(b)(4)(B).[1784] Delegating discretion to the Media Bureau to evaluate and act on waiver requests in accordance with these parameters is in line with the discretion afforded under section 6403(b)(4)(B) to grant waivers "as [the Commission] considers appropriate."[1785]

641. We decline to grant waivers solely upon request (i.e., automatically) without further analysis, as is advocated by some commenters.[1786] In evaluating a waiver request, the Media Bureau will

[1781] *See* Sinclair Reply at 6–9 (urging the Commission to use repacking as a means to support the deployment of the next generation television broadcasting standard); *see also* Univision Comments at 18-19 ("Univision encourages the Commission to initiate a separate proceeding to relax its television service rules for all licensees that continue to operate after the incentive auction, including those that choose to participate in a channel sharing arrangement and regardless of whether the licensee retains UHF spectrum or moves to a VHF channel."); SEI, Inc. Comments at 7–10 (encouraging the Commission to permit spectrum flexibility for LPTV stations). Similarly, Tribune contends that permitting greater flexibility in the use of broadcast spectrum would permit broadcasters to integrate existing broadcast facilities with wireless networks to provide greater network capacity for video services. Tribune Comments at 4–6.

[1782] *See*, *e.g.*, Sinclair Comments at 8.

[1783] The Commission's rules may be waived if good cause is shown. 47 C.F.R. § 1.3. The Commission may exercise its discretion to waive a rule where the particular facts make strict compliance inconsistent with the public interest. *See Northeast Cellular*, 897 F.2d at 1166. In addition, the Commission may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis. *See WAIT Radio*, 418 F.2d at 1159; *Northeast Cellular*, 897 F.2d at 1166. Waiver of the Commission's rules is appropriate only if both (i) special circumstances warrant a deviation from the general rule, and (ii) such deviation will serve the public interest. *See Northeast Cellular*, 897 F.2d at 1166. The Media Bureau should consider the applicant's agreement to forego relocation costs as one factor weighing in favor of a waiver grant.

[1784] We note that the Commission has previously provided guidance on what constitutes "broadcasting," although we do not foreclose alternative showings demonstrating compliance with the § 6403(b)(4)(B) requirement that the waiver recipient will "provide[] at least 1 broadcast television program stream on such spectrum at no charge to the public." *See* 47 U.S.C. § 153(6) (defining "broadcasting" as "the dissemination of radio communications intended to be received by the public, directly or by the intermediary of relay stations"); *In re Subscription Video*, GN Docket No. 85-305, Report and Order, 2 FCC Rcd 1001, 1006, para. 41 (1987) (finding that there are three indicia of intent that a service is not meant to be received by the public and thus does not qualify as "broadcasting" and explaining that the presence or absence of any one indicia is not necessarily determinative: (1) the service is not receivable on conventional television sets and requires the viewer use special equipment; (2) the programming is encrypted, so a viewer needs a decoder even if the service can be received with conventional equipment; and (3) the provider and the viewer are engaged in a private contractual relationship), *aff'd sub nom., Nat'l Ass'n for Better Broad. v. FCC*, 849 F.2d 665 (D.C. Cir. 1988).

[1785] Spectrum Act § 6403(b)(4)(B).

[1786] *See* Sinclair Comments at 9 (arguing that the Commission should determine that any licensee is entitled to a service rule waiver simply by requesting it); *see also* LIN Comments at 6 (arguing that the Commission should grant

(continued….)

need to determine whether the request meets our general waiver standard and complies with the statutory requirements pertaining to interference protection and the provision of one broadcast television program stream at no charge to the public. This will require a case-specific analysis of each waiver request and makes commenters' suggested "standard waiver" approach unworkable.[1787]

642. We also decline to permit stations that are not eligible for reimbursement to operate pursuant to a service rule waiver under section 6403(b)(4)(B). Section 6403(b)(4)(B) expressly limits the availability of waivers to stations that request them in lieu of reimbursement of relocation costs.[1788] Therefore, permitting a licensee to receive a service rule waiver, even if the station is not reassigned to a new channel in the repacking process, as advocated by some commenters,[1789] is both inconsistent with and outside the scope of the Spectrum Act.[1790] Accordingly, only full power and Class A stations that are assigned new channels in the repacking process, and consequently are eligible for reimbursement, will be permitted to operate pursuant to a waiver granted under section 6403(b)(4)(B).[1791]

643. The Media Bureau will accept waiver requests filed pursuant to section 6403(b)(4)(B) during a 30 day window commencing upon the date that the *Channel Reassignment PN* is released. Licensees may request that a waiver be granted on either a temporary or a permanent basis. A licensee will have 10 days following the grant of a waiver by the Media Bureau to notify the Media Bureau whether it accepts the terms of the waiver.

644. As proposed in the *NPRM*, a licensee that is granted and accepts the terms of a waiver

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automatic flexible use waivers); Sinclair Sept. 4, 2013 *Ex Parte* Letter at 3 (asserting that any licensee in good standing should be granted a service rule waiver simply by requesting it).

[1787] *See* Sinclair Sept. 4, 2013, *Ex Parte* Letter at 3; *see also* Gray TV Oct. 21, 2013 *Ex Parte* Letter at 2 (supporting the establishment of a "standard waiver" that is available to all stations and is not conditioned on whether a station is eligible for reimbursement or reassigned a new channel in the repacking process).

[1788] Section 6403(b)(4)(B) of the Spectrum Act specifies that a waiver is available "[i]n lieu of reimbursement for costs under subparagraph (A)," thus indicating that full power and Class A stations that are ineligible for reimbursement are not eligible for a waiver under § 6403(b)(4)(B). As discussed in this Order and under the plain reading of the Spectrum Act, only full power and Class A television stations assigned new channels in the repacking process, pursuant to § 6403(b)(1)(B)(i), are eligible for reimbursement under § 6403(b)(4)(A). *See* § V.C.5.a (Television Station Licensees and MVPDs Eligible for Reimbursement).

[1789] *See* Sinclair Sept. 4, 2013 *Ex Parte* Letter at 4 (arguing that any licensee that requests a service rule waiver and commits to forgoing reimbursement should be entitled to a waiver regardless of whether the station is reassigned to a new channel in the repacking process); Young Broadcasting Oct. 25, 2013 *Ex Parte* Letter at 3 (supporting the grant of service rule waivers to stations that are not reassigned to a new channel in the repacking process so long as those stations request a waiver prior to the reverse auction).

[1790] Our decision, however, does not foreclose broadcasters from seeking waiver of our rules for stations that are not assigned new channels in the repacking process under our general waiver authority. *See* 47 C.F.R. § 1.3. For example, we note that the Media Bureau has granted requests by several broadcast television licensees for authority to operate experimental digital facilities in order to evaluate the performance of non-ATSC transmission standards. *See* Letter from Barbara Kreisman, Chief, Video Division, FCC to New York Spectrum Holding Company, LLC, dated June 20, 2013, Request To Operate an Experimental Facility, File No. BPEXLD-20130313ADO. This experimental facility will use Converged Mobile Multimedia Broadcasting (CMMB) technology, which proponents hope will expand mobile video and data delivery in a spectrum-efficient manner. Nothing in this Order is intended to modify the scope of these experimental authorizations or exclude these licensees, if otherwise eligible, from seeking a waiver under § 6403(b)(4)(B).

[1791] A full power or Class A station in a channel sharing arrangement may apply for a waiver under § 6403(b)(4)(B) in cases where the sharer station has been assigned a new channel in the repacking process and is therefore eligible for reimbursement. We adopt our proposal in the *NPRM* to require each licensee that is subject to a channel sharing arrangement and operates pursuant to a service rule waiver under § 6403(b)(4)(B) to provide one broadcast television program stream at no charge to the public. *NPRM*, 27 FCC Rcd at 12472, para. 347 n.525.

under section 6403(b)(4)(B) will not qualify for reimbursement, regardless of the duration of the waiver.[1792] However, licensees are required to meet all requirements for obtaining reimbursement established by the Commission, such as filing a timely estimated cost form, until they are granted and accept the terms of their waiver.[1793] Furthermore, unless otherwise instructed by the Media Bureau, licensees that are granted and accept the terms of a waiver under section 6403(b)(4)(B) or licensees with a pending waiver application must comply with all filing and notification requirements, construction schedules, and other post-auction transition deadlines, established in this Order.[1794]

f. Other Reimbursement Issues

645. In this Section, we address the $1.75 billion statutory limit on reimbursements. We also address several methods of potentially reducing channel reassignment-related costs. Cost mitigation is critically important to ensure that the money in the Reimbursement Fund is used efficiently.

646. *Reimbursement Limit*. We disagree with commenters who argue that the $1.75 billion Reimbursement Fund serves as a limit on our repacking authority.[1795] While our goal in administering the Reimbursement Fund will be to reimburse all eligible costs reasonably incurred, the statute on its face does not condition the Commission's repacking authority on our ability to do so. Rather, section 6403(b)(4)(A) requires only that the Commission "reimburse costs reasonably incurred" by eligible broadcasters and MVPDs "from amounts available" in the Fund.[1796] By contrast, Congress authorized reimbursement of the relocation costs of channel 37 incumbent users "provided that all such users can be relocated and that the total relocation costs of such users do not exceed $300,000,000."[1797] Congress's determination not to similarly tie reimbursement of broadcaster relocation costs to the total amount of those costs[1798] supports our reading of section 6403(b)(4)(A).[1799]

[1792] *Id.* at n.526. Once a licensee accepts the terms of its waiver under § 6403(b)(4)(B), a licensee will not later become eligible for reimbursement if its waiver no longer is effective because, for example, it expires, it is canceled for failure to comply with any terms or conditions of waiver, or the licensee voluntarily chooses to broadcast in accordance with current Commission rules.

[1793] *See* § V.C.5.b (Reimbursement Process) (establishing requirements for obtaining reimbursement in accordance with § 6403(b)(4)(A) of the Spectrum Act). Compliance with such reimbursement-related requirements is necessary to ensure timely reimbursement in the event a station's waiver request is denied or the station declines to accept the terms of a waiver grant. If a waiver request is granted and the station accepts the terms of the grant, the station will no longer be subject to reimbursement-related requirements.

[1794] *See* § V.C.1-4 (License Modification Procedures; Construction Schedules and Deadlines; Consumer Education; Notice to MVPDs) (adopting filing requirements, notification obligations, and deadlines for completing construction the post-auction transition).

[1795] The main argument advanced by broadcasters is that the $1.75 billion Reimbursement Fund effectively limits the number of television stations that can be reassigned to new channels in the repacking process because Congress mandated that broadcasters be held harmless in the repacking process. *See, e.g.*, Affiliates Associations Comments at 46-47; Affiliates Associations Reply at 13–14; Belo Comments at 19; NAB Comments at 49. *See also* ION Reply at 4-5. We address and reject broadcasters' "hold harmless" interpretation of the Spectrum Act in § III.B.2. *See* paras. 123, 137 n.454. Congress required only "all reasonable efforts" to preserve broadcasters' coverage areas and populations served; it did not require the Commission to ignore the other objectives in the Spectrum Act. Likewise, for the reasons discussed below, we do not interpret the reimbursement mandate to elevate full reimbursement of broadcasters' relocation costs above other statutory goals.

[1796] Spectrum Act § 6403(b)(4)(A).

[1797] *Id.* § 6403(c)(2)(A).

[1798] Congress explicitly placed other financial conditions on the Commission in the Spectrum Act as well, such as establishing a minimum proceeds requirement for the forward auction. *See* Spectrum Act § 6403(c)(2)(A). Congress did not, however, require that that the forward auction proceeds be sufficient to cover the total relocation costs that might be eligible for reimbursement. On the contrary, it required that such proceeds be sufficient to cover,

(continued….)

647. We also reject assertions that the reverse auction will not be "voluntary" within the meaning of the statute if broadcasters might incur out-of-pocket relocation costs.[1800] As directed by the Spectrum Act, incentive auction participation for broadcasters will be "voluntary." [1801] However, the Spectrum Act also grants the Commission broad authority to reorganize the broadcast television spectrum in order to carry out the incentive auction, subject to the "all reasonable efforts" mandate.[1802] Participation *in repacking* is not voluntary; to the contrary, the Spectrum Act expressly precludes broadcasters from exercising rights that would otherwise be available to them under section 316 to "protest" license modifications made pursuant to section 6403(b).[1803] As discussed above, we do not interpret the Spectrum Act to insulate broadcasters from any and all uncertainty in the repacking process in derogation of the statute's other objectives.[1804] Likewise, we do not interpret the statute to require the Commission to insulate broadcasters from the mere possibility of out-of-pocket expenses in order to ensure that their choice of whether or not to participate *in the reverse auction* is voluntary. Nor is there any evidence in the record to suggest that such a possibility would have a coercive effect.

648. We also conclude that conditioning the closing of the auction on the sufficiency of the Reimbursement Fund to cover all reimbursable relocation costs or delaying the closing of the auction until the Fund is determined to be sufficient to cover all such costs[1805] would jeopardize the other objectives in the Spectrum Act. As set forth above, the repacking approach we adopt provides speed and certainty by finalizing the channel assignment for each station that will remain on the air only *after* the final stage rule is satisfied and bidding stops (but before the incentive auction concludes). [1806] By imposing another constraint on repacking that is not authorized by the statute, NAB's proposed "hold-harmless" policy would impinge on the speed and certainty required for successful implementation of the incentive auction and would prevent an efficient final channel assignment scheme.[1807] In addition, contrary to some commenters' arguments, we cannot provide additional funding in order to guarantee that all broadcasters are fully reimbursed.[1808] Section 6402 of the Spectrum Act expressly provides for a deposit of no more than $1.75 billion into the Reimbursement Fund.[1809] Providing additional funding

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inter alia, "the estimated costs for which the Commission is required to make reimbursements under subsection (b)(4)(A)." Spectrum Act § 6403(c)(2)(B)(iii).

[1799] *See, e.g., Wolverine Power Co. v. FERC*, 963 F.2d 446, 451 (D.C.Cir. 2010) ("Congress knew how to draft an enforcement provision applicable to a 'licensee' but not a 'person.' Accordingly, we believe that, in enacting section 31(c), Congress meant what it said."). As noted below, however, we have no reason to believe that $1.75 billion will be insufficient to cover broadcasters' total relocation costs. *See* para. 650. We will seek to minimize repacking costs, and stay within the $1.75 billion Congress provided, by optimizing channel assignments at the conclusion of the auction. *See* para. 648, 650.

[1800] *See* NAB Reply at 39; Letter from Rick Kaplan, NAB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Attachment at 4-5 (filed Apr. 23, 2014).

[1801] *See* Spectrum Act § 6403(a).

[1802] *See generally* Spectrum Act § 6403.

[1803] *See* Spectrum Act § 6403(h).

[1804] *See* n.454 and accompanying text.

[1805] Harris Broadcast suggests that the FCC delay the closing of the forward auction until it solicits estimates from broadcasters and determines whether the Reimbursement Fund will cover all relocation costs. If the estimated costs exceed $1.75 billion, Harris Broadcast suggests that the Commission seek additional funding from Congress or retroactively alter its repacking methodology to reduce relocation costs. Harris Broadcast Comments at 18–19.

[1806] *See* paras. 113-18.

[1807] *See* paras. 111.

[1808] *See*, *e.g.*, Affiliates Associations Comments at iii; NAB Comments at 49; Belo Comments at 19; n.1807.

[1809] *See* Spectrum Act § 6402, adding 47 U.S.C. § 309(j)(8)(G)(iii).

would be contrary to the express language of the Spectrum Act.

649. In addition, it will not be possible for the Commission to estimate the precise amount of relocation costs until all eligible broadcasters and MVPDs submit their individual estimates three months after the Channel Reassignment PN is issued. Before that, we will not know which reassigned stations will have to replace equipment rather than reusing it, or to what extent MVPDs will incur expenses associated with fulfilling the carriage rights of reassigned broadcasters. Nor will there be any basis to estimate the number of stations that will forego cost reimbursement by taking advantage of the flexible use waiver option under § 6403(b)(4)(B) of the Spectrum Act.

650. We emphasize that we have no reason, at this time, to believe that the Fund will be insufficient to cover all eligible relocation costs. Moreover, we plan to take appropriate measures to disburse funds from the Reimbursement Fund as fairly and efficiently as possible.[1810] As indicated above, after the final stage rule is satisfied and the bidding stops, we intend to optimize the final broadcast channel assignments to minimize relocation costs.[1811] We also note that reassigned broadcasters will have the opportunity, post-optimization, to seek an alternate channel in the interest of minimizing relocation costs.[1812] We have discussed at length above the various measures we adopt to ensure that the Reimbursement Fund is used as efficiently as possible, and we address below cost mitigation measures that also may help to reduce demands on the Reimbursement Fund. If future developments suggest that $1.75 billion will be insufficient to cover all eligible costs, the Commission delegates authority to the Media Bureau to develop a prioritization scheme for reimbursement claims.

651. *Equipment Repurposing.* In the *NPRM*, the Commission sought comment on methods to encourage broadcasters to make use of equipment that is no longer needed by a reassigned or channel sharing licensee.[1813] All entities seeking reimbursement from the Reimbursement Fund should reuse their own equipment, to the extent possible, rather than obtaining new equipment paid for by the Reimbursement Fund. To the extent eligible broadcasters and MVPDs seek reimbursement for new equipment, they must provide a justification when submitting their estimated cost form as to why it is reasonable under the circumstances to purchase new equipment rather than modify their corresponding current equipment in order to change channels or to continue to carry the signal of a broadcaster that changes channels.[1814] We also encourage winning reverse auction bidders to repurpose their equipment to the extent possible. In addition, we encourage reassigned broadcasters to seek out previously used equipment no longer needed by other stations, and to make any equipment that is no longer needed available for use by another entity.

652. Unlike the DTV transition, in which there was little demand for used analog equipment, following the incentive auction broadcasters could obtain used digital equipment, either on the secondary

[1810] We note that although the broadcast industry expresses concern that $1.75 billion will be insufficient, other commenters argue that this amount will be more than enough to reimburse eligible entities. *Compare* APTS/CPB Comments at 29, n.75; Affiliates Associations Comments at 47; Testimony of Jay Adrick, Vice President of Broadcast Technology at Harris Corporation, Broadcaster Relocation Fund Workshop (June 25, 2012) *with* U.S. Cellular Comments at 8–9; AT&T Reply at 65.

[1811] We are cognizant that the expenses associated with channel reassignments will vary widely. *See Reassignment Costs Report PN*.

[1812] *See* § V.C.1.b (Alternate Channel and Expanded Facilities Opportunities), para. 553 (recognizing that, in some cases, a broadcaster may determine that a different channel will be more desirable or will make the transition process simpler and less costly.)

[1813] *See NPRM*, 27 FCC Rcd at 12471, para. 346.

[1814] In light of the limited amount of money available for reimbursement of relocation costs from the Reimbursement Fund, we will be reluctant to reimburse for the cost of new equipment when a broadcaster or MVPD could modify its corresponding current equipment. We will assess the justification provided with the estimated cost form to determine whether the cost of new equipment is reasonably incurred under the circumstances.

market or through an equipment swap, which is significantly less expensive than new equipment. In addition to cost savings, repurposing equipment could help address any potential equipment shortages.[1815] A reassigned broadcaster that cannot retune its transmitter to accommodate its new channel position may be able, for example, to sell the transmitter directly to another broadcaster or to an entity that purchases used equipment for resale. A broadcaster also may be able to purchase a previously used transmitter that works on its newly assigned channel. In addition, broadcasters in the same geographic region may consider swapping equipment that is no longer needed or usable on their newly assigned channels. We recognize that there may be significant costs associated with transporting used equipment and that cost savings may be achievable only if appropriate used equipment is available locally. We encourage broadcasters and MVPDs that cannot sell or swap unneeded equipment to consider donating it to an educational institution or other charitable organization.[1816] We decline to require licensees to return key components of their old equipment to a central repository for verification to prevent waste, fraud, and abuse.[1817] As described above,[1818] we will use site visits to validate that entities that received reimbursement for purchasing new equipment actually have deployed that new equipment.[1819]

653. *Equipment Sharing.* We encourage broadcasters to consider ways in which they may save expenses by sharing equipment. For example, it may be possible for broadcasters to share an antenna or other facilities in a manner that reduces the participating stations' overall relocation costs or contributes to more efficient use of the broadcast spectrum. In particular, we encourage broadcasters to consider whether joint use of a broadband antenna would be possible and would represent an overall cost savings as compared to the purchase of separate antennas for each of the participating stations.

654. *Bulk Purchasing*. At this time, we decline to arrange for the bulk purchase of equipment or services or to oversee any such effort.[1820] The record does not provide clear information regarding whether bulk purchasing would provide substantial benefits, in part because certain equipment, such as antennas, must be specialized for particular channels, locations, and coverage areas and because many broadcasters have existing relationships with equipment vendors.[1821] It may be useful for broadcasters and MVPDs to consider whether these kinds of arrangements could generate cost savings and result in more efficient use of the $1.75 billion Reimbursement Fund.

D. Transition Procedures for Other Services and Unlicensed Operations

655. As described above, all full power and Class A television stations must cease operations

[1815] *See, e.g.*, APTS/CPB Comments at 25 (ability to obtain custom equipment to achieve repacking is limited); Harris Broadcast Comments at 12 (noting that there currently are only two major antenna manufacturers).

[1816] We encourage stations and MVPDs to dispose of any equipment that they cannot sell, swap, or donate in a manner consistent with applicable laws regarding recycling and disposal of electronic equipment.

[1817] *See* Sprint Comments at 16.

[1818] *See* § V.C.5.d (Measures to Prevent Waste, Fraud, and Abuse).

[1819] Sprint also suggests that the Commission could contract with a third-party warehouse to dispose of the equipment either through recycling or sales. Sprint Comments at 16. Private market solutions either exist or may emerge to facilitate the resale and disposal of used broadcast equipment without intervention from the Commission.

[1820] In the *NPRM*, the Commission sought comment on whether to explore bulk purchasing opportunities or bulk services arrangements that could reduce the relocation costs of television stations. *See NPRM*, 27 FCC Rcd at 12471, para. 346.

[1821] Sprint states that it does not believe there will be any substantial benefit from entering into bulk purchase agreements. According to Sprint, in the BAS relocation such efforts were necessary to provide assurance to equipment manufacturers that they would be reimbursed for the large quantities of raw materials needed to seed production lines, but these concerns are not present in this situation as costs will be covered by the Reimbursement Fund. Sprint also warns that bulk purchasing associated with the BAS relocation was complicated. *See* Sprint Comments at 15.

in the spectrum repurposed for the 600 MHz Band no later than 39 months from issuance of the *Channel Reassignment PN* (i.e., by the end of the Post-Auction Transition Period).[1822] We expect new 600 MHz wireless licensees to commence offering services at varying times before and after that 39-month deadline, depending on when the spectrum becomes available, their respective business plans, and other factors. Meanwhile, the other users of the current UHF television band—LPTV, BAS, TVWS devices, and licensed and unlicensed wireless microphone users—may continue to use the UHF band for a period of time during its reorganization under certain conditions. The public interest is best served by establishing a UHF band transition process that promotes ready access to the repurposed spectrum by 600 MHz Band wireless licensees when and where they need it, while at the same time providing for an orderly transition process for secondary and unlicensed users that currently are serving various important consumer needs using this spectrum. We discuss below the processes by which LPTV and TV translator, BAS, LPAS, and unlicensed services and operations will transition out of the repurposed spectrum.[1823]

1. LPTV and TV Translator Stations

656. *Background*. As explained above, the facilities of LPTV and TV translator stations, including digital replacement translators ("DRTs"), will not be protected in the repacking process.[1824] As a result of the incentive auction and the repacking process, some LPTV and TV translator stations are likely to be displaced.[1825] Recognizing the important services that such stations provide to their communities, the Commission sought comment in the *NPRM* on measures to help ensure that the programming on displaced stations continues to reach viewers.[1826] Among other proposals, the Commission invited comment on whether to open a filing window allowing displaced LPTV and TV translator stations to submit displacement applications after the repacking process becomes effective. The Commission also sought comment on whether and how to avoid mutual exclusivity among displacement applications.[1827]

657. *Discussion*. The record in this proceeding demonstrates the important services provided by, and the continued need for, LPTV[1828] and TV translator stations.[1829] The record also demonstrates the

[1822] *See* § V.C.2 (Construction Schedule and Deadlines).

[1823] We address below the question of whether these secondary services and unlicensed operations may operate in the portion of the reallocated spectrum that constitutes the various guard bands (including the duplex gap).

[1824] *See* § III.B.3.d (Facilities That Will Not Receive Discretionary Protection). These stations have secondary interference protection to all primary users. Accordingly, full power and Class A stations may be assigned new channels that, once constructed and operating, will interfere with existing LPTV and TV translator facilities. Similarly, LPTV and TV translator stations may receive interference from a new licensee when it begins operating on licensed spectrum obtained through the auction. Where such interference exists, or where an existing LPTV or TV translator station would cause interference to a primary status licensee, the LPTV or TV translator station will have to relocate to a new channel that does not cause interference, or discontinue operations.

[1825] *See NPRM*, 27 FCC Rcd at 12475, para. 358.

[1826] *See id.* at para. 359.

[1827] *See id.* at 12476–77, paras. 360–61.

[1828] *See*, *e.g.*, ATBA Comments at 1–2 (noting that "approximately eleven million Americans continue to rely solely on free over-the-air broadcast television stations, including low-power stations, for news, local information and entertainment"); DTVAmerica Comments at 1–2 (noting that, according to NAB statistics, "there is an estimated 30 million U.S. consumers that rely solely on free over-the-air broadcast television station[s], which would include LPTV stations and translators, for news, local information and entertainment"); Entravision Comments at 15 ("OTA Spanish-language programming via LPTV Stations has become an increasingly important avenue for providing specialty programming to often underserved audiences"); ICN Comments at 2 ("the Commission must recognize the importance in the communications world of LPTV service to local communities by minority, independently-owned operators"); Block Stations Comments at 6–7 ("in markets with few full-power television stations, low-power stations often provide the only in-market network affiliate programming or other important local service"); LIN Comments at 9 ("lower power stations provide emergency information, news, and entertainment, often to rural and

(continued….)

potential for a significant number of LPTV and TV translator stations to be displaced as a result of the auction and repacking process.[1830] As described in more detail below, we adopt several measures to help preserve these local television services and to ensure that the important programming they provide continues to reach viewers. Specifically, after primary stations relocating to new channels have submitted their construction permit applications and have had an opportunity to request alternate channels or expanded facilities, the Media Bureau will open a special filing window to offer operating LPTV and TV translator stations, including DRTs, that are displaced an opportunity to select a new channel. We also modify our rules to allow stations with mutually exclusive displacement applications to reach a settlement or an engineering solution.[1831] We establish a priority for displaced DRTs in the event that a DRT licensee files a mutually exclusive displacement application that cannot be resolved. We also intend to initiate a rulemaking proceeding shortly after the release of this Order to consider additional means to mitigate the potential impact of the auction and repacking process on low power stations ("LPTV/TV Translator Proceeding").[1832] Further, LPTV and TV translator stations may continue operating in the spectrum repurposed for use by new 600 MHz Band licensees unless and until they are notified of displacement pursuant to the procedures set forth below.

658. In addition, we adopt rules governing the processes by which new 600 MHz Band licensees must notify LPTV and TV translator stations that they will be displaced and by which these stations must vacate displaced channels. Finally, we discuss the notification process for LPTV stations to cease operations in the 600 MHz Band guard band spectrum.

659. *Displacement Process*. We modify our displacement rules with respect to operating LPTV and TV translator stations that are displaced as a result of the incentive auction or the repacking process.[1833] We agree with commenters that doing so may enable displaced stations to continue operating.[1834] After the release of the *Channel Reassignment PN* and after eligible full power and Class A

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underserved areas"); NRB Comments at 3 ("it is hard to imagine any broadcasting entity that is closer to the community, or that meets more of the truly 'local' needs of its broadcast market than LPTV stations"); SEI Comments at 3 (LPTV "is often the only economically feasible video programming outlet for small communities that cannot economically support a full power station").

[1829] *See* PTV Comments at 10 ("CPB-Qualified Stations rely on hundreds of translators operating in remote, rural areas to provide viewers in these areas television programming, to transmit emergency alerts, and to provide other important informational and programming services"); NYSBA Comments at 16 ("stations in the upstate area [of New York] rely on translators to reach viewers whose reception of their signals is blocked by terrain or are beyond the reach of their primary signal").

[1830] *See* ATBA Comments at 2 (arguing that "to implement an incentive auction, particularly without strong safeguards to protect LPTV stations in the repacking process, puts this local LPTV service that millions of viewers depend on at risk"); PTV Comments at 10 (arguing that "viewers who receive these signals for free over-the-air would be left in the dark if translator service is lost due to repacking"); Leadership Conference Comments at 4 (arguing that "a number of low power stations owned by women or people of color could be put in jeopardy during the eventual repacking"); NYSBA Comments at 16–17 (arguing that the "Commission should carefully evaluate the role that particular translators play before adopting a repacking plan that would preclude their existence").

[1831] *See* Appendix A (revising 47 C.F.R. § 73.3700 by, among other things, adding § 73.3700(g)(3)).

[1832] As discussed above, the Commission may consider modifying the rules governing the DRT service to create a new "digital to digital" replacement translator service in a future rulemaking proceeding. *See* § III.B.3.d (Facilities That Will Not Receive Discretionary Protection).

[1833] The Commission also modified its displacement rules in the context of the DTV transition. *See DTV MO&O on Recon of 6th R&O*, 13 FCC Rcd at 7465–66, para. 116. All of the requirements of our current displacement rules will continue to apply (e.g., required interference showing and limits on transmitter moves), except for the requirement that displacement applications be submitted only after the primary station obtains a construction permit or license. *See* 47 C.F.R. §§ 73.3572(a)(4) and 74.787(a)(4).

[1834] *See, e.g.*, Entravision Comments at 15–16; SEI Comments at 10–11.

television stations have an opportunity to file construction permit applications for their new facilities, including an alternate channel or an expanded facility,[1835] the Media Bureau will announce a limited window for operating LPTV and TV translator stations to submit displacement applications.[1836] This filing window will be open only to operating stations that (1) are displaced by a full power or Class A television station as a result of the incentive auction or the repacking process, (2) will cause interference to or receive interference from frequencies repurposed for new, flexible use by a 600 MHz Band wireless licensee, or (3) are licensed on frequencies that will serve as part of the 600 MHz Band guard bands.[1837] We delegate authority to the Media Bureau to announce the terms of the limited displacement window consistent with the approach outlined above.[1838]

660. We disagree with NTA that the Commission should allow displacement relief applications to be filed at any time without requiring stations to wait for a window.[1839] NTA opposes the use of filing windows, claiming that "they tend to multiply conflicting application cases."[1840] Accepting displacement applications during a limited window will ensure that all affected stations are given an equal opportunity to obtain a new channel and will avoid the "race to the courthouse" that occurs with first-come, first-served filing opportunities. Further, because the Commission typically receives a large number of conflicting applications on the first day of first-come, first-served processing, we disagree with NTA that such an approach would avoid the possibility of multiple conflicting applications.

661. Under our existing rules, mutually exclusive applications (i.e., those that cannot be granted without causing interference to each other) generally are resolved through an auction.[1841] In this case, the public interest would be served by allowing LPTV and TV translator stations with mutually exclusive displacement applications to explore engineering solutions or agree on a settlement to resolve the mutual exclusivity.[1842] This approach will expedite the displacement process and prevent processing

[1835] The *Channel Reassignment PN* will announce the new channel assignments for full power and Class A stations resulting from the incentive auction and the repacking process.

[1836] *See* § V.C.1 (License Modification Procedures). Displaced stations may apply only for a channel that remains allocated to broadcast television service and is not repurposed for new, flexible uses or reserved as guard bands. When requesting a new channel in a displacement application, LPTV and TV translator stations will be required to demonstrate that they would not cause interference to the predicted service of full power or Class A stations on: (1) existing channels assigned to full power and Class A stations; (2) new channels assigned to full power and Class A stations pursuant to the *Channel Reassignment PN*; and (3) alternative channels and expanded facilities proposed by such stations during the applicable filing window.

[1837] All displacement applications submitted during the window will be considered filed on the last day of the window and will be processed in accordance with our existing rules. *See* 47 C.F.R. §§ 73.3572(a)(4) and 74.787(a)(4).

[1838] We note that digital LPTV and TV translator stations filing displacement applications may propose a change in transmitter site of not more than 30 miles (48 kilometers) from the reference coordinates of the existing station's community of license, provided in § 76.53 of the rules. *See* 47 C.F.R. §§ 76.53 (reference points list), 74.787(a)(4) (digital displacement); *see also* 47 C.F.R. § 73.3572(a)(4)(i) (analog displacement).

[1839] NTA Comments at 10–11.

[1840] *Id.* at 11.

[1841] Consistent with § 309(j) of the Communications Act, our rules require resolution of mutual exclusivity through competitive bidding. *See* 47 C.F.R. § 73.5000, *et seq.* The Communications Act, however, provides that the Commission shall use engineering solutions, negotiation, threshold qualifications, and other means to avoid mutual exclusivity where the Commission determines that doing so would serve the public interest. *See* 47 U.S.C. § 309(j)(6)(E).

[1842] Globe supports a limited settlement opportunity. *See* Globe Comments at 8. We delegate authority to the Media Bureau to announce the terms of the engineering solution or settlement opportunity that will be provided to mutually exclusive displacement applications filed by LPTV or TV translator stations as a result of the auction or repacking process, consistent with our existing rules, including the monetary limits on settlement payments and reporting

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delays that could result in stations having to go silent.[1843] Should no resolution of mutually exclusive applications occur through an engineering solution or settlement, we will grant a selection priority to the licensees of any displaced DRTs. This means that the DRT displacement application will be processed first and, if granted, will result in the dismissal of all pending displacement applications that are mutually exclusive with it. DRTs are used to fill in loss areas in the pre-DTV transition analog service areas of full power television stations that could not otherwise be replicated with post-transition digital facilities.[1844] We conclude that DRT displacement applications should be given priority over mutually exclusive displacement applications filed for LPTV and other TV translator stations in order to help preserve the existing services of full power stations.[1845] Should two or more stations remain mutually exclusive after the application of the selection priority, we will use an auction as a last resort to resolve remaining displacement groups.

662. We reject PTV's proposal to grant a selection priority to the displacement applications filed by TV translator stations that are operating on an NCE basis and are eligible to receive a community service grant from the Corporation for Public Broadcasting ("CPB-Qualified Stations").[1846] PTV argues that such a priority is appropriate in light of "CPB-Qualified stations' unique mission of public service and the strong preference of Congress to promote the nation's public television system."[1847] Many LPTV stations and other TV translator stations also have important public service missions, and PTV does not provide any evidence that Congress intended for CPB-Qualified TV translators to receive preferential treatment over other low power stations. Further, stations are permitted to change their designation from "low power television" to "translator" without prior Commission approval; thus, stations could change their designation to gain the selection priority if we granted the proposal.

663. In addition, we decline to adopt the particular selection priorities proposed in the *NPRM* for to displacement applications.[1848] Commenters that support this proposal advocate prioritizing applications from stations that provide network service to their community or other types of programming

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requirements. *See* 47 C.F.R. § 73.3525. *See also* Globe Comments at 8 (arguing that "monetary payments shall be limited to an applicant's reasonable and prudent expenses").

[1843] The Commission previously has found engineering solutions and settlement opportunities to be successful tools for reducing the number of mutually exclusive LPTV and TV translator applications, including displacement applications, because of the operating characteristics of these stations and the fact that they are not allotted channels using a Table of Allotments. *See Notice of Receipt of Settlement Agreements and Removal of Applications From Closed Broadcast Auction*, Public Notice, Report No. 24557A (rel. Aug. 25, 1999); *Auction 81 Final Settlement Window Announced*, Public Notice, 18 FCC Rcd 25141 (2003); *Auction 85 Announcement of Settlement Period Ending July 31, 2008*, Public Notice, 23 FCC Rcd 10819 (2008).

[1844] *See DRT R&O*, 24 FCC Rcd at 5938, para. 14 ("[T]he Commission's priority is to expeditiously assist full-service stations to maintain their analog service areas through the digital transition. Furthermore, the goal of this new service is digital replication of full-power analog television service areas, not their expansion.").

[1845] *See id.* at 5937, para. 13 (noting that "replacement digital television translator applicants will be full-service stations seeking to duplicate their pre-transition analog service areas, thereby serving an important public policy goal"). Such a priority is consistent with our current rules, which establish a processing priority for new DRTs over applications filed by LPTV and non-DRT TV translator stations, even if the latter are filed first. *See* 47 C.F.R. § 74.787(a)(5)(i); *DRT R&O*, 24 FCC Rcd at 5934, para. 6, and 5936, para. 11. Under the rules, a new DRT has co-equal priority with LPTV and non-DRT TV translator displacement applications; the Commission has never previously addressed the priority of displaced DRTs relative to displaced LPTVs and non-DRT TV translator stations.

[1846] PTV Comments at 14; PTV Reply at 8–9.

[1847] PTV Comments at 14.

[1848] *NPRM*, 27 FCC Rcd at 12476, para. 361.

content.[1849] The Commission's longstanding policy has been to avoid involvement in the format and other content choices of licensees based on First Amendment concerns, and we conclude that adoption of these proposals would be inconsistent with that policy.[1850]

664. *LPTV/TV Translator Proceeding*. We intend to initiate the LPTV/TV Translator Proceeding shortly after the release of this Order to consider additional measures that may help alleviate the consequences of LPTV and TV translator station displacements resulting from the incentive auction and the repacking process, and we intend to issue an order in this proceeding prior to the commencement of the auction. First, the LPTV/TV Translator Proceeding will consider whether to modify the current September 1, 2015 deadline for LPTV stations to convert to digital service.[1851] The LPTV Spectrum Rights Coalition claims that many LPTV stations that are displaced may have to "double-build" digital facilities within a short period of time in order to both comply with the deadline for LPTV stations to convert to digital service and to relocate to new channels if displaced.[1852] The Commission recently reaffirmed the September 1, 2015 LPTV digital transition deadline.[1853] However, to address the concerns raised by the LPTV Spectrum Rights Coalition, we will consider whether to modify the deadline, based on the timing of the incentive auction and any other relevant factors.

665. Second, the LPTV/TV Translator Proceeding will consider whether to permit LPTV and TV translator stations to participate in channel sharing arrangements after the conclusion of the reverse auction.[1854] A number of commenters support extending the opportunity to channel share to these stations.[1855] We recognize the potential benefits of allowing LPTV and TV translator stations to explore channel sharing outside of the auction context, such as to ensure the continued viability of LPTV and TV translator services through new programming and business arrangements, to promote spectral efficiency by freeing up spectrum, and to promote the use of available digital capacity on other platforms to distribute programming. We conclude that the record on this issue is not sufficiently developed and that it would be more appropriate to consider this issue in a separate proceeding along with other remedial

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[1849] *See, e.g.*, LPTV Spectrum Aug. 27, 2013 *Ex Parte* at 5 (supporting "displacement filing priorities for stations which air civic content (government or education channels), stations which are Primary EAS providers for their communities, and those providing local news rather than just a national network feed"); Gray TV Comments at 8; AIC Reply at 5; Globe Comments at 8.

[1850] *See*, *e.g.*, *FCC v. WNCN Listener's Guild*, 450 U.S. 582 (1981). We note that neither the *NPRM* proposal nor our decision here implicates the Commission's policies promoting the "fair distribution" of broadcast stations, including allotment priorities for first or second "local" service, which do not apply to LPTV and TV translator stations. *Implementation of Section 309(j) of the Communications Act – Competitive Bidding for Commercial Broadcast and Instructional Television Fixed Service Licenses*, First Report and Order, 13 FCC Rcd 15920, ¶ 115 n.109 (1998) ("LPTV and television . . . translator stations are not required to meet basic full-service station requirements, *i.e.* provide responsive programming or maintain a presence in the community, cover the community with an adequate strength signal, etc. Although LPTV and translator stations are licensed to specific communities, the Commission has concluded that Section 307(b) issues are not relevant in the context of these secondary services.") (citing *Low Power Television and Television Translator Service,* 2 FCC Rcd 1278, 1281 (1987)); *see* 47 U.S.C. § 307(b) ("fair, efficient, and equitable distribution of radio service").

[1851] *LPTV DTV Second R&O*, 26 FCC Rcd at 10733, para. 2; *see also Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations*, MB Docket No. 03-185, Second Memorandum Opinion and Order, 28 FCC Rcd 14412, 14417, para. 11 (2013) (*Digital Low Power Second MO&O*).

[1852] LPTV Spectrum Aug. 27, 2013 *Ex Parte* at 5.

[1853] *See Digital Low Power Second MO&O,* 28 FCC Rcd at 14412, para 1.

[1854] *See NPRM*, 27 FCC Rcd at 12457, para. 359.

[1855] Entravision Comments at 15–16; ICN Comments at 2; SEI Comments at 11–12; Spectrum Bridge Comments at 7; WISPA Comments at 22; *see also* PTV Comments at 11–12; NTA Comments at 9 (channel sharing will not be feasible for most TV translator stations); Weigel Comments at 6.

actions we will propose in the LPTV/TV Translator proceeding. We thus decline to permit LPTV and TV translator channel sharing at this time, but we will consider doing so in our forthcoming rulemaking proceeding.[1856]

666. Third, we will consider in the LPTV/TV Translator Proceeding whether to create a new digital replacement translator service for stations that experience losses in their pre-auction service areas. Fourth, we will explore ways of maximizing the number of channels available to LPTV and TV translator stations in the remaining television bands. Following the release of the *Channel Reassignment PN* and the processing of construction permit applications for new channel assignments, it may be possible to identify efficient ways to assign the remaining spectrum available for LPTV and TV translator stations. We will explore these options in the LPTV/TV Translator Proceeding, including the possible use of the repacking software to optimize frequency assignments. If feasible, the use of our software for this purpose may expedite and ease the post-auction transition process for many low power stations. In addition, because it is likely that a number of LPTV and TV Translator stations will be displaced from UHF channels, we will consider whether and, if so how, we should facilitate the ability of such stations to relocate to VHF channels where UHF channels are unavailable. Finally, we will invite input on any other measures we should consider to further mitigate the impact of the auction and repacking process on low power stations.

667. *Other Proposals*. We decline to adopt several other proposals. Although we are sympathetic to the objectives and concerns these commenters raise, these proposals either are not feasible at this time or would conflict with the other goals of the incentive auction. We reject the proposal to set aside channels 2-4 for the exclusive use of LPTV or TV translator stations.[1857] Such a set-aside would eliminate available channels that otherwise could be assigned to full power and Class A stations and would require relocating a number of full power and Class A stations to different channels.[1858] This proposal would also be inconsistent with our goal to allow market forces to determine the highest and best use of spectrum. We also reject NRB's proposal to provide displaced LPTV stations with cable carriage rights at their new location or channel.[1859] Neither NRB nor any other commenter maintains that such action would be within the Commission's statutory authority and, regardless, we decline to grant carriage rights beyond those required under the Communications Act.[1860]

668. *Notification and Termination Provisions for LPTV Stations Displaced by the 600 MHz Wireless Service*. We also adopt rules to govern the process for new 600 MHz Band licensees to notify LPTV and TV translator stations that they will be displaced and for such stations to cease operations on displaced channels. These procedures are designed to ensure that stations are given adequate notice of when they will be displaced and that stations expeditiously terminate operations on a displaced channel after they receive such notice. Specifically, new 600 MHz wireless licensees must provide LPTV and TV

[1856] Accordingly, we reject Mako's proposal to grant a selection priority in the displacement process to LPTV stations willing to enter into channel sharing agreements. *See* Mako Comments at 8.

[1857] Harris Broadcast Comments at 28.

[1858] To limit the displacement of rural TV translator stations, PTV asks the Commission to "avoid condensing the band more in rural areas than in urban areas." PTV Comments at 12; PTV Reply at 8. We clarify that, while the Commission does not intend to specifically repurpose broadcast spectrum more extensively in rural areas than urban areas, the 600 MHz Band Plan will enable us to offer fewer spectrum blocks in constrained markets where less spectrum is available.

[1859] NRB Comments at 8; *see also* LPTV Spectrum Aug. 27, 2013 *Ex Parte* at 5–6.

[1860] *See* 47 U.S.C. § 534(c) (low power station carriage obligations). In addition, we reject LPTV Spectrum Rights Coalition's proposal to "increase [ ] the LPTV fee structure to support more staff and resources dedicated to LPTV-related activities." LPTV Spectrum Aug. 27, 2013 *Ex Parte* at 6. This proposal did not receive support from other LPTV commenters, and we conclude that it would pose a hardship on many licensees without any clear offsetting benefits.

translator stations advance notification if they intend to commence operations[1861] in areas of their geographic licenses where there is a likelihood of receiving harmful interference from an LPTV or TV translator station.[1862] After receiving such notification, the LPTV or TV translator station must cease operations or reduce power in order to eliminate the potential for harmful interference to the operations of the 600 MHz licensee.[1863]

669. The 600 MHz Band licensee must provide notice to the LPTV or TV translator licensee in the form of a letter, by certified mail, return receipt requested. The notice must indicate the date that the 600 MHz Band licensee intends to commence operations, and must be delivered to the LPTV or TV translator licensee not less than 120 days in advance of that date. The LPTV or TV translator licensee must cease operating or reduce power before the commencement date set forth in the notice.[1864] This obligation will apply even if the LPTV or TV translator station has submitted a displacement application that has not been granted.

670. LPTV and TV translator stations may continue operating on channels in the 600 MHz Band until a wireless licensee commences operations pursuant to the notification process we are adopting. Commenters support this approach as a means to mitigate the impact of the post-incentive auction transition on low power services by allowing these stations to continue to operate as long as possible,[1865] and we agree that this approach will serve the public interest.[1866]

671. The notice procedures we adopt are based on our experience with the transition of the 700 MHz Band from broadcast to wireless use.[1867] We conclude that it is appropriate to adopt more definitive channel clearing obligations for LPTV and TV translator than were implemented in the 700 MHz transition in order to ensure that new 600 MHz Band licensees will have prompt and efficient access

[1861] The Commission will define the term "commence operations" for purposes of the above notification obligations and displacement of LPTV and TV translator stations, as well as displacement of other secondary licensees, in the pre-auction process.

[1862] Wireless licensees will be required to determine whether a likelihood of receiving harmful interference exists based on the methodology we adopt to prevent inter-service interference. *See* § III.A.2.d (Market Variation).

[1863] To the extent that the 600 MHz licensees are commencing operations in areas of their geographic licenses where harmful interference from LPTV or TV translator stations would not be likely, these stations are not required to cease operations.

[1864] If the date that the 600 MHz licensee will commence operations is delayed, a revised notification must be sent to the LPTV or TV translator licensee and filed with the Commission. If the wireless licensee does not commence operations by the date set forth in the letter, the LPTV or TV translator station must cease operating by the date the wireless licensee actually commences operations.

[1865] *See* NTA Comments at 7; PTV Comments at 13 (allowing stations to remain temporarily on displaced channels will provide stations sufficient time to investigate alternative spectrum options and thereby prevent disruption of service); PTV Reply at 8–9.

[1866] Similarly, as provided under our existing rules, LPTV and TV translator stations operating on channels that will continue to be allocated and assigned to full power broadcast television services may continue to operate until displaced by a full power or Class A television station that is reassigned a new channel in the repacking process. *See* 47 C.F.R. § 74.703(b). Because full power and LPTV stations follow informal notification procedures with respect to interference and displacement, we do not adopt notification requirements for these situations.

[1867] In the 2004 *Digital LPTV Order*, 19 FCC Rcd at 19355–56, paras 72–75, the Commission established provisions to allow a primary wireless licensee in the 700 MHz Band (former television channels 52–69) to notify affected digital LPTV and TV translator stations of its intent to initiate or change operations. In 2011, the Commission extended these provisions to analog LPTV and TV translator stations operating in the 700 MHz Band. *See LPTV DTV Second R&O*, 26 FCC Rcd at 10749–50, para. 35. The 700 MHz Band was subsequently "cleared" of all LPTV services when, per the Commission's order, all LPTV and TV translator stations operating on 700 MHz frequencies were required to terminate operations and move to an "in-core" channel (2-51) by December 31, 2011. *Id.* at 10748–49, paras. 33–34.

to their spectrum.[1868] This approach will provide certainty to new licensees, helping to ensure the success of the auction and a smooth transition.

672. *Displacement from the Guard Bands.* We will require that LPTV and TV translator stations operating on channels that include frequencies repurposed for 600 MHz Band guard band use (including the duplex gap) cease operations on those frequencies. NTA asks that LPTV stations be allowed to continue operating on any channels allocated as guard bands.[1869] As discussed above, the 600 MHz Band Plan designates spectrum to serve as guard bands,[1870] and consistent with the Commission's proposal in the *NPRM*, we will permit only low power device operations in those bands and make this spectrum available for innovative unlicensed use nationwide.[1871] In order to fully transition this spectrum for unlicensed use on a nationwide basis, all LPTV and TV translator licensees operating in spectrum repurposed for 600 MHz Band guard band use will be required to cease operating on that spectrum no later than the end of the Post-Auction Transition Period (i.e., 39 months after the issuance of the *Channel Reassignment PN*). In addition, as set forth above, an LPTV or TV translator licensee operating in spectrum reserved for the guard bands will be required to cease operating prior to that date if any 600 MHz Band licensee has notified them that their operations would be likely to cause harmful interference in areas where the wireless licensee intends to commence operations. LPTV stations that currently operate on channels that include frequencies that are repurposed as 600 MHz Band guard bands will be eligible to file an application for a new channel in the displacement window discussed above.

2. Television Fixed Broadcast Auxiliary Stations

673. As discussed above, we will continue to license fixed BAS on a secondary basis in the television bands following the incentive auction.[1872] As a result of the incentive auction and repacking process, however, BAS operators will be required to vacate the 600 MHz Band no later than the end of the Post-Auction Transition Period. Following the issuance of the *Channel Reassignment PN*, BAS operations will have significant advance notice of the channels they may need to vacate, which will assist them in advance planning for that process.

674. *Notification Procedures for Operations in the 600 MHz Band and the Post-Auction Television Bands.* We agree with CTIA that requiring BAS to discontinue operations and/or relocate is necessary to produce fully available spectrum to meet the growing demand for wireless services.[1873] Therefore, while we will continue to license fixed BAS on a secondary basis in the UHF spectrum that remains allocated and assigned to full power television services nationwide, we will require all fixed BAS stations to cease operating and relocate from the 600 MHz Band no later than the end of the Post-Auction Transition Period (i.e., 39 months after issuance of the *Channel Reassignment PN*).[1874] Additionally, before the end of this transition period, if a new 600 MHz licensee intends to commence operations,[1875]

[1868] In the 700 MHz proceeding, LPTV and TV translator licensees were afforded a 120-day period to cease operation of interference-causing facilities after receiving notice from a primary wireless licensee. *See Digital LPTV Order*, 19 FCC Rcd at 19355, para 73. In addition, the Commission implemented procedures in the 700 MHz proceeding enabling LPTV and TV translator licensees to negotiate alternative arrangements with primary wireless licensees and permitting them to seek a stay of the effect of an interference notification. *Id.* at 19355–56, paras 73–74.

[1869] NTA Comments at 8.

[1870] *See* § III.A.2.e (Guard Bands).

[1871] *See* § III.C.2.b (Guard Bands).

[1872] *See* § III.D.2 (Television Fixed Broadcast Auxiliary Stations).

[1873] CTIA Comments at 43.

[1874] *See* § V.D (Transition Procedures for Other Services and Unlicensed Operations).

[1875] *See* § V.D.1 (LPTV and TV Translator Stations), n.1861.

the 600 MHz licensee must provide 30 days' advance notice to the BAS operator that it intends to commence operations and that the BAS station is likely to cause harmful interference to those operations. The BAS operator must cease operating on that channel within 30 days of receiving notice. The few commenters addressing fixed BAS relocation issues are generally supportive of this notification approach.[1876] The notice from the 600 MHz licensee to the BAS licensee must take the form of a letter, by certified mail, return receipt requested.[1877] A 30-day notice period will serve the public interest by both protecting BAS operations and speeding the deployment of new broadband wireless services.

675. In addition, as a secondary service, BAS may not cause interference to repacked television stations. Should a repacked broadcast television licensee in the 600 MHz Band or the repacked UHF Band[1878] experience harmful interference from a BAS licensee, the BAS licensee must, pursuant to the Commission's rules, immediately cease operations and may not resume operations until the interference problem is resolved.[1879]

676. *Operations in the Guard Bands.* We also will require that BAS operations on channels that include frequencies that will be reserved for guard bands pursuant to this Order cease operations on those channels. As discussed above, the 600 MHz Band includes guard bands (including the duplex gap), and consistent with the Commission's proposal in the *NPRM*, we will permit only low power operations in those bands.[1880] We will establish specific rules for low power operations in the guard bands in the 600 MHz and TVWS Part 15 Proceeding. All BAS operations in spectrum reserved for guard bands will be required to cease operating on that spectrum no later than the end of the Post-Auction Transition Period (i.e., 39 months after the issuance of the *Channel Reassignment PN*).[1881]

3. Television White Space (TVWS) and Unlicensed Device Operations

677. *Operations in the Post-Auction Television Bands.* As set forth above, we will continue to allow TVWS devices to operate under the current Part 15 rules in the spectrum that remains allocated and assigned for TV broadcast services following the incentive auction.[1882] We note that, as the television bands are repacked, there are likely to be fewer available channels for TVWS devices in this spectrum and we intend to designate one unused TV channel in each area for shared use by TVWS devices and

[1876] *See, e.g.,* CTIA Comments at 43; Verizon Reply Comments at 50; *cf.* Affiliates Associations Comments at 41-42 (supports notification process, but requests 90-day notice period).

[1877] BAS stations must cease operation within 30 days of receiving a notification from a primary licensee. In addition, BAS licensees are obligated to notify the Commission when they discontinue operation by submitting an FCC Form 601 requesting license cancellation (*see* 47 C.F.R. § 1.955(a)(3)), or by obtaining prior approval to modify their authorization by filing an FCC Form 601 if they wish to change frequencies to a channel outside the 600 MHz Band (*see* 47 C.F.R. §§ 1.913, 1.947). We emphasize that filing an application for modification does not relieve a BAS station from the obligation to cease operation in the 600 MHz Band within 30 days of receiving notice, even if the Commission has not yet processed its modification application.

[1878] In order to accommodate market variation, there may be some broadcast television licensees that will be authorized to operate in the repurposed 600 MHz Band. *See* § III.A.2.d (Market Variation).

[1879] *See* 47 C.F.R. §§ 74.602(h), 74.702, 74.803(b). Thus, while Affiliates Associations sought a 90-day notice period for both broadcast and wireless operations, we do not adopt a notice requirement for broadcasters where BAS is likely to cause harmful interference to a repacked broadcast station. Instead we rely on existing Commission procedures for resolving interference under those circumstances.

[1880] *See* § III.C.2.b (Guard Bands).

[1881] In addition, as set forth above, a BAS licensee operating in spectrum reserved for the 600 MHz Band guard bands will be required to cease operating prior to that date if any 600 MHz Band licensee has notified them that their operations would be likely to cause harmful interference in areas where the wireless licensee intends to commence operations.

[1882] *See* § III.C.2.a (addressing unlicensed operations in the reorganized television bands).

wireless microphones. In the 600 MHz and TVWS Part 15 Proceeding, we plan to explore improvements to our TV bands databases to enable wireless microphone licensees more immediate access to protection from interference by TVWS devices in the television bands.[1883]

678. *Operations in the 600 MHz Band Guard Bands.* We will initiate a separate 600 MHz and TVWS Part 15 Proceeding in the near term to develop the technical parameters for unlicensed operations in the spectrum that, following the incentive auction, will serve as 600 MHz Band guard bands—specifically, the bands between broadcast television and wireless services, the duplex gap, and bands adjacent to channel 37.[1884] As part of that proceeding, we will also re-examine our current rules, with the goal of providing more flexibility for TVWS devices. As we proceed with developing rules for unlicensed operations in the 600 MHz Band guard bands, to the extent the pre-auction television channels that will be repurposed as guard bands are available for TVWS devices under existing rules, TVWS devices may continue to operate on those channels under these rules. Allowing these channels to remain available for TVWS operations during the post-auction transition will be particularly helpful to the unlicensed industry as fewer television channels will continue to be available. These unlicensed operations will be subject to whatever rules we ultimately establish for 600 MHz Band guard band operations in the separate rulemaking.

679. *Operations on Unused Television Channels Currently Designated for Wireless Microphones.* We will no longer require that up to two unused channels in any area be designated exclusively for wireless microphone operations.[1885] We will, however, continue to prohibit TVWS devices from operating on these channels until our rules to improve our TV bands databases to provide for more immediate protection of registered wireless microphone operations become effective,[1886] after which time TVWS devices potentially could operate on any of these channels. As noted above, we also intend to designate one television channel for shared use by wireless microphones and TVWS devices.[1887]

680. *Operations in the 600 MHz Band.* We will permit the continued operation of TVWS devices on repurposed spectrum except in those areas in which a 600 MHz Band licensee commences operations. A number of commenters agree with this approach of allowing unlicensed operations to continue in the 600 MHz Band spectrum repurposed until they build out their license areas.[1888] AT&T

[1883] *See* §§ III.C.2.a (discussion of TVWS device operations in the post-auction television bands), III.D.3.a (discussion of wireless microphone operations in the post-auction television bands).

[1884] *See* § III.C (Unlicensed Operations). In this separate proceeding, we also plan to make improvements to our TV bands databases to enable wireless microphone licensees more immediate access to protection from interference by TVWS devices in the TV bands. *See* § III.D.3.a (Television Bands). We also plan to determine whether, if we were to allow unlicensed operations on channel 37, we can provide reliable protection to incumbent RAS and WMTS through use of a database similar to the TV bands database. *See* § III.C.2.c (discussing unlicensed operations on Channel 37).

[1885] *See* §§ III.C.2.a (discussion of channels designated for wireless microphones), III.D.3.a (same).

[1886] *See* § III.D.3.a (discussion of improvements relating to the TV Bands Databases).

[1887] *See* §§ III.C.2.a (Television Bands), III.D.3.a (Television Bands).

[1888] We note that in the *NPRM*, the Commission asked about a "use it or share it" approach in which unlicensed devices could gain access to unused 600 MHz Band spectrum where the licensee has failed to deploy service by the end of its build-out term. *NPRM*, 27 FCC Rcd at 12490, para. 405. Commenters supporting this approach, however, seek a "use it or share it" approach prior to that time. *See, e.g.*, Google/Microsoft Comments at 44-46 ("The FCC should permit unlicensed operations in the 600 MHz band in areas where auction winners have not yet begun providing service"); Spectrum Bridge Comments at 5 ("It could take years for rural build out of auctioned spectrum to occur and it does not have to remain fallow during that period if white space rules are applied and managed by a database."); WSDAG Comments at 3 ("spectrum where no licensed service is deployed can remain available for use until a relatively short time before a new service goes online without jeopardizing the rights of licensees."); CCIA Comments at 13-14 (arguing that the Commission should temporarily permit unlicensed use of 600 MHz spectrum until new services have been licensed and met at least one construction benchmark); WSA

(continued….)

does not necessarily oppose unlicensed uses in the 600 MHz Band prior to wireless service deployment, but states it would have to be subject to strict enforcement mechanisms, and any unlicensed user would have to commit unequivocally to clear the spectrum immediately once the licensed operator is ready to make use of it.[1889] As discussed above, after obtaining their licenses we expect that 600 MHz Band licensees will be commencing operations at different places at different times depending on their business plans and other factors. We are not persuaded by those that unequivocally oppose unlicensed use of this repurposed spectrum following the incentive auction.[1890] Since TVWS devices can operate only on channels identified in the TV bands databases, these databases can serve to ensure that unlicensed operations will no longer occur on a channel on which a licensee has commenced service. When a 600 MHz Band licensee plans to commence operations on frequencies that include channels available for unlicensed operations under the rules for TVWS devices, that licensee can notify any of the TV bands database administrators when and where it plans to commence operations.[1891] Through these actions, the TV bands databases would be updated and would preclude unlicensed operations in those areas.

681. We disagree with T-Mobile's contention that allowing TVWS devices to operate in repurposed spectrum before new 600 MHz licensees deploy services will increase uncertainty surrounding the value of spectrum to be auctioned, decrease auction revenues, and complicate and delay broadband deployment.[1892] As already noted, TVWS devices rely on a database to ensure that users do not operate on channels that are being used by licensed services. Once a channel is indicated in the database as being unavailable for unlicensed use, the database will no longer provide that channel on the list of available channels to devices, effectively ending any further use of it. Thus, there will be no uncertainty concerning whether unlicensed device use will cease once a licensee is ready to commence service on a channel. The database approach also addresses AT&T's concern that allowing unlicensed operation before a licensee commences service will require enforcement mechanisms to ensure that unlicensed users clear the spectrum when the licensee commences service. We will work with the TV bands database administrators to ensure that their databases contain accurate information and that the databases provide lists of available channels in accordance with the rules.[1893]

4. Low Power Auxiliary Stations and Unlicensed Wireless Microphones

682. As discussed above, we are adopting several rule changes that address operations of licensed LPAS and unlicensed wireless microphones in the post-auction television bands, as well as the operation of these devices in the 600 MHz Band guard bands once the technical rules are established in a separate rulemaking.[1894] Wireless microphone operators today rely on UHF band spectrum to provide important broadcasting and production services, as well as other services, and will need some time to

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Comments at 19; PISC Reply Comments at 31-35. The NTA argues that in order to keep spectrum from lying fallow, the Commission should wait to displace translators until a winning forward auction bidder is in a position to build out and make use of the spectrum that is reallocated through the incentive auction process. NTA Reply Comments at 3.

[1889] AT&T Reply Comments at 36-37.

[1890] *See, e.g.*, CTIA Reply Comments at 59-62; NTCA Comments at 6.

[1891] We will work with the TV bands database administrators to develop procedures to implement this decision in a manner similar to how we protect wireless microphone operations over a specified geographic area. Specifically, the TV bands database could include the coordinates of four corners of a polygon that corresponds to the area where the 600 MHz Band licensee has commenced service, and prohibit operation of TVWS devices on the channel(s) used by the licensee within the defined area.

[1892] T-Mobile Reply at 99.

[1893] The Office of Engineering and Technology has delegated authority to oversee the TV bands database administrators. *See* 47 C.F.R. § 0.241(h).

[1894] *See* § III.D.3 (Low Power Auxiliary Stations and Unlicensed Wireless Microphones).

transition many of their operations to other spectrum bands.[1895] Accordingly, we will allow wireless microphone operations in the post-auction television bands, 600 MHz Band guard bands, and the 600 MHz Band spectrum repurposed for wireless services during the post-auction transition, as discussed below. The transition period will be helpful in addressing the important needs of wireless microphone users in the near term as future technologies are developed for accommodating their needs through a combination of more efficient use of post-auction television band spectrum as well as use of spectrum outside of the current UHF television band. As we also discussed above, we will be initiating a proceeding to address additional steps we can take help accommodate the needs of wireless microphone users outside of the UHF television band following the post-auction transition and over the long term.[1896]

683. *Operations in the Post-Auction Television Bands.* As discussed in Section III.D.3 above, licensed LPAS and unlicensed wireless microphone operations may continue to operate on available unused television channels under the revised rules for co-channel operations.[1897] We note that, with the post-auction transition and the repacking of television stations (including relocated full power stations, LPTV, and BAS), the particular channels available for wireless microphone users may change, and these users will need to adjust their operations accordingly. In addition, we intend to designate one television channel following the auction for shared use by wireless microphones and TVWS devices, and note that on any of the television channels available for TVWS devices, wireless microphone users can obtain protection from interference from TVWS devices by registering in the TV bands databases.

684. *Operations in the 600 MHz Band Guard Bands*. As discussed in Section III.D.3.b, we also will allow wireless microphone users to operate on the spectrum established for 600 MHz Band guard bands (including the duplex gap) to the extent that those channels are available for use under the revised separation distance rules for co-channel operation with TV broadcast stations.[1898] Wireless microphone users generally will be permitted to operate on an unlicensed basis in the guard bands, while broadcasters and cable programming networks operating wireless microphones on a licensed basis will be permitted to obtain interference protection from unlicensed devices in a portion of the duplex gap at specified times and locations, on an as-needed basis. Wireless microphone use in the guard bands will be subject to any rule revisions that the Commission later adopts in the planned 600 MHz and TVWS Part 15 Proceeding, which will develop rules for unlicensed and other low power operations in the guard bands that protect licensed operations outside of the guard bands.

685. *Operations on Unused Television Channels Currently Designated for Wireless Microphones.* As discussed above, given the repacking of the television bands and repurposing of spectrum in the 600 MHz Band that will follow the incentive auction, we will no longer continue to designate up to two unused television channels in any area exclusively for wireless microphone operations, although we do intend to designate one unused television channel for shared use by wireless microphone and TVWS devices.[1899] To help ensure that licensed wireless microphone operators can obtain access to available television channels they need free of interference from TVWS devices, in our planned 600 MHz and TVWS Part 15 Proceeding, we will be seeking comment on ways we can update the rules for TV bands databases to provide for more immediate reservation of unused and available

[1895] Shure et. al. Feb. 10, 2014 *Ex Parte* Letter at 2–3.

[1896] *See* § III.D.3.c (Long-Term Needs of Wireless Microphone Users).

[1897] *See* § III.D.3 (Low Power Auxiliary Stations and Unlicensed Wireless Microphones). We also note that wireless assist video devices, which are authorized under the Part 74, Subpart H rules, may continue to operate in the post-auction television bands under existing rules. *See* 47 C.F.R. §§ 74.801; 74.870.

[1898] We will not permit wireless assist video devices, which are only authorized on a licensed basis and operate pursuant to technical rules that differ from those applicable to wireless microphones and other low power auxiliary stations, in the guard bands. *See* 47 C.F.R § 74.870.

[1899] *See* §§ III.C.2.a (Television Bands), III.D.3.a (Television Bands).

channels in the television bands.[1900] However, for some period of time following the incentive auction, the two channels currently available exclusively for wireless microphones may, depending on the particular location, continue to be unused by either broadcasters or 600 MHz Band licensees. To the extent that one or both of these channels remain available for wireless microphones in particular locations, we will continue to prohibit TVWS devices from operating on these channels until the Commission's rules to improve our TV bands database registration process (providing for more immediate protection from interference by TVWS devices) become effective. After that time, any available channels could be used by either wireless microphones or TVWS devices.

686. *Operations in the 600 MHz Band*. Several commenters request that the Commission determine the extent to which wireless microphone users may continue to operate in the spectrum that will be repurposed during the post-auction transition. We agree with those commenters recommending that we allow wireless microphone operations to continue in the repurposed spectrum during the transition.[1901] Winning forward auction bidders will not have been granted their 600 MHz Band licenses immediately following the incentive auction, and may not commence operations for some period of time. In addition, as wireless microphone users and manufacturers point out, many wireless microphone users have recently incurred substantial costs associated with buying new UHF band wireless microphone equipment following their relocation outside of the 700 MHz Band.[1902] Thus, we disagree with commenters who argue that wireless microphone users should be cleared from the repurposed spectrum no later than the date of the incentive auction.[1903] We find that during the Post-Auction Transition Period the public interest will be served by allowing wireless microphone operations in the repurposed spectrum.

687. We will permit wireless microphone users to continue to operate in the 600 MHz Band during the Post-Auction Transition Period subject to certain conditions designed to protect the 600 MHz licensees' primary rights to make full use of their licensed spectrum. Specifically, for this transition period, to the extent that either licensed LPAS or unlicensed wireless microphone users operate in the 600 MHz Band, consistent with their secondary or unlicensed status they will not be entitled to any interference protection from operations of the primary 600 MHz licensees. We also require that wireless microphone users cease any operations in the 600 MHz Band if their operations cause harmful interference to any 600 MHz licensee's operations. Finally, we establish a hard date by which all wireless microphone operations must be transitioned out of the 600 MHz Band, requiring that all such operations cease no later than the end of the Post-Auction Transition Period (i.e., 39 months after the issuance of the *Channel Reassignment PN*).[1904] We find that establishing a hard date by which all licensed and unlicensed microphone operations must cease operations provides needed certainty and clarity that wireless microphone operators cannot continue operations in spectrum assigned to wireless licensees and helps ensure that wireless providers can operate without interference.[1905]

[1900] *See* § III.D.3.a (Television Bands).

[1901] *See, e.g.*, Sennheiser Reply at 18-19.

[1902] *See, e.g.*, NYSBA Comments at 23-24; Performing Arts Comments at 4-5; SBE Comments at 4; TV Programmers Reply at 11; Shure et. al. Feb. 10, 2014 *Ex Parte* Letter.

[1903] *See, e.g.*, CTIA Comments at 42-44; Verizon Comments at 69-70; CTIA Reply at 59-62; Ericsson Reply at 33.

[1904] Similarly, we are requiring that wireless assist video devices cease operations in the 600 MHz Band no later than the end of the post-auction transition. During the transition, such operations are permitted on a secondary basis, they are not entitled to interference protection from operations of primary 600 MHz band licensees, and operations must cease operations if they cause in they cause harmful interference to operations of 600 MHz Band licensees.

[1905] *See generally Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band,*WT Docket No. 08-166, Report and Order and Further Notice of Proposed Rulemaking,, 25 FCC Rcd 643, 665-66, para. 42 (2010) (establishing a hard date by which time all wireless microphone operations must cease operations in the 700 MHz Band licensed for wireless broadband; the spectrum in this band was being transitioned from broadcast service to wireless broadband).

688. In taking these actions, we seek to accommodate the needs of wireless microphone users in the near term, providing some necessary time for transitioning operations out of the repurposed 600 MHz Band, while we protect the primary rights of 600 MHz licensees. Considering the various types of wireless microphone users, and the various types of wireless microphone devices in use today (including devices that can only operate on particular frequencies in the UHF band), some time is needed in order to obtain new equipment and transition wireless microphone users off of the frequencies that are being repurposed for 600 MHz Band service, whether to other available frequencies in the UHF band (i.e., the post-auction television bands or the 600 MHz Band guard bands) or to spectrum outside of the UHF band. And, as discussed above, we are initiating a proceeding to help accommodate the needs of wireless microphone users through use of additional spectrum outside of the 600 MHz Band.[1906]

VI. POST-TRANSITION REGULATORY ISSUES

A. Broadcast Issues

689. We adopt in this Section adjustments to some of the licensing, operational, and technical rules applicable to broadcasters as a result of the incentive auction and the repacking process. Specifically, we adopt a grandfathering policy for certain existing station combinations that otherwise would violate the Commission's media ownership rules after the conclusion of the reverse auction. We also address our ongoing efforts to promote ownership diversity among broadcast licensees. In addition, we adopt technical and operational rules that will apply to stations that enter into channel sharing agreements.

1. Media Ownership Rules and Diversity

a. Media Ownership Rules

690. *Background*. The Commission's media ownership rules include limits on the common ownership of commercial full power television stations, as well as the cross-ownership of such stations with other media outlets.[1907] The acceptance of bids in the reverse auction may reduce the number of broadcast television stations in a market or result in changes in stations' contours or frequency bands, which in turn may cause some existing station combinations to become non-compliant with the media ownership rules.[1908] The Commission proposed in the *NPRM* to grandfather existing station combinations that otherwise would no longer comply with the media ownership rules as a result of the auction.[1909]

691. *Discussion*. We will grandfather existing station combinations previously approved by the Commission that otherwise would no longer comply with the media ownership rules as a result of the reverse auction.[1910] Absent a waiver of the rules, however, we will not accept channel sharing bids in the

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[1906] *See* § III.D.3.c (Long-Term Needs of Wireless Microphone Users).

[1907] These rules include the local television ownership rule, the newspaper/broadcast cross-ownership rule, and the radio/television cross-ownership rule. 47 C.F.R. §§ 73.3555(b)–(d). In some cases, these rules are based on the number of stations in the relevant market and, in some cases, they are triggered by contour overlap between commercial full power television stations or between such stations and other media outlets. Our rules also include a limit on the percentage of television households that a single owner of commercial television stations may reach nationwide. *See* 47 C.F.R. § 73.3555(e).

[1908] *NPRM,* 27 FCC Rcd at 12474, para. 356.

[1909] *Id.*

[1910] *See Review of the Commission's Regulations Governing Television Broadcasting*, MM Docket No. 91-221, Report and Order, 14 FCC Rcd 12903, 12932–33, para. 64 (1999) (*1999 Broadcast Ownership Order*) (holding that, if an entity acquires a duopoly under the Commission's current local television ownership rule, "it will not later be required to divest if the number of operating television voices within the market falls below eight or if the two merged stations subsequently are both ranked among the top four stations in the market; however, a duopoly may not automatically be transferred to a new owner if the market does not satisfy the eight voice/top four-ranked standard"). Further, as Verizon notes, "[i]n creating a one-time market-based mechanism for broadcast licensees to

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reverse auction that would cause a media ownership rule violation by a party to the channel sharing arrangement based on the rules and facts as they exist at the time the application to participate in the auction is filed.[1911] Such a violation potentially could be caused by the relocation of a sharee station if the contour of the station newly overlaps or encompasses any other media outlets in which the licensee of the station has an attributable ownership interest. Because the licensee in this situation would exercise control over the triggering of a potential violation of our rules and because the licensee would have the ability to determine prior to the auction that such a violation would occur, grandfathering would be inappropriate and contrary to the public interest. We do not believe this limitation on grandfathering will unduly discourage reverse auction participation. In addition, we agree with commenters that it is appropriate to keep our grandfathering policy simple to avoid unnecessary disruption to the broadcast industry.[1912]

692. We reject arguments that grandfathering should not be permitted because it would "irreparably harm" ownership diversity.[1913] While we acknowledge concerns about the potential impact of the auction on broadcast ownership diversity, we conclude that grandfathering existing combinations that have been approved by the Commission is justified in these unique circumstances. The Commission structures transitional procedures as appropriate in light of the specific rule changes at issue, whether the changes could have been anticipated when the combinations were acquired, reliance on existing rules, and the nature and degree of disruption that would be caused by requiring immediate divestitures."[1914]

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exit the market entirely through the reverse auction, Congress necessarily understood that there would be fewer broadcasters in many markets, which could place the remaining stations in violation of ownership rules." Verizon Comments at 31–32. Combinations that have not been previously approved by the Commission, including the ownership of a television station combined with a daily newspaper or the operation of an attributable local marketing agreement or joint sales agreement**,** will not be similarly grandfathered.

[1911] Specifically, we will not accept channel sharing bids that would trigger a violation of the local television multiple ownership rule, the newspaper/broadcast cross-ownership rule, or the radio/television cross-ownership rule by a channel sharing partner. We will accept reverse auction bids that would trigger a violation of the national television multiple ownership rule, which limits a broadcaster's national audience reach to 39 percent, subject to a "UHF Discount" attributing only 50 percent of the TV households in a DMA to UHF stations. *See* 47 C.F.R. § 73.3555(e); *see also Amendment of Section 73.3555(e) of the Commission's Rules, National Television Multiple Ownership Rule*, MB Docket No. 13-236, Notice of Proposed Rulemaking, 28 FCC Rcd 14324 (2013) (proposing elimination of the UHF discount). Successful UHF-to-VHF or channel sharing bids could lead owners to lose the UHF discount for certain stations, resulting in violations of the national cap. To avoid discouraging UHF stations from moving to the VHF band, any existing station groups that become non-compliant with the national cap as a result of a successful bid or bids in the reverse auction will be grandfathered.

[1912] LIN Comments at 8; *see also* Tribune Comments at 23 (supporting grandfathering of existing ownership combinations).

[1913] Leadership Conference Comments at 4; NHMC Comments at 7.

[1914] *See, e.g.*, *Amendment of Sections 73.34, 73.240, and 73.636 of the Commission's Rules Relating to Multiple Ownership of Standard, FM, and Television Broadcast Stations*, Docket No. 18100, Second Report and Order, 50 FCC 2d 1046, 1080, para. 112 (1975) (grandfathering existing daily newspaper and television or radio combinations except where the Commission found unacceptable levels of concentration); *2002 Biennial Regulatory Review – Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996*, MB Docket No. 02-277, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 13620, 13808-10, paras. 484-487 (2003) (grandfathering existing combinations of broadcast stations that exceeded the modified local radio and local television ownership rules); *2014 Quadrennial Regulatory Review*, *Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996 et al.,* MB Docket No. 14-50, Further Notice of Proposed Rulemaking and Report and Order, FCC 14-28 (rel. Apr. 15, 2014) (two-year transition period for attributable television JSAs where parties had long been on notice of attribution proposal and transition period gave them time to unwind agreements) (*2014 Quadrennial FNPRM*).

Broadcasters have made substantial long-term investments in their station combinations in reliance on Commission approval of their station acquisitions and our multiple ownership rules. It would be inequitable if owners of existing combinations were negatively affected if circumstances that they could not have anticipated and could not control subsequently change such that the combination no longer complies with the rules. For similar reasons, we reject NHMC's proposal that we review every combination "on a case-by-case basis, upon completion of the auction process" to assess whether the combination serves the Commission's public interest goals, including promoting ownership diversity, in the post-auction environment.[1915] NHMC's proposal would undermine the certainty regarding the auction and the repacking processes that is critical to the overall success of the incentive auction.[1916]

693. Upon the sale of a grandfathered station combination, we will require the new owner to comply with the media ownership rules in place at the time of the transaction or obtain a waiver. We reject Tribune's proposal to allow grandfathered combinations to be sold intact because it is inconsistent with prior FCC practice, and we are not persuaded that we should depart from our current policy here.[1917]

b. Diversity of Media Ownership

694. *Background*. In the *NPRM*, the Commission invited comment on measures that could be taken outside the context of the media ownership rules to address any impact on diversity that may result from the incentive auction.[1918] Several commenters raise concerns about the potential effect of the reverse auction and repacking process on minority and female owners of broadcast television stations, which historically have been underrepresented in the broadcasting industry.[1919] NHMC and Leadership Conference assert that the reverse auction could lead to a substantial decrease in the number of stations owned by minorities and women.[1920] They recommend that the Commission conduct extensive outreach to small and mid-sized television broadcasters, including those that are minority or female owned, to ensure that they are fully informed about the auction and "do not feel compelled to exit broadcasting because of misinformation" about the auction process.[1921] These commenters also emphasize that the

[1915] NHMC Comments at 7.

[1916] *See* § III.B.3 (Facilities to Be Protected).

[1917] Tribune Comments at 24; *see 1999 Broadcast Ownership Order*, 14 FCC Rcd at 12932–33, para. 64 (holding that a "duopoly may not automatically be transferred to a new owner if the market does not satisfy the eight voice/top four-ranked standard").

[1918] *NPRM*, 27 FCC Rcd at 12474–75, para. 357.

[1919] *See Promoting Diversification of Ownership in the Broadcasting Services*, MB Docket No. 07-294, Report and Order and Third Further Notice of Proposed Rulemaking, 23 FCC Rcd 5922, 5924, para. 1 (2008); *Policies and Rules Regarding Minority and Female Ownership of Mass Media Facilities*, MM Docket Nos. 91-140, 94-149, Notice of Proposed Rulemaking, 10 FCC Rcd 2788, 2789, para. 5 (1995) ("[D]espite the Commission's efforts to increase minority ownership of broadcast and cable facilities, minorities today remain significantly underrepresented among mass media owners.").

[1920] *See* NHMC Reply at 4–5; Leadership Conference Comments at 4. They argue that minority and female broadcasters often face significant competitive challenges and financial difficulties that may make them especially likely to exit the market through the reverse auction. NHMC Comments at 3; Leadership Conference Comments at 4. Leadership Conference further claims that "licensees who are women or people of color will face intense pressure to participate in the reverse auction." Leadership Conference Comments at 4; *see also* NHMC Comments at 4.

[1921] Leadership Conference Comments at 5; *see also* NHMC Comments at 5. Some commenters also express concern that the reverse auction and the repacking process could reduce opportunities for LPTV stations and thereby adversely impact traditionally underserved viewers. *See, e.g.*, UVM Reply at 16–18; NHMC Reply at 5–6; Signal Above Comments at 4; Leadership Conference Comments at 5; ICN Comments at 2. We discuss actions we are taking to mitigate the potential impact on LPTV stations above. *See* § V.D.1 (LPTV and TV Translator Stations).

Commission should not restrict minority or female owners from participating in the auction.[1922]

695. *Discussion*. As an initial matter, we emphasize that all qualified broadcasters will have an opportunity to enter the reverse auction. Consistent with the Spectrum Act, auction participation will be voluntary: no broadcasters will be compelled to participate.[1923] We concur with commenters about the importance of outreach regarding the incentive auction to broadcasters, including those owned by minorities or females. As noted above, we have conducted numerous workshops and other direct outreach efforts to help broadcasters, including those that are minority- or female-owned, make informed business decisions about whether and how to participate in the reverse auction.[1924] As broadcast representatives have emphasized repeatedly, access to capital is an ongoing challenge for minority and female broadcasters.[1925] Voluntary participation in the reverse auction, via a channel sharing, UHF-to-VHF, or high-VHF-to-low-VHF bid, offers a significant and unprecedented opportunity for these owners to raise capital that may enable them to stay in the broadcasting business and strengthen their operations. We consider fostering minority and female ownership of broadcast stations an important goal, and our efforts to promote such ownership will continue after the auction and the repacking process.[1926]

696. We reject suggestions to assess the impact of the auction on minority and female ownership levels by collecting from all auction participants the same ownership information we already collect through our biennial ownership report forms.[1927] Although measuring the impact of the auction on broadcast ownership diversity is important, the additional data collection efforts proposed would replicate

[1922] *See* NHMC Comments at 3; NHMC Reply at 2; Leadership Conference Comments at 5 (stating that it "strongly believe[s] that all eligible broadcast licensees should be allowed to participate in the reverse auction").

[1923] *See, e.g.*, Spectrum Act § 6403(a)(1) (providing for voluntary reverse auction participation).

[1924] *See* n.8; *see also* Letter from James L. Winston, Executive Director and General Counsel, NABOB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Jan. 8, 2013); Letter from James L. Winston, Executive Director and General Counsel, NABOB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Jan. 24, 2013) (NABOB Jan. 24, 2013 *Ex Parte* Letter); Letter from James L. Winston, Executive Director and General Counsel, NABOB, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed June 24, 2013) (NABOB June 24, 2013 *Ex Parte* Letter).

[1925] *See* NABOB Jan. 24, 2013 *Ex Parte* Letter; NABOB June 24, 2013 *Ex Parte* Letter; Leadership Conference Comments at 7.

[1926] For example, the Commission continues to refine and improve its collection and analysis of broadcast ownership information to improve its understanding of ownership diversity. *See Promoting Diversification of Ownership in the Broadcasting Services*, MB Docket No. 07-294, Report and Order and Fourth Further Notice of Proposed Rulemaking, 24 FCC Rcd 5896, 5910–5911, paras. 27, 30 (2009) (*Diversity Fourth FNPRM*), *recon. granted in part*, Memorandum Opinion and Order and Fifth Further Notice of Proposed Rulemaking, 24 FCC Rcd 13040 (2009) (*Diversity Fifth FNPRM*) (seeking comment on modifications to Form 323-E to gather race, ethnicity, and gender ownership data for noncommercial broadcast stations, including low-power FM); *Diversity Fifth FNPRM*, 24 FCC Rcd at 13047, para. 16 (seeking comment on whether to expand reporting to include certain non-attributable interests); *Promoting Diversification of Ownership in the Broadcasting Services*, MB Docket No. 07-294, Sixth Further Notice of Proposed Rulemaking, 28 FCC Rcd 461, 461–463, paras. 1–3 (2013) (seeking comment on whether to require a unique identifier generated by the Commission's Registration System for each attributable individual among other things); *2014 Quadrennial FNPRM*, FCC 14-28, at para 244 (seeking comment on "ways to expand the participation of minorities and women in the broadcast industry" and "specific measures . . . that may provide further opportunities for minorities and women to own and operate broadcast outlets").

[1927] *See* NHMC Comments at 6; NHMC Reply at 2–3; Leadership Conference Comments at 5. According to these commenters, the Commission then could use this information to inform subsequent quadrennial reviews of broadcast ownership rules or other diversity-related initiatives. *See* Leadership Conference Comments at 5; NHMC Comments at 6.

existing efforts and thus impose an unnecessary burden.[1928]

2. Channel Sharing Operating Rules

697. *Background*. The FCC previously adopted a general framework for channel sharing in connection with the incentive auction.[1929] Among other things, it required channel sharing agreements ("CSAs") to contain a provision requiring that each channel sharing licensee retain spectrum usage rights adequate to ensure access to enough shared channel capacity to allow it to provide at least one Standard Definition ("SD") program stream at all times.[1930] The Commission also concluded that (1) NCE licensees must structure their channel sharing arrangements to ensure compliance with NCE rules; and (2) reserved channel NCE licensees that move to a non-reserved channel as part of a channel sharing arrangement must continue to operate on an NCE basis.[1931]

698. The Commission sought comment on a number of additional channel sharing issues in the *NPRM*.[1932] Specifically, the Commission asked whether it should require CSAs to include provisions delineating each station's rights and responsibilities with respect to key aspects of the channel sharing arrangement.[1933] The Commission also sought comment on how to relicense the spectrum usage rights of a channel sharing licensee in the event that its license is terminated.[1934] In addition, it asked whether channel sharing stations should be held individually or jointly responsible for compliance with certain technical obligations.[1935] The Commission also sought input on any additional conditions that should apply to NCE stations participating in channel sharing arrangements,[1936] issues related to channel sharing between full power and Class A stations,[1937] and the cable and satellite carriage rights of channel

[1928] Our required biennial ownership reports provide extensive information about the ownership structure of each commercial broadcast licensee, including information about minority and female ownership status. The collection of data biennially and the use of a uniform "as of" date give the Commission successive "snapshots" of the status of minority and female ownership in the industry on a fixed, periodic schedule. This information provides a basis for analyzing ownership trends within the broadcast industry. *See 2010 Quadrennial Regulatory Review – Review of the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act of 1996,* MB Docket No. 09-182, Report on Ownership of Commercial Broadcast Stations, 27 FCC Rcd 13814, 13814, para. 1 (2012). The Commission also has sought comment on whether to require NCE stations to submit gender and minority ownership information. *See Diversity Fourth FNPRM*, 24 FCC Rcd at 5910, para. 27.

[1929] *See Channel Sharing Report and Order*, 27 FCC Rcd at 4621–25, paras. 11–18.

[1930] *See id*. at 4624, para. 15; *see also* 47 C.F.R. § 73.3700(b)(3).

[1931] *See Channel Sharing Report and Order*, 27 FCC Rcd at 4628–29, para. 24.

[1932] *NPRM*, 27 FCC Rcd at 12477–80, paras. 362–72.

[1933] *Id.* at 12477, paras. 363–65.

[1934] *Id.* at 12478, para. 366–67.

[1935] *Id.* at 12478–12479, paras. 368–69.

[1936] The Commission specifically sought comment on issues that may arise when an NCE station operating on a reserved channel enters into a channel sharing agreement with a commercial station or an NCE station operating on a non-reserved channel. *Id.* at 12479, para. 370. As explained in the *NPRM*, there currently are two options for stations to operate on an NCE basis. They may broadcast on a channel reserved in our Table of Allotments exclusively for NCE use, or they may provide a noncommercial educational service on a channel that is not reserved for NCE use. *Id.* at 12479, para. 370 n.559 (citing 47 U.S.C. § 399b; *Reexamination of Comparative Standards for Noncommercial Educational Applicants*, MM Docket No. 95-31, Further Notice of Proposed Rulemaking, 13 FCC Rcd 21167, 21168, para. 2 (1998)). In either case, in order to maintain NCE status, the NCE licensee must remain a nonprofit educational organization or municipality and comply with NCE requirements, including that the station "be used primarily to serve the educational needs of the community; for the advancement of educational programs; and to furnish a nonprofit and noncommercial television broadcast service." 47 C.F.R. § 73.621(a), (b).

[1937] *NPRM*, 27 FCC Rcd at 12480, paras. 371–72.

sharees.[1938]

699. *Discussion.* We will require all CSAs to include certain key provisions.[1939] Specifically, in addition to the existing requirement regarding access to shared channel capacity,[1940] we adopt our proposal in the *NPRM*[1941] that CSAs must contain provisions outlining each licensee's rights and responsibilities in the following areas: (1) access to facilities, including whether each licensee will have unrestrained access to the shared transmission facilities; (2) allocation of bandwidth within the shared channel; (3) operation, maintenance, repair, and modification of facilities, including a list of all relevant equipment, a description of each party's financial obligations, and any relevant notice provisions; and (4) termination or transfer/assignment of rights to the shared licenses, including the ability of a new licensee to assume the existing CSA.[1942] While channel sharing partners will be required to address these matters in their CSAs, they may craft provisions as they choose, based on marketplace negotiations,[1943] subject to pertinent statutory requirements and the Commission's rules and regulations.[1944] CSAs also must include a provision affirming compliance with the channel sharing requirements in this Order, the *Channel Sharing Report and Order*, and our rules.[1945] We reserve the right to review CSA provisions and require modification of any that do not comply with these requirements or the Commission's rules.

700. Channel sharing will create new and complex relationships between television stations. Although stations have been sharing towers, studios, and transmission facilities for many years, they

[1938] *Id.* at 12480, para. 372.

[1939] The requirements will apply to all CSAs, including any that may have been executed before the release of this Order. We note that the Commission previously put licensees on notice that it would be adopting additional requirements for CSAs in a future proceeding. *See Channel Sharing Report and Order*, 27 FCC Rcd at 4261–63, paras. 11, 13.

[1940] *See* 47 C.F.R. § 73.3700(b)(3) (requiring each CSA to contain a provision ensuring that each channel sharing licensee "retain spectrum usage rights adequate to ensure a sufficient amount of shared channel capacity to allow it provide one SD program stream at all times").

[1941] *See NPRM*, 27 FCC Rcd at 12477–78, paras. 363–65. No commenter provided input on these specific proposals.

[1942] Any rights of first refusal included in a CSA would have to be consistent with our media ownership rules and any other Commission rules and policies. *See* 47 C.F.R. § 73.1150(a) (prohibition on retention of reversionary interests).

[1943] *See* PTV Comments at 18.

[1944] We do not anticipate being involved in any disputes between channel sharing stations to the extent that such disputes are not directly related to compliance with the Communications Act or applicable Commission policies and rules. We expect that any disputes concerning the terms and conditions of the CSA, including those that are directly related to compliance with the Communications Act or our rules, would be handled in the first instance by the channel sharing stations as a private contractual enforcement matter and that we would independently determine if additional regulatory enforcement steps would be warranted. *See Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, WT Docket No. 00-230, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 20604, 20613, para. 7 (2003) (*Secondary Markets First R&O*).

[1945] As set forth above, on submission of an application to participate in the reverse auction, channel sharing parties must file an executed copy of their CSA and certify that it contains provisions addressing the aforementioned matters. *See* § IV.B.1.e (Information and Certifications Required in Application to Participate). As with any document filed with the Commission, parties may seek confidential treatment. *See* 47 C.F.R. § 0.459. In addition, the Commission will take reasonable steps to keep CSAs confidential pursuant to its statutory obligation during the relevant time periods applicable to successful and unsuccessful reverse auction bids. *See* § IV.B.1.c (Confidentiality and Prohibition of Certain Communications).

never before have been licensed to a shared channel.[1946] The provisions we are requiring in CSAs concern the issues most likely to lead to disagreements between channel sharing stations. By requiring stations to address these issues in their CSAs, we seek to avoid disputes that could lead to a disruption in service to the public and to ensure that each licensee is able to fulfill its independent obligation to comply with all pertinent statutory requirements and our rules. At the same time, the FCC ordinarily does not involve itself in private contractual agreements, and we do not wish to discourage channel sharing relationships.[1947] The approach we adopt will protect the public interest and ensure the success of channel sharing with minimal intrusion into channel sharing relationships.

701. *Termination and Assignment/Transfer of Channel Sharing Licenses*. Should a channel sharing station's license be terminated due to voluntary relinquishment, revocation, failure to renew, or any other circumstance, the remaining channel sharing station or stations will continue to have rights to their portion(s) of the shared channel.[1948] The rights to the terminated portion of the shared channel will revert to the Commission for reassignment.[1949] We will condition the final award of the rights to the terminated portion of the shared channel on the new channel sharing licensee agreeing to the terms of the existing CSA. If the new channel sharing licensee and the remaining channel sharing station(s) agree to renegotiate the terms of the existing CSA, the agreement may be amended, subject to Commission approval. If the negotiations to amend the agreement are unsuccessful, the remaining station or stations may continue to operate while the channel remains a "shared" allocation and subject to reassignment.[1950]

[1946] As PTV argues, "[w]ith respect to certain limited issues, . . . public interest considerations may require some baseline requirements to ensure that one channel sharing participant's actions would not unduly disrupt viewers' ability to continue receiving the broadcast television services of other stations." PTV Comments at 18. PTV further claims that the Commission must "take steps to make channel sharing arrangements a viable option for stations to continue their broadcast television station operations, rather than a house of cards that unexpectedly falls apart months, or even years, into the arrangement to the unfair disadvantage of an innocent party." *Id*.

[1947] *See NPRM*, 27 FCC Rcd at 12477, para. 363. We note that the Commission's rules concerning stations operating on a "time sharing" basis require that certain provisions be included in the relevant contract to ensure the most efficient use of the spectrum. *See* 47 C.F.R. §§ 73.561(b)(1), 73.1715(a). The Commission also has provided guidance in other contexts regarding the permissibility of certain types of contractual provisions or relationships. *See, e.g., Network Affiliated Stations Alliance Petition for Inquiry into Network Practices and Motion for Declaratory Ruling*, Declaratory Ruling, 23 FCC Rcd 13610 (2008) (declaratory ruling of certain principles related to television network/affiliate contracts); *Use of the Frequencies in the Instructional Television Fixed Service*, MM Docket No. 93-106, Report and Order, 9 FCC Rcd 3360 (1994) (providing guidance on contractual arrangements to "channel load" requisite programming to a single channel); *Instructional Television Fixed Service*, *the Multipoint Distribution Service, and the Private Operational Fixed Microwave Service,* GN Docket No. 80-112, Report and Order, 94 FCC 2d 1203 (1983) (providing guidance on contractual arrangements to lease unused transmission time).

[1948] These rights are consistent with the existing rule that channel sharing stations continue to be treated as separate licensed stations. *See* 47 C.F.R. § 73.3700(a); *Channel Sharing Report and Order*, 27 FCC Rcd at 4624, para. 16. As set forth above, the licenses of channel sharing stations will be modified post-auction to reflect their shared status. *See* § V.C.1 (License Modification Procedures). In addition, shared channels permanently will be designated as shared in the Table of Allotments, absent a future rulemaking proceeding to redesignate the channel for non-shared use. Therefore, CSAs may not contain any provision that would seek to dissolve or modify the shared nature of the channel because such a provision would violate the Commission's rules. Likewise, CSAs may not contain provisions permitting one licensee to retain any reversionary interest in another licensee's portion of the shared channel. *See* 47 C.F.R. § 73.1150 (prohibition on retention of reversionary interests).

[1949] In such circumstances, the remaining licensees that are parties to the channel sharing agreement in question may participate in the auction or comparative selection process, if otherwise eligible.

[1950] We recognize that, in practice, very few television licenses are terminated, but it is important to clarify our rules so that stations considering a channel sharing bid in the reverse auction can factor them into their channel sharing negotiations. A Class A licensee that fails to meet the ongoing statutory eligibility requirements to maintain its Class A status is subject to modification of its license to LPTV status. *See*, *e.g., Reclassification of License of Class A Television Station WGSA-CA, Savannah, Georgia*, Order to Show Cause, 27 FCC Rcd 2544 (2012). A Class A

(continued….)

We will allow rights under a CSA to be assigned or transferred, subject to the requirements of section 310 of the Communications Act,[1951] our rules, and the requirement that the assignee or transferee comply with the applicable CSA.[1952] We agree with CIT that allowing such assignments "will allow the marketplace to freely facilitate the efficient implementation of the incentive auctions program."[1953]

702. *Joint Responsibility for Compliance with FCC Rules.* We decline to adopt a rule that would make channel sharing licensees jointly responsible for compliance with specific rules. As stated above, we previously determined that each channel sharing station is independently subject to all of the Commission's rules, including technical, operational, and programming obligations.[1954] We received no comment in response to the inquiry in the *NPRM* regarding whether requiring joint responsibility with respect to certain technical requirements is necessary or appropriate, and the record in this proceeding does not support a change to our existing policy.[1955]

703. *Reserved-Channel NCE Sharing Stations*. We adopt rules to govern NCE stations operating on reserved channels that choose to channel share.[1956] Specifically, we adopt the proposal in the *NPRM* that an NCE licensee operating on a reserved channel, whether it relinquishes its channel in order to share a non-reserved channel or agrees to share its reserved channel with a commercial station, will retain its NCE status and must continue to comply with the rules applicable to NCE licensees.[1957] In either case, the NCE station's portion of the shared channel (which, at a minimum, must enable the broadcast of one SD programming stream) will continue to be reserved for NCE-only use.[1958] Further, as

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station whose license is modified to LPTV status no longer would be entitled to channel share, because channel sharing is permitted only between full power stations, between Class A stations, and between full power and Class A stations. *See Channel Sharing Report and Order*, 27 FCC Rcd at 4626–27, paras. 19–20; 47 C.F.R. § 73.3700(b)(1). Under these circumstances, the rights to the portion of the shared channel that are lost by a downgraded Class A station will be reassigned by the Commission. We will allow a Class A channel sharing station that loses its Class A eligibility to file a displacement application to move to another channel as an LPTV station.

[1951] 47 U.S.C. § 310.

[1952] The assignee or transferee must agree to the terms of the CSA in existence at the time of the transfer or assignment, unless the assignee/transferee and the remaining sharing station(s) agree to amend the CSA and the amendment is approved by the Commission. *See* CIT Comments at 7; PTV Comments at 18.

[1953] CIT Comments at 7.

[1954] *Channel Sharing Report and Order*, 27 FCC Rcd at 4624, para. 16; 47 C.F.R. § 73.3700(a).

[1955] *See NPRM*, 27 FCC Rcd at 12478-79, paras. 368–69. Accordingly, in the event that there is a potential or actual violation of any of our technical, operational, or programming rules with respect to a channel sharing station, the Commission will take any necessary enforcement actions, such as issuing a notice(s) of apparent liability for forfeiture, to the individual licensee(s) participating in the channel sharing arrangement alleged to have violated our rules.

[1956] These rules will not apply to a channel sharing station that has elected to operate as an NCE station, but that is licensed to a non-reserved channel. As noted in the *NPRM*, we do not believe we need special rules related to channel sharing between a non-reserved channel NCE station and a commercial station, given our requirement that each station must continue to abide by the terms of its separate license after implementation of the channel sharing arrangement. *See NPRM*, 27 FCC Rcd at 12479, para. 370 n.559 (citing *Channel Sharing Report and Order*, 27 FCC Rcd at 4628–29, para. 24).

[1957] *NPRM*, 27 FCC Rcd at 12479–80, para. 370.

[1958] In addition, we note that, although an NCE licensee may channel share with a commercial licensee, it must continue to satisfy the obligation set forth in § 73.621 of our rules to "be used primarily to serve the educational needs of the community; for the advancement of educational programs; and to furnish a nonprofit and noncommercial television broadcast service." 47 C.F.R. § 73.621(a). In addition, because NCE licensees are prohibited from broadcasting advertisements, NCE stations that participate in channel sharing agreements will be prohibited from broadcasting advertisements on their portion of a shared channel. 47 U.S.C. § 399b(b)(2).

proposed in the *NPRM*,[1959] a reserved-channel NCE sharing station may assign its license only to a qualified NCE entity.[1960] Similarly, if a reserved-channel NCE sharing station's license is relinquished or terminated, only another entity meeting the NCE eligibility criteria will be considered for reassignment of the license.[1961]

704. In adopting these rules, we seek to ensure that we continue to reserve adequate NCE channel space in light of our previous decision to permit channel sharing between reserved-channel NCE stations and commercial stations.[1962] The existence of reserved channels in the Table of Allotments ensures a nationwide distribution of NCE stations, and in order to preserve this distribution, commercial stations generally may not operate on reserved channels.[1963] As APTS/CPB notes, historically, the Commission has denied requests to delete reserved channels, principally in order to preserve the future availability of such channels.[1964] We agree with APTS/CPB that NCE "[s]tations should have the flexibility to enter into channel sharing arrangements with commercial stations, as long as the Commission ensures that these arrangements do not result in the dereservation of a noncommercial educational station's channel consistent with the Commission's longstanding policy against de-reservation."[1965]

705. *Class A/Full Power Sharing Agreements*. We adopt rules governing the power levels at which stations may operate and the applicable MVPD carriage rights when both a full power and a Class A station participate in a channel sharing agreement. The Part 73 rules that govern full power stations authorize operation at higher maximum power levels than those allowed under the Part 74 rules governing Class A stations.[1966] Channel sharing stations must share a single transmission facility and therefore broadcast at the same power level. To encourage channel sharing, we will allow a Class A station to operate under the Part 73 rules governing power levels and interference if it shares a full power television station's channel.[1967] Similarly, a full power station sharing a Class A station's channel must operate under the Part 74 power level and interference rules. This approach will help to eliminate any technical

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[1959] *See NPRM*, 27 FCC Rcd at 12479–80, para. 370.

[1960] This rule is consistent with our current rules regarding the assignment of a reserved-channel NCE station. *See* 47 C.F.R. § 73.621. Any such assignment would be subject to Commission approval.

[1961] As noted previously, we also will condition the final award of the rights to the terminated portion of the shared channel upon the new NCE licensee agreeing to terms of the existing CSA with the other sharing station(s), unless the new NCE licensee and the remaining sharing station(s) agree to amend the CSA and the amendment is approved by the Commission. *See* para. 701.

[1962] *See Channel Sharing Report and Order*, 27 FCC Rcd at 4628–29, paras. 23–24.

[1963] *See NPRM*, 27 FCC Rcd at 12479-80, para. 370 & nn. 556, 557.

[1964] PTV Comments at 17.

[1965] *Id*.

[1966] *Compare* 47 C.F.R. § 73.622(f) *with* 47 C.F.R. § 74.735(b).

[1967] A Class A licensee that channel shares with a full power station will continue to be subject to the restrictions set forth in § 336(f)(7)(B) of the Communications Act. *See* 47 U.S.C. § 336(f)(7)(B); *see also* 47 C.F.R. §§ 73.6012, 73.6019; *Class A R&O*, 15 FCC Rcd at 6389–90, para. 80–81. Among other things, that provision prohibits the Commission from approving the modification of a Class A license unless the licensee shows that the Class A station will not cause interference within the protected contour of any LPTV or TV translator station that "(i) was licensed prior to the date on which the application . . . for the modification of such a license[] was filed; (ii) was authorized by construction permit prior to such date; or (iii) had a pending application that was submitted prior to such date." 47 U.S.C. § 336(f)(7)(B). This restriction will apply to license and frequency modifications sought by Class A licensees, including those that share with a full power sharer station, except for those modifications implementing the new channel assignments resulting from the reverse auction and repacking process. *See* § III.B.3 (Facilities to Be Protected) (concluding that § 336(f)(7)(B) of the Communications Act does not restrict the Commission's channel reassignments in the reverse auction and repacking process).

barriers to full power and Class A channel sharing.[1968]

706. A channel sharing station is entitled to the same cable and satellite carriage rights at its shared location as it would have at that same location were it not channel sharing.[1969] The cable and satellite carriage rules, however, provide Class A stations fewer carriage rights than those afforded to full power stations.[1970] As the Commission tentatively concluded in the *NPRM*,[1971] we interpret the Spectrum Act to entitle a Class A station that channel shares with a full power sharer only to those carriage rights to which a Class A station would be entitled at the shared location were it not sharing. We also clarify that, under section 6403(a)(1), a full power sharee, whether a commercial or NCE station, that channel shares with a Class A licensee will have the same carriage rights at the channel sharing location that a non-channel sharing full power station would have at that location.[1972] In addition, we agree with DIRECTV/DISH that low power stations, including Class A stations, lack statutory mandatory carriage rights on DBS systems, and that lack of such rights will continue when a Class A station channel shares with a full power station.[1973]

707. We note that, as a result of channel sharing with a Class A station and operating with the Class A station's reduced power level, a full power station may find it needs to use alternative means, such as fiber or microwave, to deliver a good quality signal to a cable system headend it previously could reach with its over-the-air signal.[1974] This change, however, will not affect its right to demand carriage

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[1968] We note that, although Class A stations are permitted to share a full power television station's technical facilities, the Class A station must continue to air a minimum of 18 hours a day and an average of at least three hours per week of locally-produced programming each quarter, as required by § 73.6001 of the rules. *See* 47 C.F.R. § 73.6001(b).

[1969] *See* Spectrum Act § 6403(a)(4); *see also* 47 C.F.R. § 76.56(g).

[1970] Class A stations have the same limited must carry rights as LPTV stations; in other words, they are "low power stations" for mandatory carriage purposes. *See Establishment of a Class A Television Service*, MM Docket No. 00-10, Memorandum Opinion and Order on Reconsideration, 16 FCC Rcd 8244, 8259–60, paras. 40, 42. Low power stations are not entitled to mandatory satellite carriage. 47 U.S.C. § 338(a)(3). Low power stations may be entitled to mandatory cable carriage, but only in limited circumstances. Both the Communications Act and the Commission's rules mandate that only a minimum number of qualified low power stations must be carried by cable systems, *see* 47 U.S.C. § 534(c)(1); 47 C.F.R. § 76.56(b)(3), and, in order to qualify, such stations must meet several criteria. *See* 47 U.S.C. § 534(h)(2)(A)–(F); 47 C.F.R. § 76.55(d)(1)–(6). For example, if a full power station is located in the same county or other political subdivision (of a State) as an otherwise qualified low power station, then the low power station will not be eligible for cable must-carry status. *See* 47 U.S.C. § 534(h)(2)(F); *see also Implementation of the Cable Television Consumer Protection and Competition Act of 1992, Broadcast Signal Carriage Issues*, MM Docket No. 92-259, Report and Order, 8 FCC Rcd 2965, 2983, para. 67 & n.211 (1993) (*Must Carry Order*). Moreover, an otherwise qualified low power station qualifies for cable carriage only if the community of license of that station and the franchise area of the cable system on which it seeks carriage are both located outside of the largest 160 Metropolitan Statistical Areas, ranked by population, as determined by the Office of Management and Budget on June 30, 1990, and the population of the community of license on that date did not exceed 35,000. *See* 47 U.S.C. § 534(h)(2)(E).

[1971] *NPRM*, 27 FCC Rcd at 12480, para. 371.

[1972] Comcast, DIRECTV/DISH, and NCTA support this interpretation. *Se*e Comcast Comments at 47; DIRECTV/DISH Comments at 5–6; NCTA Comments 21–22.

[1973] DIRECTV/DISH Comments at 5–6. *See* 47 U.S.C. § 338(a)(3); *see also Implementation of the Satellite Home Viewer Improvement Act of 1999: Broadcast Signal Carriage Issues, Retransmission Consent Issues*, CS Docket Nos. 00-96 and 99-363, Report and Order, 16 FCC Rcd 1918, 1977 para. 136 (2000).

[1974] As Comcast notes, full power stations "must account for the technical prerequisites for carriage when deciding whether to enter into a channel sharing agreement." Comcast Comments at 47.

throughout its market.[1975] Similarly, NCE stations that share with a Class A station will retain the ability to cure their signal and secure must-carry rights, but only with respect to headends located within 50 miles of their communities of license, or located within their noise limited service contours – the same rights they possess today.[1976]

708. *Carriage Rights of Relocating Channel Sharing Stations*. We clarify in this Section the impact that station relocations made to implement a channel sharing arrangement may have on a station's MVPD carriage rights.[1977] We discuss how channel sharing arrangements may result in the modification of certain stations' television markets, and how these arrangements may impact the ability of stations to exercise their network nonduplication and syndicated-exclusivity rights or to invoke their significantly viewed status in certain counties or communities.

709. As discussed above, stations in certain circumstances will be able to submit channel sharing bids in the reverse auction pursuant to which they will relocate to a different community of license, so long as they remain in the same DMA.[1978] A station's carriage rights will not be expanded or diminished through this process,[1979] although its ability to exercise these rights may change based upon the facts of its specific channel sharing arrangement.[1980] For example, certain NCE and Class A stations may gain carriage on some cable systems, but lose carriage on others, as a result of the movements of

[1975] Full power commercial stations are considered "local" to the entire market to which they are assigned and are entitled to assert mandatory carriage rights on cable systems located throughout that same market. *See* 47 U.S.C. §§ 534(a), (b)(1)(A)-(B), (h)(1)(A) & (C)(i); *see also Must Carry Order*, 8 FCC Rcd at 2975, para. 37. A commercial broadcast television station's market is its DMA as determined by The Nielsen Company. *See* 47 C.F.R. § 76.55(e)(2). However, to obtain carriage, a local commercial television station must be capable of delivering a good quality signal to a cable system headend or bear responsibility for the cost of delivering such a good quality signal. *See* 47 U.S.C. § 534(h)(1)(B)(iii) and 47 C.F.R. § 76.55(c)(3) (defining "local commercial television station" to exclude those stations failing to deliver a good quality signal to a cable system's headend, unless the station bears the cost of delivering such signal).

[1976] *See* 47 U.S.C. § 535(l)(2)(A)–(B); 47 C.F.R. §§ 76.55(b)(1)–(2); *see also* 47 U.S.C. § 535(i)(1) (stating that an NCE station "may be required to bear the cost associated with delivering a good quality signal or a baseband video signal to the principal headend of the cable system").

[1977] Commenters have expressed divergent views concerning whether channel sharing arrangements should impact stations' carriage rights. *Compare* Tribune Comments at 24–25 (arguing that the Spectrum Act "explicitly requires the FCC to preserve intact the cable and satellite carriage rights of broadcasters that elect to enter into a channel sharing arrangement," and asking that the Commission "adopt rules explicitly preserving and protecting the cable carriage rights of all full power and Class A broadcasters that continue to operate, regardless of their post-auction facilities") *with* NCTA Reply at 12–16 (arguing that "Congress intended to hold cable operators harmless from changes resulting from the Spectrum Act" and suggesting that the Commission should restrict channel sharing arrangements involving a change in community of license that have the potential to increase cable operators' carriage obligations) *and* DIRECTV/DISH Comments at 4 (asking that the Commission "refrain from expanding or altering the mandatory carriage rights of broadcasters on MVPD systems").

[1978] *See* § IV.B.1.b (Reverse Auction Bid Options).

[1979] *See* Spectrum Act § 6403(a)(4); *NPRM*, 27 FCC Rcd at 12480, para. 372; *see also Channel Sharing Report and Order*, 27 FCC Rcd at 4629, para. 26 (stations will retain the same carriage rights operating on a channel sharing basis from a particular location as they would operating from the same location on a non-channel sharing basis).

[1980] The Commission has cautioned that, "in order to ensure carriage, broadcasters must continue to meet the eligibility requirements in our rules after implementing the channel sharing arrangement." *Channel Sharing Report and Order*, 27 FCC Rcd at 4631, para. 30. For example, "carriage rights extend only to those local commercial stations that provide a 'good quality signal' of at least -61 dBm to the cable or satellite provider," and stations will have to provide this signal level to qualify for carriage from a shared location. *Id*. at para. 30 n.101 (citing 47 U.S.C. §§ 338(b), 534(h)(1)(B)(iii)); *see also* para. 707 (NCE and full power commercial stations can cure a low quality signal through alternative means, provided they bear the cost).

their facilities or the changes in their communities of license.[1981] In addition, a full power commercial station that relocates within its DMA may gain carriage on some cable systems, but lose carriage on others, as a result of market modification requests.[1982] A broadcaster may seek to add communities to its market which it can now reach from its new location, and, conversely, a cable system may seek to exclude communities from the broadcaster's market that the station no longer serves as a result of its move.[1983] Because full power commercial stations have market-wide carriage rights, their movements within their assigned DMA should not automatically result in modification petitions, but unique factual situations may arise, such as a station's move resulting in its serving new communities outside of its DMA.[1984] Although it is thus possible that some cable operators may see a change in the local stations they must carry as a result of channel sharing agreements, either by gaining or losing stations, the statutory caps on the number of must-carry stations these systems are required to carry will not change.[1985]

[1981] An NCE station is eligible for mandatory carriage only with respect to cable systems with headends located within 50 miles of its community of license or located within its noise limited service contour. *See* 47 U.S.C. §§ 535(l)(2)(A)–(B); *see also* 47 C.F.R. §§ 76.55(b)(1)–(2). Accordingly, if an NCE station changes its community of license or shifts its signal contour, it may gain carriage on some cable systems and lose carriage on others. Furthermore, if a Class A station moves for purposes of channel sharing, its subsequent cable carriage rights will depend upon its ability to meet the same requirements applicable to qualified low power stations at its new location, including that (i) it not be located in the same county or other political subdivision (of a State) as a full-power station; (ii) its transmitter be within 35 miles of the cable system's principal headend; and (iii) it deliver a good quality signal to that headend (although, unlike NCE and full power commercial stations, it will have no right to improve the quality of its signal to meet the signal quality threshold). *See* 47 U.S.C. § 534(h)(2)(D) & (F); 47 C.F.R. § 76.55(d)(4) & (6); *see also Central Ohio Ass'n of Christian Broads.*, MB Docket No. 12-366, Memorandum Opinion & Order, 28 FCC Rcd 5271, 5272, para. 4 & n.12 (2013) (citing *Must Carry Order*, 8 FCC Rcd at 2991, para. 104 ("We also reject the suggestion . . . to extend the provisions of Section 614(h)(1)(B)(iii) [pertaining to the right of a full-power commercial station to cure a low quality signal through alternative means, provided it bears the cost], which apply on their face to full power television stations, to LPTV stations.")).

[1982] As explained above, *see* n.1978, each full power commercial television station is assigned to a market or DMA, and § 614(h)(1)(C) of the Communications Act permits the Commission, in response to a written request, to add communities to or subtract communities from a station's television market to better reflect marketplace conditions. *See* 47 U.S.C. § 534(h)(1)(C). The Commission has established a market modification procedure whereby stations or cable operators may file special relief petitions requesting that a station's market be changed. *See* 47 C.F.R. § 76.59; *see also Must Carry Order*, 8 FCC Rcd at 2976–77, paras. 42–47.

[1983] There are a number of nonexclusive statutory factors the Commission considers in deciding whether to grant or deny such market modification requests, and the scope of a station's signal is only one. *See* 47 U.S.C. §§ 534(h)(1)(C)(ii)(I)–(IV). Whether a full power commercial station gains or loses its ability to exercise its carriage rights in particular communities depends on whether a market modification is sought and the application of these factors. We note that such market modifications are not available to NCE or Class A stations.

[1984] We decline to revise Part 76 of our rules regarding MVPD must-carry obligations as suggested by Entravision because any changes to the must-carry regime are beyond the scope of this proceeding. Entravision Comments at 12–13.

[1985] For example, cable operators generally must carry local commercial full power television stations, up to one-third of the aggregate number of usable activated channels of such system. *See* 47 U.S.C. § 534(b)(1)(B). The number of qualifying NCEs they must carry is also limited. *See* 47 U.S.C. § 535(b)(1)–(3) & (e). With respect to low power and Class A stations, however, a cable system with more than 35 channels must carry two low power stations only if there are not enough local commercial television stations to fill the full power channel set asides. *See* 47 U.S.C. § 534(c)(1); 47 C.F.R. § 76.56(b)(3). These cable carriage rules will not change with the advent of channel sharing. Moreover, in light of our decision to allow channel sharing stations to relocate only within their current DMAs, any new carriage obligations resulting from channel sharing will be limited. *See* § IV.B.1.b (Bid Options). The carriage rules applicable to DBS operators will also not change as a result of channel sharing. *See* 47 C.F.R. § 76.66. Given that DBS operators' carriage obligations are limited to market-wide retransmission of television signals broadcast in the same local market ("local-into-local" service), we estimate that movements of stations within their local markets should generally result in no net change in the number of signals carried by

(continued….)

710. *Potential Impact of Relocating Channel Sharing Stations on Other Rules.* Stations changing their communities of license or signal contours as a result of channel sharing may impact other Commission rules.[1986] Under the Commission's cable network nonduplication rules,[1987] a station that has been contractually granted the exclusive right to distribute certain network programming[1988] in a geographic area is entitled to assert that exclusivity right by preventing the retransmission of that programming by other stations on cable systems serving communities[1989] that fall within a certain distance of its community of license.[1990] Similarly, the syndicated exclusivity rule allows a commercial broadcast station to protect its exclusive distribution of syndicated programming by requiring local cable systems with more than 1,000 subscribers to delete duplicative syndicated programming from cable communities located within 35 miles of the station's community of license.[1991] Exclusivity rights also exist in the satellite context with respect to the retransmission of nationally distributed superstations.[1992] Given the

(Continued from previous page)
satellite systems in a market. *See* 47 U.S.C. § 338(a)(1); 47 C.F.R. § 76.66(a)(6) & (b); *see also Implementation of the Satellite Home Viewer Improvement Act of 1999: Broadcast Signal Carriage Issues*, CS Docket No. 00-96, Report and Order, 16 FCC Rcd 1918, 1934–35, paras. 34–36 (2000) (interpreting § 338 of the Communications Act, 47 U.S.C. § 338(k)(3), and § 122 of the Copyright Act, 17 U.S.C. § 122(j)(2)(A) & (C), such that "local market," as it is used for satellite carriage purposes, includes all counties within a market, as well as the home county of the television station if that county is not physically located in the DMA). In addition, we estimate that, with some stations returning spectrum rights and going off the air entirely, the net effect of the auction and repacking should be an overall reduction in the number of stations MVPDs must carry. Finally, the costs that MVPDs reasonably incur in order to begin carrying new stations in these circumstances will be reimbursable under the Spectrum Act.

[1986] We note that, in some circumstances, a licensee is able to cover its community of license, and/or remain in the same DMA, while moving a transmit site across state lines. If, as the result of a successful channel sharing bid, a licensee changes its state of license, the licensee will follow the license renewal dates for the state in which it was licensed prior to the auction until commencement of the 2020 renewal cycle.

[1987] *See* 47 C.F.R. § 76.92(a).

[1988] "Network program" is defined as "any program delivered simultaneously to more than one broadcast station regional or national, commercial or noncommercial." 47 C.F.R. § 76.5(m). It is not necessary that the program be delivered by a "television network."

[1989] Cable systems are comprised of one or more "community units" that correspond to separate and discrete communities or municipal entities. *See* 47 C.F.R. § 76.5(dd).

[1990] The "geographic zone" in which a station can assert network nonduplication rights is set in a station's network-affiliation agreement, but its size is limited by the rules depending on the station's market. *See* Note to 47 C.F.R. § 76.92 For a station in one of the Top 100 television markets, the zone of protection may not exceed 35 miles from the reference point of its community of license. *See id.* (citing 47 C.F.R. § 73.658(m)); *see also* 47 C.F.R. § 76.51 (listing the major or top 100 television markets). For this purpose, the rules provide a list of the reference points for each community. *See* 47 C.F.R. § 76.53. Where such reference points are not available for a community, the location of the main post office of the community is used. *See id.* The zone of protection for a smaller market television station extends 55 miles from its community reference point. *See* Note to 47 C.F.R. § 76.92.

[1991] 47 C.F.R. § 76.101; *see also* Note to 47 C.F.R. § 76.101 (citing 47 C.F.R. § 73.658(m)). Unlike the network nonduplication rules, there is no difference in the zone of protection between smaller and larger market stations under the syndicated exclusivity rules. A syndicated program is defined as "any program sold, licensed, distributed or offered to television station licensees in more than one market within the United States other than as network programming." 47 C.F.R. § 76.5(ii).

[1992] *See, e.g.*, 47 C.F.R. §§ 76.122, 76.123. Due to the technical differences between how cable and satellite transmit programming to communities, the zones of protection for satellite are defined in terms of zip codes. DBS operators must provide protection in all relevant zip codes that fall "in whole or in part" within a station's zone of protection. *See* 47 C.F.R. §§ 76.120(e)(1) & (e)(2), 76.122(a), 76.123(a); *see also Implementation of the Satellite Home Viewer Improvement Act of 1999: Application of Network Non-Duplication, Syndicated Exclusivity, and Sports Blackout Rules to Satellite Retransmissions of Broadcast Signals*, CS Docket No. 00-2, Report and Order, 15 FCC Rcd 21688, 21703-05, paras. 28-32 (2000).

possibility that full power commercial stations may change their communities of license as a result of channel sharing, it is likely that where such stations may assert their network nonduplication and syndicated exclusivity zones of protection will change.[1993]

711. Moreover, commercial broadcast stations that vary their signal strength or change their locations as a result of channel sharing may modify their status as "significantly viewed" in certain counties or communities under sections 76.5(i) and 76.54 of our rules.[1994] Our significantly viewed rules permit a station that demonstrates significant viewership in certain communities[1995] to be carried in those communities as a "local" station for purposes of calculating the statutory copyright fees paid by cable and satellite system operators for carrying it, even outside of its market,[1996] and to be exempt from another station's assertion of its network non-duplication or syndicated exclusivity rights in those communities.[1997] Because significantly viewed status is largely a function of signal availability, once a full power commercial station is permitted to move in order to channel share, or to modify the shape or strength of its over-the-air signal, it will lose its status as "significantly viewed" in those counties and communities it can no longer reach with its over-the-air signal, and it will have to apply for such status in counties or communities it will be able to reach with the new scope of its signal.[1998]

B. 600 MHz Band Technical and Service Rules

712. As discussed above, we are creating a terrestrial wireless broadband service with the repurposed broadcast spectrum from the incentive auction. Below, we adopt technical rules for the 600 MHz Band similar to those in the adjacent Lower 700 MHz Band. We also adopt service rules that specify the terms under which we license the 600 MHz Band, which are consistent with the fixed and mobile allocation for the band.[1999] Specifically, we adopt a set of service rules that allows for maximum flexibility for wireless carriers to utilize the 600 MHz Band spectrum; determines which license restrictions apply to wireless licenses in this band; sets forth the license term, performance requirements, and license renewal criteria; and establishes secondary market transaction and permanent discontinuance

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[1993] In a Further Notice of Proposed Rulemaking seeking comment on whether to modify or eliminate the network non-duplication and syndicated exclusivity rules, the Commission asked whether it should modify its exclusivity rules in light of the opportunity stations will have to channel share under the Spectrum Act. *See Amendment of the Commission's Rules Related to Retransmission Consent*, MB Docket No. 10-71, Report and Order and Further Notice of Proposed Rulemaking, FCC 14-29, para. 73 (rel. Mar. 31, 2014).

[1994] *See* 47 C.F.R. §§ 76.5(i), 76.54. Section 340(c)(2) of the Communications Act requires that the Commission's website host a current list of all such significantly viewed stations, which consists of the 1972 list as amended over time via additions of stations newly found to be significantly viewed, as well as the removal of stations determined to be no longer significantly viewed in specific communities through case-by-case adjudications. *See* 47 U.S.C. § 340(c)(2); FCC, Significantly Viewed List, http://transition.fcc.gov/mb/significantviewedstations112013.pdf (last visited Apr.7, 2014).

[1995] *See* 47 C.F.R. §§ 76.5(i), 76.54(b).

[1996] *See, e.g., Implementation of the Satellite Home Viewer Extension and Reauthorization Act of 2004*, MB Docket No. 05-49, Report and Order, 20 FCC Rcd 17278, 17281, para. 3 (2005).

[1997] *See* 47 C.F.R. §§ 76.92(f) and 76.106(a) (significantly viewed exception to cable network nonduplication and syndicated exclusivity for cable); 47 C.F.R. §§ 76.122(j) and 76.123(k) (significantly viewed exception to satellite network nonduplication and syndicated exclusivity for satellite).

[1998] To assist such applications, stations which have experienced a significant technical upgrade or change to their facilities will continue to be eligible to file a waiver to be treated as "new" stations eligible to use county-wide data pursuant to § 76.54(d) in order to demonstrate their significantly viewed status. *See KSTC-TV, LLC Request for Significantly Viewed Status*, Order on Reconsideration, 25 FCC Rcd 8123, 8124, para. 2 n.4 (2010) (citing 47 C.F.R. § 76.54(d)); *see also Taft Television and Radio Co., Inc.*, Memorandum Opinion and Order, 103 FCC 2d 883, 886, para. 7 (1986); *Calvert TeleCommunications Corp.*, Memorandum Opinion and Order, 63 FCC 2d 1022, 1025-26, para. 5 (1977).

[1999] *See* § III.E (Allocations).

rules for 600 MHz Band wireless licenses. We also affirm that other rule parts that pertain generally to wireless communication services will similarly apply to 600 MHz Band licensees.

1. Technical Rules

713. In the *NPRM*, the Commission proposed to adopt technical rules similar to those in the adjacent Lower 700 MHz Band in an effort to maximize flexible use of the 600 MHz Band while appropriately protecting incumbent operations in the neighboring bands.[2000] As discussed below in greater detail, we adopt primarily the Lower 700 MHz Band technical rules, contained in Part 27 of the Commission's rules, for the 600 MHz Band. The Lower 700 MHz Band technical rules have generally prevented harmful interference in that band,[2001] and given the similar propagation and interference characteristics of the 600 MHz and Lower 700 MHz Bands, and that the services provided in both Bands will likely be similar, we anticipate that these technical requirements would also prevent harmful interference in the 600 MHz Band.[2002] In addition, the 600 MHz and Lower 700 MHz Bands are adjacent to each other, and consistent rules across these adjacent bands should speed the deployment of the 600 MHz Band while protecting incumbent licensees in the Lower 700 MHz Band from harmful interference.[2003] Furthermore, commenters generally support this approach.[2004]

a. Out-of-Band Emission Limits

714. *Background*. As explained above, we are licensing the 600 MHz Band spectrum in paired 5+5 megahertz blocks using Partial Economic Area ("PEA") licenses.[2005] Because we plan on licensing multiple spectrum blocks, we must consider how to address interference between adjacent blocks within the 600 MHz Band, and between the 600 MHz Band and adjacent bands.[2006] In the *NPRM*, the Commission proposed to apply section 27.53(g) of the Commission's rules to the 600 MHz Band, which includes out-of-band emission ("OOBE") attenuation of $43+10*\log_{10}(P)$ dB and the associated

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[2000] *NPRM*, 27 FCC Rcd at 12423-24, para. 185.

[2001] We note that in the Lower 700 MHz Band proceeding, some parties raised concerns about interference between broadcast television and wireless services in the A block of the Lower 700 MHz Band. *700 MHz Interoperability R&O*, 28 FCC Rcd at 15127-28, para. 12. Because we are establishing technically reasonable guard bands between high power broadcast television services and wireless services in the 600 MHz Band, we expect the technical rules we adopt—in conjunction with the guard bands—will serve to protect against harmful interference. *See* § III.A.2.e (Guard Bands). We note that we will provide further guidance in subsequent releases for the rules to protect against inter-service interference between co- and adjacent-channel television operations and wireless services. *See* § III.A.2.d (Market Variation).

[2002] *See* CEA Comments at 26 (the Lower 700 MHz Band rules have generally "worked to avoid harmful interference between broadcast and mobile operations, with the one notable exception being the issue of Channel 51/52 operations; . . . [and the 600 MHz Band has] similar propagation and interference characteristics").

[2003] *See* TIA Comments at 18 (the Lower 700 MHz Band rules "have proven successful in promoting rapid deployment of services in other bands, and . . . should be carried over to the 600 MHz mobile broadband band").

[2004] *See, e.g.*, Nokia Comments at 20 (Nokia "agrees with the Commission's proposal to largely base the new service rules for the 600 MHz Band on those used in the Lower 700 MHz Band."); Qualcomm Comments at 24 ("Qualcomm supports the Commission's general approach of applying the technical rules for the Lower 700 MHz to the 600 MHz Band."). The few areas of disagreement in the 600 MHz Band technical rules are limited to questions stemming from the 600 MHz Band plan design rather than the application of the Lower 700 MHz Band technical rules themselves to 600 MHz operations. *See, e.g.*, § VI.B.1.a (Out-of-Band Emission Limits).

[2005] *See* §§ III.A.2.b (5+5 MHz, Interchangeable Spectrum Blocks), III.A.2.c (Geographic Area Licensing).

[2006] One predominant type of adjacent-band interference is caused by out-of-band emissions of the interfering transmitter that falls directly within the operating channel of the victim receiver in the adjacent-band. Out-of-band emissions interference cannot be filtered out by the victim receiver, and can only be mitigated through appropriate filtering at the transmitter to limit the out-of-band emissions.

measurement procedure.[2007]

715. *Discussion*. Four interference scenarios exist that relate to OOBE limits: (1) interference to adjacent 600 MHz Block operations; (2) interference to adjacent Lower 700 MHz Band operations; (3) interference to television operations; and (4) interference to channel 37 operations.

716. *Interference to Adjacent 600 MHz Block Operations*. We adopt section 27.53(g) of the Commission's rules, which includes OOBE attenuation of $43+10*\log_{10}(P)$ dB and the associated measurement procedure, to address interference between adjacent blocks within the 600 MHz Band, and between 600 MHz Band spectrum and adjacent bands. This OOBE limit is commonly employed in other commercial wireless services bands and it has generally been found to be adequate in preventing harmful interference to adjacent spectrum blocks operations.[2008] Additionally, it is beneficial to maintain comparable emissions limits among commercial bands with similar services so as not to disadvantage one band over another.[2009]

717. *Interference to Adjacent Lower 700 MHz Band Operations*. The upper end of the 600 MHz Band uplink band is adjacent to the lower portion of the Lower 700 MHz Band,[2010] which is also being used for mobile uplink operations.[2011] As discussed above, the interference environment between these two bands will be similar to interference within either band and the OOBE limits we are adopting will protect adjacent Lower 700 MHz Band because their operations are harmonized.[2012]

718. *Interference to Television Operations*. Under the 600 MHz Band Plan, the lower end of the 600 MHz Band downlink band will likely be adjacent to broadcast television operations, with a guard band between the two services.[2013] Most parties commenting on this issue support the Commission's proposal to adopt the Lower 700 MHz Band OOBE requirements.[2014] However, IEEE 802 and the Wi-Fi Alliance express concern that emissions from 600 MHz Band uplinks may cause interference to nearby television receivers and that the Commission should regulate the OOBE limits of all newly licensed devices (e.g., mobile broadband handsets) to ensure that we protect all authorized devices.[2015] Under the 600 MHz Band Plan, mobile uplink operations are not adjacent to television broadcast spectrum and will therefore not interfere with television receivers.[2016]

719. Based on our technical analysis, this OOBE requirement, in conjunction with the guard

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[2007] *NPRM*, 27 FCC Rcd at 12424, para. 188.

[2008] *See, e.g.*, *AWS-1 R&O*, 18 FCC Rcd at 25198, para. 91. Section 27.53(m) provides that the Commission has authority to require greater attenuation when OOBE causes harmful interference. *See* 47 C.F.R. § 27.53(m).

[2009] *NPRM*, 27 FCC Rcd at 12424-25, para. 190.

[2010] *See* § III.A.2.a (All-Paired, Down From 51 Band Plan).

[2011] *NPRM*, 27 FCC Rcd at 12424, para. 189.

[2012] *See* § III.A.2.e (Guard Bands).

[2013] *See* § III.A.2.a (All-Paired, Down From 51 Band Plan). We note that in the event that 84 megahertz of broadcast spectrum is repurposed, the 600 MHz Band downlink band will instead be adjacent to channel 37, with a three megahertz guard band. *See* Technical Appendix § III.B.6 (Seven Sets of Paired Blocks (84 megahertz repurposed)).

[2014] *See, e.g.*, Qualcomm Comments at 24 ("agrees with applying current FCC Rule Section 27.53(g) for out-of-band emissions attenuation of 43+10*log10(P) dB and the associated measurement procedure to the 600 MHz Band"). Television is a "one way" service (i.e., the broadcast stations do not receive any signals) so we are not concerned with protecting broadcast transmissions but instead must ensure that TV receivers/sets are able to adequately receive the broadcast transmissions.

[2015] IEEE 802 Reply at 3; Wi-Fi Alliance Reply at 4.

[2016] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

bands we establish, will prevent harmful interference to television and channel 37 operations.[2017] Accordingly, the proposed OOBE limits for the 600 MHz Band, with a required guard band, will address interference to all television operations.[2018] We note that in the event that a specific incidence of harmful interference occurs, we may impose stricter emissions limits as a remedy.[2019] By applying the same OOBE limits as currently exist between the Lower 700 MHz Band and television stations, 600 MHz Band licensees will provide similar protection as exists today.

720. *Interference to Channel 37 Operations*. Depending on the total amount of spectrum made available for flexible use, we may permit either television stations, and/or 600 MHz Band base stations to operate adjacent to channel 37 operations.[2020] Television stations currently operate adjacent to channel 37 without any guard bands at very high power, with no reported problems, which indicates that the television stations' OOBE and power limits are sufficient to protect channel 37 operations.[2021] Both of these current limits are higher than those adopted for the 600 MHz Band.[2022] The 600 MHz Band OOBE and power limits coupled with three megahertz guard bands will provide as much or more protection to channel 37 operations than they currently receive from television operations. Therefore, these limits are sufficient to protect against harmful interference to existing channel 37 operations.

721. Some commenters argue that we should adopt more stringent emission limits to protect WMTS operations in channel 37. Specifically, they express concern that the reallocation of the 600 MHz Band for fixed and mobile services will result in a large number of mobile devices and/or base stations operating in close proximity of WMTS operations on adjacent channels, which will result in significant interference to WMTS operations.[2023] To address possible interference from mobile devices to WMTS operations, these commenters propose that we apply the spectral mask for TV white space devices[2024] to transmitters operating on channels adjacent to WMTS.[2025] In the alternative, WMTS Coalition suggests we restrict all mobile uplink transmissions to bands well removed from channel 37.[2026] In our Band Plan scenarios, the mobile uplink band will not be adjacent to WMTS operations; as a result, mobile devices should not cause harmful interference to WMTS operations.[2027]

722. To address possible harmful interference from base stations, commenters suggest we

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[2017] *See* § III.A.2.e (Guard Bands).

[2018] We reiterate that these OOBE limits are the general limits applicable to all 600 MHz licensees. As noted in § III.A.2.d (Market Variation), we plan to adopt inter-service interference rules that will govern operations in impaired license areas.

[2019] 47 C.F.R. § 27.53(m); *Lower 700 MHz R&O*, 17 FCC Rcd at 1069-1070, para. 122.

[2020] Technical Appendix § III.B (Specific Band Plan Scenarios).

[2021] *See NPRM*, 27 FCC Rcd at 12425, para. 191.

[2022] *See* § VI.B.1.b (Power Limits).

[2023] For example, GEHC notes that there are only 74 full-power television stations that transmit on adjacent channels and that "some healthcare facilities have been forced to incorporate aggressive filtering mechanisms and/or implement a de facto guard band within channel 37 to protect WMTS operations from adjacent channel broadcast signals." GEHC Comments at 22.

[2024] 47 C.F.R. § 15.709(c)(4).

[2025] *See, e.g.*, Philips Healthcare Comments at 6; WMTS Coalition Comments at 28 n.43.

[2026] WMTS Coalition Comments at 29.

[2027] Channel 37 will be adjacent to either the mobile downlink band or broadcast spectrum while the mobile uplink band will be at least 24 megahertz away from channel 37 (in the 144 megahertz scenario), which is more than sufficient spectral separation. *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

either prohibit base stations from operating within a specific range of WMTS systems,[2028] coordinate base station operations with adjacent WMTS systems and limit the maximum allowable field strength of base station emissions,[2029] or consider creating a guard band between channel 37 WMTS operations and wireless broadband operations.[2030] To protect Radio Astronomy facilities from wireless downlinks into Radio Astronomy observations, NAS-CORF proposes OOBE limits below $43+10*\log_{10}(P)$ dB.[2031]

723. We also note that Sony recommends that we clearly define transmission masks for all operations under the new 600 MHz Band, including both television and wireless data, and for both base stations and mobile devices.[2032] The Commission's transmission masks for existing spectrum bands and the associated measurement procedures are clearly defined in its "Emission Limits" rules.[2033]

724. As discussed above, we adopt a three megahertz guard band between 600 MHz base stations and channel 37 services.[2034] Further, we adopt a band plan that has generally large separations between 600 MHz mobile stations and channel 37 services, and require 600 MHz licensees to coordinate with NSF when radio astronomy observatories are near their operations.[2035] Given these considerations, the proposed OOBE limits for the 600 MHz Band will mitigate potential harmful interference to channel 37 operations. If a specific incidence of harmful interference occurs, we may impose stricter emissions limits as a remedy.[2036]

b. Power Limits

725. *Background*. In the *NPRM*, the Commission proposed to apply power limits for the 600 MHz Band that are generally consistent with the Lower 700 MHz Band.[2037] As the Commission noted in the *NPRM*, however, we must modify the Lower 700 MHz Band rules on power limits for purposes of the 600 MHz Band because, unlike the Lower 700 MHz Band, the 600 MHz Band has a predetermined uplink and downlink band with similar wireless services.[2038] For 600 MHz Band downlink operations, it proposed to limit fixed and base station power for downlink operations in non-rural areas to 1000 watts ERP for emission bandwidths less than 1 MHz and to 1000 watts per 1 MHz ERP for emission bandwidths greater than one megahertz, and to double these limits to 2000 watts or 2000 watts/MHz ERP

[2028] Philips Healthcare suggests that we prohibit wireless base stations from operating within 500 meters of WMTS systems. Philips Healthcare Comments at 5.

[2029] GEHC suggests that wireless broadband licensees coordinate the construction and operation of base stations and obtain the written concurrence of the affected healthcare facility. In addition, GEHC states that the Commission should limit the maximum allowable field strength of Part 27 base station fundamental emissions in channels 36 and 38 to 20 mV/m/MHz (i.e., 86 dBμV/m/MHz), as measured at the perimeter of a registered WMTS facility stations. To mitigate the risk of co-channel interference, GEHC proposes a limit of 10 μV/m/100kHz (i.e., 20 dBμV/m/100kHz) within channel 37. GEHC Comments at 24.

[2030] WMTS Coalition Comments at 29-30.

[2031] NAS-CORF Comments at 10-11.

[2032] Sony Comments at 7.

[2033] For example, the transmission masks for the 700 MHz, AWS and BRS Bands can be found at 47 C.F.R. § 27.53.

[2034] *See* § III.A.2.e (Guard Bands). *See also* Technical Appendix §§ II.E.2 (Potential for Interference between 600 MHz Downlink and WMTS).

[2035] *See* Technical Appendix §§ III.B (Specific Band Plan Scenarios); II.E.3 (Potential for Interference between 600 MHz Downlink and RAS); III.D.1.b.ii (Interference Protections for Incumbent Services).

[2036] 47 C.F.R. § 27.53(m); *see also Lower 700 MHz R&O*, 17 FCC Rcd at 1069-70, para. 122.

[2037] *NPRM*, 27 FCC Rcd at 12425, para. 192.

[2038] *Id.* at 12425, para. 192.

in rural areas, provided advance notice is given.[2039] In addition, the Commission proposed not to apply the power flux density requirements of section 27.55(b) to the 600 MHz Band because there is no provision for high powered (50 kW) stations within the 600 MHz Band.[2040] In the 600 MHz Band uplink band, the Commission proposed to adopt the same power limit of three watts ERP for both portables and mobiles that apply to the Lower 700 MHz Band and prohibit higher-powered control station operations, which are allowed in the Lower 700 MHz Band.[2041]

726. *Discussion*. Commenters overwhelmingly support our adopting the proposed power limits for the 600 MHz Band.[2042] We adopt these proposed limits, which will help ensure robust service in the 600 MHz Band while also helping to minimize harmful interference into other bands. These power limits are also commonly employed in other commercial wireless services bands and it has generally been found to be adequate in preventing harmful interference to adjacent spectrum blocks operations.[2043]

c. Base Station Antenna Height Restrictions

727. *Background*. In the *NPRM*, the Commission proposed to apply the Lower 700 MHz Band flexible base station antenna height rules to 600 MHz Band base stations.[2044] Part 27 of the Commission's rules does not provide specific antenna height restrictions for the Lower 700 MHz Band. Pursuant to section 27.56, however, all services operating under Part 27 must limit base station antenna heights to elevations that do not present a hazard to air navigation.[2045] Additionally, the limitations of field strength at the geographical boundary of the license also effectively limit antenna heights.[2046] As a result, the Commission proposed not to require unique antenna height limits for 600 MHz Band facilities, concluding that the general height restrictions of Part 27 are sufficient.[2047]

728. *Discussion*. Consistent with the Commission's proposal, specific antenna height restriction for 600 MHz Band base stations are not necessary. As discussed above, the general requirement to not endanger air navigation and the effective height limitations implicitly resulting from our co-channel interference rules obviate the need for specific antenna height restrictions for 600 MHz Band licensees. Further, commenters addressing this issue support this proposal.[2048] Thus, we will not

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[2039] *Id.* at 12425, para. 193. *See also* 47 C.F.R. § 27.50(c)(8)(rule requiring advanced notice).

[2040] The power flux density requirement in the Lower 700 MHz Band is used to limit the signal strengths on the ground near the high-powered stations. *NPRM*, 27 FCC Rcd at 12425, para. 193; 47 C.F.R. § 27.55.

[2041] *NPRM*, 27 FCC Rcd at 12425, para. 194.

[2042] Alcatel-Lucent Comments at 28 (supports the Commission's proposal to apply the Lower 700 MHz Band power limits (but not power flux density limits) to the 600 MHz Band); Harris Broadcast Comments at 27 (the Commission should adopt its proposal to apply power limits no greater than the 700 MHz Band); Verizon Comments at 57 (the Commission's power limit proposals in the *NPRM* are appropriate for 600 MHz Band licenses).

[2043] For example, we set similar power limits in the 700 MHz Bands and the AWS-1 Band. *See* 47 C.F.R. §§ 27.50(c), (d).

[2044] *NPRM*, 27 FCC Rcd at 12426, para. 195; *see also* 47 C.F.R. § 27.50(c).

[2045] *See* 47 C.F.R. § 27.56.

[2046] *See* § VI.B.1.d (Co-Channel Interference Between 600 MHz Band Wireless Broadband Systems). Wireless licenses may also be restricted if regulations are adopted to protect against inter-service interference. *See* § III.A.2.d. (Market Variation).

[2047] *NPRM*, 27 FCC Rcd at 12426, para. 195.

[2048] *See, e.g.*, Alcatel-Lucent Comments at 29 (agrees with the Commission's proposal to apply to new wireless operations in the new 600 MHz Band the flexible antenna height rules currently applied in the Lower 700 MHz Band); Harris Broadcast Comments at 27 (the Commission should adopt its proposal to apply antenna height rules that are no greater than the height specified in the Lower 700 MHz Band rules); Verizon Comments at 58 (supports the application of the Lower 700 MHz Band flexible antenna height rules to the 600 MHz Band).

require specific antenna height restrictions for 600 MHz Band base stations.

d. Co-Channel Interference Between 600 MHz Band Wireless Broadband Systems

729. *Background*. Co-channel interference rules prevent harmful interference between geographically adjacent licensees operating in the same spectrum. To avoid this interference, we set field strength limits that apply at the geographic edge of the license area.[2049] In the *NPRM*, the Commission proposed to apply the current Lower 700 MHz Band field strength limit to 600 MHz Band operations to prevent interference among 600 MHz Band wireless broadband providers, because of the similarity between these spectrum bands, both in terms of their propagation and interference characteristics.[2050] Because we are licensing the 600 MHz Band spectrum in smaller than nationwide service areas,[2051] we must adopt field strength limits here to prevent interference among 600 MHz Band wireless providers.

730. *Discussion*. We adopt the 700 MHz Band co-channel interference requirements, limiting field strength levels at the edge of a license area to 40 dBμV/m for the 600 MHz Band to protect adjacent wireless broadband systems from one another.[2052] As explained above, the 700 MHz Band requirements are appropriate because of the 700 MHz Band's similar propagation and interference characteristics. Commenters support this approach.[2053] Thus, we adopt the proposed co-channel interference levels and expand section 27.55(a)(2) of the Commission's rules to include the 600 MHz Band.[2054]

e. Interoperability Rule

731. *Background*. In the *NPRM*, the Commission identified interoperability as one of the five key policy goals that would guide the choice of a wireless band plan.[2055] The Commission sought comment on several interoperability considerations including whether to require interoperability by adopting a specific interoperability rule or whether the Commission's band plan proposals sufficiently encouraged and ensured interoperability;[2056] how market variation affects interoperability and the number of band plans that should be supported;[2057] and how to resolve issues related to coexistence of Lower A Block operations and channel 51.[2058]

732. *Discussion*. We adopt an interoperability requirement for the 600 MHz Band. Specifically, we require that user equipment certified to operate in any portion of the 600 MHz Band must

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[2049] *See* 47 C.F.R. § 27.55(a).

[2050] *NPRM*, 27 FCC Rcd at 12426, para. 196.

[2051] *See* § III.A.2.c (Geographic Area Licensing).

[2052] *See* 47 C.F.R. 27.55(a)(2). We note, however, that adjacent licensees can agree on a different field strength. 47 C.F.R. § 27.55(a). As we note above, to accommodate market variation, we may allow wireless broadband systems and television stations to operate on the same channel, which can result in inter-service interference. Rules to address this issue will be adopted in a future Commission release. *See* § III.A.2.d (Market Variation).

[2053] *See, e.g.*, CTIA Comments at 30; TIA Comments at 18 n. 61. *But see* Verizon Comments at 58 (stating that the Commission should adopt a 50 dBμV/m per MHz field strength limit for 600 MHz licensees because this type of measurement is more appropriate for broadband LTE technologies). As discussed in the *H Block Order*, we intend to explore the issue of whether to apply a measurement bandwidth to co-channel boundary limits in future service rules proceedings, once we have a more fulsome record on the issue. *See H Block Report and Order*, 28 FCC Rcd at 9515-16, para. 79.

[2054] 47 C.F.R. § 27.55(a)(2).

[2055] *NPRM*, 27 FCC Rcd at 12401, para. 123.

[2056] *Id.* at 12415, para. 162.

[2057] *Id.* at 12415-16, paras. 163-64.

[2058] *Id.* at 12416, para. 165.

be capable of operating throughout the 600 MHz Band.[2059] Although the 600 MHz Band Plan promotes interoperability by creating a single paired band rather than multiple bands, it does not guarantee that interoperability will naturally occur, particularly since, as a technical matter, multiple filters may be needed depending on how much spectrum is repurposed.[2060]

733. Commenters overwhelmingly support the principle of interoperability. Many commenters agree that the Commission should mandate an interoperability requirement[2061] while others suggest that the Commission could encourage interoperability through a carefully organized band plan.[2062] US Cellular proposes that the Commission should "require that: (1) all mobile devices designed to operate on 600 MHz paired spectrum must tune to all 600 MHz paired frequencies; and (2) all 600 MHz networks operating on 600 MHz paired frequencies must permit the use of such devices."[2063] US Cellular also suggests that, in the event that we offer nationwide downlink-only blocks, any interoperability requirement should apply to downlink-only spectrum as well.[2064] Verizon Wireless, however, states that "the Commission should not adopt any interoperability requirement but should instead facilitate interoperability by adopting a well-conceived band plan that minimizes interference issues."[2065] It also raises concerns that mandating interoperability will have a negative impact on investment and reduce the value of auctioned spectrum by increasing device complexity, size and cost.[2066]

734. Historically, the Commission has supported promoting interoperability. Beginning with the licensing of cellular spectrum, the Commission has opined that consumer equipment should be capable of operating over the entire range of cellular spectrum as a means to "ensure full coverage in all markets and compatibility on a nationwide basis."[2067] More recently, a group of small and rural wireless

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[2059] This requirement does not prescribe or require that all technologies be supported in a 600 MHz Band device, but only that a provider serving the 600 MHz Band must ensure that the devices it provides using its technology of choice must operate across the entire 600 MHz Band.

[2060] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[2061] *See, e.g.*, CCA Reply at 10-12; C Spire Comments at 8-9; DISH Reply at 11-12; KSW Reply at 5; Leap Comments at 7; McBride *Band Plan PN* Comments at 3-4; MetroPCS Comments at 28; NTCA Comments at 2-3; PISC Reply at 15-16; T-Mobile Reply at 50-54 (advocating for an interoperability rule and random assignment procedures, which "reinforces and extends the interoperability requirement that T-Mobile and many other commenters support by providing durable, market-based incentives for manufacturers to create interoperable devices capable of tuning across all paired spectrum following the 600 MHz auction"); Letter from Leighton T. Brown, Counsel for US Cellular, to Marlene Dortch, Secretary, FCC, GN Docket No. 12-268 (filed Jan. 6, 2014) (US Cellular Jan. 6, 2014 *Ex Parte* Letter).

[2062] *See, e.g.*, AT&T Reply at 37-40; CEA Comments at 16; Ericsson Reply at 4; RIM Comments at 12-13; Verizon Reply at 38.

[2063] US Cellular Jan. 6, 2014 *Ex Parte* Letter at 2.

[2064] US Cellular Jan. 6, 2014 *Ex Parte* Letter at 2-3.

[2065] Verizon Reply at 38-40. *See also* AT&T Reply at 37-40.

[2066] Verizon Reply at 39.

[2067] *Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems*, CC Docket No. 79–318, Report and Order, 86 FCC 2d 469, 482 (1981). The Commission adopted band-wide interoperability requirements for cellular service. *Id*. Although the Commission did not adopt a rule to require band-wide interoperability for PCS, it again stressed the importance of interoperability by acknowledging industry efforts to establish voluntary interoperability standards; concluded that "[t]he availability of interoperability standards will deliver important benefits to consumers and help achieve our objectives of universality, competitive delivery of PCS, that includes the ability of consumers to switch between PCS systems at low cost, and competitive markets for PCS equipment"; and reserved the right to consider "what actions the Commission may take to facilitate the more rapid development of appropriate standards." *Amendment of the Commission's Rules to Establish New Personal*

(continued….)

licensees in the Lower 700 MHz Band asserted that the larger wireless carriers had been involved in developing restrictive band classes for 700 MHz mobile equipment, which limited their ability to provide roaming to their customers, delayed the deployment of networks in rural areas, and limited smaller wireless carriers from fully utilizing their spectrum, and urged the Commission to initiate a rulemaking to address interoperability issues in the 700 MHz Band.[2068] Subsequently, the Commission took certain steps to implement an industry solution to provide interoperable service in the Lower 700 MHz Band in an efficient and effective manner to improve choice and quality for consumers of mobile services.[2069] In reviewing the voluntary solution that would resolve the lack of interoperability in this band, the Commission determined that the voluntary solution would serve the public interest by enabling consumers, especially in rural areas, to enjoy the benefits of greater competition and more choices, and by encouraging efficient use of spectrum, investment, job creation, and the development of innovative mobile broadband services and equipment.[2070] Most recently, we adopted an interoperability requirement in the *AWS-3 Order*.[2071]

735. To comply with the interoperability requirement we adopt for the 600 MHz Band, user equipment certified to operate in any portion of the 600 MHz Band must be capable of operating, using the same technology that the licensee has elected to use, throughout the entire 600 MHz Band.[2072] While we adopt a band plan that promotes interoperability by creating a single paired band, the unique nature of the incentive auction amplifies the need for certainty and clear rules. Given that we may repurpose more spectrum for flexible use than can be supported by a single filter,[2073] promoting interoperability through our band plan is insufficient to ensure interoperability for this band. Thus, we make clear that our interoperability requirement applies to the entire 600 MHz Band, regardless of how many band classes may be created by standards-setting bodies to cover this spectrum assigned for flexible-use licenses (i.e., devices must support the entire 600 MHz Band, regardless of whether services are provided over one 5+5 megahertz block, or multiple spectrum blocks). The benefits of requiring interoperability to promote rapid deployment of the 600 MHz Band, particularly in rural areas, outweigh any potential costs relating to increased device complexity.

(Continued from previous page)
Communications Services, Memorandum Opinion and Order, GEN Docket No. 90-314, 9 FCC Rcd 4957, 5021-22, paras. 163, 165 (1994) (*PCS Order*); *see also Establishment of Rules and Policies for the Digital Audio Radio Service in the 2310-2360 MHz Frequency Band*, Report and Order, IB Docket No. 95-91, GEN Docket No 90-357, Memorandum Opinion and Order and Further Notice of Proposed Rulemaking, 12 FCC Rcd 5754, 5795-98, paras.102-06 (1997); *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WT Docket No. 06-150, Second Report and Order, 22 FCC Rcd 15289, 15419-20, paras. 363-64 (2007).

[2068] *Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks*, Sept. 29, 2009 at 12. Subsequently, in 2012, the Commission issued a Notice of Proposed Rulemaking "to promote interoperability in the Lower 700 MHz band and to encourage the efficient use of spectrum." *Promoting Interoperability in the 700 MHz Commercial Spectrum*, WT Docket No. 12-69, Notice of Proposed Rulemaking, 27 FCC Rcd 3521 (2012). The Commission sought comment on whether providing interoperable service with the use of a unified LTE band class (to achieve interoperability) would result in harmful interference to customers using service on the Lower 700 MHz B and C Blocks and whether, if harmful interference were likely to exist, it reasonably could be mitigated. The Commission expressed its preference for an industry solution for interoperability, but also recognized that if the industry failed to move in a timely manner toward interoperability, additional regulatory steps might be appropriate to further the public interest, and sought comment on whether the FCC should adopt a device interoperability requirement. *Id.*

[2069] *See 700 MHz Interoperability R&O*, 28 FCC Rcd 15122.

[2070] *See id.*

[2071] *AWS-3 Report and Order* at paras. 225–31 (adopting an interoperability requirement for the paired 1755-1780 MHz and 2155-2180 MHz band); *see* 47 C.F.R. § 27.75 (Basic Interoperability Requirement).

[2072] Accordingly, we amend § 27.75 of the Commission's rules to include the 600 MHz Band.

[2073] *See* Technical Appendix § II.A (Mobile Filter Considerations). *See also* Verizon Reply at 39-40.

736. The Commission's experience with deployment in the Lower 700 MHz Band highlights the need for clear *ex ante* interoperability rules to promote rapid deployment in the 600 MHz Band, particularly in rural areas. Although Verizon Wireless notes that the Commission chose to defer to voluntary industry initiatives in promoting interoperability in the PCS band, it did so only because "the industry is now working aggressively to complete several voluntary interoperability standards for PCS in a timely manner."[2074] The record reflects no such assurances here. We further note that there may be increased complexity of 600 MHz devices independent of any interoperability requirement depending on the amount of spectrum we can repurpose for 600 MHz Band services. As Verizon readily acknowledges, clearing a large swath of spectrum would inevitably increase device complexity but that repurposing a large amount of spectrum for new wireless use "would be a good 'problem' to have."[2075] Because it is essential to promote rural broadband deployment and ensure that consumers have rapid access to 600 MHz Band services, the public interest will be best served by requiring interoperability in the 600 MHz Band, and therefore adopt an interoperability requirement.

737. The 600 MHz Band Plan we adopt today also ensures that we will clear broadcast television stations from channel 51, which will serve as the top edge of the 600 MHz uplink band.[2076] Commenters strongly support clearing channel 51 of broadcast television operations to minimize interference to 700 MHz A Block operations, and urge us to consider early relocation of channel 51.[2077] Under our 600 MHz Band Plan, pursuant to each of the band plan scenarios we set forth in the Technical Appendix, we will offer the first spectrum block at channel 51.[2078] Further, we note that our decisions today on repacking and reimbursement support early, voluntary relocation of channel 51.[2079]

f. Other Technical Issues

738. In addition to the specific technical issues addressed above, the Commission proposed to apply several Part 27 rules to the 600 MHz Band: equipment authorization, RF safety, frequency stability, antennas structures; air navigation safety, and disturbance of AM broadcast station antenna patterns.[2080] The Commission reasoned that because the 600 MHz Band will be licensed as a Part 27 service, these rules should apply to all licensees, including those who acquire licenses through partitioning or disaggregation.[2081] No commenters oppose this proposal. Accordingly, because we are licensing the 600 MHz Band under our Part 27 regulatory framework[2082] and these rules generally apply to all Part 27 services, we will apply these additional Part 27 rules to 600 MHz Band licensees.[2083]

739. As described above, some broadcasters may remain in the 600 MHz Band in areas close enough in proximity to new 600 MHz licensees that certain wireless licensees may not be able to operate

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[2074] *PCS Order*, 9 FCC Rcd at 5021, para.163.

[2075] Verizon Reply at 39.

[2076] *See* § III.A.2.a (All-Paired, Down From 51 Band Plan).

[2077] *See, e.g.*, CCA Comments at 13-14; Leap Reply at 5-6.

[2078] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

[2079] *See* § III.B.3.b.(ii) (Channel Substitution Construction Permits) (protects the substitute channel facilities of former channel 51 licensees that relocated from channel 51 pursuant to a voluntary relocation agreement with Lower 700 MHz A Block licensees); § V.C.5.a (Television Station Licensees and MVPDs Eligible for Reimbursement) (allows for reimbursement of any station formerly on channel 51 that must relocate because its channel is reassigned in the repacking process even if it previously relocated from channel 51 pursuant to a private agreement).

[2080] *NPRM*, 27 FCC Rcd at 12427, para. 198; *see also* 47 C.F.R. §§ 27.51, 27.52, 27.54, 27.56, 27.63.

[2081] *NPRM*, 27 FCC Rcd at 12427, para. 198.

[2082] *See* § VI.B.2.a.ii (Regulatory Framework).

[2083] The Commission recently deleted § 27.63. Rules governing disturbance of AM broadcast station antenna patterns are now contained in Subpart BB of Part 1.

within the entire boundary of their license (i.e., these 600 MHz licensees will hold an "impaired" license).[2084] As explained further above, we will provide further guidance on the obligations of 600 MHz licensees holding impaired licenses, including any additional or modified technical rules that may apply only to licensees in these impaired areas, no later than the release of the *Comment PN*.

2. Service Rules

a. Flexible Use, Regulatory Framework, and Regulatory Status

(i) Flexible Use

740. *Background.* In the *NPRM*, the Commission proposed service rules that would permit wireless licensees to employ the 600 MHz Band for any use permitted by the Table of Allocations contained in Part 2 of the Commission's rules,[2085] subject to the Commission's service rules.[2086] The Commission noted that the Spectrum Act provides that new initial licenses made available through incentive auctions be subject to flexible-use service rules,[2087] and thus, proposed that the 600 MHz Band may be used for any fixed or mobile service that is consistent with the allocations for the Band.[2088] The Commission also noted that Congress earlier recognized the benefits of flexible use by amending the Communications Act to add section 303(y), which provides us with the authority to allocate spectrum for flexible use if certain criteria are met.[2089]

741. *Discussion.* We adopt the Commission's proposal to license the 600 MHz Band under flexible-use service rules, in accordance with the Spectrum Act's direction that new initial licenses for spectrum voluntarily relinquished through incentive auction be subject to flexible-use service rules.[2090] Accordingly, 600 MHz Band licensees may use the licensed, 600 MHz Band spectrum for any use permitted by the Table of Allocations, provided that the licensee complies with the applicable service rules. As CEA notes, allowing flexible use will promote innovation and best enable licensees to resolve any technical issues associated with the new 600 MHz Band.[2091] Other commenters uniformly support this approach.[2092] Adopting flexible-use service rules, moreover, is consistent with prior Congressional and Commission actions that promote allocating spectrum for flexible use.[2093]

(ii) Regulatory Framework

742. *Background.* The Spectrum Act provides that new initial licenses for spectrum voluntarily relinquished through incentive auction will be subject to flexible-use service rules.[2094] The Commission proposed to license the 600 MHz Band under the Part 27 rules, and asked commenters to

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[2084] *See* § III.A.2.d (Market Variation).

[2085] 47 C.F.R. § 2.106.

[2086] *NPRM*, 27 FCC Rcd at 12481, para. 375.

[2087] *Id.*; *see* Spectrum Act § 6402.

[2088] *NPRM*, 27 FCC Rcd at 12481, para. 376.

[2089] *Id.* at para. 375. Section 303(y) provides the Commission with authority to provide for flexibility of use. Balanced Budget Act of 1997, Pub. L. No. 105-33,111 Stat. 251, 268-69 (1997); 47 U.S.C. § 303(y).

[2090] Spectrum Act § 6402.

[2091] CEA Comments at 16, 21.

[2092] *See, e.g.,* CTIA Comments at 14 (supporting the allocation of 600 MHz spectrum for flexible use by fixed and mobile services); Verizon Comments at 58-60, Verizon Reply at 50 (supporting the Commission's flexible use proposal). *See also* § VI.B.2.a.ii-iii (Regulatory Framework and Regulatory Status).

[2093] *See, e.g.*, 47 U.S.C. § 303(y); *AWS-4 Report and Order*, 27 FCC Rcd at 16186, para. 220; *H Block Report and Order*, 28 FCC Rcd at 9490-91, paras. 15-16; *AWS-3 Report and Order* at para. 112.

[2094] *See* Spectrum Act § 6402. *See also* § III.A (600 MHz Band Plan).

address the associated costs and benefits of doing so.[2095] Part 27 does not prescribe a comprehensive set of licensing and operating rules for services, but instead defines the permissible uses of spectrum and any limitations thereon, and specifies basic licensing requirements.[2096]

743. *Discussion.* In accordance with Congress's direction that new initial licenses made available through incentive auctions be subject to flexible use service rules, we will license the 600 MHz Band under Part 27. We received no comments on this proposal. The Part 27 rules provide a broad and flexible regulatory framework for licensing spectrum, enabling the spectrum to be used for a wide variety of broadband services, thereby promoting innovation and efficient use.

(iii) Regulatory Status

744. *Background.* In the *NPRM*, the Commission proposed to apply the regulatory status provisions of section 27.10 of the Commission's rules to 600 MHz Band licensees.[2097] Specifically, section 27.10 requires license applicants to identify the regulatory status of the services they intend to provide, and permits applicants and licensees to request common carrier status, non-common carrier status, private internal communications status, or a combination of these options, for authorization in a single license (or to switch between them).[2098] The Commission also proposed that if a licensee changes the service or services it offers such that its regulatory status would change, it must notify the Commission within 30 days of the change.[2099]

745. *Discussion.* We adopt the proposal to apply section 27.10 of our rules to the 600 MHz Band. Under this flexible regulatory approach, 600 MHz Band licensees may provide common carrier, non-common carrier, private internal communications or any combination of these services, so long as the provision of service otherwise complies with applicable service rules.[2100] This broad licensing framework is likely to achieve efficiencies in the licensing and administrative process and will provide flexibility to the marketplace, thus encouraging licensees to develop new and innovative services. Moreover, by applying this requirement to 600 MHz Band licensees, they will receive the same regulatory treatment as other Part 27 licensees subject to this rule.[2101] Although no commenters directly address this issue, commenters do support increased regulatory flexibility generally.[2102] This approach is in the public interest and its benefits outweigh any potential costs.

746. We remind potential applicants that an election to provide service on a common carrier basis requires that the elements of common carriage be present;[2103] otherwise the applicant must choose non-common carrier status.[2104] If a potential licensee is unsure of the nature of its services and whether classification as common carrier is appropriate, it may submit a petition with its application, or at any

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[2095] *NPRM*, 27 FCC Rcd at 12482, para. 377.

[2096] *Id*.

[2097] *Id.* at para. 378.

[2098] *See* 47 C.F.R. § 27.10; *Part 27 R&O*, 12 FCC Rcd at 10846–48, paras. 119–22.

[2099] *NPRM*, 27 FCC Rcd at 12482, para. 379.

[2100] *See* 47 C.F.R. § 27.10. *See also* FCC Form 601.

[2101] *See, e.g.*, *AWS-4 Report and Order,* 27 FCC Rcd at 16190, para. 231; *H Block Report and Order*, 28 FCC Rcd at 9552, para. 176; *AWS-3 Report and Order* at para. 116.

[2102] *See* § VI.B.2.a.i (Flexible Use).

[2103] *See* 47 U.S.C. § 153(44) ("A telecommunications carrier shall be treated as a common carrier under this Act"); *see also* 47 U.S.C. § 332(c)(1)(A) ("A person engaged in the provision of a service that is a commercial mobile service shall, insofar as such person is so engaged, be treated as a common carrier for purposes of this Act").

[2104] *See Part 27 R&O*, 12 FCC Rcd at 10848, paras. 121-22.

time, requesting clarification and including service descriptions for that purpose.[2105]

747. Consistent with the Commission's proposal in the *NPRM*,[2106] we adopt for the 600 MHz Band the Part 27 requirement that if a licensee elects to change the service or services it offers such that its regulatory status would change, it must notify the Commission and must do so within 30 days of making the change.[2107] A change in the licensee's regulatory status will not require prior Commission authorization, provided the licensee is in compliance with the foreign ownership requirements of section 310(b) of the Communications Act that apply as a result of the change.[2108] We note, however, that a different time period (other than 30 days) may apply, as determined by the Commission, where the change results in the discontinuance, reduction, or impairment of the existing service.[2109]

b. License Restrictions

(i) Eligibility

748. *Background.* Section 6404 of the Spectrum Act amends section 309(j) to bar the FCC from "prevent[ing] a person from participating in a system of competitive bidding" if such person complies with auction procedures and satisfies specified qualifications criteria.[2110] It also provides, however, that the Commission retains its authority "to adopt and enforce rules of general applicability, including rules concerning spectrum aggregation that promote competition."[2111] In the *NPRM*, the FCC proposed to adopt an open eligibility standard for the 600 MHz Band.[2112] The Commission explained that opening the 600 MHz Band to as wide a range of licensees as possible would encourage efforts to develop new technologies, products, and services, while helping to ensure efficient use of this spectrum.[2113]

749. *Discussion*. We adopt the proposed open eligibility standard.[2114] Commenters that support our adoption of open eligibility for the 600 MHz Band do so largely on the basis that large, diverse participation will foster innovation, competition, spectrum reclamation and maximization of spectrum use.[2115] Open eligibility for the 600 MHz Band is consistent with our statutory mandate to promote the development and rapid deployment of new technologies, products, and services; economic opportunity and competition; and the efficient and intensive use of the electromagnetic spectrum.[2116] Therefore, the potential benefits of open eligibility for the 600 MHz Band outweigh any potential costs.

750. Open eligibility is a threshold matter in determining access to spectrum. Our adoption of open eligibility in no way restricts or preempts other statutory requirements that may limit access to

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[2105] *See id.* at para. 121.

[2106] *NPRM*, 27 FCC Rcd at 12482, para. 379.

[2107] *See* 47 C.F.R. § 27.10(d). *See also* 47 C.F.R. § 27.66 (directing a licensee to notify the Commission if it elects to change its services such that its regulatory status would change).

[2108] 47 U.S.C. § 310(b); *see* § VI.B.2.b.ii (Foreign Ownership).

[2109] *See* 47 C.F.R. § 27.66.

[2110] Spectrum Act § 6404.

[2111] *Id*.

[2112] *NPRM,* 27 FCC Rcd at 12483, para. 381.

[2113] *Id*.

[2114] *Id*. *See also* Spectrum Act § 6404; 47 U.S.C. § 309(j)(3)(B).

[2115] *See, e.g.,* TIA Comments at 16-17; CEA Comments at 12-16; TechFreedom Reply at 2-4; Mobile Future Reply at 7.

[2116] *See* 47 U.S.C. § 309(j)(3)(A), (B), & D.

spectrum, such as foreign ownership[2117] and character qualifications.[2118]

751. In that regard, we take this opportunity to clarify that adopting open eligibility for the 600 MHz Band is not inconsistent with the spectrum aggregation rules we establish in the *MSH Report and Order*.[2119] Some commenters conflate the open eligibility issue with the issue of whether the Commission should apply a mobile spectrum holdings limit with respect to the 600 MHz auction. For example, in advocating for open eligibility, EOBC asserts that the Commission must first find that there is a significant likelihood of substantial harm before it can establish a mobile spectrum holding limit and argues that "the Commission should avoid imposing any spectrum aggregation constraints on participants' eligibility in any spectrum auction."[2120] Similarly, TIA and Mobile Future suggest that any limit on open eligibility would be inconsistent with the Spectrum Act.[2121] In contrast, KSW and Sprint suggest in their comments that an initial eligibility determination involves issues distinct from the policy considerations related to mobile spectrum holdings limits like the reserved spectrum approach we adopt in the *MSH Report and Order*.[2122] Specifically, KSW and Sprint assert that if the Commission adopts open eligibility it also should constrain the ability of the largest carriers to dominate the 600 MHz auction.[2123]

752. The Commission's precedent regarding open eligibility for bidding at auction for mobile wireless licenses generally has focused on whether it was necessary to restrict the eligibility of a firmly established regulatory class of entities.[2124] In contrast, our focus in adopting a mobile spectrum holdings limit in the *MSH Report and Order* is on a class of entities that, through their substantial existing holdings of below-1-GHz spectrum and potential acquisition of a significant portion of the 600 MHz Band in a particular geographic area, could hamper competition in the mobile wireless service market. This is a

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[2117] *See id.* § 310.

[2118] *See id.* § 308(b).

[2119] *See MSH Report and Order* at § V.B (600 MHz Band Incentive Auction).

[2120] Letter from Richard J. Bodorff, Counsel for Expanding Opportunities for Broadcasters Coalition, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-268 at 2-3 (filed Mar. 4, 2013); *see also* EOBC Comments, WT Docket No. 12-269, Att. at 15-16 (filed Nov. 4, 2013) (equating an industry-wide spectrum aggregation limitation with an eligibility restriction).

[2121] *See* TIA Comments at 16-17 (stating that an auction design that would limit "bidder eligibility" would violate the Spectrum Act by depressing auction revenue and, for this reason, the Commission "should adopt the Notice's proposal for an open eligibility standard for the forward auction"); Mobile Future Reply at 7 (asserting that the open eligibility standard is consistent with the Spectrum Act's mandates). To the extent that parties argue that a limitation on the amount of mobile spectrum that one mobile wireless provider may aggregate is inconsistent with the prohibition against prevention of participation in a system of competitive bidding contained in § 6404 of the Spectrum Act, or otherwise contravenes any of the overarching objectives of the Spectrum Act, we address those arguments in the context of describing and assessing our legal authority in the *MSH Report and Order* at § V.B (600 MHz Band Incentive Auction).

[2122] KSW Reply at 4 ("Should the Commission determine that its statutorily mandated obligations can best be met by defining initial eligibility broadly, the Commission then must determine how to prevent very broad eligibility to participate from realistically and effectively crushing others' opportunity to compete effectively in the auction – and the Commission's very ability to comply with its governing statute"); Sprint Reply at 11-12 (arguing that open eligibility without limits or set asides could lead to diminish auction participation and revenue).

[2123] *See* KSW Reply at 3; Sprint Reply at 11-12.

[2124] For example, the Commission restricted the eligibility of incumbent local exchange carriers to bid on LMDS licenses, finding that this determination met the standard that eligibility restrictions may be imposed on licenses only when open eligibility would pose a significant likelihood of substantial harm to competition in specific markets and when an eligibility restriction would be effective in eliminating that harm. *See Rulemaking To Amend Parts 1, 2, 21, and 25 of the Commission's Rules To Redesignate the 27.5-29.5 GHz Frequency Band*, CC Docket No. 92-297, *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545, 12614-15 at paras. 157-159 (1997).

transient, open class of entities – any entity could enter or exit this class based solely on the amount of its below-1-GHz spectrum holdings in a particular geographic area or the geographic scope of its coverage. The Commission previously has recognized this type of distinction, between open eligibility and the CMRS spectrum cap (until its elimination in 2001) or other CMRS spectrum aggregation limits.[2125] Here, although it is not necessary to restrict auction eligibility of a closed class of entities, we do find it necessary to apply a limit on the amount of 600 MHz spectrum that can be acquired at the forward auction by any entity with substantial existing holdings of below-1-GHz spectrum in a particular geographic area, depending upon the geographic scope of its coverage. Though we acknowledge that on occasion the Commission's description of the scope of its open eligibility standard might not have been precise,[2126] we take the opportunity to clarify that mobile spectrum holding limitations are not eligibility restrictions to which the open eligibility standard applies.

753. In addition, even if the mobile spectrum holdings limit we adopt in the *MSH Report and Order* were to be considered a restriction on open eligibility, this limit meets the standard that open eligibility would pose a significant likelihood of substantial harm to competition in specific markets and an eligibility restriction would be effective in eliminating that harm.

754. In sum, we see no record evidence that would persuade us that our approach is inconsistent with our past framework for assessing eligibility matters and, in any event, we clarify our open eligibility approach going forward.

(ii) Foreign Ownership

755. *Background.* In the *NPRM*, the Commission observed that sections 310(a) and 310(b) of the Communications Act impose foreign ownership and citizenship requirements that restrict the issuance of licenses to certain applicants.[2127] The Commission proposed to apply section 27.12 of the Commission's rules, which implements section 310, to applicants for wireless communications services licenses in the 600 MHz Band.[2128] With respect to filing applications, the Commission proposed that all applicants provide the same foreign ownership information, which covers both sections 310(a) and 310(b), regardless of whether they propose to provide common carrier or non-common carrier service in the Band.[2129] The Commission sought comment on this proposal, including the associated costs and

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[2125] *Amendment of the Commission's Rules to Establish Part 27*, Report and Order, 12 FCC Rcd 10785, paras. 80-91 (1997) (separately addressing question of open eligibility for the Wireless Communciations Service from question of whether to extend then existing CMRS spectrum cap to WCS licenses); *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, Notice of Proposed Rulemaking and Notice of Inquiry, 27 FCC Rcd 3561, paras. 108-11 (2012) (separate questions regarding open eligibility for AWS-4 licenses and applicability of spectrum aggregation policies to acquisition of AWS-4 licenses).

[2126] For example, in the context of the proposed "Air-to-Ground" rulemaking, where the Commission similarly recognized a distinction between open eligibility and spectrum aggregation limits, the Commission may have contributed to the ambiguity surrounding the definition of open eligibility when it suggested in a footnote that open eligibility is an "unrestricted eligibility approach for licensing spectrum [under which] the Commission does not exclude any potential applicants because of the amount of spectrum they already control, as such exclusions in these instances are deemed to be unnecessary for ensuring competition." *See Expanding Access to Broadband and Encouraging Innovation through Establishment of an Air-to-Ground Mobile Broadband Secondary Service for Passengers Aboard Aircraft in the 14.0-14.5 GHz Band*, GN Docket No. 13-114, Notice of Proposed Rulemaking, 28 FCC Rcd 6765, 6785, paras. 67-68 and n.101 (2013).

[2127] *See NPRM*, 27 FCC Rcd at 12482-83, para. 380.

[2128] *See id*. *See also* 47 C.F.R. 27.12 (stating that, except as provided in certain other Part 27 rules, any entity other than those precluded by § 310 is eligible to hold a license).

[2129] *See NPRM*, 27 FCC Rcd at 12483, para. 380.

benefits.[2130]

756. *Discussion.* In order to fulfill our statutory obligations under section 310 of the Communications Act, all 600 MHz Band applicants and licensees shall be subject to the provisions of section 27.12 of the Commission's rules.[2131] All such entities are subject to section 310(a), which prohibits licenses from being "granted to or held by any foreign government or the representative thereof."[2132] In addition, any applicant or licensee that would provide a common carrier, aeronautical en route, or aeronautical fixed service would also be subject to the foreign ownership and citizenship requirements of section 310(b).[2133]

757. No parties comment on the Commission's proposal to require all 600 MHz Band applicants and licensees to provide the same foreign ownership information in their filings, regardless of the type of service the licensee would provide using its authorization. Applicants for this Band should not be subject to different obligations in reporting their foreign ownership based on the type of service authorization requested in the application, and the benefits of a uniform approach outweigh any potential costs. Therefore, we will require all 600 MHz Band applicants and licensees to provide the same foreign ownership information, which covers both sections 310(a) and 310(b), regardless of which wireless communications service they propose to provide in the Band. We expect, however, that we would be unlikely to deny a license to an applicant requesting to provide services exclusively that are not subject to section 310(b), solely because its foreign ownership would disqualify it from receiving a license if the applicant had applied for authority to provide section 310(b) services. However, if any such licensee later desires to provide any services that are subject to the restrictions in section 310(b), we would require that licensee to apply to the Commission for an amended license, and we would consider issues related to foreign ownership at that time.

c. License Term, Performance Requirements, Renewal Criteria, and Permanent Discontinuance of Operations

(i) License Term

758. *Background.* In the *NPRM*, the Commission proposed a 10-year term for 600 MHz Band wireless licenses. It also proposed that if a license is partitioned or disaggregated, any partitionee or disaggregatee would be authorized to hold its license for the remainder of the partitioner or disaggregator's original license term.[2134] The Commission sought comment on these proposals, including the costs and benefits of adopting them.[2135]

759. *Discussion.* In recognition of the Post-Auction Transition Period that will occur after the completion of the incentive auction, we adopt an initial license term of 12 years for 600 MHz Band licenses, and a term of 10 years for any subsequent license renewals. In addition, in the event that a license is partitioned or disaggregated, any partitionee or disaggregatee will be authorized to hold its license for the remainder of the partitioner or disaggregator's license term, consistent with the existing

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[2130] *See id.*

[2131] 47 C.F.R. § 27.12. *See also Foreign Ownership Second R&O*, FCC 13-50, 28 FCC Rcd 5741 (modifying the policies and procedures that apply to foreign ownership of common carrier, aeronautical en route, and aeronautical fixed radio station licensees pursuant to §§ 310(b)(3) and 310(b)(4) of the Communications Act). The rules adopted in the *Foreign Ownership Second R&O* became effective August 9, 2013.

[2132] 47 U.S.C. § 310(a).

[2133] *Id.* § 310(b).

[2134] *NPRM*, 27 FCC Rcd at 12487, paras. 392-93.

[2135] *NPRM*, 27 FCC Rcd at 12487, paras. 392-93. No party commented on the costs or benefits of a 10-year license term, specifically.

Part 27 rule.[2136] Accordingly, we modify sections 27.13 and 27.15 of the Commission's rules to reflect these determinations.

760. The Communications Act does not require a specific term for non-broadcast spectrum licenses.[2137] The Commission has typically adopted 10-year license terms for Part 27 services,[2138] but has also found, as in the case of AWS-1 licenses and AWS-3 licenses, a longer initial term to be in the public interest.[2139] Further, commenters generally support at least a 10-year license term.[2140] Given the complexities and timing of clearing broadcast operations in this Band, we agree with US Cellular that a longer initial license term is appropriate.[2141] Consequently, adopting a 12-year initial license term is in the public interest and the associated benefits outweigh any potential costs.

761. A 12-year license initial term will provide wireless licensees with sufficient time to plan and launch operations. As explained in Section V (Post-Incentive Auction Transition), following the incentive auction, broadcast television licensees will have, at most, 39 months to transition off channels that are repurposed for flexible use licenses sold at the forward auction.[2142] While we expect that during that period, 600 MHz Band wireless licensees can plan and begin building operations, they will not have unfettered access to the repurposed spectrum won at the forward auction until broadcast television licensees have ceased operating on those channels.[2143] Extending the Commission's typical license term by two years, to provide an initial license term of 12 years for the 600 MHz Band licenses, is the best way to accommodate the necessary broadcast transition while retaining the proper incentives for 600 MHz Band licensees to rapidly deploy wireless services in the Band.

762. We decline to adopt alternative proposals by US Cellular.[2144] With respect to its proposal for 15-year initial license terms, we observe that the Post-Auction Transition Period begins prior to wireless providers' receiving their licenses.[2145] Therefore, a 12-year initial term adequately compensates for this transition, but a 15-year initial term would be unnecessarily long. With respect to US Cellular's proposal that we adopt a 10-year license term, but do not commence the initial license term until broadcast television licensees have ceased operating on the repurposed spectrum, such a plan would

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[2136] *See* 47 C.F.R. 27.15(c). Verizon and CTIA support the Commission's proposals to adopt the Part 27 partitioning and disaggregation rules, and to permit spectrum leasing. *See* Verizon Comments at 64; CTIA Comments at 37-38; *see also* § VI.B.2.d.ii (Partitioning and Disaggregation).

[2137] The only statutory limit on license terms is eight years for licenses in the broadcast services. *See* 47 U.S.C. § 307(c)(1); *see also* 47 C.F.R. § 73.1020(a).

[2138] *See* 47 C.F.R. § 27.13, describing initial license terms for licensees in 2305-2320 MHz and 2345-2360 MHz Bands (not to exceed 10 years), 698-758 MHz and 776-788 MHz Bands (not to exceed 10 years, generally), 1390-1392 MHz Band (not to exceed 10 years), 1392-1395 MHz and 1432-1435 MHz Bands (not to exceed 10 years), 1670-1675 MHz Band (not to exceed 10 years).

[2139] *See, e.g.*, *AWS-1 R&O*, 18 FCC Rcd at 25190, para. 70 (relocation of government operations warrant 15-year initial license term for licenses issued before 2010, with 10-year terms thereafter); *AWS-3 Report and Order* at para. 131 (transition of government operations warrant 12-year initial license term).

[2140] *See, e.g.*, Verizon Comments at 64; US Cellular Comments at 34-36.

[2141] US Cellular Comments at 34-36.

[2142] *See* § V.C.2 (Construction Schedule and Deadlines).

[2143] *See* § V.C.2 (Construction Schedule and Deadlines).

[2144] US Cellular Comments at 34-36; Letter from Leighton T. Brown, Counsel for US Cellular, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 17 (filed Jul. 15, 2013).

[2145] *See* § V.C (Transition Procedures for Television Stations and Reimbursement Procedures for Television Stations and MVPDs). Wireless licensees receive their licenses not at auction completion, but after a period of time following the close of the auction to allow for license applications to be filed, processed, and reviewed to ensure that the applicant meets the applicable qualifications to hold the license.

create uncertainty, would be difficult to administer, and would be difficult for licensees and other interested parties to monitor and implement. In addition, because these broadcast television licensees are transitioning off the repurposed spectrum on a rolling basis, we see no need to delay 600 MHz Band licensees' access until all broadcast operations in the 600 MHz Band cease. Moreover, we must issue 600 MHz Band licenses promptly in order to fund the TV Broadcaster Relocation Fund that will be used to compensate relocating broadcast operations. Delaying the start of the initial wireless license term until broadcast operations have been cleared could delay wireless deployment and undermine the regulatory incentives that our policies are intended to foster.

(ii) Performance Requirements

763. *Background*. In the *NPRM*, the Commission proposed to adopt specific, quantifiable performance requirements for the 600 MHz Band to ensure that licensees begin providing service to consumers in a timely manner. It proposed to measure build-out progress using a population-based benchmark within each license area, and sought comment on an alternative geography-based benchmark; it also sought comment on whether it should adopt an interim benchmark, an end-of-term benchmark, and/or multiple benchmarks throughout the license term.[2146] In addition, in the *NPRM* the Commission sought comment on whether performance requirements are necessary for service areas within the Gulf of Mexico.[2147] Along with performance benchmarks, the Commission noted that there must be meaningful and enforceable consequences, or penalties, for failing to meet construction requirements. Toward that end, the Commission also sought comment on a number of different penalties, seeking input on which set of incentives would most effectively ensure timely build-out in this Band.[2148]

764. *Discussion*. We establish performance requirements to promote the productive use of spectrum, to encourage licensees to provide service to customers in a timely manner, and to promote the provision of innovative services in unserved areas, particularly rural areas.[2149] Over the years, the Commission has tailored performance and construction requirements with an eye to the unique characteristics of individual frequency bands and the types of services expected, among other factors. The performance requirements we adopt for the 600 MHz Band are consistent with those the Commission has adopted for similar spectrum bands,[2150] while taking into account certain exceptional circumstances related to the conduct of the incentive auction, including the timing for the transition of this spectrum from broadcast use to flexible wireless use.[2151] These requirements will ensure that the 600 MHz Band spectrum is put to use expeditiously while providing 600 MHz Band licensees with flexibility to deploy services according to their business plans. Specifically, we adopt the following:

- *600 MHz Band interim build-out requirement*: Within six (6) years of initial license grant, a licensee shall provide reliable signal coverage and offer wireless service to at least forty (40) percent of the population in each of its license areas.

[2146] *NPRM*, 27 FCC Rcd at 12488, paras. 395, 397.

[2147] *NPRM*, 27 FCC Rcd at 12411-12, para. 150.

[2148] *Id.* at 12489-91, paras. 398-406. In the *NPRM*, the Commission sought comment on implementing a range of penalties for failing to meet both interim and final build-out requirements in the 600 MHz Band, including following the approaches used for other spectrum bands, such as broadband PCS, and upper 700 MHz, and also sought comment on some novel approaches, including a "triggered keep-what-you-use," "use it or lease it," and "use it or share it" approach. *NPRM*, 27 FCC Rcd at 12489-91, paras. 398-406.

[2149] *See 700 MHz Second R&O*, 22 FCC Rcd at 15348, para. 154.

[2150] *See, e.g., H-Block Report and Order*, 28 FCC Rcd at 19558-66, paras. 195-217; *AWS-4 Report and Order*, 27 FCC Rcd at 16173-82, paras. 187-208; *700 MHz Second R&O*, 22 FCC Rcd at 15348-55, paras. 153-77.

[2151] As noted in the Partitioning and Disaggregation Section, the performance requirements we adopt also apply to disaggregated spectrum or partitioned geographic service areas. *See* § VI.B.2.d.ii (Partitioning and Disaggregation). *See* 47 C.F.R. § 27.15(d) (addressing compliance with construction requirements).

- *600 MHz Band final build-out requirement*: Within twelve (12) years of initial license grant (or at the end of the license term[2152]), a licensee shall provide reliable signal coverage and offer wireless service to at least seventy-five (75) percent of the population in each of its license areas.

765. We also adopt the following penalties for failing to meet the build-out benchmarks:

- *Failure to meet 600 MHz Band interim build-out requirement*: Where a licensee fails to meet the interim build-out requirement in any license area, the final build-out requirement and initial license term for that license shall be accelerated by two years (from 12 to 10).
- *Failure to meet 600 MHz Band final build-out requirement*: Where a licensee fails to meet the final build-out requirement for any license area, its authorization for that license area shall terminate automatically without further Commission action, and the licensee will be unable to regain the license.

766. We explain below the rationale for and public benefits of imposing these performance requirements. Those benefits outweigh any perceived costs of adopting performance benchmarks and penalties for failure to meet those requirements. We also discuss below how we will measure build-out in the Gulf of Mexico.

767. *Population-Based Benchmark, per PEA License Area*. Supported by a number of comments in the record, we adopt the proposal to use objective, population-based interim and final construction benchmarks, which will be measured per license area.[2153] Requiring 600 MHz Band licensees to meet these performance benchmarks will promote rapid deployment of new broadband services to the American public, and at the same time provide licensees with certainty regarding their construction obligations. We agree with CCA and MetroPCS that, for the 600 MHz Band, measuring build-out by percentage of population served "provides a clear metric that will promote efficient deployment."[2154]

768. We are not persuaded by arguments that our build-out requirements must be geography-based, or include a geographic component, in order to ensure that less densely populated, often rural, communities have timely access to the most advanced mobile broadband services.[2155] We agree that it is

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[2152] If a licensee fails to meet the interim benchmark, the final benchmark and initial license term are accelerated by two years– from 12 to 10 years. *See* para. 774 (discussing interim benchmark performance requirement penalties).

[2153] *See*, *e.g.*, Verizon Comments at 65; Verizon Reply at 46-47; MetroPCS Comments at 24; CCA Reply at 14-15; US Cellular Comments at 44-46; US Cellular Reply at 33-34; WGAW Comments at 9; McBride *Band Plan PN* Reply at 7.

[2154] CCA Comments at 17; MetroPCS Comments at 24 (arguing that a population-based build-out requirement is a far more accurate measure of useful coverage in a market than a geographic-based requirement). US Cellular argues that geography-based requirements could cause economically irrational behavior because "licensees would be forced to divert capital into areas where it is uneconomic to provide additional services, thereby depriving investment where it would otherwise be more likely to produce benefits." US Cellular Comments at 44. *See also* US Cellular Reply at 34 (stating that geographic-based build-out requirements can force carriers to build systems where no population exists); Verizon Reply at 46-47 (arguing that a geographic-based requirement in rural areas is not necessary).

[2155] *See, e.g.*, CCA Comments at 17 (arguing that the Commission should consider a geographic component to its build-out requirements, particularly in rural areas); CCA Reply at 15; WGAW Comments at 9 (arguing that the Commission should consider how to make sure license holders develop services in rural parts of geographic license areas); C Spire Comments at 9-10. *But see* US Cellular Comments at 17-18 (stating that if the Commission adopts population-based build-out requirements, licensees of large service areas could meet these benchmarks by focusing almost exclusively on urban areas, which would withhold the potential benefits of this new spectrum from rural areas); MetroPCS Comments at 24 (arguing that a population-based build-out requirement "is a far more accurate

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important to promote rapid broadband deployment in rural areas. In fact, section 309(j)(4)(B) of the Communications Act requires that the Commission "include performance requirements, such as appropriate deadlines and penalties for performance failures, to ensure prompt delivery of service to rural areas."[2156] Adopting relatively small, PEA service areas, and requiring licensees to meet challenging population-based benchmarks in each individual license area separately, strikes an appropriate balance between providing flexibility to 600 MHz Band licensees to deploy their networks in a cost-effective manner and assertively promoting deployment of service to less densely populated areas. Therefore, we reject commenters' proposals to measure build-out geographically or through a combination of population and geography.[2157] Our decision to require population-based benchmarks in this Band does not foreclose our ability to impose geographic-based benchmarks in other spectrum bands that may warrant different considerations.[2158]

769. Further, we reject Verizon's request that we measure compliance with the interim benchmark in the aggregate, i.e., by summing the population of all of a licensee's authorizations in the 600 MHz Band.[2159] Creating benchmarks on a per-license basis, rather than in the aggregate, is consistent with our build-out requirements in other, similar spectrum bands.[2160] In addition, measuring benchmarks on a per-license basis is consistent with our determination to license service on a geographic basis and holds a licensee accountable for meeting performance obligations for all of the licenses (including partitioned licenses) that it holds. Thus, a per-license approach allows for more flexibility and certainty. For example, should a licensee partition some of a 600 MHz Band license area, a percentage-based approach would apply to each partitioned license. In contrast, it is not clear how the responsibility for meeting benchmarks for partitioned and disaggregated licenses would be handled under Verizon's proposal.

770. *Interim Benchmark*. Requiring an interim milestone is supported by the record and serves the public interest. A 40 percent build-out per license area benchmark is consistent with the interim benchmarks established in other bands[2161] and similar to various proposals suggested by commenters. Verizon proposes adopting a build-out requirement of 40 percent of the population within four years.[2162] US Cellular suggests we require licensees to meet the interim build-out benchmark by

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measure of useful coverage in a market, as opposed to an arbitrary geographic percentage determined by regulatory fiat.").

[2156] 47 U.S.C. § 309(j)(4)(B).

[2157] *See*, *e.g.*, C Spire Reply at 7-8 (proposing that licensees offer service to 35 percent of each geographic license area after four years and 70 percent of each geographic license area after 10 years); CCA Comments at 17 (arguing that the Commission should consider a geographic component to its build-out requirements, particularly in rural areas).

[2158] For example, we observe that the Commission established geographic-based performance requirements for the 700 MHz B Block in light of technical characteristics and the CMA geographic license area size specific to that band. *See 700 MHz Second R&O*, 22 FCC Rcd at 15349, paras. 157-58 (adopting geographic-based benchmarks).

[2159] Verizon Comments at 65.

[2160] *See, e.g., H Block Report and Order*, 28 FCC Rcd at 9558, para. 195; *700 MHz Second R&O*, 22 FCC Rcd at 15348-49, paras. 153-55.

[2161] *See, e.g., AWS-3 Report and Order* at para. 135; *H Block Report and Order*, 28 FCC Rcd at 9558, para. 195; *AWS-4 Report and Order,* 27 FCC Rcd at 16174, para. 187; *700 MHz Second R&O*, 22 FCC Rcd 15351, para. 162.

[2162] Verizon Comments at 65 (40 percent interim population benchmark would cover all of a licensee's authorizations in the 600 MHz Band rather than per license). *See also* Capitol Reply at 15-16 (arguing that it would be reasonable for the Commission to require winning bidders to put spectrum to use within four years following the close of the forward auction); *see also* C Spire Comments at 9-10; C Spire Reply at 7-8 (proposing four-year interim benchmark, based on geography); McBride *Band Plan PN* Reply at 7 (arguing that the Commission should
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covering 35 percent of the population within five years.[2163] Setting the interim benchmark of 40 percent at six years addresses commenters' concerns over taking into account the broadcast transition.[2164]

771. Several commenters ask that we base our build-out benchmarks on the date that the broadcast repacking is completed and the 600 MHz Band is cleared.[2165] We decline to do so. Instead, the interim build-out benchmark is six years from the grant of the license, which should adequately account for the Post-Auction Transition Period.[2166] Given that no broadcast television licensee will be permitted to operate on its pre-auction channel after the 39-month Post-Auction Transition Period regardless of whether they have completed construction and have begun operating on their new channel,[2167] 600 MHz Band licensees should have sufficient time to deploy their networks to meet the interim benchmark.[2168] Further, setting a date certain that is tied to initial grant of the 600 MHz Band license will provide greater certainty to 600 MHz Band licensees, their investors, and other interested parties. This does not mean, however, that a 600 MHz Band licensee must wait for the entire broadcast transition to be completed; a 600 MHz Band licensee can begin operating in a specific license area as soon as the broadcast television licensees have ceased operations in that license area.[2169]

772. We disagree with the few commenters that argue that interim construction benchmarks are unnecessary because licensees already have commercial incentives to rapidly deploy their networks.[2170] While such commercial incentives may exist in many market areas, the per-license approach will help to ensure that build-out progresses appropriately in all license areas. Some commenters also assert that benchmarks unfairly favor large carriers and incumbents because they are able to spread the economic construction cost over a greater number of subscribers than smaller carriers and new entrants.[2171] We disagree. The Commission noted in the *NPRM* that the propagation characteristics of the 600 MHz Band should allow for robust coverage at a lower cost than some other comparable bands.[2172] The interim benchmark we adopt in this Order will provide all licensees with an

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maximize the number of small carriers that can win licenses in the auction by creating "start-up and small business build-out requirements based on the population covered by the end of 10 year license").

[2163] US Cellular Comments at 47-48; US Cellular Reply at 35.

[2164] CTIA Comments at 39. *See also* Nokia Comments at 20-21 (arguing that build-out deadlines should be based on the actual date licenses are cleared); Verizon Reply at 47 (arguing that construction deadlines must account for the need for repacked and exiting broadcast television licensees to cease operations in the 600 MHz Band).

[2165] CTIA Comments at 39; Nokia Comments at 20-21; US Cellular Comments at 47; US Cellular Reply at 35.

[2166] *See* § V.C (Transition Procedures for Television Stations and Reimbursement Procedures for Television Stations and MVPDs). *See also AWS-3 Report and Order* at para. 143 (interim build-out benchmark set at six years to accommodate government transition).

[2167] *See* § V.C.2 (Construction Schedule and Deadlines).

[2168] Further, wireless licensees can make use of the spectrum (for testing, etc.) in coordination with broadcast television licensees during the 39-month transition period. *See* § V.C (Transition Procedures for Television Stations and Reimbursement Procedures for Television Stations and MVPDs).

[2169] *See* § V.C (Transition Procedures for Television Stations and Reimbursement Procedures for Television Stations and MVPDs).

[2170] *See, e.g.*, MetroPCS Comments at 22 (interim benchmarks are "unnecessary" and "counterproductive" because license holders have a "market imperative to roll out service over a license area as promptly as is commercially reasonable"); *but see* WGAW Comments at 9 (multiple, quantifiable benchmarks ensure adequate build-out).

[2171] MetroPCS Comments at 22-23. *See also* US Cellular Comments at 42-44; US Cellular Reply at 33.

[2172] *NPRM*, 27 FCC Rcd at 12487-88, para. 394 (citing § 6002(b) of the Omnibus Budget Reconciliation Act of 1993, *Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, including Commercial Mobile Services*, WT Docket No. 10-133, Fifteenth Report, 26 FCC Rcd 9664, 9833-37, paras. 292-97 (2011)).

ability to scale networks in a cost efficient manner while also ensuring that the vast majority of the population will have access to wireless broadband services expeditiously.

773. Further, we reject the proposal of commenters who advocate a "substantial service" standard at the end of the license term as the only measurement of performance.[2173] Our purpose is to ensure that timely and robust build-out occurs in this Band, and for the reasons enumerated above, concrete interim and final build-out benchmarks will best facilitate meeting this goal. Further, we note that in recent decisions, the Commission has replaced the substantial service standard with specific interim and final build-out requirements.[2174]

774. *Penalty for Failure to Meet the Interim Benchmark*. As the Commission has done in similar spectrum bands,[2175] where a wireless licensee fails to meet its interim build-out requirement, we accelerate both the time frame to meet the final build-out benchmark and the length of the license term by two years. Several commenters agree that if a licensee fails to meet the interim build-out requirement, we should accelerate the time frame for a licensee's meeting the final build-out requirement,[2176] with some of those same commenters advocating for acceleration of the license term as well.[2177] Because the initial license term is 12 years,[2178] if a licensee fails to meet the interim benchmark, it must complete its final build-out requirement within 10 years, when its license term also expires.

775. *Final Benchmark*. Within 12 years of the initial license grant (or 10 years if the interim benchmark is not met), a licensee shall provide reliable coverage and offer wireless service to at least 75 percent of the population in each of its license areas. Establishing a final build-out benchmark that coincides with the end of the initial license term is consistent with how the Commission has formulated performance requirements in other spectrum bands.[2179] Because we have set the interim benchmark at six years and we have created a 12-year initial license term, Verizon's suggestion that we establish a seven-year final build-out requirement is unduly accelerated and we therefore decline to adopt it.[2180] In addition, the Post-Auction Transition Period renders infeasible Cavell, Mertz's suggestion that a 600 MHz Band wireless licensee be required to construct its new facilities within a year-and-a-half.[2181] Under the circumstances, a 12-year construction milestone provides a reasonable timeframe for a licensee to deploy its network and offer widespread service, provided it meets its interim benchmark. Licensees that do not meet the six-year interim benchmark must accelerate their final build out by two years to meet the final benchmark by the end of their shortened, 10-year license term.

776. *Penalty for Failure to Meet the Final Benchmark*. Where a licensee fails to meet the final build-out requirement in any PEA, its authorization for each PEA in which it fails to meet the

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[2173] *See, e.g.*, MetroPCS Comments at 23-24; US Cellular Comments at 40; US Cellular Reply at 32-33.

[2174] *AWS-4 Report and Order*, 27 FCC Rcd at 16173-74, para. 187; *H Block Report and Order*, 28 FCC Rcd at 9558, para. 195; *AWS-3 Report and Order* at paras. 135, 144.

[2175] *See, e.g., 700 MHz Second R&O*, 22 FCC Rcd at 15351, para. 163; *H Block Report and Order*, 28 FCC Rcd at 9558, para. 195; *AWS-3 Report and Order* at para. 136.

[2176] Verizon Comments at 65 (supports two-year acceleration); WGAW Comments at 9-10 (supports reducing the license term for failing to meet the interim benchmark); US Cellular Comments at 50; US Cellular Reply at 36 (supports one-year acceleration).

[2177] *See* Verizon Comments at 65; WGAW Comments at 9-10.

[2178] *See* § VI.B.2.c.i (License Term).

[2179] *See, e.g.*, *700 MHz Second R&O*, 22 FCC Rcd at 15293, para. 6; *H Block Report and Order*, 28 FCC Rcd at 9558, para. 195; *AWS-3 Report and Order* at para. 135.

[2180] Verizon Comments at 65.

[2181] Cavell, Mertz Comments at 3-4 (arguing that beneficiaries of this new "transition" should be required to be aggressive with their construction).

requirement shall terminate automatically without further Commission action, and the licensee will be prohibited from regaining the license. Automatic license termination with the inability to regain the license is a common remedy for failure to build out Part 27 licenses and is the approach adopted most recently by the Commission in the *AWS-3 Report and Order*.[2182] Terminating only the specific licenses where a licensee fails to meet the final benchmark will not directly affect a licensee's customers in other license areas.[2183] Further, as WGAW points out, cancellation of the license will free up spectrum to an entity that will more likely develop it.[2184] We decline to adopt a "keep-what-you-use" approach or "use it or lease it" or "use it or share it" as penalties for failure to meet construction requirements as some commenters suggest,[2185] because these proposals may encourage less robust build-out by a licensee that decides not to build out to the final benchmark – particularly in rural areas.[2186]

777. As a general matter, we expect that 600 MHz Band licensees will meet the performance requirements because of the serious consequences associated with non-compliance, including automatic license cancellation. Further, we expect that licensees' deployment will generally exceed the levels set forth in the benchmarks, and that these build-out requirements generally represent a floor – not a ceiling. As for US Cellular's assertion that automatic termination is too punitive,[2187] the Commission has previously explained and we state again that automatic termination is not overly punitive or unfair if robust build-out is to be accomplished. It is noteworthy that the Commission has applied this approach to nearly all geographically-licensed wireless services.[2188] Further, the Commission has rejected the argument, and we do so again here, that an automatic termination penalty would deter capital investment,[2189] observing that the wireless industry has invested billions of dollars and has flourished under this paradigm in other spectrum bands.[2190] For the same reason, an automatic termination penalty will have little effect on auction participation, as suggested by US Cellular.[2191] Finally, we do not agree with US Cellular that automatic termination harms the public because, even if a customer loses service from a provider when it loses spectrum rights for a particular license area,[2192] alternative providers may be

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[2182] *AWS-3 Report and Order* at para. 150. 47 C.F.R. § 27.14(r)(4) (AWS-3 Band). *See also* 47 C.F.R. § 27.14(g)(2) (AWS-4 Band) and 47 C.F.R. § 27.14(h)(2) (H Block).

[2183] *See AWS-4 Report and Order*, 27 FCC Rcd at 16180, para. 202; *H Block Report and Order*, 28 FCC Rcd at 9564, para. 211; *AWS-3 Report and Order* at para. 148.

[2184] *See* WGAW Comments at 10 (arguing that the failure to meet an end of term benchmark should result in the cancellation of a license, making the spectrum available to an entity that will develop it).

[2185] Several commenters support a "keep what you use" approach. Capitol Reply at 15-16; NTCA Comments at 5-6; US Cellular Comments at 50-51; US Cellular Reply at 36-37; Verizon Comments at 65-67. A number of commenters support "use it or share it" as a penalty for failing to reach final benchmarks. IEEE 802 Comments at 4; Neul Comments at 7; Google/Microsoft Comments at 45-46; Google Reply at 16-17; WISPA Reply at 17.

[2186] *See* IEEE 802 Comments at 4 (the "use it or lease it" penalty model would further restrict the ability to provide services in rural and remote areas).

[2187] *See* US Cellular Reply at 37-38.

[2188] *See AWS-3 Report and Order* at para. 149; *H Block Report and Order*, 28 FCC Rcd at 9564, para. 212*; AWS-4 Report and Order*, 27 FCC Rcd at 16180, para. 204; *2010 WCS Order*, 25 FCC Rcd at 11796, para. 214; *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band*, WT Docket No. 07-293, IB Docket No. 95-91, Order on Reconsideration, 27 FCC Rcd 13651, 13704, para. 131 (*2012 WCS Order*).

[2189] *See* US Cellular Reply at 37-38.

[2190] *AWS-4 Report and Order*, 27 FCC Rcd at 16180, para. 204 (citing *2010 WCS Order*, 25 FCC Rcd at 11796, para. 214; *2012 WCS Order*, 27 FCC Rcd at 13704, para. 131).

[2191] US Cellular Reply at 38.

[2192] *See* US Cellular Reply at 38.

available. We also expect that a future licensee may ultimately be able to serve more customers for that license area.[2193]

778. *Compliance Procedures*. Having received no comments on the issue, we adopt the proposal in the *NPRM* to apply to the 600 MHz Band the compliance procedures under section 1.946(d) of the Commission's rules. Specifically, this rule states that licensees must demonstrate compliance with their performance requirements by filing a construction notification within 15 days of the relevant milestone certifying that they have met the applicable performance benchmark.[2194] Additionally, consistent with other Part 27 services,[2195] we require that each construction notification include electronic coverage maps and supporting documentation, which must be truthful and accurate and must not omit material information that is necessary for the Commission to determine compliance with its performance requirements.[2196]

779. We emphasize that electronic coverage maps must accurately depict the boundaries of each license area in the licensee's service territory.[2197] If a licensee does not provide reliable signal coverage to an entire PEA, its map must accurately depict the boundaries of the area or areas within each PEA not being served. Each licensee also must file supporting documentation certifying the type of service it is providing for each PEA within its service territory and the type of technology used to provide such service. Supporting documentation must include the assumptions used to create the coverage maps, including the propagation model and the signal strength necessary to provide reliable service with the licensee's technology.

780. The licensee must use the most recently available decennial U.S. Census data at the time of measurement to meet the population-based build-out requirements.[2198] Specifically, a licensee must base its claims of population served on areas no larger than the Census Tract level.[2199] To the extent the Census Tract (or other acceptable identifier) extends beyond the boundaries of a license area, a licensee with authorizations for such areas may only include the population within the Census Tract (or other acceptable identifier) towards meeting the performance requirement of a single, individual license. This requirement tracks the Commission's action requiring broadband service providers to report "snapshots" of broadband service at the Census Tract level twice each year by completing FCC Form 477.[2200]

[2193] *See AWS-4 Report and Order*, 27 FCC Rcd at 16180, para. 204.

[2194] 47 C.F.R. § 1.946(d) ("notification[s] must be filed with Commission within 15 days of the expiration of the applicable construction or coverage period").

[2195] *See AWS-4 Report and Order*, 27 FCC Rcd at 16181, para. 206; *H Block Report and Order*, 28 FCC Rcd at 9565-66, paras. 215-16; *AWS-3 Report and Order* at para. 152.

[2196] *NPRM*, 27 FCC Rcd at 12491, para. 407 (citing 47 C.F.R. § 1.17 (Truthful and accurate statements to the Commission)); 47 C.F.R. § 1.917(c) ("Willful false statements . . . are punishable by fine and imprisonment, 18 U.S.C. 1001, and by appropriate administrative sanctions, including revocation of station license pursuant to 312(a)(1) of the Communications Act of 1934, as amended.").

[2197] *See* 47 C.F.R. § 27.14(p)(7).

[2198] *See id.* § 27.14(h).

[2199] The Census Bureau defines Census Tracts as "small, relatively permanent statistical subdivisions of a county delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program." The entire United States is covered by census tracts. U.S. Census Bureau, http://www.census.gov/geo/reference/gtc/gtc_ct.html (last visited Apr. 9, 2014).

[2200] *See, e.g.*, *Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership*, WC Docket No. 07-38, Report and Order and Further Notice of Proposed Rulemaking, 23 FCC Rcd 9691 (2008). Specifically, the Commission modified FCC Form 477 to require (1) wired, terrestrial fixed wireless, and satellite broadband service providers to

(continued….)

781. *Performance Requirements of Impaired Licenses*. As discussed above, we plan to offer "impaired" licenses in the forward auction, i.e., licenses that contain impairments, or areas within the license area where a wireless licensee may not be able to provide service because it would interfere with a broadcast television licensee's coverage area, or conversely, those license areas in which a wireless provider may receive harmful interference from remaining television operations in or near the 600 MHz Band.[2201] It is important to apply the same performance requirements to all 600 MHz Band wireless licensees to ensure rapid build-out, but we recognize that licensees holding impaired licenses may not be able to build out their entire license area due to the impairments within a particular geographic service area. Thus, for those licensees, section 27.14 will similarly apply, but a licensee with a geographic service area that includes any impairments may meet the build-out benchmarks by providing reliable signal coverage and offering service to the relevant percentages of population in the service area that is not impaired.[2202] To the extent this applies to a licensee's particular impaired license, at the relevant construction benchmarks, a licensee must provide with its construction notification an explanation of why it cannot serve its entire license area and/or meet its performance requirements within the entire license area. The submission must be truthful and accurate and must not omit material information that is necessary for the Commission to determine whether the licensee could have reasonably met its performance requirements for its entire license area.

782. *Gulf of Mexico*. Having received no comments on Gulf of Mexico performance requirements, and recognizing that we are licensing wireless service in the Gulf as a specified PEA, we adopt the same coverage requirements as set forth above, with one exception: we will calculate "population" pursuant to the approach taken in *Small Ventures Memorandum Opinion and Order*.[2203] In that order, the Wireless Bureau recognized that using the conventional Census Tract methodology for determining population in the Gulf of Mexico would be infeasible because the Gulf consists of a body of water with non-permanent, mobile residents.[2204] Consistent with that order, we allow a Gulf of Mexico licensee to use all off-shore platforms, including production, manifold, compression, pumping and valving platforms as a proxy for population in the Gulf of Mexico for purposes of meeting build-out obligations.[2205] Thus, in lieu of measuring its build-out obligations based on population, a licensee serving the Gulf of Mexico shall within six years provide reliable signal coverage and offer wireless service to at least 40 percent of all off-shore platforms in its license area and within 12 years (or at the end of the license term[2206]), provide reliable signal coverage and offer wireless service to at least 75 percent of all off-shore platforms in its license area in the Gulf of Mexico. All penalties and other compliance procedures we adopt, excluding those discussing the methodology for meeting population-based build-out

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report the number of broadband connections in service in individual Census Tracts; and (2) mobile wireless broadband service providers to identify those Census Tracts in which they offer service. *See id*. at 6995-99, paras. 10-16.

[2201] The Spectrum Act requires us to "make all reasonable efforts" to preserve the coverage area and population served of broadcast television licensees. *See* Spectrum Act § 6403(b)(2).

[2202] This approach is consistent with the approach the Commission adopted in the 700 MHz proceeding where for purposes of meeting construction requirements, licensees could exclude areas in their service area to which they could not provide service (in that case, to government lands). *See 700 MHz Second R&O*, 22 FCC Rcd at 15350, para. 160.

[2203] *See Small Ventures USA, LP and Cellco Partnership d/b/a Verizon Wireless Request for Waiver and Applications for Assignment of 700 MHz C Block License*, WT Docket No. 12-373, Memorandum Opinion and Order, 28 FCC Rcd 6569, 6572-73, paras. 9-12 (2013) (*Small Ventures Memorandum Opinion and Order*).

[2204] *See Small Ventures Memorandum Opinion and Order,* 28 FCC Rcd at 6572, para. 11; *see also* n.2199 (Census Tract description).

[2205] *See Small Ventures Memorandum Opinion and Order*, 28 FCC Rcd 6569, 6572-73, paras. 9-12.

[2206] If a licensee fails to meet the interim benchmark, the final benchmark and initial license term are accelerated by two years – from 12 to 10 years.

requirements, shall apply to a 600 MHz Band licensee with respect to its Gulf of Mexico license.

(iii) Renewal Criteria

783. *Background.* Section 308(b) of the Communications Act authorizes the Commission to require renewal applicants to "set forth such facts as the Commission by regulation may prescribe as to the citizenship, character, and financial, technical, and other qualifications of the applicant to operate the station[,]" as well as "such other information as it may require."[2207] In the *NPRM*, the Commission proposed to adopt license renewal requirements consistent with those adopted in the *700 MHz First Report and Order*.[2208] Under those requirements, renewal applicants must file a "renewal showing," in which they demonstrate that they have been and are continuing to provide service to the public, and are compliant with the Communications Act and with the Commission's rules and policies.[2209]

784. In the *NPRM*, the Commission proposed that 600 MHz Band licensees should be awarded renewal expectancies if they meet their performance obligations and otherwise comply with the Commission's rules and policies and the Communications Act throughout their license term.[2210] The Commission also inquired whether licensees should receive renewal expectancy for subsequent license terms if they continue to provide at least the level of service demonstrated at the final performance benchmark through the end of any subsequent license terms.[2211] Finally, the Commission proposed that, consistent with its 700 MHz licensing paradigm, the Commission would prohibit the filing of competing license renewal applications, and that if a license is not renewed, the associated spectrum would be returned to the Commission for assignment.[2212]

785. *Discussion*. Pursuant to section 308(b) of the Communications Act, we will require 600 MHz Band licensees seeking license renewal to file renewal applications; below, we specify the information that renewal applicants must provide to enable the Commission to assess whether renewal is warranted and in the public interest. In addition, where a license is not renewed, the associated spectrum will be returned to the Commission and made available for assignment. Filing competing applications against license renewal applications is not permitted.

786. We apply to 600 MHz Band licensees the same renewal showing requirements we

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[2207] 47 U.S.C. § 308(b). *See also NPRM*, 27 FCC Rcd at 12492, para. 409.

[2208] *NPRM*, 27 FCC Rcd at 12492-93, paras. 409-12; *700 MHz First Report and Order*, 22 FCC Rcd at 8093-94, paras. 75-77.

[2209] *NPRM*, 27 FCC Rcd at 12492, para. 410. The 700 MHz Band renewal showings include: the level and quality of service provided, whether service was ever interrupted or discontinued, whether service has been provided to rural areas, and any other factors associated with a licensee's level of service to the public. *See 700 MHz First Report and Order*, 22 FCC Rcd at 8093, para. 75. *See also AWS-4 Report and Order*, 27 FCC Rcd at 16202, para. 271; *H Block Report and Order*, 28 FCC Rcd at 9567-68, para. 223; AWS-3 Report and Order at para. 158. The Commission proposed the tribal lands renewal requirement in the *WRS Renewals NPRM and Order* (subsequent to the *700 MHz First Report and Order*), and first adopted it in the *AWS-4 Report and Order*. *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112, Notice of Proposed Rulemaking and Order, 25 FCC Rcd 6996, 7043, App. A (2010) (*WRS Renewals NPRM and Order*); *AWS-4 Report and Order*, 27 FCC Rcd at 16202, para. 271.

[2210] *NPRM*, 27 FCC Rcd at 12492, para. 411.

[2211] *Id.* at 12492-93, para. 411.

[2212] *Id.* at 12493, para. 412. *See 700 MHz First Report and Order*, 22 FCC Rcd at 8093-94, paras. 76-77; *see also WRS Renewals NPRM and Order,* 25 FCC Rcd at 6998, 7012-14, paras. 3, 40-44. The Commission also sought comment on how a licensee's failure to meet its performance requirements should affect its ability to renew its license. *See* § VI.B.2.c.ii (Performance Requirements).

recently adopted for the AWS-3 Band.[2213] Specifically, a 600 MHz Band licensee's renewal showing must provide a detailed description of its provision of service during the entire license period and discuss: (1) the level and quality of service provided (including the population served, the area served, the number of subscribers, and the services offered); (2) the date service commenced, whether service was ever interrupted, and the duration of any interruption or outage; (3) the extent to which service is provided to rural areas; (4) the extent to which service is provided to qualifying tribal land as defined in section 1.2110(f)(3)(i) of the Commission's rules; and (5) any other factors associated with the level of service to the public. Accordingly, we hereby modify section 27.14 of the Commission's rules to apply these renewal showing criteria to the 600 MHz Band.[2214]

787. The renewal requirements we establish for 600 MHz Band licensees are in the public interest and their benefits outweigh any likely costs. In recent years, the Commission has refined its license renewal policies—beginning with the *700 MHz First Report and Order* in 2007, and most recently in the *AWS-3 Report and Order*.[2215] Through these actions, the Commission established that licensees must demonstrate that they are providing adequate levels of service over the course of their license terms, and here we act consistently with that policy. Consequently, we agree with those commenters who support adopting renewal criteria for the 600 MHz Band that are based on those criteria adopted in the *700 MHz First Report and Order*[2216] and that were similarly followed in the *AWS-4 Report and Order*, the *H Block Report and Order*, and the *AWS-3 Report and Order*.[2217] These renewal requirements will provide licensees certainty regarding the factors that the Commission will consider during the renewal process, thereby facilitating investment decisions regarding broadband rollout. Further, adopting clear requirements address US Cellular's concern that the renewal process not be unnecessarily burdensome to licensees or that the process not deter investment.[2218]

788. In adopting these criteria, we decline to adopt at this time US Cellular's proposal to categorically provide licensees a renewal expectancy if they meet their performance requirements.[2219] US Cellular claims that renewal expectancies, based solely on performance requirements, would provide certainty to licensees and investors.[2220] As the Commission has consistently stated, performance and renewal showings are distinct; they serve different purposes and, if not met, the Commission may apply

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[2213] *AWS-3 Report and Order* at para. 158.

[2214] Nothing in our decision in this Order prejudges or forecloses the Commission's future consideration of the policies and proposed rules, and related record, for the *WRS Renewals NPRM*, which remains pending. *See WRS Renewals NPRM and Order.* In addition, we emphasize that licensees seeking renewal bear the risk of future changes to our rules.

[2215] *See 700 MHz First Report and Order*, 22 FCC Rcd at 8093-94, paras. 75-77; *AWS-3 Report and Order* at paras. 157-62.

[2216] Verizon Comments at 67 (citing *700 MHz First Report and Order*, 22 FCC Rcd at 8093-94, paras. 75-77). *See also* US Cellular Reply at 31-32 (supporting the renewal criteria and policies adopted in the *700 MHz First Report and Order*).

[2217] *See AWS-4 Report and Order*, 27 FCC Rcd at 16202, para. 271; *H Block Report and Order*, 28 FCC Rcd at 9567-68, para. 223; *AWS-3 Report and Order* at para. 158.

[2218] US Cellular Comments at 37-38. *See* US Cellular Reply at 31-32 (characterizing the *700 MHz First Report and Order* as "simply list[ing] a 'variety of factors'" encompassed in the substantial service renewal standard).

[2219] US Cellular Comments at 37-38; US Cellular Reply at 31. *See also* Verizon Comments at 67.

[2220] US Cellular Comments at 37-38. US Cellular asserts that in certain services the Commission "routinely" grants unopposed renewal applications where performance requirements are met. US Cellular Comments at 37-38. *See also* US Cellular Reply at 31. We reiterate that since 2007, the Commission has consistently adopted renewal criteria for wireless radio service licenses that require licensees to show the level and types of service provided over the course of the license term.

different penalties.[2221] A performance showing provides a snapshot in time of the level of a licensee's service, whereas a renewal showing provides information regarding the level and types of service provided over the course of a license term.[2222] Where a licensee meets the applicable performance requirements, but fails to provide continuity of service (by, for example, repeatedly discontinuing operations between required performance showings for periods of less than 180 days), the Commission could find that renewal would be contrary to the public interest.[2223] Where a licensee fails to meet its interim build-out requirement and becomes subject to a two-year acceleration of both its final build-out requirement and its license term, its final performance showing might merely reflect a snapshot in time of compliance with the performance requirements. By contrast, its renewal application must provide a timeline of its provision of service, the percentage of the license-area population covered, and types of service provided over the course of the license term, including any efforts to meet the interim build-out requirement.

789. For subsequent license terms, licensees are likely—absent extraordinary circumstances—to obtain license renewal if they submit satisfactory showings demonstrating that they have maintained or exceeded the level of coverage and service required at the final build-out benchmark (during the initial license term) and otherwise comply with Commission rules and policies and the Communications Act.[2224]

790. Finally, we reject US Cellular's proposal that we permit competing renewal applications.[2225] Rather, we agree with Verizon that the Commission need not permit competing renewal applications or comparative hearings to evaluate an application for license renewal.[2226] The renewal requirements we adopt in this Order will provide Commission staff with ample information to determine whether license renewal would serve the public interest. The public interest would be ill-served by permitting the filing of potentially time-consuming and costly competing applications.[2227]

(iv) Permanent Discontinuance of Operations

791. *Background.* In the *NPRM*, the Commission asked whether it should apply to 600 MHz Band wireless licensees the rules governing the permanent discontinuance of operations.[2228] Under section 1.955(a)(3), an authorization will automatically terminate, without specific Commission action, if service is "permanently discontinued."[2229] The Commission proposed to define "permanently discontinued" for the 600 MHz Band as a period of 180 consecutive days during which a licensee does not operate and does not serve at least one subscriber that is not affiliated with, controlled by, or related

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[2221] *See AWS-3 Report and Order* at para. 160; *AWS-4 Report and Order*, 27 FCC Rcd at 16202, para. 270; *700 MHz First Report and Order*, 22 FCC Rcd at 8093, para. 75; *WRS Renewals NPRM and Order*, 25 FCC Rcd at 6997-98, 7004-11, paras. 2, 21-35.

[2222] *See, e.g., AWS-3 Report and Order* at para. 160; *700 MHz First Report and Order*, 22 FCC Rcd at 8093, para. 75; *WRS Renewals NPRM and Order*, 25 FCC Rcd at 7004-06, paras. 21-24.

[2223] *See AWS-3 Report and Order* at para. 160.

[2224] *See AWS-3 Report and Order* at para. 161*; accord H Block Report and Order,* 28 FCC Rcd at 9567, para 223 n.695 (citing *AWS-4 Report and Order,* 27 FCC Rcd at 16202, para. 270); *700 MHz First Report and Order,* 22 FCC Rcd at 8093, para. 75.

[2225] US Cellular Comments at 38.

[2226] Verizon Comments at 67.

[2227] As the Commission explained in the *700 MHz First Report and Order*, prohibiting competing applications "protects the public interest without creating incentives for speculators to file 'strike' applications." *700 MHz First Report and Order,* 22 FCC Rcd at 8093, para. 76; *see also AWS-4 Report and Order*, 27 FCC Rcd at 16202, para. 272; *H Block Report and Order,* 28 FCC Rcd at 9568, para. 224; *AWS-3 Report and Order* at para. 162.

[2228] *NPRM*, 27 FCC Rcd at 12493, para. 413.

[2229] 47 C.F.R. § 1.955(a)(3).

to, the provider.[2230] The Commission also proposed that licensees would not be subject to this requirement until the date of the first performance requirement benchmark (i.e., the interim build-out requirement).[2231]

792. In addition, the Commission proposed that a licensee must notify the Commission within 10 days if it permanently discontinues service, by filing FCC Form 601 or 605 and requesting license cancellation, consistent with section 1.955(a)(3) of the Commission's rules.[2232] The Commission emphasized that even if a licensee fails to file the required form, however, an authorization will automatically terminate without specific Commission action if service is permanently discontinued.[2233] The Commission sought comment on these proposals.[2234]

793. *Discussion.* Section 1.955(a)(3) of the Commission's rules will apply to 600 MHz Band licensees because the benefits of applying this rule outweigh any potential costs of doing so.[2235] Notably, we received no comments on the permanent discontinuance proposals. Therefore, a licensee's 600 MHz Band authorization will automatically terminate, without specific Commission action, if service is "permanently discontinued."[2236]

794. In accordance with the proposal in the *NPRM*, for providers that identify their regulatory status as common carrier or non-common carrier, we define "permanently discontinued" as a period of 180 consecutive days during which the licensee does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to, the provider in the individual license area (or smaller service area in the case of a partitioned license). We adopt a different approach for wireless licensees that use their licenses for private, internal communications, however, because such licensees generally do not provide service to unaffiliated subscribers.[2237] For such private, internal communications, we define "permanent discontinuance" as a period of 180 consecutive days during which the licensee does not operate.[2238] Finally, as the Commission has previously explained, the operation of so-called channel keepers, e.g., devices that transmit test signals, tones, and/or color bars, do not constitute "operation" under section 1.955(a)(3) or the Commission's other permanent discontinuance rules.[2239]

[2230] *NPRM*, 27 FCC Rcd at 12493, para. 413.

[2231] *Id*.

[2232] *Id*.

[2233] *Id*.

[2234] *Id*.

[2235] *See* 47 C.F.R. § 1.955(a)(3).

[2236] *See id*.

[2237] *See H Block Report and Order*, 28 FCC Rcd at 9570-71, para. 230 (citing *WRS Renewals NPRM and Order*, 25 FCC Rcd at 7022, 7047, para. 68, App. A § 1.953).

[2238] In other words, the rule that we adopt for private, internal communications does not include a requirement that the licensee provide service to an unaffiliated subscriber in order to avoid triggering the permanent discontinuance rule. *See H Block Report and Order*, 28 FCC Rcd at 9571, para. 230, n.726 (citing *WRS Renewals NPRM and Order*, 25 FCC Rcd at 7022, 7047, para. 68, App. A § 1.953).

[2239] *See Application of San Diego MDS Company*, Memorandum Opinion and Order, 19 FCC Rcd 23120, 23124, para. 10 (2004) ("in order to provide a service a provider would, at a minimum, need a customer or other person to serve") (*San Diego MDS*); *Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educations and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands*, WT Docket Nos. 03-66, 03-67, 02-68, 00-230, MM Docket No. 97-217, IB Docket No. 02-364, ET Docket No. 00-258,Order on Reconsideration and Fifth Memorandum Opinion and Order, 21 FCC Rcd 5606, 5731, para. 310 (2006) (*BRS/EBS 3rd MO&O*) (favorably citing *San Diego MDS* when affirming that "transmission of test signals and/or color bars by a BRS/EBS licensee or lessee does not constitute substantial

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795. A licensee will not be subject to the discontinuance rules until the date it must meet its interim build-out requirement,[2240] thereby negating the possibility that a licensee will lose its license if it chooses to construct early, but may discontinue operations before the interim build-out benchmark date. The permanent discontinuance rules will apply thereafter, to include any subsequent license renewal term.[2241]

796. This approach is consistent with the discontinuance rules applied to similar wireless services.[2242] Using this approach for the 600 MHz Band also strikes the appropriate balance between affording licensees operational flexibility and ensuring that licensed spectrum is efficiently utilized.

797. Furthermore, in accordance with section 1.955(a)(3) of the Commission's rules, if a licensee permanently discontinues service, the licensee must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 or 605 and requesting license cancellation.[2243] As explained above, even if the licensee fails to notify the Commission, an authorization will automatically terminate without specific Commission action if service is permanently discontinued.

d. Secondary Markets

(i) Qualifications under Section 6004

798. *Background*. Section 6004 of the Spectrum Act restricts participation in auctions required under the Spectrum Act by "person[s] who [have] been, for reasons of national security, barred by an agency of the Federal Government from . . . participating in an auction, or receiving a grant."[2244] In the *NPRM*, the Commission explained that this section does not address eligibility to acquire licenses on the secondary market.[2245] The Commission sought comment on whether, pursuant to section 6004, it must (or should) similarly restrict eligibility of persons acquiring licenses on the secondary market. If so, the Commission asked whether this restriction is consistent with other provisions of the Communications Act, and what procedures and rules, if any, should apply to persons acquiring licenses on the secondary market.[2246]

799. *Discussion*. In the *H Block Report and Order*, the Commission adopted rule section 27.12(b), which restricts entities from holding licenses if they have been barred by a federal agency for reasons of national security, in accordance with section 6004 of the Spectrum Act.[2247] Because that rule

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service"); *H Block Report and Order*, 28 FCC Rcd at 9571, para. 233*; AWS-4 Report and Order*, 27 FCC Rcd at 16203, paras. 274-76.

[2240] *See* § VI.B.2.c.ii (Performance Requirements).

[2241] Thus, the permanent discontinuance rules apply as follows: (1) after the interim build-out deadline specified in 47 C.F.R. § 27.14(t) or (2) after the accelerated final build-out deadline (when the licensee fails to meet the interim build-out requirements); and during any subsequent license term.

[2242] *See AWS-3 Report and Order* at paras. 165-66*; H Block Report and Order*, 28 FCC Rcd at 9570-71, para. 230-33*; AWS-4 Report and Order*, 27 FCC Rcd at 16203, para. 274 (adopting substantially similar requirements); *see also WRS Renewals NPRM and Order*, 25 FCC Rcd at 7018, para. 54.

[2243] 47 C.F.R. § 1.955(a)(3).

[2244] Specifically, § 6004 of the Spectrum Act restricts "person[s] who [have] been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant" from participating in the incentive auction (among others). Spectrum Act § 6004.

[2245] *NPRM*, 27 FCC Rcd at 12483, para. 382 (citing Spectrum Act § 6004(c)). Secondary market transactions include transfers and assignments, partitioning, disaggregation, and spectrum leasing.

[2246] *Id*.

[2247] *H Block Report and Order*, 28 FCC Rcd at 9555, para. 187. Specifically, § 27.12(b) states: "[a] person described in 47 U.S.C. § 1404(c) is ineligible to hold a license that is required by 47 U.S.C. Chapter 13 (Middle
(continued….)

implements a statutory provision that applies to all spectrum bands covered under the Spectrum Act,[2248] section 27.12(b) applies to the 600 MHz Band.[2249] Further, we received no comments opposing or supporting applying section 6004 to secondary market transactions that include 600 MHz Band licenses. Thus, consistent with the purpose of the statute, we require applicants to certify in an application seeking approval of a secondary market transaction involving 600 MHz Band licenses that neither the applicants nor any party to the application are persons barred from participating in an auction under section 6004 of the Spectrum Act.[2250]

(ii) Partitioning and Disaggregation

800. *Background.* In the *NPRM*, the Commission proposed to permit 600 MHz Band licensees to partition geographic markets and disaggregate spectrum under existing Part 27 partitioning and disaggregation rules.[2251] Specifically, it proposed that any entity holding a 600 MHz Band license, including parties to any partitioning or disaggregation arrangement pertaining to a 600 MHz Band license, must independently meet applicable performance and renewal requirements.[2252] The Commission proposed this approach to facilitate efficient spectrum use, while enabling service providers to configure geographic area licenses and spectrum blocks to meet their operational needs.[2253]

801. *Discussion*. We adopt the Part 27 partitioning and disaggregation rules for the 600 MHz Band.[2254] Very few commenters discuss partitioning and disaggregation, but those who do support this approach.[2255] Permitting partitioning and disaggregation is in the public interest, and based on our examination of the record,[2256] the associated benefits would outweigh any potential costs. We agree with Verizon that applying these rules "promotes a robust secondary market in spectrum" and "facilitates

(Continued from previous page)
Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 125 Stat. 156 (2012)) to be assigned by a system of competitive bidding under § 309(j) of the Communications Act, 47 U.S.C. § 309(j)." 47 C.F.R. § 27.12(b). This rule applies to licenses acquired through the secondary market, as well as to new initial licenses acquired at auction. *H Block Report and Order*, 28 FCC Rcd at 9555, para. 187. In the *H Block Report and Order*, the Commission also adopted a revision to the bidding application and certification procedures. *See* 47 C.F.R. § 1.2105(a)(2)(xii).

[2248] *See H Block Report and Order*, 28 FCC Rcd at 9573, para. 238. *See also AWS-3 Report and Order* at para. 125.

[2249] As part of the § 6004 implementation, the Commission instituted a revision to the bidding application and certification procedures, which also applies to the 600 MHz Band. *See* 47 C.F.R. § 1.2105(a)(2)(xii).

[2250] As the Commission explained in the *H Block Report and Order*, "[t]he Commission generally does not allow parties to avoid statutory or regulatory requirements through use of secondary markets. It is reasonable to assume that Congress did not intend to permit persons barred on national security grounds from 'participating in an auction' for certain licenses to acquire those same licenses in such an indirect fashion. In any event, given the policies reflected in § 6004, it is appropriate to exercise our independent authority under § 308(b) of the Communications Act to extend such a national security bar to the acquisition of Commission licenses through the secondary market." *H Block Report and Order,* 28 FCC Rcd at 9555, para. 187 (*footnotes omitted*).

[2251] *NPRM*, 27 FCC Rcd at 12485, paras. 385-88. Geographic partitioning refers to the assignment of geographic portions of a license to another licensee along geopolitical or other boundaries. Spectrum disaggregation refers to the assignment of a discrete amount of spectrum under the license to another entity. Disaggregation allows for multiple transmitters in the same geographic area operated by different companies on adjacent frequencies in the same band. *See* 47 C.F.R. § 27.15. A partitionee or disaggregatee is authorized to hold its license for the remainder of the partitioner's or disaggregator's license term. *See* 47 C.F.R. § 27.15(c).

[2252] *NPRM*, 27 FCC Rcd at 12485, para. 387.

[2253] *Id*.

[2254] 47 C.F.R. § 27.15.

[2255] *See, e.g.*, CTIA Comments at 37-38; Verizon Comments at 64.

[2256] *See* CTIA Comments at 37-38; Verizon Comments at 64.

acquisition of spectrum rights by smaller carriers who may serve small, targeted markets,"[2257] thus allowing for new entrants and promoting competition. Further, permitting disaggregation and partitioning will help facilitate investment and rapid deployment in the 600 MHz Band, while giving licensees flexibility to use the spectrum to meet changing market demand. As the Commission noted when it first adopted partitioning and disaggregation rules, allowing this type of flexibility can facilitate the efficient use of spectrum, and expedite provision of services in areas that might not otherwise receive service in the near term.[2258]

802. As proposed in the *NPRM*, and consistent with the treatment of other Part 27 services,[2259] a partitionee or disaggregatee will hold its license for the remainder of the partitioner's or disaggregator's license term. In addition, any 600 MHz Band licensee that is a party to a partitioning or disaggregation arrangement (or combination of both) must independently meet the applicable 600 MHz Band technical rules and regulatory requirements, including performance and renewal requirements.[2260] As the Commission has previously observed, this approach should facilitate efficient spectrum usage and prevent licensees from avoiding construction obligations by participating in secondary market transactions, while still providing operators with the flexibility to design their networks according to their operation and business needs.[2261]

(iii) Spectrum Leasing

803. *Background.* In the *NPRM*, the Commission proposed to apply to 600 MHz Band licensees the spectrum leasing policies established in various secondary markets proceedings[2262] in the same manner that those policies and rules apply to other Part 27 services.[2263] Since 2003, these secondary markets policies and rules have enabled licensees to lease some or all of their spectrum usage rights to third party spectrum lessees, who are permitted to provide wireless services consistent with the

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[2257] Verizon Comments at 64.

[2258] *Geographic Partitioning and Spectrum Disaggregation by Commercial Mobile Radio Service Licensees*, WT Docket No. 96-148, Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 21831, 21833, para. 1 (1996). The Commission observed previously that allowing rural telephone companies to acquire spectrum through geographic partitioning sped the deployment of broadband services in rural areas because rural telephone companies could rely on existing infrastructure. *Implementation of Section 309(j) of the Communications Act – Competitive Bidding*, PP Docket No. 93-253, Fifth Report and Order, 9 FCC Rcd 5532, para. 150 (1994).

[2259] *See* 47 C.F.R. § 27.15. The Commission most recently adopted this rule for the AWS-3 Band. *See AWS-3 Report and* Order at paras. 168-69. *See also H Block Report and Order*, 28 FCC Rcd at 9573, para. 238.

[2260] *See* 47 C.F.R. § 27.15(d) (addressing compliance with construction requirements); *see also* 47 C.F.R. § 27.14(t) (addressing license build-out and renewal requirements).

[2261] *AWS-4 Report and Order*, 27 FCC Rcd at 16196 para. 253; *WRS Renewals NPRM and Order*, 25 FCC Rcd at 7029, para. 91; *H Block Report and Order*, 28 FCC Rcd at 9573, para 238; *AWS-3 Report and Order* at para.169.

[2262] *See Secondary Markets First R&O*, 18 FCC Rcd 20604; *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, WT Docket No. 00-230, Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 17503 (2004). The Commission has added more terrestrial services to this spectrum leasing framework, including the AWS-1 Band in 2003 (*AWS-1 R&O*, 18 FCC Rcd 25162), the Broadband Radio Services and Educational Broadband Services in 2004 (*Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands*, WT Docket Nos. 03-66, 03-67, 02-68, 00-230, MM Docket No. 97-217, Report and Order and Further Notice of Proposed Rulemaking, 19 FCC Rcd 14165, 14232-34, paras. 177-81 (2004)), and the AWS-4 Band in 2012 (*AWS-4 Report and Order*, 27 FCC Rcd at 16196-99, paras. 254-59); and the H Block in 2013 (*H Block Report and Order*, 28 FCC Rcd at 9573-75, paras. 239-42).

[2263] *NPRM*, 27 FCC Rcd at 12486, para. 391.

underlying license authorization.[2264]

804. *Discussion*. We adopt the same spectrum leasing policies and rules that apply to other Part 27 services.[2265] Commenters that discuss spectrum leasing support the proposals made in the *NPRM* and agree that adopting spectrum leasing rules will promote the public interest.[2266] For example, CTIA notes that "the Commission's leasing policies have brought licensees much-needed flexibility in managing their networks, and have enabled innovative service and market entry by new competitors."[2267] Our secondary markets policies are designed to promote more efficient, innovative, and dynamic use of the spectrum, expand the scope of available wireless services and devices, enhance economic opportunities for accessing spectrum, and promote competition among providers.[2268] Likewise, allowing spectrum leasing in the 600 MHz Band will serve these same purposes.[2269] In other Part 27 services spectrum leasing policies generally follow the same approach as the partitioning and disaggregation policies for the band."[2270] Thus, our decision to permit spectrum leasing in the 600 MHz Band is consistent with our determination to permit partitioning and disaggregation in the 600 MHz Band[2271] and with our existing Part 27 spectrum leasing policies.

e. Other Operating Requirements

805. *Background.* In the *NPRM*, the Commission explained that even though we issue licenses in the 600 MHz Band pursuant to one rule part (Part 27), we may require licensees in this Band to comply with rules contained in other parts of the Commission's rules, depending on the particular services they provide.[2272] The Commission sought comment on whether we need to modify any provisions in existing, service-specific rules to ensure that we cover 600 MHz Band licensees under the necessary Commission rules.[2273] In addition, the Commission sought comment on any rules that would be affected by the proposal to apply elements of the framework of these rule parts, whether separately or in conjunction with other requirements.[2274]

806. *Discussion.* Although we primarily adopt rules for the 600 MHz Band under Part 27 of the Commission's rules, we also require 600 MHz Band licensees to comply with certain other rule parts that pertain generally to wireless communication services. This approach will maintain general consistency among various wireless communications services. We received no comments on the *NPRM* proposal. Section 27.3 of the Commission's rules lists some of the rule parts applicable to wireless communications services licensees.[2275] In addition, other FCC rules may apply to 600 MHz Band

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[2264] *Secondary Markets First R&O*, 18 FCC Rcd at 20609-13, 20648-49, paras. 8-9, 12-13, 91-92.

[2265] *See id*. Under these secondary market policies and rules, the service rules and policies applicable to the licensee under its license authorization – including all technical, interference, and operational rules – apply to the spectrum lessee as well. *Secondary Markets First R&O*, 18 FCC Rcd at 20648-49, paras. 91-92; *see* 47 C.F.R. §§ 1.9020(c)-(d), 1.9030 (c)-(d), 1.9035(c)-(d). The rules and procedures for spectrum leasing arrangements are set forth in Part 1, Subpart X. 47 C.F.R §§ 1.9001 *et seq*.

[2266] *See, e.g.*, CTIA Comments at 37-38; Verizon Comments at 10, 64.

[2267] CTIA Comments at 38.

[2268] *See Secondary Markets First R&O*, 18 FCC Rcd at 20607, para. 2.

[2269] *NPRM*, 27 FCC Rcd at 12486, paras. 389-91.

[2270] *See AWS-3 Report and Order* at para. 171; *see also AWS-4 Report and Order*, 27 FCC Rcd at 16198, para. 258.

[2271] *See* § VI.B.2.d.ii (Partitioning and Disaggregation).

[2272] *NPRM*, 27 FCC Rcd at 12493-94, para. 414.

[2273] *Id.* at 12494, para. 415.

[2274] *Id*.

[2275] 47 C.F.R. § 27.3.

licensees, including those that apply only to certain licensees, depending on the specific type of service or services that a particular licensee provides.[2276] Thus, it is appropriate to apply section 27.3, as well as similar rules applicable to wireless communications service licensees, to 600 MHz Band licensees. In so doing, we will maintain consistency among various wireless communications services—including the 600 MHz Band—which will best serve the public interest. For these same reasons, the benefits of this approach outweigh any potential costs.

VII. PROCEDURAL MATTERS

807. *Final Regulatory Flexibility Act Analysis*. Pursuant to the Regulatory Flexibility Act of 1980, as amended,[2277] the Commission's Final Regulatory Flexibility Analysis (FRFA) relating to this Report and Order is attached as Appendix B.

808. *Final Paperwork Reduction Act of 1995 Analysis*. This document contains new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 ("PRA"), Public Law 104-13. It will be submitted to the Office of Management and Budget ("OMB") for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

809. We have assessed the effects of the policies adopted in this Report and Order with regard to information collection burdens on small business concerns, and find that these policies will benefit many companies with fewer than 25 employees by providing them with options for voluntarily relinquishing broadcast spectrum usage rights or for gaining access to valuable repurposed spectrum. In addition, we have described impacts that might affect small businesses, which includes most businesses with fewer than 25 employees, in the FRFA attached to this Report and Order as Appendix B.

810. *Congressional Review Act*. The Commission will send a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act.[2278]

811. *Delegation to Correct Rules*. We delegate authority to the Wireless Telecommunications Bureau, Media Bureau, International Bureau, and Office of Engineering and Technology, as appropriate, to make corrections to the rules set forth in Appendix A as necessary to conform them to the text of this Order. We note that any entity that disagrees with a rule correction made on delegated authority will have the opportunity to file an Application for Review by the full Commission.[2279]

VIII. ORDERING CLAUSES

812. **IT IS ORDERED**, pursuant to the authority found in Sections 1, 4, 301, 303, 307, 308, 309, 310, 316, 319, 325(b), 332, 336(f), 338, 339, 340, 399b, 403, 534, and 535 of the Communications Act of 1934, as amended, and sections 6004, 6402, 6403, 6404, and 6407 of Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, 47 U.S.C. §§ 151, 154, 301, 303, 307, 308, 309, 310, 316, 319, 325(b), 332, 336(f), 338, 339, 340, 399b, 403, 534, 535, 1404, 1452, and 1454, the Report and Order in GN Docket No. 12-268 **IS ADOPTED**.

813. **IT IS FURTHER ORDERED** that the Commission's rules **ARE HEREBY**

[2276] *See, e.g.*, 47 C.F.R. § Part 9.5 (wireless licensees providing interconnected VoIP services are subject to E911 service requirements); *see generally* Parts 20, 22, 24, 27, and 101 for other obligations that may apply to certain wireless communications services licensees.

[2277] *See* 5 U.S.C. § 604.

[2278] *See* 5 U.S.C. 801(a)(1)(A).

[2279] *See* 47 U.S.C. § 155(c)(1).

AMENDED as set forth in Appendix A.

814. **IT IS FURTHER ORDERED** that the rules adopted herein **WILL BECOME EFFECTIVE** 60 days after the date of publication in the *Federal Register*, except for those rules and requirements which contain new or modified information collection requirements that require approval by the OMB under the PRA and **WILL BECOME EFFECTIVE** after the Commission publishes a notice in the *Federal Register* announcing such approval and the relevant effective date.

815. **IT IS FURTHER ORDERED** that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, **SHALL SEND** a copy of this Report and Order in GN Docket No. 12-268, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

816. **IT IS FURTHER ORDERED** that the Commission **SHALL SEND** a copy of this Report and Order in GN Docket No. 12-268 in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 0, 1, 2, 15, 27, 73, and 74 as follows:

PART 0—COMMISSION ORGANIZATION

1. The authority citation for part 0 continues to read as follows:

Authority: Sec. 5, 48 Stat. 1068, as amended; 47 U.S.C. 155, 225, unless otherwise noted.

2. Section 0.457 is amended by adding paragraph (d)(1)(ix) to read as follows:

§ 0.457 Records not routinely available for public inspection.

* * * * *

(d) * * *

(1) * * *

(ix) Confidential Broadcaster Information, as defined in § 1.2206(d) of this chapter, submitted by a broadcast television licensee in a broadcast television spectrum reverse auction conducted under section 6403 of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96) (the "Spectrum Act"), or in the application to participate in such a reverse auction, is not routinely available for public inspection until the reassignments and reallocations under section 6403(b)(1)(B) of the Spectrum Act become effective or until two years after public notice that the reverse auction is complete and that no such reassignments and reallocations shall become effective. In the event that reassignments and reallocations under section 6403(b)(1)(B) of the Spectrum Act become effective, Confidential Broadcaster Information pertaining to any unsuccessful reverse auction bid or pertaining to any unsuccessful application to participate in such a reverse auction will not be routinely available for public inspection until two years after the effective date.

* * * * *

PART 1—PRACTICE AND PROCEDURE

3. The authority citation for part 1 is revised to read as follows:

Authority: 15 U.S.C. 79 et seq.; 47 U.S.C. 151, 154(i), 154(j), 155, 157, 225, 227, 303(r), 309, 1403, 1404, 1451, and 1452.

4. Section 1.2101 is revised to read as follows:

§ 1.2101 Purpose.

The provisions of §§ 1.2101 through 1.2114 implement section 309(j) of the Communications Act of 1934, as added by the Omnibus Budget Reconciliation Act of 1993 (Pub. L. 103–66) and subsequent amendments.

§ 1.2102 [Amended]

5. Section 1.2102 is amended by removing paragraph (c).

6. Section 1.2103 is revised to read as follows:

§ 1.2103 Competitive bidding design options.

(a) Public notice of competitive bidding design options. Prior to any competitive bidding for initial licenses, public notice shall be provided of the detailed procedures that may be used to implement auction design options.

(b) Competitive bidding design options. The public notice detailing competitive bidding procedures may establish procedures for collecting bids, assigning winning bids, and determining payments, including without limitation:

(1) Procedures for collecting bids.

(i) Procedures for collecting bids in a single round or in multiple rounds.

(ii) Procedures allowing for bids for specific items, bids for generic items in one or more categories of items, or bids for one or more aggregations of items.

(iii) Procedures allowing for bids that specify a price, indicate demand at a specified price, or provide other information as specified by competitive bidding policies, rules, and procedures.

(iv) Procedures allowing for bids that are contingent on specified conditions, such as other bids being accepted or for packages of licenses being awarded.

(v) Procedures to collect bids in one or more stages, including procedures for transitions between stages.

(vi) Procedures for whether, when, and how bids may be modified during the auction.

(2) Procedures for assigning winning bids.

(i) Procedures that take into account one or more factors in addition to the submitted bid amount, including but not limited to the amount of bids submitted in separate competitive bidding.

(ii) Procedures to assign specific items to bidders following bidding for quantities of generic items.

(iii) Procedures to incorporate public interest considerations into the process for assigning winning bids.

(3) Procedures for determining payments. Procedures to determine the amount of any payments made to or by winning bidders consistent with other auction design choices.

7. Section 1.2104 is amended by revising paragraphs (e) and (j) to read as follows:

§ 1.2104 Competitive bidding mechanisms.

* * * * *

(e) Stopping procedures. Before or during an auction, procedures may be established regarding when bidding will stop for a round, a stage, or an entire auction, in order to terminate the auction within a reasonable time and in accordance with public interest considerations and the goals, statutory requirements, rules, and procedures for the auction, including any reserve price or prices.

* * * * *

(j) Bid apportionment.

(1) Apportioned license bid. The Commission may specify a method for apportioning a bid among portions of the license (i.e., portions of the license's service area or bandwidth, or both) when necessary to compare a bid on the original license or portions thereof with a bid on a corresponding reconfigured license for purposes of the Commission's rules or procedures, such as to calculate a bid withdrawal or default payment obligation in connection with the bid.

(2) Apportioned package bid. The apportioned package bid on a license is an estimate of the price of an individual license included in a package of licenses in an auction with combinatorial (package) bidding. Apportioned package bids shall be determined by the Commission according to a methodology it establishes in advance of each auction with combinatorial bidding. The apportioned package bid on a

license included in a package shall be used in place of the amount of an individual bid on that license when the bid amount is needed to determine the size of a designated entity bidding credit (see § 1.2110(f)(1) and (f)(2)), a new entrant bidding credit (see § 73.5007 of this chapter), a bid withdrawal or default payment obligation (see § 1.2104(g)), a tribal land bidding credit limit (see § 1.2110(f)(3)(iv)), or a size-based bidding credit unjust enrichment payment obligation (see § 1.2111(d), (e)(2), and (e)(3)), or for any other determination required by the Commission's rules or procedures.

8. Section 1.2105 is amended by revising paragraphs (a)(2)(i), (a)(2)(xii), and (c)(6), and adding paragraph (c)(8) to read as follows:

§ 1.2105 Bidding application and certification procedures; prohibition of certain communications.

(a) * * *

(2) * * *

(i) Identification of each license, or category of licenses, on which the applicant wishes to bid.

* * * * *

(xii) For auctions required to be conducted under Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96) or in which any spectrum usage rights for which licenses are being assigned were made available under 47 U.S.C. 309(j)(8)(G)(i), certification under penalty of perjury that the applicant and all of the person(s) disclosed under paragraph (a)(2)(ii) of this section are not person(s) who have been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or receiving a grant. For the purposes of this certification, the term "person" means an individual, partnership, association, joint-stock company, trust, or corporation, and the term "reasons of national security" means matters relating to the national defense and foreign relations of the United States.

* * * * *

(c) * * *

(6) A party that makes or receives a communication prohibited under paragraphs (c)(1) or (c)(8) of this section shall report such communication in writing immediately, and in any case no later than five

business days after the communication occurs. A party's obligation to make such a report continues until the report has been made. Such reports shall be filed as directed in public notices detailing procedures for the bidding that was the subject of the reported communication. If no public notice provides direction, the party making the report shall do so in writing to the Chief of the Auctions and Spectrum Access Division, Wireless Telecommunications Bureau, by the most expeditious means available, including electronic transmission such as email.

* * * * *

(8) Prohibition of certain communications for the broadcast television spectrum incentive auction conducted under section 6403 of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96).

(i) For the purposes of the prohibition described in paragraphs (c)(8)(ii) and (c)(8)(iii) of this section, the term forward auction applicant is defined the same as the term applicant is defined in paragraph (c)(7) of this section, and the terms full power broadcast television licensee and Class A broadcast television licensee are defined the same as those terms are defined in § 1.2205(a)(1).

(ii) Except as provided in paragraph (c)(8)(iii) of this section, in the broadcast television spectrum incentive auction conducted under section 6403 of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96), beginning on the short-form application filing deadline for the forward auction and until the results of the incentive auction are announced by public notice, all forward auction applicants are prohibited from communicating directly or indirectly any incentive auction applicant's bids or bidding strategies to any full power or Class A broadcast television licensee.

(iii) The prohibition described in paragraph (c)(8)(ii) of this section does not apply to communications between a forward auction applicant and a full power or Class A broadcast television licensee if a controlling interest, director, officer, or holder of any 10 percent or greater ownership interest in the forward auction applicant, as of the deadline for submitting short-form applications to participate in the forward auction, is also a controlling interest, director, officer, or governing board member of the full

power or Class A broadcast television licensee, as of the deadline for submitting applications to participate in the reverse auction.

NOTE 1 TO PARAGRAPH (c): For the purposes of paragraph (c), "controlling interests" include individuals or entities with positive or negative de jure or de facto control of the licensee. De jure control includes holding 50 percent or more of the voting stock of a corporation or holding a general partnership interest in a partnership. Ownership interests that are held indirectly by any party through one or more intervening corporations may be determined by successive multiplication of the ownership percentages for each link in the vertical ownership chain and application of the relevant attribution benchmark to the resulting product, except that if the ownership percentage for an interest in any link in the chain meets or exceeds 50 percent or represents actual control, it may be treated as if it were a 100 percent interest. De facto control is determined on a case-by-case basis. Examples of de facto control include constituting or appointing 50 percent or more of the board of directors or management committee; having authority to appoint, promote, demote, and fire senior executives that control the day-to-day activities of the licensee; or playing an integral role in management decisions.

NOTE 2 TO PARAGRAPH (c): The prohibition described in paragraph (c)(8)(ii) of this section applies to controlling interests, directors, officers, and holders of any 10 percent or greater ownership interest in the forward auction applicant as of the deadline for submitting short-form applications to participate in the forward auction, and any additional such parties at any subsequent point prior to the announcement by public notice of the results of the incentive auction. Thus, if, for example, a forward auction applicant appoints a new officer after the short-form application deadline, that new officer would be subject to the prohibition in paragraph (c)(8)(ii) of this section, but would not be included within the exception described in paragraph (c)(8)(iii).

9. Section 1.2106 is amended by revising paragraph (a) to read as follows:

§ 1.2106 Submission of upfront payments.

(a) Applicants for licenses subject to competitive bidding may be required to submit an upfront payment. In that event, the amount of the upfront payment and the procedures for submitting it will be set forth in a

public notice. Any auction applicant that has previously been in default on any Commission license or has previously been delinquent on any non-tax debt owed to any Federal agency must submit an upfront payment equal to 50 percent more than the amount that otherwise would be required. No interest will be paid on upfront payments.

* * * * *

10. Section 1.2114 is amended by revising paragraph (e) to read as follows:

§ 1.2114 Reporting of eligibility event.

* * * * *

(e) Public notice of application. Applications under this section will be placed on an informational public notice on a weekly basis (see § 1.933(a)).

* * * * *

11. Subpart Q is amended by adding §§ 1.2200 through 1.2209 under the new undesignated center heading "Broadcast Television Spectrum Reverse Auction" to read as follows:

Broadcast Television Spectrum Reverse Auction

§ 1.2200 Definitions.

For purposes of §§ 1.2200 through 1.2209:

(1) Broadcast television licensee. The term broadcast television licensee means the licensee of (A) a full-power television station, or (B) a low-power television station that has been accorded primary status as a Class A television licensee under § 73.6001(a) of this chapter.

(2) Channel sharee. The term channel sharee means a broadcast television licensee that relinquishes all spectrum usage rights with respect to a particular television channel in order to share a television channel with another broadcast television licensee.

(3) Channel sharer. The term channel sharer means a broadcast television licensee that shares its television channel with a channel sharee.

(4) Channel sharing bid. The term channel sharing bid means a bid to relinquish all spectrum usage rights with respect to a particular television channel in order to share a television channel with another broadcast television licensee.

(5) Forward auction. The term forward auction means the portion of an incentive auction of broadcast television spectrum described in section 6403(c) of the Spectrum Act.

(6) High-VHF-to-low-VHF bid. The term high-VHF-to-low-VHF bid means a bid to relinquish all spectrum usage rights with respect to a high very high frequency ("VHF") television channel (channels 7 through 13) in return for receiving spectrum usage rights with respect to a low VHF television channel (channels 2 through 6).

(7) License relinquishment bid. The term license relinquishment bid means a bid to relinquish all spectrum usage rights with respect to a particular television channel without receiving in return any spectrum usage rights with respect to another television channel.

(8) NCE station. The term NCE station means a noncommercial educational television broadcast station as defined in § 73.621 of this chapter.

(9) Reverse auction. The term reverse auction means the portion of an incentive auction of broadcast television spectrum described in section 6403(a) of the Spectrum Act.

(10) Reverse auction bid. The term reverse auction bid includes a license relinquishment bid, a UHF-to-VHF bid, a high-VHF-to-low-VHF bid, a channel sharing bid, and any other reverse auction bids permitted.

(11) Spectrum Act. The term Spectrum Act means Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96).

(12) UHF-to-VHF bid. The term UHF-to-VHF bid means a bid to relinquish all spectrum usage rights with respect to an ultra-high frequency ("UHF") television channel in return for receiving spectrum usage rights with respect to a high VHF television channel or a low VHF television channel.

§ 1.2201 Purpose.

The provisions of §§ 1.2200 through 1.2209 implement section 6403 of the Spectrum Act, which requires

the Commission to conduct a reverse auction to determine the amount of compensation that each broadcast television licensee would accept in return for voluntarily relinquishing some or all of its broadcast television spectrum usage rights in order to make spectrum available for assignment through a system of competitive bidding under subparagraph (G) of section 309(j)(8) of the Communications Act of 1934, as added by section 6402 of the Spectrum Act.

§ 1.2202 Competitive bidding design options.

(a) Public notice of competitive bidding design options. Prior to conducting competitive bidding in the reverse auction, public notice shall be provided of the detailed procedures that may be used to implement auction design options.

(b) Competitive bidding design options. The public notice detailing competitive bidding procedures for the reverse auction may establish procedures for collecting bids, assigning winning bids, and determining payments, including without limitation:

(1) Procedures for collecting bids.

(i) Procedures for collecting bids in a single round or in multiple rounds.

(ii) Procedures for collecting bids for multiple reverse auction bid options.

(iii) Procedures allowing for bids that specify a price for a reverse auction bid option, indicate demand at a specified price, or provide other information as specified by competitive bidding policies, rules, and procedures.

(iv) Procedures allowing for bids that are contingent on specified conditions, such as other bids being accepted.

(v) Procedures to collect bids in one or more stages, including procedures for transitions between stages.

(vi) Procedures for whether, when, and how bids may be modified during the auction.

(2) Procedures for assigning winning bids.

(i) Procedures that take into account one or more factors in addition to bid amount, such as population coverage or geographic contour, or other relevant measurable factors.

(ii) Procedures to evaluate the technical feasibility of assigning a winning bid.

(A) Procedures that utilize mathematical computer optimization software, such as integer programming, to evaluate bids and technical feasibility, or that utilize other decision routines, such as sequentially evaluating bids using a ranking based on specified factors.

(B) Procedures that combine computer optimization algorithms with other decision routines.

(iii) Procedures to incorporate public interest considerations into the process for assigning winning bids.

(3) Procedures for determining payments.

(i) Procedures to determine the amount of any incentive payments made to winning bidders consistent with other auction design choices.

(ii) The amount of proceeds shared with a broadcast television licensee will not be less than the amount of the licensee's winning bid in the reverse auction.

§ 1.2203 Competitive bidding mechanisms.

(a) Public notice of competitive bidding procedures. Detailed competitive bidding procedures shall be established by public notice prior to the commencement of the reverse auction, including without limitation:

(1) Sequencing. The sequencing with which the reverse auction and the related forward auction assigning new spectrum licenses will occur.

(2) Reserve price. Reserve prices, either disclosed or undisclosed, so that higher bids for various reverse auction bid options would not win in the reverse auction. Reserve prices may apply individually, in combination, or in the aggregate.

(3) Opening bids and bid increments. Maximum or minimum opening bids, and by announcement before or during the reverse auction, maximum or minimum bid increments in dollar or percentage terms.

(4) Activity rules. Activity rules that require a minimum amount of bidding activity.

(b) Binding obligation. A bid is an unconditional, irrevocable offer by the bidder to fulfill the terms of the bid. The Commission accepts the offer by identifying the bid as winning. A bidder has a binding obligation to fulfill the terms of a winning bid. A winning bidder will relinquish spectrum usage rights pursuant to the terms of any winning bid by the deadline set forth in § 73.3700(b)(4) of this chapter.

(c) Stopping procedures. Before or during the reverse auction, procedures may be established regarding when bidding will stop for a round, a stage, or an entire auction, in order to terminate the auction within a reasonable time and in accordance with public interest considerations and the goals, statutory requirements, rules, and procedures for the auction, including any reserve price or prices.

(d) Auction delay, suspension, or cancellation. By public notice or by announcement during the reverse auction, the auction may be delayed, suspended, or cancelled in the event of a natural disaster, technical obstacle, network disruption, evidence of an auction security breach or unlawful bidding activity, administrative or weather necessity, or for any other reason that affects the fair and efficient conduct of the competitive bidding. The Commission has the authority, at its sole discretion, to resume the competitive bidding starting from the beginning of the current or some previous round or cancel the competitive bidding in its entirety.

§ 1.2204 Applications to participate in competitive bidding.

(a) Public notice of the application process. All applications to participate must be filed electronically. The dates and procedures for submitting applications to participate in the reverse auction shall be announced by public notice.

(b) Applicant. The applicant identified on the application to participate must be the broadcast television licensee that would relinquish spectrum usage rights if it becomes a winning bidder. In the case of a channel sharing bid, the applicant will be the proposed channel sharee.

(c) Information and certifications provided in the application to participate. An applicant may be required to provide the following information in its application to participate in the reverse auction:

(1) The following identifying information:

(i) If the applicant is an individual, the applicant's name and address. If the applicant is a corporation, the name and address of the corporate office and the name and title of an officer or director. If the applicant is a partnership, the name, citizenship, and address of all general partners, and, if a general partner is not a natural person, then the name and title of a responsible person for that partner, as well. If the applicant is a trust, the name and address of the trustee. If the applicant is none of the above, it must identify and

describe itself and its principals or other responsible persons;

(ii) Applicant ownership and other information as set forth in § 1.2112(a); and

(iii) List, in the case of a non-profit entity, the name, address, and citizenship of each member of the governing board and of any educational institution or governmental entity with a controlling interest in the applicant, if applicable.

(2) The identity of the person(s) authorized to take binding action in the bidding on behalf of the applicant.

(3) For each broadcast television license for which the applicant intends to submit reverse auction bids:

(i) The identity of the station and its television channel;

(ii) Whether it is a full-power or Class A television station;

(iii) If the license is for a Class A television station, certification under penalty of perjury that it is and will remain in compliance with the ongoing statutory eligibility requirements to remain a Class A station;

(iv) Whether it is an NCE station and, if so, whether it operates on a reserved or non-reserved channel;

(v) The types of reverse auction bids that the applicant may submit;

(vi) Whether the license for the station is subject to a non-final revocation order, has expired and is subject to a non-final cancellation order, or if for a Class A station is subject to a non-final downgrade order and, if the license is subject to such a proceeding or order, then an acknowledgement that the Commission will place all of its auction proceeds into escrow pending the final outcome of the proceeding or order; and

(vii) Any additional information required to assess the spectrum usage rights offered.

(4) For each broadcast television license for which the applicant intends to submit a license relinquishment bid:

(i) Whether it will control another broadcast station if it becomes a winning bidder and terminates operations; and

(ii) If it will control another broadcast station, an acknowledgement that it will remain subject to any pending license renewal, as well as any enforcement action, against the station offered; or

(iii) If it will not control another broadcast station, an acknowledgement that the Commission will place a share of its auction proceeds into escrow to cover any potential forfeiture costs associated with any pending license renewal or any pending enforcement action against the station offered.

(5) For each broadcast television license for which the applicant intends to submit a channel sharing bid:

(i) The identity of the channel sharer and the television channel the applicant has agreed to share;

(ii) Any required information regarding the channel sharing agreement, including a copy of the executed channel sharing agreement;

(iii) Certification under penalty of perjury that the channel sharing agreement is consistent with all Commission rules and policies, and that the applicant accepts any risk that the implementation of the channel sharing agreement may not be feasible for any reason, including any conflict with requirements for operation on the shared channel;

(iv) Certification under penalty of perjury that its operation from the shared channel facilities will not result in a change to its Designated Market Area;

(v) Certification under penalty of perjury that it can meet the community of license coverage requirement set forth in § 73.625(a) of this chapter from the shared channel facilities or, if not, that the new community of license for its shared channel facilities either meets the same or a higher allotment priority as its current community; or, if no community meets the same or higher allotment priority, provides the next highest priority;

(vi) Certification under penalty of perjury that the proposed channel sharing arrangement will not violate the multiple ownership rules, set forth in § 73.3555 of this chapter, based on facts at the time the application is submitted; and

(vii) Certification by the channel sharer under penalty of perjury with respect to the certifications described in paragraphs (c)(3)(iii), (c)(5)(iii), and (c)(5)(vi) of this section.

(6) Certification under penalty of perjury that the applicant and all of the person(s) disclosed under paragraph (c)(1) of this section are not person(s) who have been, for reasons of national security, barred by any agency of the Federal Government from bidding on a contract, participating in an auction, or

receiving a grant. For the purposes of this certification, the term "person" means an individual, partnership, association, joint-stock company, trust, or corporation, and the term "reasons of national security" means matters relating to the national defense and foreign relations of the United States.

(7) Certification that the applicant agrees that it has sole responsibility for investigating and evaluating all technical and marketplace factors that may have a bearing on the bids it submits in the reverse auction.

(8) Certification that the applicant agrees that the bids it submits in the reverse auction are irrevocable, binding offers by the applicant.

(9) Certification that the individual submitting the application to participate and providing the certifications is authorized to do so on behalf of the applicant, and if such individual is not an officer, director, board member, or controlling interest holder of the applicant, evidence that such individual has the authority to bind the applicant.

(10) Certification that the applicant is in compliance with all statutory and regulatory requirements for participation in the reverse auction, including any requirements with respect to the license(s) identified in the application to participate.

(11) Such additional information as may be required.

(d) Application processing. (1) Any timely submitted application to participate will be reviewed for completeness and compliance with the Commission's rules. No untimely applications to participate shall be reviewed or considered.

(2) Any application to participate that does not contain all of the certifications required pursuant to this section is unacceptable for filing, cannot be corrected subsequent to the application filing deadline, and will be dismissed with prejudice.

(3) Applicants will be provided a limited opportunity to cure specified defects and to resubmit a corrected application to participate. During the resubmission period for curing defects, an application to participate may be amended or modified to cure identified defects or to make minor amendments or modifications. After the resubmission period has ended, an application to participate may be amended or modified to make minor changes or correct minor errors in the application to participate. Minor amendments may be

subject to a deadline specified by public notice. Major amendments cannot be made to an application to participate after the initial filing deadline. Major amendments include, but are not limited to, changes in ownership of the applicant that would constitute an assignment or transfer of control, changes to any of the required certifications, and the addition or removal of licenses identified on the application to participate for which the applicant intends to submit reverse auction bids. Minor amendments include any changes that are not major, such as correcting typographical errors and supplying or correcting information as requested to support the certifications made in the application.

(4) Applicants that fail to correct defects in their applications to participate in a timely manner as specified by public notice will have their applications to participate dismissed with no opportunity for resubmission.

(5) Applicants shall have a continuing obligation to make any amendments or modifications that are necessary to maintain the accuracy and completeness of information furnished in pending applications to participate. Such amendments or modifications shall be made as promptly as possible, and in no case more than five business days after applicants become aware of the need to make any amendment or modification, or five business days after the reportable event occurs, whichever is later. An applicant's obligation to make such amendments or modifications to a pending application to participate continues until they are made.

(e) Notice to qualified and non-qualified applicants. Each applicant will be notified as to whether it is qualified or not qualified to participate in the reverse auction.

§ 1.2205 Prohibition of certain communications.

(a) Definitions.

(1) For the purposes of this section, a full power broadcast television licensee, or a Class A broadcast television licensee, shall include all controlling interests in the licensee, and all officers, directors, and governing board members of the licensee.

(2) For the purposes of this section, the term forward auction applicant is defined the same as the term applicant is defined in § 1.2105(c)(7).

(b) Certain communications prohibited.

(1) Except as provided in paragraph (b)(2) of this section, in the broadcast television spectrum incentive auction conducted under section 6403 of the Spectrum Act, beginning on the deadline for submitting applications to participate in the reverse auction and until the results of the incentive auction are announced by public notice, all full power and Class A broadcast television licensees are prohibited from communicating directly or indirectly any incentive auction applicant's bids or bidding strategies to any other full power or Class A broadcast television licensee or to any forward auction applicant.

(2) The prohibition described in paragraph (b)(1) of this section does not apply to the following:

(i) Communications between full power or Class A broadcast television licensees if they share a common controlling interest, director, officer, or governing board member as of the deadline for submitting applications to participate in the reverse auction;

(ii) Communications between a forward auction applicant and a full power or Class A broadcast television licensee if a controlling interest, director, officer, or holder of any 10 percent or greater ownership interest in the forward auction applicant, as of the deadline for submitting short-form applications to participate in the forward auction, is also a controlling interest, director, officer, or governing board member of the full power or Class A broadcast television licensee, as of the deadline for submitting applications to participate in the reverse auction; and

(iii) Communications regarding reverse auction applicants' (but not forward auction applicants') bids and bidding strategies between parties to a channel sharing agreement executed prior to the deadline for submitting applications to participate in the reverse auction and disclosed on a reverse auction application.

(c) Duty to report potentially prohibited communications. A party that makes or receives a communication prohibited under paragraph (b) of this section shall report such communication in writing immediately, and in any case no later than five business days after the communication occurs. A party's obligation to make such a report continues until the report has been made.

(d) Procedures for reporting potentially prohibited communications. Reports under paragraph (c) of this section shall be filed as directed in public notices detailing procedures for bidding in the incentive auction. If no public notice provides direction, the party making the report shall do so in writing to the Chief of the Auctions and Spectrum Access Division, Wireless Telecommunications Bureau, by the most expeditious means available, including electronic transmission such as email.

(e) Violations. A party who is found to have violated the antitrust laws or the Commission's rules in connection with its participation in the competitive bidding process, in addition to any other applicable sanctions, may be subject to forfeiture of its winning bid incentive payment and revocation of its licenses, where applicable, and may be prohibited from participating in future auctions.

NOTE 1 TO § 1.2205: References to "full power broadcast television licensees" and "Class A broadcast television licensees" are intended to include all broadcast television licensees that are or could become eligible to participate in the reverse auction, including broadcast television licensees that may be parties to a channel sharing agreement.

NOTE 2 TO § 1.2205: For the purposes of this section, "controlling interests" include individuals or entities with positive or negative de jure or de facto control of the licensee. De jure control includes holding 50 percent or more of the voting stock of a corporation or holding a general partnership interest in a partnership. Ownership interests that are held indirectly by any party through one or more intervening corporations may be determined by successive multiplication of the ownership percentages for each link in the vertical ownership chain and application of the relevant attribution benchmark to the resulting product, except that if the ownership percentage for an interest in any link in the chain meets or exceeds 50 percent or represents actual control, it may be treated as if it were a 100 percent interest. De facto control is determined on a case-by-case basis. Examples of de facto control include constituting or appointing 50 percent or more of the board of directors or management committee; having authority to appoint, promote, demote, and fire senior executives that control the day-to-day activities of the licensee; or playing an integral role in management decisions.

NOTE 3 TO § 1.2205: The prohibition described in § 1.2205(b)(1) applies to controlling interests, officers, directors, and governing board members of a full power or Class A broadcast television licensee as of the deadline for submitting applications to participate in the reverse auction, and any additional such parties at any subsequent point prior to the announcement by public notice of the results of the incentive auction. Thus, if, for example, a full power or Class A broadcast television licensee appoints a new officer after the application deadline, that new officer would be subject to the prohibition in § 1.2205(b)(1), but would not be included within the exceptions described in §§ 1.2205(b)(2)(i) and (ii).

§ 1.2206 Confidentiality of Commission-held data.

(a) The Commission will take all reasonable steps necessary to protect all Confidential Broadcaster Information for all reverse auction applicants from the time the broadcast television licensee applies to participate in the reverse auction until the reassignments and reallocations under section 6403(b)(1)(B) of the Spectrum Act become effective or until two years after public notice that the reverse auction is complete and that no such reassignments and reallocations shall become effective.

(b) In addition, if reassignments and reallocations under section 6403(b)(1)(B) of the Spectrum Act become effective, the Commission will continue to take all reasonable steps necessary to protect Confidential Broadcaster Information pertaining to any unsuccessful reverse auction bid and pertaining to any unsuccessful application to participate in the reverse auction until two years after the effective date.

(c) Notwithstanding paragraphs (a) and (b) of this section, the Commission may disclose Confidential Broadcaster Information if required to do so by law, such as by court order.

(d) Confidential Broadcaster Information includes the following Commission-held data of a broadcast television licensee participating in the reverse auction:

(1) The name of the applicant licensee;

(2) The licensee's channel number, call sign, facility identification number, and network affiliation; and

(3) Any other information that may reasonably be withheld to protect the identity of the licensee, as determined by the Commission.

§ 1.2207 Two competing participants required.

The Commission may not enter into an agreement for a licensee to relinquish spectrum usage rights in exchange for a share of the proceeds from the related forward auction assigning new spectrum licenses unless at least two competing licensees participate in the reverse auction.

§ 1.2208 Public notice of auction completion and auction results.

Public notice shall be provided when the reverse auction is complete and when the forward auction is complete. With respect to the broadcast television spectrum incentive auction conducted under section 6403 of the Spectrum Act, public notice shall be provided of the results of the reverse auction, forward auction, and repacking, and shall indicate that the reassignments of television channels and reallocations of broadcast television spectrum are effective.

§ 1.2209 Disbursement of incentive payments.

A winning bidder shall submit the necessary financial information to facilitate the disbursement of the winning bidder's incentive payment. Specific procedures for submitting financial information, including applicable deadlines, will be set out by public notice.

12. Section 1.9005 is amended by adding paragraph (kk) to read as follows:

§ 1.9005 Included Services.

* * * * *

(kk) The 600 MHz band (part 27 of this chapter).

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

13. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

14. Section 2.106 is amended by revising page 28 as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

456-459 FIXED MOBILE 5.286AA 5.271 5.287 5.288			456-459 5.287 US64 US288	456-460 FIXED LAND MOBILE 5.287 US64 US288 NG32 NG112 NG124 NG148	Public Mol Maritime (Private La MedRadio
459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460		
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290			460-470 Meteorological-satellite (space-to-Earth) 5.287 US73 US209 US288 US289	460-462.5375 FIXED LAND MOBILE US209 US289 NG124	Private La
				462.5375-462.7375 LAND MOBILE US289	Personal F
				462.7375-467.5375 FIXED LAND MOBILE 5.287 US73 US209 US288 US289 NG124	Maritime (Private La
				467.5375-467.7375 LAND MOBILE 5.287 US288 US289	Maritime (Personal F
				467.7375-470 FIXED LAND MOBILE US73 US288 US289 NG124	Maritime (Private La
470-790 BROADCASTING 5.149 5.291A 5.294 5.296 5.300 5.302 5.304 5.306 5.311A 5.312	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING 5.291 5.298	470-608	470-512 FIXED LAND MOBILE BROADCASTING NG5 NG14 NG66 NG115 NG149	Public Mol Broadcast LPTV, TV Low Powe Private La
	512-608 BROADCASTING 5.297	585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307		512-608 FIXED MOBILE BROADCASTING NG5 NG14 NG115 NG149	Wireless C Broadcast LPTV, TV Low Powe
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	610-890 FIXED MOBILE 5.313A 5.317A BROADCASTING 5.149 5.305 5.306 5.307 5.311A 5.320	608-614 LAND MOBILE (medical telemetry and medical telecommand) RADIO ASTRONOMY US74 US246		Personal F
	614-698 BROADCASTING Fixed Mobile 5.293 5.309 5.311A		614-698	614-698 FIXED MOBILE BROADCASTING NG5 NG14 NG115 NG149	Wireless C Broadcast LPTV, TV Low Powe

15. Section 2.1033 is amended by adding paragraph (c)(19)(iii) to read as follows:

§ 2.1033 Application for certification.

(c) * * *

(19) * * *

(iii) 600 MHz band shall include a statement indicating compliance with § 27.75 of this chapter.

* * * * *

PART 15—RADIO FREQUENCY DEVICES

16. The authority citation for part 15 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, 304, 307, 336, 544a, and 549.

17. Section 15.707 is amended by redesignating paragraph (a) as (a)(1) and adding paragraph (a)(2) to read as follows:

§ 15.707 Permissible channels of operation.

(a) (1) * * *

(2) TVBD operations in 600 MHz band. TVBDs may operate on frequencies in the 600 MHz Band as defined in part 27 of this chapter in areas where 600 MHz Band licensees have not commenced operations.

* * * * *

18. Section 15.713 is amended by adding paragraphs (b)(2)(iv) and (h)(10) to read as follows:

§ 15.713 TV bands database.

(b) * * *

(2) * * *

(iv) 600 MHz band operations under part 27 of this chapter in areas where the licensee has commenced operations.

* * * * *

(h) * * *

(10) 600 MHz band operations under part 27 of this chapter in areas where the licensee has commenced

operations.

(i) License area of the 600 MHz band licensee, as defined under part 27 of this chapter;

(ii) Identification of the frequencies on which the part 27 600 MHz wireless licensee has commenced operations;

(iii) Call sign.

PART 27—MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

19. The authority citation for part 27 is revised to read as follows:

    Authority: 47 U.S.C. 154, 301, 302a, 303, 307, 309, 332, 336, 337, 1403, 1404, 1451, and 1452, unless otherwise noted.

20. Section 27.1 is amended by adding paragraph (b)(14) to read as follows:

§ 27.1 Basis and purpose.

* * * * *

(b) * * *

(14) Spectrum in the 470-698 MHz UHF band that has been reallocated and redesignated for flexible fixed and mobile use pursuant to section 6403 of the Spectrum Act.

Note to paragraph (b)(14): The specific frequencies and number of channel blocks will be determined in light of further proceedings pursuant to Docket No. 12-268 and the rule will be updated accordingly pursuant to a future public notice.

* * * * *

21. Section 27.4 is amended by adding the definitions "600 MHz service", "Post-auction transition period", and "Spectrum Act" to read as follows:

§ 27.4 Terms and definitions.

600 MHz service. A radiocommunication service licensed pursuant to this part for the frequency bands specified in § 27.5(l).

* * * * *

Post-auction transition period. The 39-month period commencing upon the public release of the Channel Reassignment Public Notice as defined in § 73.3700(a) of this chapter.

* * * * *

Spectrum Act. The term Spectrum Act means Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96).

* * * * *

22. Section 27.5 is amended by adding paragraph (l) to read as follows:

§ 27.5 Frequencies.

* * * * *

(l) 600 MHz band. In accordance with the terms and conditions established in Docket No. 12-268, pursuant to section 6403 of the Spectrum Act, paired channel blocks of 5+5 megahertz are available for assignment on a Partial Economic Area basis.

Note to paragraph (l): The specific frequencies and number of channel blocks will be determined in light of further proceedings pursuant to Docket No. 12-268 and the rule will be updated accordingly pursuant to a future public notice.

23. Section 27.6 is amended by adding paragraph (l) to read as follows:

§ 27.6 Service areas.

* * * * *

(l) 600 MHz band. Service areas for the 600 MHz band are based on Partial Economic Areas (PEAs), to be defined by a subsequent public notice. The service areas of PEAs that border the U.S. coastline of the Gulf of Mexico extend 12 nautical miles from the U.S. Gulf coastline. The service area of the Gulf of Mexico PEA that comprises the water area of the Gulf of Mexico extends from 12 nautical miles off the U.S. Gulf coast outward into the Gulf. Maps of the PEAs and the Federal Register notice that established the 416 PEAs are available for public inspection and copying at the Reference Center, Room CY A-257, 445 12th St., SW., Washington, DC 20554. These maps and data are also available on the FCC Web site at: http://www.fcc.gov/oet/info/maps/areas/.

Note to paragraph (l): The specific title, reference number, and date of the public notice will be determined in light of further proceedings pursuant to Docket No. 12-268 and the rule will be updated accordingly.

24. Section 27.11 is amended by adding paragraph (k) to read as follows:

§ 27.11 Initial authorization.

* * * * *

(k) 600 MHz band. Initial authorizations for the 600 MHz band will be based on Partial Economic Areas (PEAs), as specified in § 27.6(1), and, shall be paired channels that each consist of a 5 megahertz channel block in the 600 MHz downlink band, paired with a 5 megahertz channel block in the 600 MHz uplink band.

Note to paragraph (k): The specific frequencies and number of channel blocks will be determined in light of further proceedings pursuant to Docket No. 12-268 and the rule will be updated accordingly pursuant to a future public notice.

25. Section 27.13 is amended by adding paragraph (l) to read as follows:

§ 27.13 License period.

* * * * *

(l) 600 MHz band. Authorizations for the 600 MHz band will have an initial term not to exceed twelve years from the date of issuance and ten years from the date of any subsequent license renewal.

26. Section 27.14 is amended by revising the first sentence of paragraphs (a), (f), (k) and adding paragraph (t) to read as follows:

§ 27.14 Construction requirements; Criteria for renewal.

(a) AWS and WCS licensees, with the exception of WCS licensees holding authorizations for the 600 MHz band, Block A in the 698-704 MHz and 728-734 MHz bands, Block B in the 704-710 MHz and 734-740 MHz bands, Block E in the 722-728 MHz band, Block C, C1 or C2 in the 746-757 MHz and 776-787 MHz bands, Block A in the 2305-2310 MHz and 2350-2355 MHz bands, Block B in the 2310-

2315 MHz and 2355-2360 MHz bands, Block C in the 2315-2320 MHz band, and Block D in the 2345-2350 MHz band, and with the exception of licensees holding AWS authorizations in the 1915-1920 MHz and 1995-2000 MHz bands, the 2000-2020 MHz and 2180-2200 MHz bands, or 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz bands, must, as a performance requirement, make a showing of "substantial service" in their license area within the prescribed license term set forth in § 27.13. * * *

* * * * *

(f) Comparative renewal proceedings do not apply to WCS licensees holding authorizations for the 600 MHz band, 698-746 MHz, 747-762 MHz, and 777-792 MHz bands or licensees holding AWS authorizations for the 1915-1920 MHz and 1995-2000 MHz bands or the 2000-2020 MHz and 2180-2200 MHz bands, or the 1695-1710 MHz, or the 1755-1780 MHz and 2155-2180 MHz bands. * * *

* * * * *

(k) Licensees holding WCS or AWS authorizations in the spectrum blocks enumerated in paragraphs (g), (h), (i), (q), (r), (s) and (t) of this section, including any licensee that obtained its license pursuant to the procedures set forth in paragraph (j) of this section, shall demonstrate compliance with performance requirements by filing a construction notification with the Commission, within 15 days of the expiration of the applicable benchmark, in accordance with the provisions set forth in § 1.946(d) of this chapter. * * *

* * * * *

(t) The following provisions apply to any licensee holding an authorization in the 600 MHz band:

(1) A licensee shall provide reliable signal coverage and offer service within six (6) years from the date of the initial license to at least forty (40) percent of the population in each of its license areas ("Interim Buildout Requirement").

(2) A licensee shall provide reliable signal coverage and offer service within twelve (12) years from the date of the initial license to at least seventy-five (75) percent of the population in each of its license areas ("Final Buildout Requirement").

(3) If a licensee fails to establish that it meets the Interim Buildout Requirement for a particular licensed area, then the Final Buildout Requirement (in this paragraph (t)) and the license term (as set forth in

§ 27.13(l)) for each license area in which it fails to meet the Interim Buildout Requirement shall be accelerated by two (2) years (from twelve (12) to ten (10) years).

(4) If a licensee fails to establish that it meets the Final Buildout Requirement for a particular license area, its authorization for each license area in which it fails to meet the Final Buildout Requirement shall terminate automatically without Commission action, and the licensee will be ineligible to regain it if the Commission makes the license available at a later date.

(5) To demonstrate compliance with these performance requirements, licensees shall use the most recently available decennial U.S. Census Data at the time of measurement and shall base their measurements of population served on areas no larger than the Census Tract level. The population within a specific Census Tract (or other acceptable identifier) will be deemed served by the licensee only if it provides reliable signal coverage to and offers service within the specific Census Tract (or other acceptable identifier). To the extent the Census Tract (or other acceptable identifier) extends beyond the boundaries of a license area, a licensee with authorizations for such areas may include only the population within the Census Tract (or other acceptable identifier) towards meeting the performance requirement of a single, individual license. For the Gulf of Mexico license area, the licensee shall demonstrate compliance with these performance requirements, using off-shore platforms, including production, manifold, compression, pumping and valving platforms as a proxy for population in the Gulf of Mexico.

(6) An applicant for renewal of a license covered by this paragraph (t) must make a renewal showing, independent of its performance requirements, as a condition of each renewal. The showing must include a detailed description of the applicant's provision of service during the entire license period and address:

(i) The level and quality of service provided by the applicant (including the population served, the area served, the number of subscribers, the services offered);

(ii) The date service commenced, whether service was ever interrupted, and the duration of any interruption or outage;

(iii) The extent to which service is provided to rural areas;

(iv) The extent to which service is provided to qualifying tribal land as defined in § 1.2110(f)(3)(i) of this chapter; and

(v) Any other factors associated with the level of service to the public.

27. Section 27.15 is amended by revising the first sentence in paragraph (d)(1)(i); revising paragraph (d)(1)(iii); revising the first sentence in paragraph (d)(2)(i), and revising paragraph (d)(2)(iii) to read as follows:

§ 27.15 Geographic partitioning and spectrum disaggregation.

* * * * *

(d) * * *

(1) * * *

(i) Except for WCS licensees holding authorizations for the 600 MHz band, Block A in the 698-704 MHz and 728-734 MHz bands, Block B in the 704-710 MHz and 734-740 MHz bands, Block E in the 722-728 MHz band, or Blocks C, C1, and C2 in the 746-757 MHz and 776-787 MHz bands; and for licensees holding AWS authorizations in the 1915-1920 MHz and 1995-2000 MHz bands, the 2000-2020 MHz and 2180-2200 MHz bands; or the 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz bands the following rules apply to WCS and AWS licensees holding authorizations for purposes of implementing the construction requirements set forth in § 27.14. * * *

* * * * *

(iii) For licensees holding authorizations for the 600 MHz band, AWS authorizations in the 1915-1920 MHz and 1995-2000 MHz bands, or the 2000-2020 MHz and 2180-2200 MHz bands, or the 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz bands, the following rules apply for purposes of implementing the construction requirements set forth in § 27.14. Each party to a geographic partitioning must individually meet any service-specific performance requirements (i.e., construction and operation requirements). If a partitioner or partitionee fails to meet any service-specific performance requirements on or before the required date, then the consequences for this failure shall be those enumerated in §27.14(q) for 2000-2020 MHz and 2180-2200 MHz licenses, those enumerated in § 27.14(r) for 1915-1920 MHz and 1995-2000 MHz licenses, and those enumerated in § 27.14(s) for 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz licenses, and those enumerated in § 27.14(t) for 600 MHz band licenses.

(2) * * *

(i) Except for WCS licensees holding authorizations for the 600 MHz band, Block A in the 698–704 MHz and 728–734 MHz bands, Block B in the 704–710 MHz and 734–740 MHz bands, Block E in the 722–728 MHz band, or Blocks C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands; and for licensees holding AWS authorizations in the 1915-1920 MHz and 1995-2000 MHz bands, the 2000-2020 MHz and 2180-2200 MHz bands or the 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz bands; the following rules apply to WCS and AWS licensees holding authorizations for purposes of implementing the construction requirements set forth in § 27.14. * * *

* * * * *

(iii) For licensees holding authorizations for the 600 MHz band, AWS authorizations in the 1915-1920 MHz and 1995-2000 MHz bands, or the 2000-2020 MHz and 2180-2200 MHz bands, or the 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz bands, the following rules apply for purposes of implementing the construction requirements set forth in § 27.14. Each party to a spectrum disaggregation must individually meet any service-specific performance requirements (i.e., construction and operation requirements). If a disaggregator or a disaggregatee fails to meet any service-specific performance requirements on or before the required date, then the consequences for this failure shall be those enumerated in § 27.14(q) for 2000-2020 MHz and 2180-2200 MHz licenses, those enumerated in § 27.14(r) for 1915-1920 MHz and 1995-2000 MHz licenses, those enumerated in § 27.14(s) for 1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz licenses, and those enumerated in § 27.14(t) for 600 MHz band licenses.

28. Section 27.17 is amended by revising the title and paragraphs (a), (b) and (c) to read as follows:

§ 27.17 Discontinuance of service in the 600 MHz band and the 1695-1710 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2155-2180 MHz, and 2180-2200 MHz bands.

(a) Termination of authorization. A 600 MHz band authorization and an AWS authorization in the 1695-1710 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2155-2180 MHz, and 2180-2200 MHz bands will automatically terminate, without specific Commission action, if the licensee permanently discontinues service either during the initial license term or during any subsequent license term, as follows:

(1) after the interim buildout deadline as specified in § 27.14(r), (s), or (t) as applicable (where the licensee meets the Interim Buildout Requirement), or after the accelerated Final Buildout Requirement (where the licensee failed to meet the Interim Buildout Requirement).

(2) * * *

(b) For licensees with common carrier or non-common carrier regulatory status that hold 600 MHz band authorizations or AWS authorizations in the 1695-1710 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, permanent discontinuance of service is defined as 180 consecutive days during which a licensee does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the licensee in the individual license area. For licensees with private, internal communications regulatory status that hold 600 MHz band authorizations or AWS authorizations in the 1695-1710 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, permanent discontinuance of service is defined as 180 consecutive days during which a licensee does not operate.

(c) Filing Requirements. A licensee that holds a 600 MHz band authorization or an AWS authorization in the 1695-1710 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2155-2180 MHz, and 2180-2200 MHz bands, that permanently discontinues service as defined in this section must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 or 605 requesting license cancellation. An authorization will automatically terminate, without specific Commission action, if service is permanently discontinued as defined in this section, even if a licensee fails to file the required form requesting license cancellation.

* * * * *

29. Section 27.19 is added to read as follows:

§ 27.19 Requirements for operation of base and fixed stations in the 600 MHz downlink band in close proximity to Radio Astronomy Observatories.

(a) Licensees must make reasonable efforts to protect the radio astronomy observatory at Green Bank, WV, Arecibo, PR, and those identified in § 15.712(h)(3) of this chapter as part of the Very Long Baseline Array (VLBA) from interference.

(b) 600 MHz band base and fixed stations in the 600 MHz downlink band within 25 kilometers of VLBA observatories are subject to coordination with the National Science Foundation (NSF) prior to commencing operations. The appropriate NSF contact point to initiate coordination is Electromagnetic Spectrum Manager, NSF, 4201 Wilson Blvd., Suite 1045, Arlington VA 22203, fax 703-292-9034, e-mail esm@nsf.gov.

(c) Any licensee that intends to operate base and fixed stations in the 600 MHz downlink band in locations near the Radio Astronomy Observatory site located in Green Bank, Pocahontas County, West Virginia, or near the Arecibo Observatory in Puerto Rico, must comply with the provisions in § 1.924 of this chapter.

30. Section 27.50 is amended by revising paragraphs (c) introductory text, (c)(5), (c)(9), (c)(10), and the headings to Tables 1 through 4 to read as follows:

§ 27.50 Power limits and duty cycle.

* * * * *

(c) The following power and antenna height requirements apply to stations transmitting in the 600 MHz band and the 698–746 MHz band:

* * *

(5) Licensees, except for licensees operating in the 600 MHz downlink band, seeking to operate a fixed or base station located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal at an ERP greater than 1000 watts must: * * *

* * * * *

(9) Control and mobile stations in the 698–746 MHz band are limited to 30 watts ERP.

(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698–746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

* * * * *

Table 1 to § 27.50—Permissible Power and Antenna Heights for Base and Fixed Stations in the 757–758 and 775–776 MHz Bands and for Base and Fixed Stations in the 600 MHz, 698–757 MHz, 758–763

MHz, 776–787 MHz and 788–793 MHz Bands Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

* * * * *

Table 2 to § 27.50—Permissible Power and Antenna Heights for Base and Fixed Stations in the 600 MHz, 698–757 MHz, 758–763 MHz, 776–787 MHz and 788–793 MHz Bands Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

* * * * *

Table 3 to § 27.50—Permissible Power and Antenna Heights for Base and Fixed Stations in the 600 MHz, 698–757 MHz, 758–763 MHz, 776–787 MHz and 788–793 MHz Bands Transmitting a Signal With an

Emission Bandwidth Greater than 1 MHz

* * * * *

Table 4 to § 27.50—Permissible Power and Antenna Heights for Base and Fixed Stations in the 600 MHz, 698–757 MHz, 758–763 MHz, 776–787 MHz and 788–793 MHz Bands Transmitting a Signal With an Emission Bandwidth Greater than 1 MHz

* * * * *

31. Section 27.53 is amended by revising paragraph (g) to read as follows:

§ 27.53 Emission limits.

* * * * *

(g) For operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

* * * * *

32. Section 27.55 is amended by revising paragraph (a)(2) to read as follows:

§ 27.55 Power strength limits.

(a) * * *

(2) 600 MHz, 698–758, and 775–787 MHz bands: 40 dBμV/m.

* * * * *

33. Section 27.57 is amended by revising paragraph (b) to read as follows:

§ 27.57 International coordination.

* * * * *

(b) Wireless operations in the 512-608 MHz, 614-763 MHz, 775-793 MHz, and 805-806 MHz bands are subject to current and future international agreements between the United States and Canada and the United States and Mexico. Unless otherwise modified by international treaty, licenses must not cause interference to, and must accept harmful interference from, television broadcast operations in Mexico and Canada, where these services are co-primary in the band.

* * * * *

34. Section 27.75 is amended by revising paragraph (a)(2) to read as follows:

§ 27.75 Basic interoperability requirement.

* * * * *

(a) * * *

(2) Mobile and portable stations that operate on any portion of frequencies in the 600 MHz band must be capable of operating on all frequencies in the 600 MHz band using the same air interfaces that the equipment utilizes on any frequencies in the 600 MHz band.

* * * * *

35. Add new subpart N to part 27 to read as follows:

Subpart N—600 MHz Band

Sec.

27.1300 600 MHz band subject to competitive bidding.
27.1301 Designated entities in the 600 MHz band.

§ 27.1300 600 MHz band subject to competitive bidding.

As required by section 6403(c) of the Spectrum Act, applications for 600 MHz band initial licenses are subject to competitive bidding. The general competitive bidding procedures set forth in 47 CFR part 1, subpart Q will apply unless otherwise provided in this subpart.

§ 27.1301 Designated entities in the 600 MHz band.

Eligibility for small business provisions:

(a) Small business. (1) A small business is an entity that, together with its affiliates, its controlling interests, the affiliates of its controlling interests, and the entities with which it has an attributable material relationship, has average gross revenues not exceeding $40 million for the preceding three (3) years.

(2) A very small business is an entity that, together with its affiliates, its controlling interests, the affiliates of its controlling interests, and the entities with which it has an attributable material relationship, has average gross revenues not exceeding $15 million for the preceding three (3) years.

(b) Bidding credits. A winning bidder that qualifies as a small business as defined in this section or a consortium of small businesses may use the bidding credit specified in § 1.2110(f)(2)(iii) of this chapter. A winning bidder that qualifies as a very small business as defined in this section or a consortium of very small businesses may use the bidding credit specified in § 1.2110(f)(2)(ii) of this chapter.

PART 73—RADIO BROADCAST SERVICES

36. The authority citation for part 73 continues to read:

Authority: 47 U.S.C. 154, 303, 334, 336, and 339.

37. Section 73.3700 is revised to read as follows:

§ 73.3700 Post-Incentive Auction Licensing and Operation.

(a) Definitions.

(1) Broadcast television station. For purposes of this section, broadcast television station means full power television stations and Class A television stations.

(2) Channel reassignment public notice. For purposes of this section, Channel Reassignment Public Notice means the public notice to be released upon the completion of the broadcast television spectrum incentive auction conducted under section 6403 of the Spectrum Act specifying the new channel

assignments and technical parameters of any broadcast television stations that are reassigned to new channels.

(3) Channel sharee station. For purposes of this section, channel sharee station means a broadcast television station for which a winning channel sharing bid, as defined in § 1.2200(4) of this chapter, was submitted.

(4) Channel sharer station. For purposes of this section, channel sharer station means a broadcast television station that shares its television channel with a channel sharee.

(5) Channel sharing agreement (CSA). For purposes of this section, channel sharing agreement or CSA means an executed agreement between the licensee of a channel sharee station or stations and the licensee of a channel sharer station governing the use of the shared television channel.

(6) High-VHF-to-Low-VHF station. For purposes of this section, High-VHF-to-Low-VHF station means a broadcast television station for which a winning high-VHF-to-low-VHF bid, as defined in § 1.2200(6) of this chapter, was submitted.

(7) License relinquishment station. For purposes of this section, license relinquishment station means a broadcast television station for which a winning license relinquishment bid, as defined in § 1.2200(7) of this chapter, was submitted.

(8) MVPD. For purposes of this section, MVPD means a person such as, but not limited to, a cable operator, a multichannel multipoint distribution service, a direct broadcast satellite service, or a television receive-only satellite program distributor, who makes available for purchase, by subscribers or customers, multiple channels of video programming as set forth in section 602 of the Communications Act of 1934 (47 U.S.C. 522).

(9) Pre-auction channel. For purposes of this section, pre-auction channel means the channel that is licensed to a broadcast television station on the date that the Channel Reassignment Public Notice is released.

(10) Predetermined cost estimate. For purposes of this section, predetermined cost estimate means the estimated cost of an eligible expense as generally determined by the Media Bureau in a catalog of expenses eligible for reimbursement.

(11) Post-auction channel. For purposes of this section, post-auction channel means the channel specified in the Channel Reassignment Public Notice or a channel authorized by the Media Bureau in a construction permit issued after the date that the Channel Reassignment Public Notice is released under the procedures set forth in paragraph (b) of this section.

(12) Reassigned station. For purposes of this section, a reassigned station means a broadcast television station that is reassigned to a new channel in the Channel Reassignment Public Notice, not including channel sharing stations, UHF-to-VHF stations, or High-VHF-to-Low-VHF stations.

(13) Reimbursement period. For purposes of this section, reimbursement period means the period ending three years after the completion of the forward auction pursuant to section 6403(b)(4)(D) of the Spectrum Act.

(14) Spectrum Act. The term Spectrum Act means Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96).

(15) Transitioning station. For purposes of this section, a transitioning station means a:

(i) Reassigned station,

(ii) UHF-to-VHF station,

(iii) High-VHF-to-Low-VHF station,

(iv) License relinquishment station, or

(v) A channel sharee or sharer station.

(16) TV broadcaster relocation fund. For purposes of this section, the TV Broadcaster Relocation Fund means the fund established by section 6403(d)(1) of the Spectrum Act.

(17) UHF-to-VHF station. For purposes of this section, UHF-to-VHF station means a television station for which a winning UHF-to-VHF bid, as defined in § 1.2200(12) of this chapter, was submitted.

(b) Post-auction licensing.

(1) Construction permit applications.

(i) Licensees of reassigned stations, UHF-to-VHF stations, and High-VHF-to-Low-VHF stations must file a minor change application for a construction permit for the channel specified in the Channel Reassignment Public Notice using FCC Form 301, 301-CA, or 340 within three months of the release

date of the Channel Reassignment Public Notice. Licensees that are unable to meet this filing deadline may request a waiver of the deadline no later than 30 days prior to the deadline.

(ii) A licensee of a reassigned station that is reassigned from one channel to a different channel within its existing band will be permitted to propose transmission facilities in its construction permit application that will extend its coverage contour, as defined by the technical parameters specified in the Channel Reassignment Public Notice, if such facilities:

(A) Are necessary to achieve the coverage contour specified in the Channel Reassignment Public Notice or to address loss of coverage area resulting from the new channel assignment;

(B) Will not extend a full power television station's noise limited contour or a Class A television station's protected contour by more than one percent in any direction; and

(C) Will not cause new interference, other than a rounding tolerance of 0.5 percent, to any other broadcast television station.

(iii) The licensee of a UHF-to-VHF station or High-VHF-to-Low-VHF station will be permitted to propose transmission facilities in its construction permit application that will extend its coverage contour, as defined by the technical parameters specified in the Channel Reassignment Public Notice, if the proposed facility will not cause new interference, other than a rounding tolerance of 0.5 percent, to any other broadcast television station.

(iv) The licensee of a reassigned station, a UHF-to-VHF station, or a High-VHF-to-Low-VHF station that, for reasons beyond its control, is unable to construct facilities that meet the technical parameters specified in the Channel Reassignment Public Notice, or the permissible contour coverage variance from those technical parameters specified in paragraph (b)(1)(ii) or (iii) of this section, may request a waiver of the construction permit application deadline specified in paragraph (b)(1)(i) no later than 30 days prior to the deadline. If its waiver request is granted, the licensee will be afforded an opportunity to submit an application for a construction permit pursuant to paragraph (b)(2)(i) or (ii) of this section in a priority filing window to be announced by the Media Bureau by public notice.

(v) Construction permit applications filed pursuant to paragraph (b)(1)(i) of this section will be afforded expedited processing if the application:

(A) Does not seek to expand the coverage area, as defined by the technical parameters specified in the Channel Reassignment Public Notice, in any direction;

(B) Seeks authorization for facilities that are no more than five percent smaller than those specified in the Channel Reassignment Public Notice with respect to predicted population served; and

(C) Is filed within the three-month deadline specified in paragraph (b)(1)(i) of this section.

(vi) Delegation of authority. The Commission delegates authority to the Chief, Media Bureau to establish construction periods for reassigned stations, UHF-to-VHF stations, and High-VHF-to-Low-VHF stations.

(2) Applications for alternate channels and expanded facilities.

(i) Alternate channels. The licensee of a reassigned station, a UHF-to-VHF station, or a High-VHF-to-Low-VHF station will be permitted to file a major change application for a construction permit for an alternate channel on FCC Form 301, 301-CA, or 340 during a filing window to be announced by the Media Bureau by public notice, provided that:

(A) The licensee of a UHF-to-VHF station cannot request an alternate UHF channel;

(B) The licensee of a UHF-to-VHF station that specified the high-VHF band or the low-VHF band in its UHF-to-VHF bid cannot request a VHF channel outside of the assigned band; and

(C) The licensee of a High-VHF-to-Low-VHF station cannot request an alternate high-VHF channel.

(ii) Expanded facilities. The licensee of a reassigned station, a UHF-to-VHF station, or a High-VHF-to-Low-VHF station will be permitted to file a minor change application for a construction permit on FCC Form 301, 301-CA, or 340 during a filing window to be announced by the Media Bureau by public notice, in order to request a change in the technical parameters specified in the Channel Reassignment Public Notice with respect to height above average terrain (HAAT), effective radiated power (ERP), or transmitter location that would be considered a minor change under §§ 73.3572(a)(1),(2) or 74.787(b) of this chapter.

(iii) Delegation of authority. The Commission delegates authority to the Chief, Media Bureau to:

(A) Announce filing opportunities for alternate channels and expanded facilities applications and specifying appropriate processing guidelines, including the standards to qualify for priority filing, cut-off protections, and means to avoid or resolve mutual exclusivity between applications; and

(B) Establish construction periods for permits authorizing alternate channels or expanded facilities.

(3) License applications for channel sharing stations. The licensee of each channel sharee station and channel sharer station must file an application for a license for the shared channel using FCC Form 302-DTV or 302-CA within three months of the date that the channel sharee station licensee receives its incentive payment pursuant to section 6403(a)(1) of the Spectrum Act.

(4) Deadlines to terminate operations on pre-auction channels.

(i) The licensee of a license relinquishment station must comply with the notification and cancellation procedures in § 73.1750 and terminate operations on its pre-auction channel within three months of the date that the licensee receives its incentive payment pursuant to section 6403(a)(1) of the Spectrum Act.

(ii) The licensee of a channel sharee station must comply with the notification and cancellation procedures in § 73.1750 and terminate operations on its pre-auction channel within three months of the date that the licensee receives its incentive payment pursuant to section 6403(a)(1) of the Spectrum Act.

(iii) All reassigned stations, UHF-to-VHF stations, and High-VHF-to-Low-VHF stations must cease operating on their pre-auction channel once such station begins operating on its post-auction channel or by the deadline specified in its construction permit for its post-auction channel, whichever occurs earlier, and in no event later than the end of the post-auction transition period as defined in § 27.4 of this chapter.

(5) Applications for additional time to complete construction.

(i) Delegation of authority. Authority is delegated to the Chief, Media Bureau to grant a single extension of time of up to six months to licensees of reassigned stations, UHF-to-VHF stations, and High-VHF-to-Low-VHF stations to complete construction of their post-auction channel upon demonstration by the licensee that failure to meet the construction deadline is due to circumstances that are either unforeseeable or beyond the licensee's control. Licensees needing additional time beyond such a single extension of time to complete construction shall be subject to the tolling provisions in § 73.3598.

(ii) Circumstances that may justify an extension of the construction deadline of a licensee of a reassigned station, a UHF-to-VHF station, or a High-VHF-to-Low-VHF station include but are not limited to:

(A) Weather-related delays, including a tower location in a weather-sensitive area;

(B) Delays in construction due to the unavailability of equipment or a tower crew;

(C) Tower lease disputes;

(D) Unusual technical challenges, such as the need to construct a top-mounted or side-mounted antenna or the need to coordinate channel changes with another station; and

(E) Delays faced by licensees that must obtain government approvals, such as land use or zoning approvals, or that are subject to competitive bidding requirements prior to purchasing equipment or services.

(iii) A licensee of a reassigned station, UHF-to-VHF station, or High-VHF-to-Low-VHF station may rely on "financial hardship" as a criterion for seeking an extension of time if it is subject to an active bankruptcy or receivership proceeding, provided that the licensee makes an adequate showing that it has filed requests to proceed with construction in the relevant court proceedings. Any other licensee that seeks an extension of time based on financial hardship must demonstrate that, although it is not subject to an active bankruptcy or receivership proceeding, rare and exceptional financial circumstances warrant granting additional time to complete construction.

(iv) Applications for additional time to complete construction must be filed electronically in CDBS using FCC Form 337 no less than 90 days before the expiration of the construction permit.

(c) Consumer education for transitioning stations.

(1) Transitioning stations that operate on a commercial basis will be required to air at least one Public Service Announcement (PSA) and run at least one crawl in every quarter of every day for 30 days prior to the date that the station terminates operations on its pre-auction channel. One of the required PSAs and one of the required crawls must be run during prime time hours (for purposes of this section, between 8:00 pm and 11:00 pm in the Eastern and Pacific time zones, and between 7:00 pm and 10:00 pm in the Mountain and Central time zones) each day.

(2) Transitioning stations that operate on a noncommercial educational (NCE) basis have the option to either:

(i) Comply with the requirements of section (c)(1) of this paragraph; or

(ii) Air 60 seconds per day of on-air consumer education PSAs, in variable timeslots, for 30 days prior to the station's termination of operations on its pre-auction channel.

(3) Transition crawls.

(i) Each crawl must run during programming for no less than 60 consecutive seconds across the bottom or top of the viewing area and be provided in the same language as a majority of the programming carried by the transitioning station.

(ii) Each crawl must include the date that the station will terminate operations on its pre-auction channel; inform viewers of the need to rescan if the station has received a new post-auction channel assignment; and explain how viewers may obtain more information by telephone or online.

(4) Transition PSAs.

(i) Each PSA must have a duration of at least 15 seconds.

(ii) Each PSA must be provided in the same language as a majority of the programming carried by the transitioning station; include the date that the station will terminate operations on its pre-auction channel; inform viewers of the need to rescan if the station has received a new post-auction channel assignment; explain how viewers may obtain more information by telephone or online; and for stations with new post-auction channel assignments, provide instructions to both over-the-air and MVPD viewers regarding how to continue watching the television station; and be closed-captioned.

(5) Licensees of transitioning stations, except for license relinquishment stations, must place a certification of compliance with the requirements in paragraph (c) of this section in their online public file within 30 days after beginning operations on their post-auction channels. Licensees of license relinquishment stations must include the certification in their notification of discontinuation of service pursuant to § 73.1750 of this chapter.

(d) Notice to MVPDs.

(1) Licensees of transitioning stations must provide notice to MVPDs that:

(i) No longer will be required to carry the station because it will cease operations or because of the relocation of a channel sharee station;

(ii) Currently carry and will continue to be obligated to carry a station that will have a new post-auction channel assignment; or

(iii) Will become obligated to carry a station due to the relocation of a channel sharee station.

(2) The notice to MVPDs must be provided in the form of a letter notification and must contain the following information:

(i) Date and time of any channel changes;

(ii) Pre-auction and post-auction channels;

(iii) Modification (if any) to antenna position, location or power levels;

(iv) Stream identification information for channel sharing stations; and

(v) Engineering staff contact information.

(3) Should any of the information in (d)(2) of this section change during the time that the station is transitioning from its pre-auction to its post-auction channel, an amended notification must be sent.

(4) For cable systems, the notification letter must be addressed to the system's official address of record provided in the cable system's most recent filing in the Commission's Cable Operations and Licensing System (COALS) Form 322. For all other MVPDs, the notification letter must be addressed to the official corporate address registered with their State of incorporation.

(5) Notification letters must be sent within the following time frames:

(i) For license relinquishment stations, not less than 30 days prior to terminating operations;

(ii) For channel sharee stations, not less than 30 days prior to terminating operations of the pre-auction channel;

(iii) For channel sharee and channel sharer stations, not less than 30 days prior to initiation of operations on the shared channel; and

(iv) For reassigned stations, UHF-to-VHF stations, and High-VHF-to-Low-VHF stations, not less than 90 days prior to the date on which they will begin operations on their post-auction channel.

(v) If a station's anticipated transition date changes due to an unforeseen delay or change in transition plan, the licensee must send a further notice to affected MVPDs informing them of the new anticipated transition date.

(e) Reimbursement rules.

(1) Entities eligible for reimbursement. The Commission will reimburse relocation costs reasonably incurred only by:

(i) The licensees of full power and Class A broadcast television stations that are reassigned under section 6403(b)(1)(B)(i) of the Spectrum Act, including channel sharer stations that are reassigned to a new channel in the Channel Reassignment Public Notice; and

(ii) MVPDs in order to continue to carry the signal of a full power or Class A broadcast television station that is:

(A) Described in paragraph (1)(i) of this section;

(B) A UHF-to-VHF station;

(C) A High-VHF-to-Low-VHF station; or

(D) A channel sharee station.

(2) Estimated costs.

(i) No later than three months following the release of the Channel Reassignment Public Notice, all broadcast television station licensees and MVPDs that are eligible to receive payment of relocation costs will be required to file an estimated cost form providing an estimate of their reasonably incurred relocation costs.

(ii) Each broadcast television station licensee and MVPD that submits an estimated cost form will be required to certify, inter alia, that:

(A) It believes in good faith that it will reasonably incur all of the estimated costs that it claims as eligible for reimbursement on the estimated cost form;

(B) It will use all money received from the TV Broadcaster Relocation Fund only for expenses it believes in good faith are eligible for reimbursement;

(C) It will comply with all policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the TV Broadcaster Relocation Fund;

(D) It will maintain detailed records, including receipts, of all costs eligible for reimbursement actually incurred; and

(E) It will file all required documentation of its relocation expenses as instructed by the Media Bureau.

(iii) If a broadcast television station licensee or MVPD seeks reimbursement for new equipment, it must provide a justification as to why it is reasonable under the circumstances to purchase new equipment

rather than modify its corresponding current equipment in order to change channels or to continue to carry the signal of a broadcast television station that changes channels.

(iv) Entities that submit their own cost estimates, as opposed to the predetermined cost estimates provided in the estimated cost form, must submit supporting evidence and certify that the estimate is made in good faith.

(3) Final Allocation Deadline.

(i) Upon completing construction or other reimbursable changes, or by a specific deadline prior to the end of the Reimbursement Period to be established by the Media Bureau, whichever is earlier, all broadcast television station licensees and MVPDs that received an initial allocation from the TV Broadcaster Relocation Fund must provide the Commission with information and documentation, including invoices and receipts, regarding their actual expenses incurred as of a date to be determined by the Media Bureau (the "Final Allocation Deadline").

(ii) If a broadcast television station licensee or MVPD has not yet completed construction or other reimbursable changes by the Final Allocation Deadline, it must provide the Commission with information and documentation regarding any remaining eligible expenses that it expects to reasonably incur.

(4) Final accounting. After completing all construction or reimbursable changes, broadcast television station licensees and MVPDs that have received money from the TV Broadcaster Relocation Fund will be required to submit final expense documentation containing a list of estimated expenses and actual expenses as of a date to be determined by the Media Bureau. Entities that have finished construction and have submitted all actual expense documentation by the Final Allocation Deadline will not be required to file at the final accounting stage.

(5) Progress reports. Broadcast television station licensees and MVPDs that receive payment from the TV Broadcaster Relocation Fund are required to submit progress reports at a date and frequency to be determined by the Media Bureau.

(6) Documentation requirements.

(i) Each broadcast television station licensee and MVPD that receives payment from the TV Broadcaster Relocation Fund is required to retain all relevant documents pertaining to construction or other

reimbursable changes for a period ending not less than 10 years after the date on which it receives final payment from the TV Broadcaster Relocation Fund.

(ii) Each broadcast television station licensee and MVPD that receives payment from the TV Broadcaster Relocation Fund must make available all relevant documentation upon request from the Commission or its contractor.

(7) Delegation of authority. The Commission delegates authority to the Chief, Media Bureau, to adopt the necessary policies and procedures relating to allocations, draw downs, payments, obligations, and expenditures of money from the TV Broadcaster Relocation Fund in order to protect against waste, fraud, and abuse and in the event of bankruptcy, to establish a catalog of expenses eligible for reimbursement and predetermined cost estimates, review the estimated cost forms, issue initial allocations for costs reasonably incurred pursuant to section 6403(b)(4) of the Spectrum Act, set filing deadlines and review information and documentation regarding progress reports, final allocations, and final accountings, and issue final allocations to reimburse for costs reasonably incurred pursuant to section 6403(b)(4) of the Spectrum Act.

(f) Service rule waiver.

(1) Waiver requests.

(i) A broadcast television station licensee described in paragraph (e)(1)(i) of this section may file a request with the Chief, Media Bureau for a waiver of the Commission's service rules pursuant to section 6403(b)(4)(B) of the Spectrum Act during a 30-day window commencing upon the date that the Channel Reassignment Public Notice is released.

(ii) A broadcast television station licensee may request that a waiver be granted on a temporary or permanent basis.

(2) A licensee will have 10 days following a grant of the waiver to notify the Commission whether it accepts the terms of the waiver.

(3) A licensee is required to meet all requirements for receiving payment of relocation costs under section 6403(b)(4) of the Spectrum Act established by the Commission, including the requirements of paragraph (e) of this section, until its waiver request is granted and the licensee accepts the terms of the waiver.

(4) A licensee that is granted and accepts the terms of the waiver or a licensee with a pending waiver application must comply with all filing and notification requirements, construction schedules, and other post-auction transition deadlines set forth in paragraphs (b), (c), and (d) of this section.

(g) Low Power TV and TV translator stations.

(1) Licensees of operating low power TV and TV translator stations that are displaced by a broadcast television station or a wireless service provider or whose channel is reserved as a guard band as a result of the broadcast television spectrum incentive auction conducted under section 6403 of the Spectrum Act shall be permitted to submit an application for displacement relief in a restricted filing window to be announced by the Media Bureau by public notice. Except as otherwise indicated in this section, such applications will be subject to the rules governing displacement applications set forth in §§ 73.3572(a)(4) and 74.787(a)(4) of this chapter.

(2) In addition to other interference protection requirements set forth in the rules, when requesting a new channel in a displacement application, licensees of operating low power TV and TV translator stations will be required to demonstrate that the station would not cause interference to the predicted service of broadcast television stations on:

(i) Pre-auction channels;

(ii) Channels assigned in the Channel Reassignment Public Notice; or

(iii) Alternative channels or expanded facilities broadcast television station licensees have applied for pursuant to paragraph (b)(2) of this section.

(3) Mutually exclusive displacement applications. Licensees of low power TV and TV translator stations that file mutually exclusive displacement applications will be permitted to resolve the mutual exclusivity through an engineering solution or settlement agreement. If no resolution of mutually exclusive displacement applications occurs, a selection priority will be granted to the licensee of a displaced digital replacement translator.

(4) Notification and termination provisions for displaced low power TV and TV translator stations.

(i) A wireless licensee assigned to frequencies in the 600 MHz band under part 27 of this chapter must notify low power TV and TV translator stations of its intent to commence wireless operations and the

likelihood of receiving harmful interference from the low power TV or TV translator station to such operations within the wireless licensee's licensed geographic service area.

(ii) The new wireless licensees must:

(A) Notify the low power TV or TV translator station in the form of a letter, via certified mail, return receipt requested;

(B) Indicate the date the new wireless licensee intends to commence operations in areas where there is a likelihood of receiving harmful interference from the low power TV or TV translator station; and

(C) Send such notification not less than 120 days in advance of the commencement date.

(iii) Low power TV and TV translator stations may continue operating on frequencies in the 600 MHz band assigned to wireless licensees under part 27 of this chapter until the wireless licensee commences operations as indicated in the notification sent pursuant to this paragraph.

(iv) After receiving notification, the low power TV or TV translator licensee must cease operating or reduce power in order to eliminate the potential for harmful interference before the commencement date set forth in the notification.

(v) Low power TV and TV translator stations that are operating on the UHF spectrum that is reserved for guard band channels as a result of the broadcast television incentive auction conducted under section 6403 of the Spectrum Act may continue operating on such channels until the end of the post-auction transition period as defined in § 27.4 of this chapter, unless they receive notification from a new wireless licensee pursuant to the requirements of paragraph (g)(4) of this section that they are likely to cause harmful interference in areas where the wireless licensee intends to commence operations, in which case the requirements of paragraph (g)(4) of this section will apply.

(h) Channel sharing operating rules.

(1) Each broadcast television station licensee that is a party to a CSA shall continue to be licensed and operated separately, have its own call sign, and be separately subject to all of the Commission's obligations, rules, and policies applicable to the television service.

(2) Channel sharing between full power television and Class A television stations.

(i) A CSA may be executed between licensees of full power television stations, between licensees of Class A television stations, and between licensees of full power and Class A television stations.

(ii) A Class A channel sharee station licensee that is a party to a CSA with a full power channel sharer station licensee must comply with the rules of part 73 governing power levels and interference, and must comply in all other respects with the rules and policies applicable to Class A television stations, as set forth in §§ 73.6000 et seq.

(iii) A full power channel sharee station licensee that is a party to a CSA with a Class A channel sharer station licensee must comply with the rules of part 74 of this chapter governing power levels and interference.

(iv) A Class A channel sharee station may qualify only for the cable carriage rights afforded to "qualified low power television stations" in § 76.56(b)(3) of this chapter.

(3) Channel sharing between commercial and noncommercial educational television stations.

(i) A CSA may be executed between commercial and NCE broadcast television station licensees.

(ii) The licensee of an NCE station operating on a reserved channel under § 73.621 that becomes a party to a CSA, either as a channel sharee station or as a channel sharer station, will retain its NCE status and must continue to comply with § 73.621.

(iii) If the licensee of an NCE station operating on a reserved channel under § 73.621 becomes a party to a CSA, either as a channel sharee station or as a channel sharer station, the portion of the shared television channel on which the NCE station operates shall be reserved for NCE-only use.

(iv) The licensee of an NCE station operating on a reserved channel under § 73.621 that becomes a party to a CSA may assign or transfer its shared license only to an entity qualified under § 73.621 as an NCE television licensee.

(v) If the licensee of an NCE station operating on a reserved channel under § 73.621 becomes a party to a CSA and its license is relinquished or terminated, only another entity meeting the eligibility criteria of § 73.621 will be considered for reassignment of the shared license.

(4) Required CSA provisions.

(i) CSAs must contain provisions outlining each licensee's rights and responsibilities regarding:

(A) Access to facilities, including whether each licensee will have unrestrained access to the shared transmission facilities;

(B) Allocation of bandwidth within the shared channel;

(C) Operation, maintenance, repair, and modification of facilities, including a list of all relevant equipment, a description of each party's financial obligations, and any relevant notice provisions; and

(D) Termination or transfer/assignment of rights to the shared licenses, including the ability of a new licensee to assume the existing CSA.

(ii) CSAs must include provisions:

(A) Affirming compliance with the channel sharing requirements in paragraph (h)(4) of this section, the Incentive Auction Report and Order, Docket No. 12-268 (FCC 14-50), and the Channel Sharing Report and Order, 27 FCC Rcd 4616 (2012); and

(B) Requiring that each channel sharing licensee shall retain spectrum usage rights adequate to ensure a sufficient amount of the shared channel capacity to allow it to provide at least one Standard Definition (SD) program stream at all times.

(5) If a channel sharee or channel sharer station's license is terminated, the licensees of the remaining channel sharing station or stations will continue to have rights to their portion(s) of the shared channel. The rights to the terminated portion of the shared channel will revert to the Commission for reassignment. The final award of the rights to the terminated portion of the shared channel will be conditioned on a new channel sharing licensee agreeing to the terms of the existing CSA. If the new channel sharing licensee and the licensees of the remaining channel sharing station or stations agree to renegotiate the terms of the existing CSA, the agreement may be amended, subject to Commission approval. If the negotiations to amend the agreement are unsuccessful, the remaining station or stations will be permitted to continue to operate while the channel remains a shared allocation and subject to reassignment.

(6) If the rights under a CSA are transferred or assigned, the assignee or the transferee must comply with the terms of the CSA. If the transferee or assignee and the licensees of the remaining channel sharing station or stations agree to amend the terms of the existing CSA, the agreement may be amended, subject to Commission approval.

(7) Preservation of carriage rights. A channel sharee station that possessed carriage rights under section 338, 614, or 615 of the Communications Act of 1934 (47 U.S.C. 338; 534; 535) on November 30, 2010, shall have, at its shared location, the carriage rights under such section that would apply to such station at the shared location if it were not sharing a channel.

38. Section 73.6012 is revised to read as follows:

§ 73.6012 Protection of Class A TV, low power TV and TV translator stations.

* * *

The protection of other authorized low power TV and TV translator stations and applications for changes in such stations shall not apply in connection with any application filed by a Class A TV station pursuant to § 73.3700(b)(1).

39. Section 73.6019 is revised to read as follows:

§ 73.6019 Digital Class A TV station protection of low power TV, TV translator, digital low power TV and digital TV translator stations.

* * *

The protection of other authorized low power TV, TV translator, digital low power TV and digital TV translator stations shall not apply in connection with any application filed by a Class A TV station pursuant to § 73.3700(b)(1).

PART 74—EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTIONAL SERVICES

40. The authority citation for part 74 continues to read as follows:

Authority: 47 U.S.C. 154, 303, 307, 309, 336 and 554.

41. Section 74.602 is amended by adding paragraph (h)(5) and (6) to read as follows:

§74.602 Frequency assignment.

* * * * *

(h) * * *

(5) (i) The licensee of a TV STL, TV relay station, or TV translator relay station that operates on frequencies in the 600 MHz band assigned to wireless licensees under part 27 of this chapter must cease

operations on those frequencies no later than the end of the post-auction transition period as defined in § 27.4 of this chapter. The licensee of a TV STL, TV relay station, or TV translator relay station may be required to cease operations on a date earlier than the end of the post-auction transition period if it receives a notification pursuant to paragraph (h)(5)(ii) of this section.

(ii) A wireless licensee assigned to frequencies in the 600 MHz band under part 27 of this chapter must notify the licensee of a TV STL, TV relay station, or TV translator relay station of its intent to commence wireless operations and the likelihood of harmful interference from the TV STL, TV relay station, or TV translator relay station to those operations within the wireless licensee's licensed geographic service area.

(A) The wireless licensee must:

(1) Notify the licensee of the TV STL, TV relay station, or TV translator relay station in the form of a letter, via certified mail, return receipt requested; and

(2) Send such notification not less than 30 days in advance of the approximate date of commencement of such operations.

(B) The licensee of the TV STL, TV relay station, or TV translator relay station must cease the subject operation within 30 days of receiving the notification pursuant to this section.

(iii) By the end of the post-auction transition period, all TV STL, TV relay station and TV translator relay station licensees must modify or cancel their authorizations and vacate the 600 MHz band. Applications for TV STL, TV relay and TV translator relay stations in the 600 MHz band will not be accepted for filing on or after the end date for the post-auction transition period.

(6) The licensee of a TV STL, TV relay station, or TV translator relay station that operates on the UHF spectrum that is reserved for guard band channels as a result of the broadcast television incentive auction conducted under section 6403 of the Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. No. 112-96) must cease operations on those frequencies no later than the end of the post-auction transition period as defined in § 27.4 of this chapter. The licensee of a TV STL, TV relay station, or TV translator

relay station may be required to cease operations on a date earlier than the end of the post-auction transition period if it receives a notification pursuant to paragraph (h)(5)(ii) of this section.

42. Section 74.802 is amended by revising paragraph (b), and by adding paragraph (f), to read as follows:

§74.802 Frequency assignment.

* * * * *

(b) (1) Operations in the bands allocated for TV broadcasting are limited to locations at least 4 kilometers outside the protected contours of co-channel TV stations as defined below. These contours are calculated using the methodology in §73.684 of this chapter and the R-6602 curves contained in §73.699 of this chapter.

Type of station	Protected contour		
	Channel	Contour (dBu)	Propagation curve
Analog: Class A TV, LPTV, translator and booster	Low VHF (2-6)	47	F(50,50)
	High VHF (7-13)	56	F(50,50)
	UHF (14-51)	64	F(50,50)
Digital: Full service TV, Class A TV, LPTV, translator and booster	Low VHF (2-6)	28	F(50,90)
	High VHF (7-13)	36	F(50,90)
	UHF (14-51)	41	F(50,90)

(2) Low power auxiliary stations may operate closer to co-channel TV broadcast stations than the distances specified in paragraph (b)(1) of this section provided that their operations are coordinated with TV broadcast stations that could be affected by the low power auxiliary station operation. Coordination must be completed prior to operation of the low power auxiliary station.

* * * * *

(f) Operations in 600 MHz band assigned to wireless licensees under part 27 of this chapter. A low power auxiliary station that operates on frequencies in the 600 MHz band assigned to wireless licensees under part 27of this chapter must cease operations on those frequencies no later than the end of the post-auction transition period as defined in § 27.4 of this chapter. During the post-auction transition period, low power auxiliary stations will operate on a secondary basis

to part 27 licensees, *i.e.*, they must not cause and must accept harmful interference to part 27 licensees.

43. Section 74.870 is amended by revising paragraph (i) to read as follows:

§74.870 Wireless video assist devices.

* * * * *

(i) Operations in 600 MHz band assigned to wireless licensees under part 27 of this chapter. A wireless video assist device that operates on frequencies in the 600 MHz band assigned to wireless licensees under part 27of this chapter must cease operations on those frequencies no later than the end of the post-auction transition period as defined in § 27.4 of this chapter. During the post-auction transition period, wireless video assist devices will operate on a secondary basis to part 27 licensees, *i.e.*, they must not cause and must accept harmful interference to part 27 licensees.

APPENDIX B

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] an Initial Regulatory Flexibility Analysis ("IRFA") was incorporated in the *Notice of Proposed Rule Making* ("*Notice*" or "*NPRM*"). The Commission sought written public comment on the proposals in the *Notice*, including comment on the IRFA. Because we amend the rules in this Order, we have included this Final Regulatory Flexibility Analysis ("FRFA") which conforms to the RFA.[2]

A. Need for, and Objectives of, the Order

2. In 2012, Congress mandated that the Commission conduct an incentive auction of broadcast television spectrum as set forth in the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act").[3] Congress's passage of the Spectrum Act set the stage for this proceeding and further expanded the Commission's ability to facilitate technological and economic growth. The Spectrum Act authorizes the Commission to conduct incentive auctions in which licensees may voluntarily relinquish their spectrum usage rights in order to permit the assignment by auction of new initial licenses subject to flexible use service rules, in exchange for a portion of the resulting auction proceeds. Section 6403 of the Spectrum Act requires the Commission to conduct an incentive auction of the broadcast television spectrum and includes specific requirements and safeguards for the required auction.[4]

3. The incentive auction will have three major pieces: (1) a "reverse auction" in which full power and Class A broadcast television licensees submit bids to voluntarily relinquish certain broadcast rights in exchange for payments; (2) a reorganization or "repacking" of the broadcast television bands in order to free up a portion of the ultra-high frequency ("UHF") band for other uses; and (3) a "forward auction" of licenses for flexible use of the newly available spectrum.[5]

4. In order to implement this congressional mandate to conduct an incentive auction of broadcast television spectrum, the Order adopts an auction design framework and rules for competitive bidding to govern the reverse auction, and modifies the Commission's general competitive bidding rules in Part 1 in order to conduct the related forward auction for new spectrum licenses. The other major component of the incentive auction, the repacking process, will help to determine which reverse auction bids will be accepted. In addition, consistent with the Commission's typical approach to spectrum license auctions, the adopted rules and Part 1 rule revisions provide a general framework to guide the development of the detailed procedures and deadlines needed to conduct the auction. A public notice process will allow both the Commission and interested parties to focus on and provide input regarding discrete details of the auction design and the auction procedures.

5. In the 600 MHz Band Plan that the Commission adopts, existing channel 37 operations remain allocated for use by radio astronomy and medical telemetry equipment. Depending on the amount of spectrum recovered from the repacking process, the 600 MHz downlink band could be situated on one or both sides of channel 37. For any band plan configurations where wireless downlink blocks are adjacent to channel 37 services, the Commission adopts technically reasonable guard bands between the

[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA"), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[2] *See* 5 U.S.C. § 604.

[3] Pub. L. No. 112-96, §§ 6402, 6403, 126 Stat. 156 (2012).

[4] *See* Spectrum Act § 6403.

[5] *See id.* §§ 6403(a)-(c). *See also id.* §§ 6001(16), (30) (defining "forward auction" and "reverse auction," respectively).

blocks and channel 37. This band plan will allow for maximum flexibility in clearing spectrum while sufficiently protecting incumbent services and new wireless operations.

6. To encourage entry by providers, including small providers, that contemplate offering wireless broadband service on a localized basis, yet at the same time not precluding carriers that plan to provide service on a much larger geographic scale, the Commission will license the 600 MHz Band on the basis of Partial Economic Areas ("PEAs"), a subdivision of Economic Areas ("EAs") created by grouping areas using Metropolitan Statistical Area ("MSA") boundaries, updated with 2010 U.S. Census data for each county. The Commission concludes that licensing on a PEA basis will best promote entry into the market by the broadest range of potential wireless service providers without unduly complicating the auction, thereby promoting competition. Moreover, the Commission concludes that licensing using PEAs throughout the country strikes the appropriate balance and will allow both smaller and larger wireless carriers to obtain licenses that best align with their respective business plans. In addition, because the MSA boundaries may more closely fit many wireless providers' existing footprints—in particular, smaller, non-nationwide providers—adopting this geographic licensing approach should provide a greater opportunity for all wireless providers to acquire spectrum licenses in their service areas.

7. To enable repacking of the broadcast spectrum, it is critical that the Commission determine how to preserve the coverage area and population served of full power and Class A stations as required by the Spectrum Act. Accordingly, the Commission adopts rules on engineering and other technical aspects of the repacking process, in particular Congress's mandate in section 6403(b)(2) of the Spectrum Act that it make all reasonable efforts to preserve the coverage area and population served of full power and Class A television stations in the repacking.

8. The broadcast television spectrum incentive auction and the associated repacking process could impact both the coverage area and the population served of full power and Class A television stations. If a station is assigned to a different channel, its technical facilities must be modified to preserve its coverage area because radio signals propagate differently on different frequencies. These varying propagation characteristics also mean that a new channel assignment may change the areas within a station's noise-limited service area affected by terrain loss. Channel reassignments, and stations going off the air as a result of the reverse auction, also may change the interference relationships between stations, which in turn affect population served. Stations going off the air can eliminate existing interference to the stations that remain on the air. Likewise, new channel assignments generally will eliminate interference that the reassigned stations are now causing or receiving. At the same time, new channel assignments create a potential for new interference between nearby stations on the same channel or an adjacent channel. The Commission adopts a repacking methodology that takes in account all of these impacts in order to carry out Congress's mandate in section 6403(b)(2).

9. The Commission recognizes that low power television ("LPTV") and television translator ("TV translator") stations may be impacted by repacking. These stations are not permitted to participate in the reverse auction. Moreover, these stations have only secondary interference protection rights and will not be protected during repacking. Many of these stations may be displaced from their current operating channel. To ease the burden on these stations, the Commission will allow displaced LPTV and TV translator stations to have the opportunity to submit a displacement application and propose a new operating channel. The Commission also will allow LPTV and TV translator stations to explore engineering solutions or agree on a settlement to resolve mutually exclusive displacement applications. In cases where stations do not resolve mutually exclusive displacement applications, the Commission will grant selection priority to the licensees of any displaced digital replacement translators ("DRTs"), and only after this priority will the Commission use an auction to resolve remaining displacement groups. The Commission also intends to initiate a rulemaking proceeding to consider additional means to mitigate the potential impact of the incentive auction and the repacking process on LPTV and TV translator stations.

10. Following the conclusion of the incentive auction, the transition to the reorganized UHF band will be as rapid as possible without causing unnecessary disruption. Television stations that

voluntarily turn in their licenses or agree to channel share must transition from their pre-auction channels within three months of receiving their reverse auction payments. The time required for stations reassigned to a new channel to modify their facilities will vary, so the Commission will tailor their construction deadlines to their situations. Consistent with Congress's mandate, the Commission establishes procedures to reimburse costs reasonably incurred by stations that are involuntarily reassigned to new channels, as well as by multichannel video programming distributors ("MVPDs") to continue to carry stations reassigned to new channels. Other incumbents must also transition from the repurposed 600 MHz Band, including the guard bands. The Commission establishes procedures and deadlines for the transition of the following services: LPTV and TV translator stations; Broadcast Auxiliary Services ("BAS"); television white space devices; low power auxiliary stations ("LPAS") and unlicensed wireless microphones; and wireless assist video devices.

11. In addition to repurposing UHF spectrum for new licensed uses, the Commission makes a significant amount of spectrum available for unlicensed use, a large portion of it on a nationwide basis. To prevent harmful interference between licensed services, the 600 MHz Band Plan includes a number of guard bands, which the Commission intends to make available for use by unlicensed devices. Moreover, the Commission will allow unlicensed use of channel 37, subject to the development of the appropriate technical parameters to protect the incumbent Wireless Medical Telemetry Service ("WMTS") and Radio Astronomy Service ("RAS") from harmful interference, and allow television white space devices as well as wireless microphones to operate on any unused television channels in a market following the incentive auction. The Commission also intends to designate one unused channel in each area following the repacking process for use by wireless microphones and television white space devices.

12. The Commission also adopts measures to facilitate wireless microphone use of available spectrum in the reorganized UHF band. With regard to the 600 MHz Band, the Commission will allow broadcasters and cable programming networks to operate licensed wireless microphones in a portion of the duplex gap. In addition, the Commission will permit other wireless microphones to operate in the guard bands on an unlicensed basis. The Commission will initiate a proceeding to adopt technical standards to govern these uses. With regard to the remaining television spectrum, while there may no longer be two unused channels for wireless microphones in markets where those channels are currently used for that purpose, the Commission intends to designate one unused channel in each area following the auction for use by wireless microphones and television white space devices. The Commission also revises the rules for co-channel operations in the post-auction television bands to expand the areas where wireless microphones may operate. The Commission will initiate a proceeding in the near future to find additional spectrum for wireless microphone users in other spectrum bands in order to help address their long-term needs.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

13. No commenters directly responded to the IRFA. However, a number of commenters raised concerns about the impact on small businesses of various auction design issues. We have nonetheless addressed these concerns in the FRFA.

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

14. The RFA directs the Commission to provide a description of and, where feasible, an estimate of the number of small entities that will be affected by the adopted rules, if adopted.[6] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," small organization," and "small government jurisdiction."[7] In addition, the term "small business" has the same

[6] 5 U.S.C. § 603(b)(3).

[7] *Id*. § 601(6).

meaning as the term "small business concern" under the Small Business Act.[8] A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[9]

15. *Television Broadcasting*. This economic census category "comprises establishments primarily engaged in broadcasting images together with sound. These establishments operate television broadcasting studios and facilities for the programming and transmission of programs to the public."[10] The SBA has created the following small business size standard for Television Broadcasting firms: those having $14 million or less in annual receipts.[11] The Commission has estimated the number of licensed commercial television stations to be 1,388.[12] In addition, according to Commission staff review of the BIA Advisory Services, LLC's *Media Access Pro Television Database* on March 28, 2012, about 950 of an estimated 1,300 commercial television stations (or approximately 73 percent) had revenues of $14 million or less.[13] We therefore estimate that the majority of commercial television broadcasters are small entities.

16. We note, however, that in assessing whether a business concern qualifies as small under the above definition, business (control) affiliations must be included.[14] Our estimate, therefore, likely overstates the number of small entities that might be affected by our action because the revenue figure on which it is based does not include or aggregate revenues from affiliated companies. In addition, an element of the definition of "small business" is that the entity not be dominant in its field of operation. We are unable at this time to define or quantify the criteria that would establish whether a specific television station is dominant in its field of operation. Accordingly, the estimate of small businesses to which rules may apply does not exclude any television station from the definition of a small business on this basis and is therefore possibly over-inclusive to that extent.

17. In addition, the Commission has estimated the number of licensed noncommercial educational ("NCE") television stations to be 396.[15] These stations are non-profit, and therefore considered to be small entities.[16]

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[8] *Id*. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

[9] 15 U.S.C. § 632. Application of the statutory criteria of dominance in its field of operation and independence are sometimes difficult to apply in the context of broadcast television. Accordingly, the Commission's statistical account of television stations may be over-inclusive.

[10] U.S. Census Bureau, *2012 NAICS Definitions: 515120 Television Broadcasting*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=515120&search=2012 (last visited Mar. 6, 2014).

[11] 13 C.F.R. § 121.201 (NAICS code 515120) (updated for inflation in 2010).

[12] *See* FCC News Release, Broadcast Station Totals as of December 31, 2013 (rel. Jan. 8, 2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0108/DOC-325039A1.pdf.

[13] We recognize that BIA's estimate differs slightly from the FCC total given the information provided above.

[14] "[Business concerns] are affiliates of each other when one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both." 13 C.F.R. § 121.103(a)(1).

[15] *See* FCC News Release, Broadcast Station Totals as of December 31, 2013 (rel. Jan. 8, 2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0108/DOC-325039A1.pdf.

[16] *See generally* 5 U.S.C. §§ 601(4), (6).

18. There are also 2,414 LPTV stations, including Class A stations, and 4,046 TV translator stations.[17] Given the nature of these services, we will presume that all of these entities qualify as small entities under the above SBA small business size standard.

19. *Cable Television Distribution Services.* Since 2007, these services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies."[18] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.[19] Census data for 2007 shows that there were 3,188 firms that operated for the duration of that year.[20] Of those, 3,144 had fewer than 1000 employees, and 44 firms had more than 1000 employees. Thus under this category and the associated small business size standard, the majority of such firms can be considered small.

20. *Cable Companies and Systems.* The Commission has also developed its own small business size standards, for the purpose of cable rate regulation. Under the Commission's rules, a "small cable company" is one serving 400,000 or fewer subscribers, nationwide.[21] Industry data indicate that, of approximately 1,100 cable operators nationwide, all but 10 are small under this size standard.[22] In addition, under the Commission's rules, a "small system" is a cable system serving 15,000 or fewer subscribers.[23] Industry data indicate that, of 6,635 systems nationwide, 5,802 systems have fewer than 10,000 subscribers, and an additional 302 systems have 10,000-19,999 subscribers.[24] Thus, under this second size standard, most cable systems are small.

21. *Cable System Operators*. The Communications Act of 1934, as amended, also contains a size standard for small cable system operators, which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed $250,000,000."[25] The Commission has determined that an operator serving fewer than 677,000

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[17] *See* FCC News Release, Broadcast Station Totals as of December 31, 2013 (rel. January 8, 2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0108/DOC-325039A1.pdf.

[18] U.S. Census Bureau, *2012 NAICS Definitions: 517110 Wired Telecommunications Carriers*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517110&search=2012 (last visited Mar. 3, 2014).

[19] *See* 13 C.F.R. § 121.201 (NAICS code 517110).

[20] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517110), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[21] 47 C.F.R. § 76.901(e). The Commission determined that this size standard equates approximately to a size standard of $100 million or less in annual revenues. *Implementation of Sections of the 1992 Cable Act: Rate Regulation,* MM Docket No. 92-266 and MM Docket No. 93-215, Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408 (1995).

[22] These data are derived from: Industry Data, National Cable & Telecommunications Association, https://www.ncta.com/industry-data (last visited Mar. 6, 2014), and R.R. Bowker, *Broadcasting & Cable Yearbook 2010*, "Top 25 Cable/Satellite Operators," page C-2 (data current as of December, 2008).

[23] 47 C.F.R. § 76.901(c).

[24] Warren Communications News, *Television & Cable Factbook 2008*, "U.S. Cable Systems by Subscriber Size," page F-2 (data current as of Oct. 2007). The data do not include 851 systems for which classifying data were not available.

[25] 47 U.S.C. § 543(m)(2); *see* 47 C.F.R. § 76.901(f) & nn. 1-3.

subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed $250 million in the aggregate.[26] Industry data indicate that, of 1,100 cable operators nationwide, all but ten are small under this size standard.[27] We note that the Commission neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed $250 million,[28] and therefore we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

22. *Direct Broadcast Satellite ("DBS") Service*. DBS service is a nationally distributed subscription service that delivers video and audio programming via satellite to a small parabolic "dish" antenna at the subscriber's location. DBS, by exception, is now included in the SBA's broad economic census category, Wired Telecommunications Carriers,[29] which was developed for small wireline firms. Under this category, the SBA deems a wireline business to be small if it has 1,500 or fewer employees.[30] To gauge small business prevalence for the DBS service, the Commission relies on data currently available from the U.S. Census for the year 2007. According to that source, there were 3,188 firms that in 2007 were Wired Telecommunications Carriers. Of these, 3,144 operated with less than 1,000 employees, and 44 operated with more than 1,000 employees. However, as to the latter 44 there is no data available that shows how many operated with more than 1,500 employees. Based on this data, the majority of these firms can be considered small.[31] Currently, only two entities provide DBS service, which requires a great investment of capital for operation: DIRECTV and EchoStar Communications Corporation ("EchoStar") (marketed as the DISH Network).[32] Each currently offers subscription services. DIRECTV[33] and EchoStar[34] each report annual revenues that are in excess of the threshold for a small business. Because DBS service requires significant capital, we believe it is unlikely that a small entity as defined by the SBA would have the financial wherewithal to become a DBS service provider.

23. *Cable and Other Subscription Programming*. This industry comprises establishments primarily engaged in operating studios and facilities for the broadcasting of programs on a subscription or fee basis. The broadcast programming is typically narrowcast in nature (e.g., limited format, such as

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[26] 47 C.F.R. § 76.901(f); *see FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, DA 01-158, Public Notice, 16 FCC Rcd 2225 (2001).

[27] These data are derived from: R.R. Bowker, *Broadcasting & Cable Yearbook 2006*, "Top 25 Cable/Satellite Operators," pages A-8 & C-2 (data current as of June 30, 2005); Warren Communications News, *Television & Cable Factbook 2006*, "Ownership of Cable Systems in the United States," pages D-1805 to D-1857.

[28] The Commission does receive such information on a case-by-case basis if a cable operator appeals a local franchise authority's finding that the operator does not qualify as a small cable operator pursuant to § 76.901(f) of the Commission's rules. *See* 47 C.F.R. § 76.909(b).

[29] *See* 13 C.F.R. § 121.201 (NAICS code 517110).

[30] *Id*.

[31] *See* U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517110), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[32] *See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Fifteenth Annual Report, MB Docket No. 12-203, 28 FCC Rcd 10496, 10507, para. 27 (2013) ("*15th Annual Report*").

[33] As of June 2012, DIRECTV is the largest DBS operator and the second largest MVPD, serving an estimated 19.8% of MVPD subscribers nationwide. *See 15th Annual Report*, 28 FCC Rcd at 687, Table B-3.

[34] As of June 2012, DISH Network is the second largest DBS operator and the third largest MVPD, serving an estimated 13.01% of MVPD subscribers nationwide. *Id*. As of June 2006, Dominion served fewer than 500,000 subscribers, which may now be receiving "Sky Angel" service from DISH Network. *See id*. at 581, para. 76.

news, sports, education, or youth-oriented). These establishments produce programming in their own facilities or acquire programming. The programming material is usually delivered to a third party, such as cable systems or direct-to-home satellite systems, for transmission to viewers.[35] The SBA size standard for this industry establishes as small any company in this category which receives annual receipts of $35.5 million or less.[36] Based on U.S. Census data for 2007, in that year 659 establishments operated for the entire year.[37] Of that 659, 197 operated with annual receipts of $10 million a year or more. The remaining 462 establishments operated with annual receipts of less than $10 million. Based on this data, the Commission estimates that the majority of establishments operating in this industry are small.

24. *Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing*. The Census Bureau defines this category as follows: "This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment."38 The SBA has developed a small business size standard for Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing, which is: all such firms having 750 or fewer employees.[39] According to Census Bureau data for 2007, there were a total of 939 establishments in this category that operated for part or all of the entire year. Of this total, 912 had less than 500 employees and 17 had more than 1000 employees.[40] Thus, under that size standard, the majority of firms can be considered small.

25. *Audio and Video Equipment Manufacturing*. The SBA has classified the manufacturing of audio and video equipment under in NAICS Codes classification scheme as an industry in which a manufacturer is small if it has less than 750 employees.41 Data contained in the 2007 U.S. Census indicate that 492 establishments operated in that industry for all or part of that year. In that year, 488 establishments had fewer than 500 employees; and only 1 had more than 1000 employees.[42] Thus, under the applicable size standard, a majority of manufacturers of audio and video equipment may be considered small.

26. *Wireless Telecommunications Carriers (except satellite)*. The Census Bureau defines this category as follows: "This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services,

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[35] U.S. Census Bureau, *2012 NAICS Definitions: 515210 Cable and Other Subscription Programming*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=515210&search=2012 (last visited Mar. 6, 2014).

[36] *See* 13 C.F. R § 121.201 (NAICS code 515210).

[37] See U.S. Census Bureau, Table No. EC0751SSSZ1, *Information: Subject Series - Establishment and Firm Size: Receipts Size of Establishments for the United States: 2007 (NAICS code 515210)*, http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ1.

[38] U.S. Census Bureau, *2012 NAICS Definitions: 334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=334220 &search=2012 (last visited Mar. 6, 2014).

[39] 13 C.F.R § 121.201 (NAICS code 334220).

[40] *See* U.S. Census Bureau, Table No. EC0731SG3, *Manufacturing: Summary Series: General Summary: Industry Statistics for Subsectors and Industries by Employment Size: 2007* (NAICS code 334220), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_31SG3.

[41] 13 CFR § 121.201 (NAICS code 334310).

[42] *See* U.S. Census Bureau, Table No. EC0731SG3, *Manufacturing: Summary Series: General Summary: Industry Statistics for Subsectors and Industries by Employment Size: 2007* (NAICS code 334310), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_31SG3.

paging services, wireless Internet access, and wireless video services."[43] The appropriate size standard under SBA rules is for the category Wireless Telecommunications Carriers (except Satellite). The size standard for that category is that a business is small if it has 1,500 or fewer employees.[44] For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year.[45] Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more.[46] Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, PCS, and Specialized Mobile Radio ("SMR") Telephony services.[47] Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.[48] Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

27. *Manufacturers of unlicensed devices.* In the context of this FRFA, manufacturers of Part 15 unlicensed devices that are operated in the UHF-TV band (channels 14-51) for wireless data transfer fall into the category of Radio and Television and Wireless Communications Equipment Manufacturing. The Census Bureau defines this category as follows: "This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment."49 The SBA has developed the small business size standard for this category as firms having 750 or fewer employees.[50] According to Census Bureau data for 2007, there were a total of 939 establishments in this category that operated for the entire year.[51] Of this total, 912 had less than 500 employees and 17 had more than 1000 employees. Thus, under that size standard, the majority of firms can be considered small.

28. *Personal Radio Services/Wireless Medical Telemetry Service ("WMTS").* Personal radio services provide short-range, low power radio for personal communications, radio signaling, and business communications not provided for in other services. The Personal Radio Services include spectrum licensed under Part 95 of our rules.[52] These services include Citizen Band Radio Service ("CB"), General Mobile Radio Service ("GMRS"), Radio Control Radio Service ("R/C"), Family Radio Service ("FRS"), Wireless Medical Telemetry Service ("WMTS"), Medical Implant Communications Service ("MICS"),

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[43] U.S. Census Bureau, *2012 NAICS Definitions: 517210 Wireless Telecommunications Carriers (except Satellite)*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517210&search=2012 (last visited Mar. 6, 2014).

[44] 13 C.F.R. § 121.201 (NAICS code 517210).

[45] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517210), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[46] *Id*. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with 1000 employees or more.

[47] *See Trends in Telephone Service* at Table 5.3.

[48] *See id*.

[49] U.S. Census Bureau, *2012 NAICS Definitions: 334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=334220&search=2012 (last visited Mar. 6, 2014).

[50] 13 C.F.R § 121.201 (NAICS code 334220).

[51] U.S. Census Bureau, Table No. EC0731SG3, *Manufacturing: Summary Series: General Summary: Industry Statistics for Subsectors and Industries by Employment Size: 2007* (NAICS code 334220), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_31SG3.

[52] 47 C.F.R. Part 95.

Low Power Radio Service ("LPRS"), and Multi-Use Radio Service ("MURS").[53] There are a variety of methods used to license the spectrum in these rule parts, from licensing by rule, to conditioning operation on successful completion of a required test, to site-based licensing, to geographic area licensing. Under the RFA, the Commission is required to make a determination of which small entities are directly affected by the rules adopted. Since all such entities are wireless, we apply the definition of Wireless Telecommunications Carriers (except Satellite), pursuant to which a small entity is defined as employing 1,500 or fewer persons.[54] For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year.[55] Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more.[56] Thus under this category and the associated small business size standard, the Commission estimates that the majority of personal radio service and WMTS providers are small entities.

29. However, we note that many of the licensees in these services are individuals, and thus are not small entities. In addition, due to the mostly unlicensed and shared nature of the spectrum utilized in many of these services, the Commission lacks direct information upon which to base a more specific estimation of the number of small entities under an SBA definition that might be directly affected by our action.

30. *Radio Astronomy*. The Commission has not developed a definition for radio astronomy. However the SBA has established a category into which Radio Astronomy fits, which is: All Other Telecommunications. This industry "comprises establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol ("VoIP") services via client-supplied telecommunications connections are also included in this industry."[57] The size standard for all establishments engaged in this industry is that annual receipts of $30 million or less establish the firm as small.[58] Based on data in the 2007 U.S. Census, in 2007 there were 2,623 establishments that operated for the entire year in the All Other Telecommunications category.[59] Of those, 145 establishments operated with annual receipts of more than $10 million per year. The remaining 2,478 establishments operated

[53] The Citizens Band Radio Service, General Mobile Radio Service, Radio Control Radio Service, Family Radio Service, Wireless Medical Telemetry Service, Medical Implant Communications Service, Low Power Radio Service, and Multi-Use Radio Service are governed by subpart D, subpart A, subpart C, subpart B, subpart H, subpart I, subpart G, and subpart J, respectively, of part 95 of the Commission's rules. *See generally* 47 C.F.R. Part 95.

[54] 13 C.F.R. § 121.201 (NAICS Code 517210).

[55] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517210), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[56] *Id*. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with 1000 employees or more.

[57] U.S. Census Bureau, *2012 NAICS Definitions: 517919 All Other Telecommunications*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517919&search=2012 (last visited Mar. 6, 2014).

[58] 13 C.F.R § 121.202 (NAICS Code 517919).

[59] U.S. Census Bureau, Table No. EC0751SSSZ1, *Information: Subject Series - Establishment and Firm Size: Receipts Size of Establishments for the United States: 2007* (NAICS code 517919), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ1.

with annual receipts of less than $10 million per year.[60] Based on this data, the Commission estimates that the majority of establishments in the All Other Telecommunications category are small.

31. *Motion Picture and Video Production.* The Census Bureau defines this category as follows: "This industry comprises establishments primarily engaged in producing, or producing and distributing motion pictures, videos, television programs, or television commercials."[61] The SBA has developed a small business size standard for this category, which is: all such businesses having $30 million dollars or less in annual receipts.[62] Census data for 2007 show that there were 9,478 establishments that operated that year.[63] Of that number, 9,128 had annual receipts of $24,999,999 or less, and 350 had annual receipts ranging from not less than $25,000,000 to $100,000,000 or more.[64] Thus, under this size standard, the majority of such businesses can be considered small entities.

32. *Fixed Microwave Services.* Microwave services include common carrier,[65] private-operational fixed,[66] and broadcast auxiliary radio services.[67] At present, there are approximately 31,549 common carrier fixed licensees and 89,633 private and public safety operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services. Microwave services include common carrier,[68] private-operational fixed,[69] and broadcast auxiliary radio services.[70] They also include the Local Multipoint Distribution Service ("LMDS"),[71] the Digital Electronic Message Service ("DEMS"),[72] and the

[60] *Id*. Available census data do not provide a more precise estimate of the number of establishments that have revenue of $30 million or less; the largest category provided is for firms with revenue of $10 million or more.

[61] U.S. Census Bureau, *2012 NAICS Definitions: 512110 Motion Picture and Video Production*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=512110&search=2012 (last visited Mar. 6, 2014).

[62] 13 C.F.R § 121.201, 2012 NAICS code 512110.

[63] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 512110), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[64] *See id*.

[65] 47 C.F.R. Part 101 *et seq*. (formerly, part 21 of the Commission's Rules) for common carrier fixed microwave services (except MDS).

[66] Persons eligible under Parts 80 and 90 of the Commission's rules can use Private-Operational Fixed Microwave services. *See* 47 C.F.R. Parts 80 and 90. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee's commercial, industrial, or safety operations.

[67] Auxiliary Microwave Service is governed by Part 74 and Part 78 of Title 47 of the Commission's Rules. Available to licensees of broadcast stations, cable operators, and to broadcast and cable network entities. Auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes TV pickup and CARS pickup, which relay signals from a remote location back to the studio.

[68] *See* 47 C.F.R. Part 101, Subparts C and I.

[69] *See* 47 C.F.R. Part 101, Subparts C and H.

[70] Auxiliary Microwave Service is governed by Part 74 of Title 47 of the Commission's Rules. *See* 47 C.F.R. Part 74. Available to licensees of broadcast stations and to broadcast and cable network entities, broadcast auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter or between two points such as a main studio and an auxiliary studio. The service also includes mobile TV pickups, which relay signals from a remote location back to the studio.

[71] *See* 47 C.F.R. Part 101, Subpart L.

[72] *See* 47 C.F.R. Part 101, Subpart G.

24 GHz Service,[73] where licensees can choose between common carrier and non-common carrier status.[74] The Commission has not yet defined a small business with respect to microwave services. For purposes of the RFA, the Commission will use the SBA's definition applicable to Wireless Telecommunications Carriers (except satellite)—i.e., a business is small if it has 1,500 or fewer employees.[75] For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year.[76] Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more.[77] Thus under this category and the associated small business size standard, the majority of firms can be considered small. The Commission notes that the number of firms does not necessarily track the number of licensees. The Commission estimates that virtually all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition.

33. *Broadband Radio Service and Educational Broadband Service.* Broadband Radio Service systems, previously referred to as Multipoint Distribution Service ("MDS") and Multichannel Multipoint Distribution Service ("MMDS") systems, and "wireless cable," transmit video programming to subscribers and provide two-way high speed data operations using the microwave frequencies of the Broadband Radio Service ("BRS") and Educational Broadband Service ("EBS") (previously referred to as the Instructional Television Fixed Service ("ITFS")).[78] In connection with the 1996 BRS auction, the Commission established a small business size standard as an entity that had annual average gross revenues of no more than $40 million in the previous three calendar years.[79] The BRS auctions resulted in 67 successful bidders obtaining licensing opportunities for 493 Basic Trading Areas ("BTAs"). Of the 67 auction winners, 61 met the definition of a small business. BRS also includes licensees of stations authorized prior to the auction. We previously estimated that of the 61 small business BRS auction winners, based on our review of licensing records, 48 remain small business licensees. In addition to the 48 small businesses that hold BTA authorizations, there are approximately 86 incumbent BRS licensees that are considered small entities (18 incumbent BRS licensees do not meet the small business size standard).[80] After adding the number of small business auction licensees to the number of incumbent licensees not already counted, there are currently approximately 133 BRS licensees that are defined as small businesses under either the SBA or the Commission's rules. In 2009, the Commission conducted Auction 86, the sale of 78 licenses in the BRS areas.[81] The Commission established three small business size standards that were used in Auction 86: (i) an entity with attributed average annual gross revenues

[73] *See id.*

[74] *See* 47 C.F.R. §§ 101.533, 101.1017.

[75] 13 C.F.R. § 121.201 (NAICS code 517210).

[76] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517210), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[77] *Id*. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with 1000 employees or more.

[78] *Amendment of Parts 21 and 74 of the Commission's Rules with Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, MM Docket No. 94-131, PP Docket No. 93-253, Report and Order, 10 FCC Rcd 9589, 9593, para. 7 (1995).

[79] 47 C.F.R. § 21.961(b)(1) (1996).

[80] 47 U.S.C. § 309(j). Hundreds of stations were licensed to incumbent MDS licensees prior to implementation of Section 309(j) of the Communications Act of 1934, 47 U.S.C. § 309(j). For these pre-auction licenses, the applicable standard is SBA's small business size standard of 1500 or fewer employees.

[81] *Auction of Broadband Radio Service (BRS) Licenses, Scheduled for October 27, 2009, Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 86*, DA 09-1376, Public Notice, 24 FCC Rcd 8277 (2009).

that exceeded $15 million and do not exceed $40 million for the preceding three years was considered a small business; (ii) an entity with attributed average annual gross revenues that exceeded $3 million and did not exceed $15 million for the preceding three years was considered a very small business; and (iii) an entity with attributed average annual gross revenues that did not exceed $3 million for the preceding three years was considered an entrepreneur.[82] Auction 86 concluded in 2009 with the sale of 61 licenses.[83] Of the 10 winning bidders, two bidders that claimed small business status won four licenses; one bidder that claimed very small business status won three licenses; and two bidders that claimed entrepreneur status won six licenses. We note that, as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service.

34. In addition, the SBA's placement of Cable Television Distribution Services in the category of Wired Telecommunications Carriers is applicable to cable-based educational broadcasting services. Since 2007, Wired Telecommunications Carriers have been defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies."[84] Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception, establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.[85] The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.[86] Census data for 2007 shows that there were 3,188 firms that operated for the duration of that year.[87] Of those, 3,144 had fewer than 1000 employees, and 44 firms had more than 1000 employees. Thus under this category and the associated small business size standard, the majority of such firms can be considered small. In addition to Census data, the Commission's Universal Licensing System indicates that as of July 2013, there are 2,236 active EBS licenses. The Commission estimates that of these 2,236 licenses, the majority are held by non-profit educational institutions and school districts, which are by statute defined as small businesses.[88]

35. *Radio Broadcasting.* The SBA defines a radio broadcast station as a small business if such station has no more than $35.5 million in annual receipts.[89] Business concerns included in this

[82] *Id.* at 8296.

[83] *Auction of Broadband Radio Service Licenses Closes, Winning Bidders Announced for Auction 86, Down Payments Due November 23, 2009, Final Payments Due December 8, 2009, Ten-Day Petition to Deny Period*, DA 09-2378, Public Notice, 24 FCC Rcd 13572 (2009).

[84] U.S. Census Bureau, *2012 NAICS Definitions: 517110 Wired Telecommunications Carriers*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517110&search=2012 (last visited Mar. 3, 2014).

[85] *Id.*

[86] *See* 13 C.F.R. § 121.201 (NAICS code 517110).

[87] U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517110), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

[88] The term "small entity" within SBREFA applies to small organizations (nonprofits) and to small governmental jurisdictions (cities, counties, towns, townships, villages, school districts, and special districts with populations of less than 50,000). 5 U.S.C. §§ 601(4)-(6).

[89] 13 C.F.R § 121.201, 2012 NAICS code 515112.

industry are those "primarily engaged in broadcasting aural programs by radio to the public."[90] According to review of the BIA Publications, Inc. Master Access Radio Analyzer Database as of November 26, 2013, about 11,331 (or about 99.9 percent) of 11,341 commercial radio stations have revenues of $35.5 million or less and thus qualify as small entities under the SBA definition. The Commission notes, however, that, in assessing whether a business concern qualifies as small under the above definition, business (control) affiliations[91] must be included. This estimate, therefore, likely overstates the number of small entities that might be affected, because the revenue figure on which it is based does not include or aggregate revenues from affiliated companies.

36. In addition, an element of the definition of "small business" is that the entity not be dominant in its field of operation. The Commission is unable at this time to define or quantify the criteria that would establish whether a specific radio station is dominant in its field of operation. Accordingly, the estimate of small businesses to which rules may apply does not exclude any radio station from the definition of a small business on this basis and therefore may be over-inclusive to that extent. Also, as noted, an additional element of the definition of "small business" is that the entity must be independently owned and operated. The Commission notes that it is difficult at times to assess these criteria in the context of media entities and the estimates of small businesses to which they apply may be over-inclusive to this extent.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

37. The projected reporting, recordkeeping, and other compliance requirements resulting from the Order will apply to all entities in the same manner. The Commission believes that applying the same rules equally to all entities in this context promotes fairness. The Commission does not believe that the costs and/or administrative burdens associated with the rules will unduly burden small entities. The revisions the Commission adopts should benefit small entities by giving them more information, more flexibility, and more options for gaining access to valuable wireless spectrum. Additionally, the reverse auction should benefit small entities that participate by providing a substantial infusion of income in exchange for spectrum usage rights, which broadcasters can use for new content and services. Similarly, by allowing unlicensed use in certain parts of the repurposed 600 MHz Band, the Commission will provide certainty and allow small entity equipment manufacturers to offer new services.

38. Auction Application Requirements. Similar to previous spectrum license auctions, all applicants wishing to participate in either the reverse or forward auction will be required to file pre-auction applications using the Commission's online electronic auction application system. Winning bidders in the forward auction will be required to file applications using the Commission's Universal Licensing System (ULS). For potential reverse auction bidders, the Commission requires submission of an application establishing their eligibility to participate, including license information and associated spectrum usage rights, certification of various qualifications, and information regarding station ownership. Applicants that are party to a channel sharing agreement must certify compliance with the Commission's media ownership rules, provide a copy of the executed agreement, and make other required certifications. No applications to participate in the reverse auction will be accepted if the applicant has failed to make these certifications by the initial deadline. Applicants will be provided a limited opportunity to cure certain minor defects and to resubmit a corrected application to participate. After the resubmission period has ended, an application to participate may be amended or modified to make minor changes or correct minor errors in the application to participate. Minor amendments may be subject to a deadline specified by public notice. Major amendments cannot be made to an application to participate after the initial filing deadline.

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[90] U.S. Census Bureau, *2012 NAICS Definitions: 515112 Radio Broadcasting*, http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=515112&search=2012 (last visited Mar. 6, 2014).

[91] *See* n.14.

39. Prohibition on Certain Communications. Participants in both the reverse and the forward auction are required to report any potential violations of the Commission's prohibition on certain communications relating to the auction process. The Order extends existing rules applicable to participants in the forward auction that prohibit certain communications among certain forward auction participants to cover communications between forward auction participants and potential reverse auction applicants. The Order adopts new rules providing that, beginning with the deadline for submitting applications and until the Commission releases the results of the incentive auction, all full power and Class A broadcast television licensees are prohibited from communicating any applicant's bids or bidding strategies to any other full power or Class A broadcast television licensee or to any forward auction applicant. This prohibition extends to controlling interests, directors, officers, and members of a governing board, with exceptions for parties to a disclosed channel sharing agreement and where the parties share common control. This rule requires all violations to be reported immediately, and may subject parties to further investigation by the Commission or the Department of Justice.

40. National Security Certifications. To satisfy section 6004 of the Spectrum Act, reverse auction applicants, forward auction applicants, and forward auction winning bidders must file certifications of their compliance with the national security restrictions as set forth in 47 C.F.R. §§ 1.2204(c)(6) and 1.2105(a), as amended, and 47 C.F.R. § 27.12(b). This requirement extends to transactions in the secondary market: in any secondary market transaction applications involving 600 MHz Band licenses, applicants must certify to the Commission that neither they nor any party to the applications are persons barred from participating in an auction under this provision of the Spectrum Act. As such, in order to comply with this requirement, all reverse auction, forward auction, and secondary market applicants may require legal services to ensure compliance with section 6004 of the Spectrum Act.

41. Repacking. The Commission exercises its discretion to protect certain full power and Class A facilities in addition to those for which the statute mandates protection. The Commission generally limits its discretionary protection to facilities that are licensed by the Pre-Auction Licensing Deadline to be announced by the Media Bureau. Similarly, in order for a broadcaster to be a reverse auction eligible licensee, it must hold a license for the full power or Class A station it wishes to offer at auction on or before the Pre-Auction Licensing Deadline. To ensure a stable, accurate database, and to facilitate the repacking process, all full power and Class A television stations are required to verify and certify to the accuracy of the information contained in the Commission's Consolidated Database System ("CDBS") with respect to their protected facilities. Prior to the start of the incentive auction, the Media Bureau will issue a Public Notice announcing each station's protected facility. All full power and Class A stations will be required to submit a form (to be developed by the Media Bureau) specifying any changes to the information contained in CDBS and certifying to the accuracy of the information in CDBS or provided on the form for their protected facility. Stations affected by the destruction of the World Trade Center may elect which of their facilities to be protected. The deadline for these stations to elect the facility to be protected is the Pre-Auction Licensing Deadline.

42. Broadcast License Modification. Once the reverse and forward auctions are complete and results from the repacking process are announced, full power and Class A stations assigned new channels must file minor change applications for construction permits using FCC Form 301, 301-CA, or 340. Stations have a three-month filing window, as opposed to the shorter standard period, to file these minor change applications or to seek a waiver for additional time. In these initial minor change applications, stations may propose transmission facilities that slightly extend their coverage contour under certain conditions. After the deadline for filing for these initial minor change applications, the Media Bureau will announce a filing window during which stations may propose expanded facilities, which are limited to minor changes, or alternate channel assignments, which will be considered major change applications and subject to the standard requirements. The licensee of each channel sharee station and channel sharer station must file an application for a license for the shared channel using FCC Form 302-DTV or 302-CA within three months of the date that the channel sharee station licensee receives its incentive payment. Compliance with these filing requirements may require stations to obtain legal, and, in the case of a construction permit application, engineering services.

43. Broadcast Transition Deadlines. A winning license relinquishment bidder must comply with the notification and cancellation procedures in 47 C.F.R. § 73.1750 and terminate operations on its pre-auction channel within three months of the date that the licensee receives its incentive payment. The licensee of a channel sharee station must comply with the notification and cancellation procedures in 47 C.F.R. § 73.1750 and terminate operations on its pre-auction channel within three months of the date that the licensee receives its incentive payment. The time allowed for full power and Class A stations reassigned to new channels to modify their facilities will vary. The Media Bureau will establish construction deadlines for such stations. A station reassigned to a new channel must cease operating on its pre-auction channel once such station begins operating on its post-auction channel or by the deadline specified in its construction permit for its post-auction channel, whichever occurs earlier, and in no event later than the end of the post-auction transition period, which is the 39-month period commencing upon the public release of the public notice specifying the new channel assignments and technical parameters of any broadcast television stations that are reassigned to new channels ("Post-Auction Transition Period"). A station may seek a single extension of up to six months of its original construction deadline. The extension request must be filed electronically in CDBS using FCC Form 337 no less than 90 days before the expiration of the construction permit. Licensees needing additional time beyond such a single extension of time to complete construction shall be subject to the tolling provisions in 47 C.F.R. § 73.3598. Stations may request Special Temporary Authority ("STA") to operate with temporary facilities while they complete construction.

44. Consumer Education Outreach. As consumers will need to be informed if stations they view will be changing channels, the Commission will require all Transitioning Stations (i.e., full power and Class A stations moving to new channels or relinquishing their licenses) to air notifications for a minimum of 30 days prior to the date that the station will terminate operations on its pre-auction channel. These notifications will be a mix of PSAs and crawls, and must meet certain duration requirements. Transitioning stations that operate on a noncommercial educational ("NCE") basis have the option to instead air 60 seconds per day of on-air consumer education PSAs, in variable timeslots, for 30 days prior to the station's termination of operations on its pre-auction channel. Licensees of Transitioning Stations, except for license relinquishment stations, must place a certification of compliance with these requirements in their online public file within 30 days after beginning operations on their post-auction channels. License relinquishment stations must include the certification in their notification of discontinuation of service pursuant to 47 C.F.R § 73.1750. Small entities may need legal and engineering services to comply with these requirements.

45. MVPD Notification. The Commission requires Transitioning Stations to provide notice to those MVPDs that: (1) no longer will be required to carry the station because it will cease operations or because of the relocation of a channel sharing sharee station; (2) currently carry and will continue to be obligated to carry a station that will change channels; or (3) will become obligated to carry a station due to a channel sharing relocation. The required notice must be provided in the form of a letter notification and contain the following information: (1) date and time of any channel changes; (2) pre-auction and post-transition channel assignments; (3) modification, if any, to antenna position, location, or power levels; (4) stream identification information for channel sharing stations; and (5) engineering staff contact information. Should any of this information change during the station's transition, an amended notification must be sent. Transitioning Stations must provide notice within the following time frames: (1) for successful license relinquishment bidders, not less than 30 days prior to terminating operations; (2) for channel sharing sharee stations, not less than 30 days prior to terminating operations of the sharee's pre-auction channel; (3) for all channel sharing stations (i.e., both the sharer station and sharee station(s)), not less than 30 days prior to initiation of operations on the sharer channel; and (4) for all other stations transitioning to a new channel, including stations that are assigned to new channels in the repacking process and successful UHF-to-VHF and high-VHF-to-low-VHF bidders, not less than 90 days prior to the date on which they will begin operations on their reassigned channel. In addition, should a station's anticipated transition date change due to an unforeseen delay or change in transition plan, the station must send a further notice to affected MVPDs informing them of the new anticipated transition date.

46. Broadcaster Relocation Reimbursement. The Order adopts a reimbursement process for eligible broadcasters and MVPDs. Within three months of the *Channel Reassignment PN*, eligible broadcasters and MVPDs are required to submit an estimated cost form providing an estimate of reasonably incurred relocation costs as well as required certifications. Upon completing construction or other reimbursable changes, or by a specific deadline prior to the end of the Reimbursement Period to be established by the Media Bureau, whichever is earlier, all broadcast television station licensees and MVPDs that received an initial allocation from the TV Broadcaster Relocation Fund must provide the Commission with information and documentation, including invoices and receipts, regarding their actual expenses incurred as of a date to be determined by the Media Bureau. After completing all construction or reimbursable changes, broadcast television station licensees and MVPDs that have received money from the TV Broadcaster Relocation Fund will be required to submit final expense documentation containing a list of estimated expenses and actual expenses as of a date to be determined by the Media Bureau. Forms will include certifications that must be made by an owner or officer of the company under penalty of perjury under 18 U.S.C. § 1001. Broadcast television station licensees and MVPDs that receive payment from the TV Broadcaster Relocation Fund are required to submit progress reports at a date and frequency to be determined by the Media Bureau. Each broadcast television station licensee and MVPD that receives payment from the TV Broadcaster Relocation Fund is required to retain all relevant documents pertaining to construction or other reimbursable changes for a period ending not less than 10 years after the date on which it receives final payment from the TV Broadcaster Relocation Fund. Further, the Commission or its authorized contractor will conduct audits of, data validations for, and site visits to entities that receive disbursements from the TV Broadcaster Relocation Fund, both during and following the three year Reimbursement Period. All relevant documentation must be provided to the Commission or its authorized contractor upon request. Small entities seeking reimbursement may require legal, engineering, or accounting services in order to comply with these recordkeeping and filing requirements.

47. Service Rule Waiver. Section 6403(b)(4)(B) of the Spectrum Act provides that broadcast licensees can, in lieu of reimbursement of relocation costs, receive a waiver of the Commission's rules to permit flexible use of their spectrum, subject to certain conditions. Such waiver requests will be evaluated on a case-by-case basis by the Media Bureau. Eligible broadcast licensees must file waiver requests during a 30-day window commencing upon the date that the *Channel Reassignment PN* is released. Eligible broadcast licensees will have ten days to notify the Commission whether it accepts the Commission's grant of the waiver. Licensees who accept a granted waiver will not qualify for reimbursement. Until the Commission grants and the licensee accepts the terms of a waiver, the licensee must still meet all requirements for obtaining reimbursement, including filing a timely estimated cost form. A licensee that is granted and accepts the terms of the waiver or a licensee with a pending waiver application must comply will all filing and notification requirements, construction schedules, and other post-auction transition deadlines. Broadcast licensees that intend to file for a waiver may require legal, engineering, or accounting services as well.

48. Displacement of LPTV and TV translator stations and Relinquishment of Broadcast Auxiliary Station ("BAS") Channels. Licensees of operating LPTV and TV translator stations that are displaced by a broadcast television station or a wireless service provider or whose channel is reserved as a guard band are permitted to submit an application for displacement relief in a restricted filing window to be announced by the Media Bureau by public notice. LPTV and TV translator stations, the majority of which are small entities, will be affected by this transition. Stations may require legal or engineering services in order to make the required filings. In addition, TV STL, TV relay station, or TV translator relay station (BAS) licensees in the 600 MHz Band will be required to cease operations or relocate from the 600 MHz Band no later than the end of the Post-Auction Transition Period. BAS licensees may require legal or engineering services in order to make the required filings.

49. Channel Sharing Operating Rules. The Commission requires all Channel Sharing Agreements ("CSAs") to include certain provisions outlining each licensee's rights and responsibilities, as well as other requirements, which must be filed with the station's reverse auction application.

Additionally, all CSAs must include a provision affirming compliance with the requirements in this Order, the *Channel Sharing Report and Order*, and Commission rules. The Commission may review CSA provisions and require modifications to meet these requirements. These provisions are meant to help avoid disputes that could interrupt service and to ensure that each licensee is able to fulfill its independent obligation to comply with all pertinent statutory requirements and Commission rules. Since many broadcasters interested in CSAs may be small businesses, small entities may need legal, engineering, or other technical services to draft a CSA that complies with these contractual requirements.

50. Notification of Commencement of Wireless Operations. A wireless licensee assigned to frequencies in the 600 MHz Band must provide notice to LPTV and TV translator stations of its intent to commence wireless operations, and the likelihood of receiving harmful interference from the LPTV or TV translator station to such operations within the wireless licensee's licensed geographic service area. The new wireless licensees must: (i) notify the LPTV or TV translator station in the form of a letter, via certified mail, return receipt requested; (ii) indicate the date the new wireless licensee intends to commence operations in areas where there is a likelihood of receiving harmful interference from the LPTV or TV translator station; and (iii) send such notification not less than 120 days in advance of the commencement date. A wireless licensee assigned to frequencies in the 600 MHz Band must notify the BAS licensee of its intent to commence wireless operations and the likelihood of harmful interference from the BAS licensee to those operations within the wireless licensee's licensed geographic service area. The wireless licensee must: (i) notify the licensee of the TV STL, TV relay station, or TV translator relay station in the form of a letter, via certified mail, return receipt requested; and (ii) send such notification not less than 30 days in advance of the approximate date of commencement of such operations. 600 MHz Band licensees may require legal and engineering services to comply with these requirements.

51. Wireless Technical and Service Rules. In general, the Commission adopts service rules contained in Part 27 of the Commission's rules. The Commission adopted technical rules for the 600 MHz Band similar to the Lower 700 MHz Band, contained in Part 27 of the Commission's rules, including out-of-band emission ("OOBE") limits, antenna height limits, co-channel interference limits, and slightly modified power limits. In order to promote interoperability across the 600 MHz Band, all user equipment certified for this band must be capable of operating throughout the band. In order to comply with these rules, 600 MHz Band licensees may require engineering and legal services.

52. Coordination with RAS Observatories. Coordination requirements apply prior to the commencement of operation of base and fixed stations in the 600 MHz Band in proximity to certain RAS observatories. 600 MHz Band licensees may require legal and engineering services to comply with this requirement.

53. Performance Requirements. All 600 MHz licensees will be required to file a construction notification and certify that they have met the applicable performance benchmarks.[92] In particular, licensees of the 600 MHz Band must demonstrate that they meet certain build-out requirements at two performance benchmarks. If a licensee fails to meet the interim benchmark, its final benchmark and license term accelerate by two years; failing to meet the final benchmark results in automatic termination of the license. Due to the possibility that some licenses will have impaired areas, while the same build out benchmarks apply, a licensee may meet its requirement by providing coverage to population in non-impaired service areas. Licensees who hold licenses with impaired areas must provide an explanation to the Commission why they cannot serve the entire license area or meet the performance requirement at the relevant construction benchmark. These entities may require legal, engineering, or survey services in order to comply with all reporting, recordkeeping, and other requirements.

54. Other Regulatory Matters. In order to renew a license, 600 MHz licensees will be required to file a license renewal application and make the necessary showings to qualify for renewal of

[92] *See* 47 C.F.R. § 1.946(d).

the license.[93] In addition, a 600 MHz licensee must notify the Commission of certain changes. Specifically, notification is required by licensees if they change their regulatory status,[94] their foreign ownership status,[95] or if they permanently discontinue service.[96] A 600 MHz Band licensee that permanently discontinues service must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 or 605 requesting license cancellation. 600 MHz Band licensees may require legal and engineering services to comply with these requirements.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

55. The RFA requires an agency to describe any significant alternatives that it has considered in developing its approach, which may include the following four alternatives (among others): "(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities."

56. Facilities Protected in the Repacking. The Spectrum Act mandates all reasonable efforts to preserve the "coverage area and population served" of full power and Class A facilities licensed as of the date of the Spectrum Act's enactment. The Commission interprets the Spectrum Act to allow it to afford discretionary protection to several additional categories of facilities. While some commenters suggest that the Commission afford protection to other facilities, including LPTV and TV translator stations, the Commission determines that the Spectrum Act does not mandate such protection, and affording discretionary protection to such stations would not be consistent with the goals of the Spectrum Act. LPTV and TV translator stations are secondary to full power stations, and affording these stations protection would severely limit recovery of spectrum and frustrate the purpose of the Spectrum Act. The Commission understands the potential impact of the incentive auction on LPTV and TV translator stations, among others, and will take steps to mitigate such impact.

57. Reverse Auction Participation. The Commission permits voluntary participation generally to all licensees of commercial and NCE full power and Class A stations, and provides several options for spectrum usage rights that a participant may bid to relinquish. Allowing options such as channel sharing, UHF-to-VHF moves, and high-VHF-to-low-VHF moves will encourage participation by small entities, which may stand to receive substantial proceeds while continuing to broadcast. In addition, the Commission will offer a license relinquishment bid option regardless of whether it may lead to a loss of service. This will allow voluntary participation by all eligible licensees, and remove obstacles that small entities may face in deciding whether to participate.

58. Confidentiality. Information regarding the identity of reverse auction applicants will be protected from disclosure for a period of time. To comport with the Spectrum Act's requirements, the Commission will protect the confidentiality of Commission-held data on broadcast television licensees participating in the reverse auction, regardless of whether their applications are complete and in compliance with the Commission's rules. Confidential information pertaining to unsuccessful bids will continue to be protected until two years after the effective date of spectrum reassignments and

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[93] *See* 47 C.F.R. § 1.949.

[94] *See* 47 C.F.R. § 27.10(d); *see also* 47 C.F.R. § 27.66. A change in a licensee's regulatory status will not require prior Commission authorization, provided the licensee was in compliance with the foreign ownership requirements of Section 310(b) of the Communications Act that would apply as a result of the change. 47 U.S.C. § 310(b).

[95] 47 U.S.C. § 310(b).

[96] The licensee must notify the Commission of the discontinuance within 10 days by filing FCC Form 601 or 605 and requesting license cancellation. 47 C.F.R. § 1.955(a)(3).

reallocations. When the spectrum reassignments and reallocations become effective, the Commission will disclose the identities of the winning bidders and their winning bid amounts. The Commission further amends its FOIA disclosure rules to accommodate the confidentiality rules adopted. While some commenters urge the Commission to protect reverse auction participant identities in perpetuity, the Commission determines that doing so would not be a reasonable step necessary to protect broadcaster data. The Commission determines that adopting the two year confidentiality rule best balances protections for broadcasters with the transparency needed to maintain public trust in the auction process.

59. Forward Auction Participation. To assist small entities in competitive bidding in the forward auction, the Order adopts an open eligibility standard as mandated in section 6404 of the Spectrum Act to further broad participation in the incentive auction.[97] In addition, the same small business size standards that were adopted in the 700 MHz Band were adopted for the 600 MHz Band, as well as bidding credits that are set forth in the standardized schedule in Part 1 of the Commission's rules. Specifically, the Order defines a "small business" as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a "very small business" as an entity with average annual gross revenues for the preceding three years not exceeding $15 million. The Commission also provides small businesses with a bidding credit of 15 percent and very small businesses with a bidding credit of 25 percent for the 600 MHz Band. The Commission will initiate a separate proceeding to review its Part 1 designated entity rules. In addition, the Commission adopts PEA geographic license sizes that will encourage entry by providers, including small providers, that contemplate offering wireless broadband service on a localized basis, yet at the same time not precluding carriers that plan to provide service on a much larger geographic scale. While some small and rural wireless carriers urge the Commission to license, wholly or in part, on a CMA basis, the Commission concludes that licensing using PEAs throughout the country strikes the appropriate balance and will allow both smaller and larger wireless carriers to obtain licenses that best align with their respective business plans. Further, licensing markets using a variety of sizes (for example, mixing EAs and CMAs) would conflict with the Commission's goal of offering spectrum blocks as interchangeable as possible in order to speed up the forward auction bidding process.

60. Band Plan Matters. While the Commission will not know which specific 600 MHz Band Plan scenario will be employed until the conclusion of the incentive auction, each scenario includes guard bands to prevent harmful interference between licensed services. Specifically, the guard bands will protect against interference between uplink and downlink wireless services, between wireless services and broadcast television services, and between wireless services and RAS and WMTS services operating on channel 37, if enough spectrum is repurposed. The Commission concludes that these guard bands are technically reasonable, and will help prevent harmful interference to entities of all sizes operating adjacent to repurposed spectrum. Further, by adopting a fully-paired band plan rather than licensing some spectrum blocks as supplemental downlink, smaller carriers and new entrants will be able to obtain much-needed low frequency, paired spectrum.[98]

61. Repacking of the Television Band. The Commission intends to optimize any final channel assignments to minimize relocation costs for eligible broadcasters and MVPDs. The Spectrum Act caps the TV Broadcaster Relocation Fund at $1.75 billion and requires the Commission to make any reimbursements within three years of the completion of the forward auction. Because eligible broadcasters and MVPDs will be eligible for an initial allocation based on estimated costs, they should

[97] In a separate proceeding, the Commission establishes a market-based spectrum reserve for the 600 MHz forward auction and analyzes the impact on small entities in the FRFA accompanying that order. *See Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269, Report and Order, Appendix C (adopted May 15, 2014).

[98] This particular band plan also will help spur deployment by 700 MHz lower A Block licensees, many of whom are small entities, by clearing broadcast television operations out of channel 51. *See Promoting Interoperability in the 700 MHz Commercial Spectrum; Requests for Waiver and Extension of Lower 700 MHz Band Interim Construction Benchmark Deadlines*, WT Docket No. 12-69, Report and Order and Order of Proposed Modification, 28 FCC 15122, 15152, para. 65 (2013).

not have to rely significantly on self-financing or outside financing. Further, delaying the "close" of the forward auction until after reassigned stations file construction permits, as some broadcasters suggest, does not reasonably comport with the statutory mandate.

62. Partitioning, Disaggregation, and Leasing. The Commission concludes that providing flexibility in the secondary markets, by allowing licensees to partition, disaggregate, and/or lease spectrum, helps smaller carriers acquire the specific spectrum rights that they need to serve small, targeted markets. As in other bands, this flexibility can facilitate the efficient use of spectrum, promote competition, and expedite provision of services in areas that might not otherwise receive service in the near term.

F. Federal Rules that Might Duplicate, Overlap, or Conflict with the Rules

63. None.

G. Report to Congress

64. The Commission will send a copy of the Order, including this FRFA, in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act. A copy of the Order and FRFA (or summaries thereof) will also be published in the Federal Register.

H. Report to Small Business Administration

65. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA.

APPENDIX C

TECHNICAL APPENDIX

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I. INTRODUCTION

1. Commenters raise in the record a number of technical topics that relate to the 600 MHz Band Plan. In Part II of this Appendix, we first discuss each technical topic, and then discuss how the 600 MHz Band Plan addresses these technical considerations. For each technical topic, we provide our technical analysis to demonstrate how it supports the conclusions we reach to create the 600 MHz Band Plan, which are based on examining the public record and weighing the costs and benefits of a particular approach. In Part III, we set forth the band plan scenarios and describe the specific parameters for each possible clearing target scenario. This set of clearing target scenarios shows how the 600 MHz Band Plan adopted in the Order will work in practice. We note, however, that we may not offer each of these

clearing targets in the incentive auction, but will provide more details about the incentive auction process in subsequent Public Notices, specifically, the *Comment* and *Procedures PN*s.

2. In the accompanying Order, we make determinations about the 600 MHz Band Plan, and evaluate how certain technical considerations should affect these decisions, based on our analysis of the record. This Appendix provides additional support for the conclusions we reach in the Order.

II. TECHNICAL CONSIDERATIONS

3. Several aspects of the 600 MHz Band Plan, including pass band sizes, guard band sizes, and block locations in the 600 MHz Band are affected by technical considerations, including the technical capabilities of mobile broadband devices, and their interaction with existing services in the band. In particular, both commenters and the Commission in the *NPRM* raise issues about mobile broadband device performance and capabilities, and how these considerations may affect the choice of band plans. In the following discussion, we organize the technical factors affecting the band plan into five categories: (1) mobile filter considerations, (2) mobile antenna considerations, (3) the potential for intermodulation interference, (4) the potential for harmonic interference, and (5) how frequency separation affects the potential for inter-service interference between services in geographic proximity.[1]

4. Mobile filter considerations affect several issues raised in the record: the maximum pass band size, the minimum guard band size, and the likelihood of intermodulation interference. Mobile antenna considerations affect the overall bandwidth of a band plan, and therefore are discussed in the record as affecting both the maximum pass band size and the maximum duplex gap size.[2] The potential for intermodulation interference affects both the minimum size of the duplex gap, and relative placements of television stations and mobile broadband uplink and downlink blocks. The potential for harmonic interference also affects the maximum pass band size. Finally, the effect of frequency separation on the potential for inter-service interference is an important consideration in determining the size of the guard bands. For each of these issues, we provide our technical analysis, which corroborates our decisions in creating the 600 MHz Band Plan.

A. Mobile Filter Considerations

5. *Background*. Most radio communication technologies use filters that pass desired frequencies while attenuating, or reducing the power of, undesired frequencies. Transmit filters pass the desired transmit signal while reducing out-of-band emissions ("OOBE"). Receive filters pass the desired signal to the receiver while attenuating undesired signals at other frequencies. Duplexers are pairs of filters, one transmit and one receive, that function together to reduce the potential for interference between a transmitter and a receiver in the same piece of equipment. In mobile broadband devices, common filter technologies include surface acoustic wave ("SAW") and bulk acoustic wave ("BAW") types.

6. In the *NPRM,* the Commission recognized that current technology limits the size of a Frequency Division Duplex ("FDD") pass band to roughly 4% of the center frequency for a single duplexer, or filter, and a Time Division Duplex ("TDD") pass band to 7.5%.[3] It noted, however, that SAW filters using alternative manufacturing processes with lithium niobate may support an FDD pass

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[1] The converse situation of potential inter-service interference between services with geographic separation but reduced or no frequency separation will be discussed in a subsequent Order addressing the issues raised in the *Inter-service Interference PN. See Office of Engineering and Technology Seeks to Supplement the Incentive Auction Proceeding Record Regarding Potential Interference Between Broadcast Television and Wireless Services*, GN Docket No. 12-268, Public Notice, 29 FCC Rcd 712 (2014) (*Inter-service Interference PN*).

[2] *See, e.g.*, Qualcomm Reply at 18.

[3] *See Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12417–18, para. 169 (2012) (*NPRM*).

band of 6%.[4] The Commission sought comment on current filter technology, the actual limitations on filters, and why those limitations exist.[5] It also asked commenters to address the potential for future technologies that may support a wider pass band than what typically can be supported currently.[6] Finally, it sought comment on how pass band size relates to the size of the guard bands, including the duplex gap,[7] and proposed guard bands between the new 600 MHz service and incumbent television services. The appropriate size of these guard bands depends in part on the capabilities of mobile filters that will be used in 600 MHz devices, especially the transition bandwidth discussed below.[8]

7. A number of commenters express concerns about intermodulation and harmonic interference, suggesting that to prevent these types of potentially harmful interference it may be necessary to make the duplex gap at least 10 or 11 megahertz, adopt a band plan that does not allow television between uplink and downlink, and limit the size of the uplink pass band.[9] Intermodulation interference and harmonic interference are discussed in detail in the Sections II.C.5 (Intermodulation Interference) and II.D (Harmonic Interference) below. Because the likelihood of these types of interference depends on the degree to which various signals can be attenuated by the mobile device filters, the filter discussion of this Section is also relevant.

8. *Discussion*. We establish reasonable parameters for three key aspects of mobile filters: pass band width, transition band width, and stop band attenuation.[10] These factors affect, respectively, the pass band size, guard band sizes (including the duplex gap), and the likelihood of intermodulation interference. We determine that reasonable values are a maximum pass band size of 25 megahertz, a minimum transition band of seven megahertz, and 25 dB of stop band attenuation. We recognize that these limits may change with continuing technology improvements. We also recognize that while seven megahertz is the minimum transition band size, it may only be achievable with some current technologies. In addition, larger transition bands may be supported more easily and by more filter vendors than smaller transition bands.

9. Although we consider a maximum filter pass band size of 25 megahertz to be reasonable, as discussed in the Order, we agree with commenters who point out that this need not limit the 600 MHz Band Plan pass band size, because multiple duplexers can be used.[11] Therefore, as discussed below and in the Order, we will not limit the pass band size (i.e., the number of paired, licensed blocks we will offer) in the band plan scenarios we adopt for the 600 MHz Band Plan due to mobile filter limitations, and our technical analysis confirms this approach.

10. Pass, stop, and transition bands. A filter generally has three types of frequency regions: (a) a pass band, where frequencies are passed with only a small attenuation (up to a few dB) referred to as insertion loss, (b) stop bands, regions that the filter rejects because the attenuation is high, and (c) transition bands between the pass bands and stop bands where the attenuation is variable. For SAW and BAW filters, the stop band attenuation is typically 25 to 30 dB in most regions, and 50 to 60 dB in limited

[4] *NPRM*, 27 FCC Rcd at 12417–18, para. 169.

[5] *NPRM*, 27 FCC Rcd at 12418, para. 170.

[6] *NPRM*, 27 FCC Rcd at 12418, para. 171.

[7] *NPRM*, 27 FCC Rcd at 12418, para. 171.

[8] *See, e.g.*, Motorola Comments at 12–13; Intel Reply Comments at 18–19; Qualcomm Comments at 5 n.7.

[9] *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

[10] We define these terms in this Section.

[11] T-Mobile Reply at 20–23.

areas where the rejection requirement is the highest.[12] The transition band may often have significant attenuation, but the level depends on the temperature of the SAW/BAW filter, variations in the manufacturing process, and other factors, so it is generally not specified.[13] This region typically would have too much attenuation to be considered in the pass band, but too little attenuation to be considered in the stop band.

11. An example of these regions is given in Figure 1, which shows the typical layout of a mobile device receive filter for an FDD band with a narrow duplex gap, such as PCS.[14] In this case, the downlink band, which consists of the user equipment ("UE") receive frequencies, is the pass band. The stop band generally provides 25 to 30 dB of attenuation, but in the uplink band, which has the greatest potential for interference because UE transmits on those frequencies and can interfere with itself, the stop band attenuation is greater: 50 dB or more. The duplex gap aligns with a transition band between the pass band and the stop band, and the width of it is related to the achievable width for the transition band.

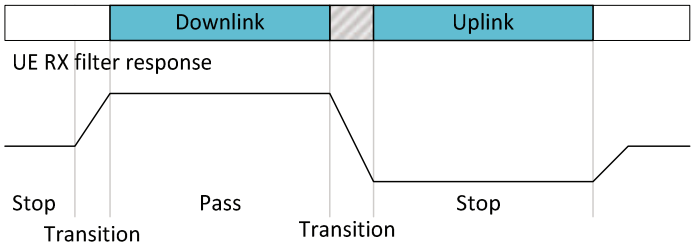
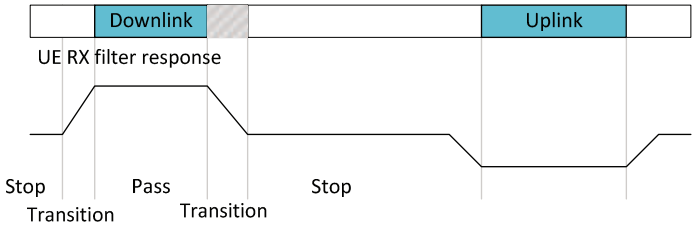


Figure 1. General Depiction of a Narrow Duplex Gap Band Plan

12. As another example, Figure 2 shows a typical device receive filter layout for a band with a wide duplex gap, such as AWS-1. Here, the pass band is again aligned with the downlink band, and the greatest stop band rejection is in the uplink band. However, the duplex gap is now much wider than the transition band, and consists mostly of stop band rejected at 25 to 30 dB. This is an important difference: for a narrow duplex gap there may be little or no rejection of signals in the gap, but in a wide duplex gap plan there is significant rejection in much of the gap. As discussed further below in Section II.C of the Technical Appendix (Intermodulation Interference), commenters raising concerns about television in the duplex gap have generally assumed no rejection of signals in the gap.



[12] *See, e.g.*, William Mueller, Avago Technologies, *600 MHz Band Plan Workshop Transcript* at 65–66. *See also* Letter from Dean R. Brenner, Senior Vice President, Government Affairs for Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 9 (filed Feb. 19, 2014) (attenuations of 24 to 36 dB) (Qualcomm Feb. 19, 2014 *Ex Parte* Letter).

[13] *See, e.g.*, Letter from Don Brown, Director, IWPC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 8 (filed Nov. 27, 2012) (IWPC Nov. 27, 2012 *Ex Parte* Letter); Letter from Dean R. Brenner, Senior Vice President, Government Affairs for Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 5 (filed Apr. 3, 2014) (Qualcomm Apr. 3, 2014 *Ex Parte* Letter).

[14] This illustration and the following one show the lower half being used for downlink, as in the adopted 600 MHz Band plans, rather than the upper half being used for downlink as is the case in the actual PCS and AWS-1 band plans.

Figure 2. General Depiction of a Wide Duplex Gap Band Plan

13. Achievable attenuation. As mentioned above, Avago states that stop band attenuation is typically 30 dB and at least 25 dB, and can be engineered to be 50 to 60 dB in specific ranges.[15] Similarly, Qualcomm shows attenuations relatively close to the pass band of 24 to 36 dB.[16] In calculating the potential for harmful interference in this Appendix, we make two conservative assumptions, that (1) rejection in the transition band will be 0 dB since that could occur in some portion of the transition band with temperature and manufacturing drift, and (2) rejection in the stop band will be 25 dB. Actual rejection would be greater in most cases.

14. Achievable bandwidth. A key consideration for mobile filters is the achievable size of the pass band and transition bands. In many cases a large pass band is desired so that a large spectrum allocation can be supported with one filter or a small number of filters. On the other hand, generally transition bands should be small, to minimize guard bands and maximize the utility of spectrum. For SAW and BAW filters, the achievable bandwidth generally varies directly with frequency, including manufacturing variation and temperature dependence, which also tend to vary by frequency.[17] Therefore the achievable bandwidths are usually expressed as a percentage of the frequency of operation. For example, a bandwidth of 1% corresponds to about seven megahertz in the 700 MHz Band, but about 19 megahertz in the PCS band. In other words, a seven megahertz bandwidth at 700 MHz and a 19 megahertz bandwidth at 1900 MHz are equally difficult or easy to achieve.

15. SAW and BAW filters are limited in how large the pass band can be.[18] As discussed above, commenters generally agree that it is reasonable to assume a limitation of around 4% of the center frequency, or about 25 megahertz for the 600 MHz Band.[19] However, some commenters note that larger numbers can be achieved in some cases with alternate technologies and that bandwidth support has improved over time.[20] This limitation does not necessarily limit the amount of licensed spectrum that we can offer in the incentive auction, however. For example, T-Mobile explains how two overlapping filters can be used to achieve the 35 megahertz pass band required by the plan submitted jointly by T-Mobile and Verizon Wireless.[21] In adopting a band plan, we assume that a single filter pass band will be limited to 25 megahertz, but where possible we allow for the possibility that technology may improve over time.

16. Similarly, SAW and BAW filters are also limited in how small a transition band can be.[22] IWPC discusses this issue in detail.[23] First, it states that transition bands under 1.5% are "hard," and

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[15] *See* William Mueller, Avago Technologies, *600 MHz Band Plan Workshop Transcript* at 65–66.

[16] Qualcomm Feb. 19, 2014 *Ex Parte* Letter, Att. at 9.

[17] A larger filter will be shifted down in frequency, and a smaller filter shifted up in frequency. This means small variations in the size of the filter in manufacturing can affect its actual frequency range, as can its expansion and contraction as its temperature changes. *See* William Mueller, Avago Technologies, *600 MHz Band Plan Workshop Transcript* at 254; IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 12–13.

[18] *NPRM*, 27 FCC Rcd at 12417–18, paras. 168–71; IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 14.

[19] *See, e.g.*, AT&T Comments at 18, Exh. A at 8–9, 33–34; Motorola Comments at 12; Qualcomm Comments at 14–15; RIM Comments at 14.

[20] *See, e.g.*, IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 14, 17; William Mueller, Avago Technologies, *600 MHz Band Plan Workshop Transcript* at 156–58.

[21] *See* T-Mobile Reply at 20–23, Exh. A at 20–21; Letter from Kathleen Ham, T-Mobile USA, Inc. and Kathleen Grillo, Verizon, to Ruth Milkman, Chief, Wireless Telecommunications Bureau and Gary Epstein, Chief, Incentive Auction Task Force, FCC GN Docket No. 12-268 (filed Sept. 16, 2013) at Att. (T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter).

[22] *See, e.g.*, Qualcomm Apr. 3, 2014 *Ex Parte* Letter, Att. at 5.

[23] IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 8, 18–24.

transition bands under 1.0% are "challenging," corresponding to about 11 megahertz and seven megahertz for the 600 MHz Band, respectively.[24] IWPC also lists achievable transition bands for several filter vendors for a variety of bands. Looking at the 700 MHz Band, closest to the 600 MHz Band, the supported bandwidths are: 0.73% (five to six megahertz for 700 MHz) for BAW filters from Avago and Triquint, 1.06% (eight megahertz for 700 MHz) for SAW/BAW filters from EPC-TDK, and 1.32% (10 megahertz for 700 MHz) for SAW filters from Murata.[25] In rating these bands, IWPC is considering such factors as filter cost, insertion loss, and size.[26] Commenters vary in the appropriate balance of these factors. For example, some commenters suggest that the IWPC analysis indicates the duplex gap should be set at 1.5%, although Alcatel-Lucent acknowledges some 3GPP bands have smaller duplex gaps.[27] AT&T suggests that based on filter considerations the duplex gap should be at least 1.0% to 1.5%.[28] Google states that making the guard band too small will "require more expensive filters, and therefore result in higher costs for consumers and/or lower auction revenues for the Treasury."[29]

17. We also consider the duplex gaps supported by 3GPP FDD bands.[30] As discussed below,[31] while duplex gap size is affected by other considerations such as the transmitted bandwidth and the duplex spacing,[32] the duplex gap will not be smaller than the achievable transition bandwidth. Table 1 lists 3GPP bands and the duplex gap as a percentage of the frequency of operation.[33]

Band	Uplink	Downlink	Gap MHz	Gap %
1	1920 MHz – 1980 MHz	2110 MHz – 2170 MHz	130	6.67%
2	1850 MHz – 1910 MHz	1930 MHz – 1990 MHz	20	1.06%
3	1710 MHz – 1785 MHz	1805 MHz – 1880 MHz	20	1.14%
4	1710 MHz – 1755 MHz	2110 MHz – 2155 MHz	355	20.49%
5	824 MHz – 849 MHz	869 MHz – 894 MHz	20	2.39%
6	830 MHz – 840 MHz	875 MHz – 885 MHz	35	4.19%
7	2500 MHz – 2570 MHz	2620 MHz – 2690 MHz	50	1.97%
8	880 MHz – 915 MHz	925 MHz – 960 MHz	10	1.11%
9	1749.9 MHz – 1784.9 MHz	1844.9 MHz – 1879.9 MHz	60	3.39%

[24] IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 19 (for 1.5%), 20–21 (for 1.0%). We consider the higher frequencies in the band and round up to the nearest megahertz to convert 1.0% and 1.5% to seven megahertz and 11 megahertz respectively.

[25] IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 22–24.

[26] IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 15; Alcatel-Lucent Comments at 22.

[27] *See* Alcatel-Lucent Comments at 21–22; T-Mobile Reply Comments, Exh. A at 25–26; Intel Reply at 20.

[28] AT&T Reply, App. A at 20–21. AT&T also suggests an additional margin should be added for temperature and manufacturing variation, but this is not necessary as the IWPC figures already include these effects. *See* IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 12–13.

[29] Google Reply at 4–6.

[30] Commenters also look at the range of duplex gaps in 3GPP bands. *See* AT&T Reply, App. A at 20–21; T-Mobile Reply, Exh. A at 25–26; Motorola Comments at 11.

[31] *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

[32] Duplex spacing and the duplex gap are defined in Section II.C.2 of the Technical Appendix (User Equipment Self-Intermodulation). For factors affecting the duplex gap, *see 600 MHz Band Plan Workshop Transcript* at 250–255.

[33] See 3GPP TS 36.101 V12.3.0 (*3GPP RF UE Standard*) at 23 (Table 5.5-1), available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.101/36101-c30.zip (last visited Apr. 23, 2014).

10	1710 MHz – 1770 MHz	2110 MHz – 2170 MHz	340	19.54%
11	1427.9 MHz – 1447.9 MHz	1475.9 MHz – 1495.9 MHz	28	1.95%
12	699 MHz – 716 MHz	729 MHz – 746 MHz	13	1.84%
13	777 MHz – 787 MHz	746 MHz – 756 MHz	21	2.80%
14	788 MHz – 798 MHz	758 MHz – 768 MHz	20	2.62%
17	704 MHz – 716 MHz	734 MHz – 746 MHz	18	2.54%
18	815 MHz – 830 MHz	860 MHz – 875 MHz	30	3.65%
19	830 MHz – 845 MHz	875 MHz – 890 MHz	30	3.58%
20	832 MHz – 862 MHz	791 MHz – 821 MHz	11	1.36%
21	1447.9 MHz – 1462.9 MHz	1495.9 MHz – 1510.9 MHz	33	2.27%
22	3410 MHz – 3490 MHz	3510 MHz – 3590 MHz	20	0.58%
23	2000 MHz – 2020 MHz	2180 MHz – 2200 MHz	160	7.96%
24	1626.5 MHz – 1660.5 MHz	1525 MHz – 1559 MHz	67.5	4.38%
25	1850 MHz – 1915 MHz	1930 MHz – 1995 MHz	15	0.80%
26	814 MHz – 849 MHz	859 MHz – 894 MHz	10	1.20%
27	807 MHz – 824 MHz	852 MHz – 869 MHz	28	3.43%
28	703 MHz – 748 MHz	758 MHz – 803 MHz	10	1.38%
30	2305 MHz – 2315 MHz	2350 MHz – 2360 MHz	35	1.52%
31	452.5 MHz – 457.5 MHz	462.5 MHz – 467.5 MHz	5	1.10%

Table 1. Duplex Gaps of 3GPP Bands

As shown in the table, there are several bands with fairly narrow duplex gaps: the PCS Band is 1.06% without the G block (Band 2), 0.80% with the G block (Band 25). Similarly Band 8 is 1.11%, Band 26 is 1.20%, Band 20 is 1.36%, and the smallest gap is Band 22 at 0.58%.[34]

18. We note that Qualcomm suggests that 24 dB attenuation could be achieved at eight megahertz,[35] and the joint T-Mobile/Verizon band plan proposal has guard bands between television and 600 MHz downlink as small as seven megahertz,[36] which imply that transition bands at least as small as eight and seven megahertz, respectively, are achievable in the 600 MHz Band. DISH states that "[a] guard band size of 6 MHz is more than sufficient to separate wireless service from digital television ('DTV') stations, as demonstrated by the current success of AT&T's 700 MHz deployment, which utilizes a frequency separation of 6 MHz from active Channel 51 broadcast stations."[37]

19. Considering all of these factors, it is reasonable to assume transition bands as small as seven megahertz, about 1%, can be achieved at the 600 MHz Band. This is just within IWPC's "hard" range (1.0% to 1.5%), avoiding the "challenging" (less than 1.0%) range, and well above the 0.73% achievable by BAW filters. In doing so, we are striking a balance between filter characteristics such as size, cost, and performance as evaluated by filter experts, and our goal of efficiently allocating spectrum.[38] On the other hand, we recognize that larger transition bands are preferable where they can be

[34] T-Mobile states that the smallest duplex gap is 1.8%, and Motorola states that the smallest absolute gap for bands below 1 GHz is 10 megahertz. As can be seen however, in the current standard there are smaller duplex gaps. *See* T-Mobile Reply, Exh. A at 25–26; Motorola Comments at 11.

[35] Qualcomm Feb. 19, 2014 *Ex Parte* Letter, Att. at 9.

[36] T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter, Att. at 1.

[37] DISH Reply at 4.

[38] *See* Google/Microsoft Comments, Att. at 3.

reasonably accommodated in the Band Plan. IWPC's "hard" range is between seven and 11 megahertz, and 11 megahertz appears to be achievable by all filter manufacturers and both BAW and SAW filters.

20. Conclusions. In summary, we are considering the following filter characteristics: pass band size may be limited to 25 megahertz, stop band attenuation will be at least 25 dB in general and at least 50 dB in the mobile transmit band, and transition bands must be at least seven megahertz, although larger transition bands can be supported by more vendors and technologies, with 11 megahertz widely supportable. These values are used for the analysis below.

21. Although filter pass band size may be limited to 25 megahertz, we agree with commenters that the band plan can be implemented with multiple filters if necessary, and therefore filter pass band size is not a limit on band plan pass band size, and our technical analysis corroborates our approach.[39] Therefore, as discussed in the Order, we will not limit the pass band size in the band plan scenarios due to these mobile filter limitations.[40] As discussed below in Section III.B of the Technical Appendix (Specific Band Plan Scenarios), we adopt several band plan scenarios corresponding to several possible clearing targets; the pass band sizes in these scenarios range from 10 megahertz to 60 megahertz.

B. Mobile Antenna Considerations

22. *Background*. In the *NPRM*, the Commission proposed the "Down from 51 and 36" band plan in which the uplink band would begin at channel 51 (698 MHz) and expand downward, and the downlink band would begin at channel 36 (608 MHz) and likewise expand downward.[41] A number of commenters express concern that a "split" band plan (i.e., a band plan in which the uplink and downlink bands are widely separated and other licensed services may be located between them) will detrimentally affect antenna design.[42] Specifically, they argue that a large duplex gap would increase the operating bandwidth the mobile antenna would have to cover, and given current antenna design, it is difficult to cover such a large band with a single antenna in smaller smartphones.[43] Qualcomm suggests that we should limit the 600 MHz Band Plan to less than 70 megahertz because antenna bandwidths of 70 megahertz or more may not be feasible in smartphones without using a tunable antenna or multiple antennas.[44] Samsung expresses concern that the "practical bandwidth of the [600 MHz] antenna is expected to be less than 20 MHz (when antenna space is about 0.4cc) due to the size constraints."[45] AT&T raises similar concerns, asserting that there are technical advantages to limiting the amount of paired spectrum to 25+25 megahertz.[46] AT&T argues, however, that "maximizing the amount of paired spectrum by relying on the 35 x 2 MHz approach outweighs the countervailing engineering concerns

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[39] *See* T-Mobile Reply at 20–23, Exh. A at 20; T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter at Att.

[40] *See* § III.A.2.f.i (Pass Band Size and Mobile Filter Considerations); *see also* Intel Reply at 14 n.10 ("These limitations include antenna bandwidth/loss over the greater antenna tuning range, multiple duplexers, additional switches, and 3rd harmonic interference when the uplink bandwidth is expanded."); Technical Appendix §§ II.B (Mobile Antenna Considerations), II.D (Harmonic Interference).

[41] *NPRM*, 27 FCC Rcd at 12402, para. 126. The uplink band is a set of frequencies used for communication from a user device to the network. The downlink band is a set of frequencies used for communication from the network to a user device. Collectively, these are referred to as the "pass bands."

[42] *See, e.g.*, RIM Comments at 8 ("beginning the downlink at 608 MHz will create a very large duplex separation (90 megahertz) that will have an impact on antenna design.").

[43] *See, e.g.*, Intel Reply at 2; T-Mobile Comments at 8–9.

[44] Qualcomm Comments at 6. Other commenters argue that tunable antennas are practical for wide deployment. S*ee, e.g.*, Craig Sparks, Sprint, *600 MHz Band Plan Workshop Transcript* at 120–122.

[45] Samsung *Band Plan PN* Reply at 6.

[46] AT&T Comments at 30–38.

where 84 megahertz of spectrum or more is widely available."[47] Commenters also explain difficulties in implementing additional antennas for the 600 MHz, and discuss how user equipment already supports multiple antennas to support multiple-input multiple-output (MIMO).[48] Ericsson and T-Mobile agree and suggest that although there is some decrease in antenna performance when supporting more paired spectrum, it is better to make more paired spectrum available.[49] Following the 600 MHz Band Plan Workshop, the Wireless Bureau sought comment on various Down from 51 band plans that reduce the total operating bandwidth for a given amount of repurposed spectrum by narrowing the duplex gap (i.e., reducing the space between the uplink and downlink bands).[50]

23. *Discussion*. As discussed in the Order, we adopt the Down from 51 All Paired Band Plan (i.e., the 600 MHz Band Plan).[51] This Band Plan minimizes mobile antenna issues because it reduces the antenna bandwidth to the extent possible. As discussed in the Order based on our analysis of the record, we will not limit the amount of paired spectrum we make available because of mobile antenna concerns, because the performance penalties that result from clearing more than 84 megahertz of spectrum are outweighed by the benefits of making more paired spectrum available for wireless broadband service.[52] Specifically, if we offer a Band Plan scenario with more than 84 megahertz, there is a decrease of 1 or 2 dB in antenna performance. While there is some degradation in antenna performance, it may be offset by the propagation benefits of this low-band spectrum as compared to high-band spectrum, and can be mitigated by using a tunable antenna or other technologies.

24. Minimizing Antenna Bandwidth. In response to the *NPRM*, commenters submit a number of band plans, which vary in the antenna bandwidth needed to implement the particular band plan.[53] We examined the antenna bandwidth of the various band plan proposals under different scenarios to determine how each band plan affects antenna bandwidth. As discussed below and in the Order, the Down from 51 All Paired Plan strikes the proper balance between maximizing paired spectrum and minimizing antenna bandwidth, and our technical analysis corroborates this approach.[54] Below we provide examples of the antenna limits for the various band plans considered and discuss in greater detail how each approach affects antenna bandwidth.

25. Commenters generally concur that with a static antenna design, the antenna must cover the entire band of operation, while with a tunable design the antenna needs to only cover the frequencies

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[47] Letter from Joan Marsh, Vice President, Federal Regulatory for AT&T, to Ruth Milkman, Chief, Wireless Telecommunications Bureau, and Gary Epstein, Chief, Incentive Auction Task Force, FCC, GN Docket No. 12-268 at 2 (filed Oct. 21, 2013) (AT&T Oct. 21, 2013 *Ex Parte* Letter).

[48] AT&T Comments at 31, Exh. A at 24; Qualcomm Comments at 6.

[49] T-Mobile Reply, Exh. A at 14–19 (T-Mobile advocates for a 35+35 megahertz pass band because it will create the most paired spectrum and argues that the losses suffered by the antenna are manageable); Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 106–109.

[50] *See Wireless Telecommunications Bureau Seeks to Supplement the Record on the 600 MHz Band Plan*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 7414 (2013) (*Band Plan PN*).

[51] *See* § III.A.2 (Band Plan for the New 600 MHz Band).

[52] *See* § III.A.2.f.ii (Mobile Antenna Considerations). Under the Down from 51 All Paired Band Plan, we provide scenarios to repurpose up to 144 megahertz of spectrum. *See* § III.A.2.a (All-Paired, Down From 51 Band Plan); Technical Appendix § III.B.11 (Twelve Sets of Paired Blocks (144 megahertz repurposed)).

[53] For example, the antenna bandwidth for Qualcomm's proposed FDD band plan is 62 megahertz. Qualcomm Comments at 15. Verizon and T-Mobile propose a band plan in which the antenna bandwidth spans 81 megahertz for the FDD portion. T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter, Att. at 1. Finally, Ericsson proposes a band plan in which the antenna bandwidth plan spans over 110 megahertz. Ericsson Reply at 18.

[54] *See* § III.A.2 (Band Plan for the New 600 MHz Band).

actually being used for communication.[55] This concept is illustrated in Figure 3, which shows the example of 11 licensed blocks in a Down from 51 and 36 configuration requiring 132 megahertz repurposed. In this case, to cover all the uplink and downlink blocks, an antenna would need to span 148 megahertz. However, at any given time, a device will be using only one radio frequency ("RF") carrier. Given a 20 megahertz carrier, as the picture shows, the bandwidth required to use that carrier is 113 megahertz, regardless of where in the band the carrier is. In this case, the needed bandwidth is 148 megahertz with a static antenna, but 113 megahertz with a tunable antenna. The antenna bandwidth required under a static approach spans the bandwidth from the uppermost edge of the first uplink block to the lowermost edge of the last downlink block. The tunable antenna bandwidth needed is the duplex spacing plus the carrier bandwidth.

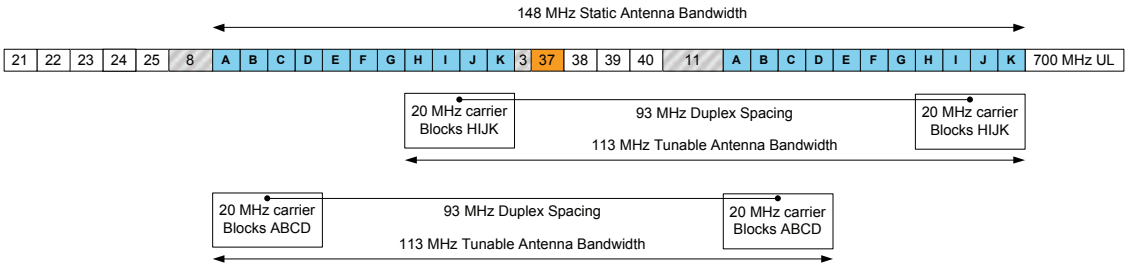

Figure 3. Example of Static Versus Tunable Bandwidth Needed for a 20 MHz RF Carrier

26. Figure 4 below shows some Down from 51 band plans that are similar to certain commenters' proposals.[56] These examples illustrate the antenna bandwidth if we repurpose 84 or 120 megahertz. The downlink-only spectrum, shown in red, is considered a separate band and cannot be used simultaneously with the paired spectrum, shown in blue. With a static approach, the antenna bandwidth for the paired spectrum is from 61 to 81 megahertz depending on the specific scenario. With a dynamic approach, assuming RF carrier bandwidths of up to 20 megahertz, the paired antenna bandwidth drops to 56 to 66 megahertz, and the downlink-only blocks' antenna bandwidth becomes 20 megahertz.

[55] Commenters use this terminology somewhat unclearly. Most current handset antennas in fact cover several bands, with many handsets using a single antenna for all cellular bands supported. The antenna can be "tuned" to the specific band being operated by either switching between different matching networks or using variable components in one or more matching networks. Commenters refer to this as "static," while "tunable" refers to a more dynamic approach where the antenna can be tuned not just to a band of operation, but the specific frequencies being used in the band. *See, e.g.*, Qualcomm Reply at 24–25.

[56] *See* AT&T Comments at 31–32; Verizon Comments at 11; T-Mobile Comments at 10; AT&T Oct. 21, 2013 *Ex Parte* Letter; T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter at Att. In these diagrams, we modified their band proposals to reflect the guard band sizes we are adopting in this Order. *See* § III.A.2.e (Guard Bands).

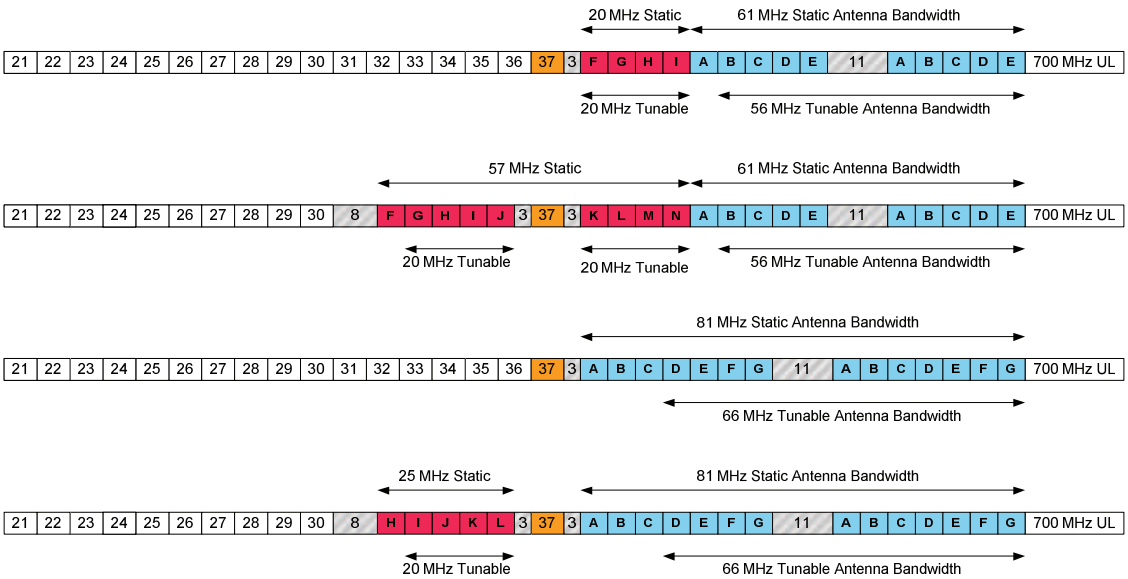

Figure 4. Antenna Bandwidth for Some Down from 51 Band Plan Proposals (Modified)

27. In the 600 MHz Band Plan we adopt (which is a Down from 51 variation), there is a single band of paired spectrum. If we can offer more than 84 megahertz for 600 MHz licenses, the duplex spacing is different for the pairs with downlink blocks below channel 37 than for those above channel 37. Figure 5 below illustrates these points for two clearing targets, 84 megahertz and 126 megahertz.

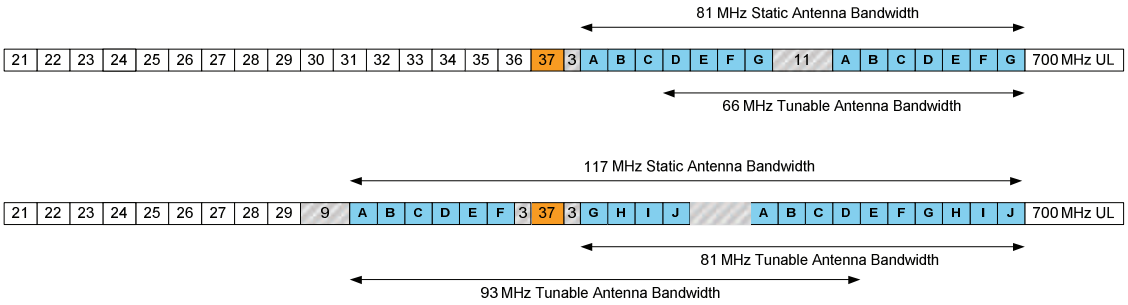

Figure 5. Antenna Bandwidth Examples for 84 Megahertz and 126 Megahertz (Down from 51 Framework)

28. The full set of possible clearing targets (i.e., the band plan scenarios) is discussed below in Section III.B of the Technical Appendix (Specific Band Plan Scenarios). Table 2 summarizes the static and tunable antenna bandwidths required for each specific scenario for the Down from 51 approach. For a static approach, the antenna bandwidth is close to the clearing target. As shown below, the tunable approach significantly reduces the bandwidth.

Licensed Paired Blocks	Repurposed Spectrum	Static Antenna Bandwidth	Tunable Antenna Bandwidth
2	42 MHz	31 MHz	31 MHz
3	48 MHz	41 MHz	41 MHz
4	60 MHz	51 MHz	51 MHz
5	72 MHz	61 MHz	56 MHz
6	78 MHz	71 MHz	61 MHz

7	84 MHz	81 MHz	66 MHz
8	108 MHz	103 MHz	73 MHz
9	114 MHz	113 MHz	88 MHz
10	126 MHz	123 MHz	93 MHz
11	138 MHz	133 MHz	98 MHz
12	144 MHz	143 MHz	103 MHz

Table 2. Down from 51 Antenna Bandwidth

29. The Down from 51 and 36 band plan scenarios have a larger antenna bandwidth than the Down from 51 band plan variants, especially at lower clearing targets, where the required antenna bandwidth is significantly more than the amount of spectrum repurposed. As shown in Figure 6, in a static approach, the 90 megahertz scenario has a 128 megahertz antenna bandwidth,[57] and the 120 megahertz scenario has a 143 megahertz antenna bandwidth. With a tunable approach, the Down from 51 and 36 band plan proposal has the same antenna bandwidth for all clearing targets that support at least 20+20 megahertz: 113 megahertz. This is because this framework has the same duplex spacing for all plans, i.e., the frequency spacing between each uplink and downlink block that is paired (for example, from the A uplink block to the A downlink block) is always 93 megahertz.

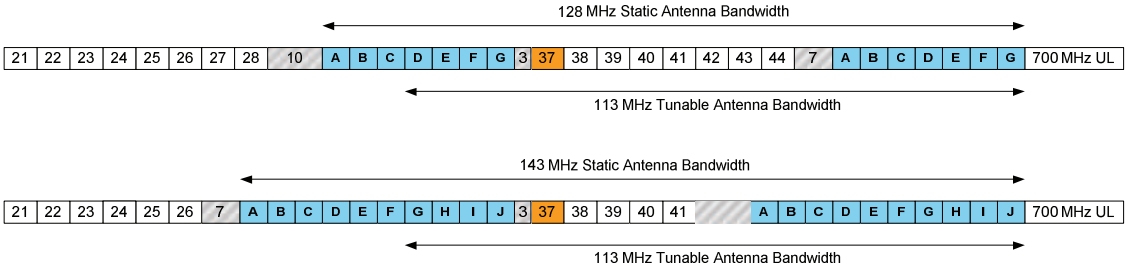

Figure 6. Antenna Bandwidth Examples for the Down from 51 and 36 Framework

30. The antenna bandwidth needed for the Down from 51 and 36 approach in all clearing scenarios is summarized in Table 3.

Licensed Paired Blocks	Repurposed Spectrum	Static Antenna Bandwidth	Tunable Antenna Bandwidth
3	48 MHz	108 MHz	108 MHz
4	60 MHz	113 MHz	113 MHz
5	72 MHz	118 MHz	113 MHz
6	78 MHz	123 MHz	113 MHz
7	90 MHz	128 MHz	113 MHz
8	102 MHz	133 MHz	113 MHz
9	108 MHz	138 MHz	113 MHz
10	120 MHz	143 MHz	113 MHz
11	132 MHz	148 MHz	113 MHz
12	138 MHz	153 MHz	113 MHz
13	150 MHz	158 MHz	113 MHz

[57] In the Down from 51 and 36 band plan, 84 megahertz is not supported, because six sets of paired licensed blocks can be supported with 78 megahertz of repurposed spectrum, while seven sets of paired licensed blocks require 90 megahertz of spectrum. The 90 megahertz plan for Down from 51 and 36 is most comparable to the 84 megahertz plan for Down from 51, because both plans use seven sets of licensed blocks.

Table 3. Down from 51 and 36 Antenna Bandwidth

31. Comparing Tables 2 and 3, significantly lower bandwidths are required in the Down from 51 approach than in the Down from 51 and 36 framework. From an antenna perspective, the Down from 51 and 36 band plan is less desirable than the various Down from 51 band plan approaches because it requires higher bandwidth for the same amount of licensed spectrum, especially for lower clearing targets.[58] This supports our conclusion in the Order to adopt a Down from 51 band plan instead of the Down from 51 and 36 band plan.[59]

32. Antenna Performance Degradation. We expect antenna performance to degrade as the antenna bandwidth increases (i.e., as the amount of repurposed spectrum increases). Specifically, the 84 megahertz scenario could have an antenna penalty of up to 0.3 dB relative to the 72 megahertz scenario, and the 126 megahertz and 138 megahertz scenarios could have antenna penalties of up to 1.5 dB and 2.0 dB, respectively, relative to the 72 megahertz scenario. Below, we discuss how we arrive at these figures.

33. Commenters agree with the broad principle that the larger the bandwidth supported, the greater the penalty.[60] Commenters discuss three inter-related issues for mobile antenna performance: the antenna's physical size, its supported bandwidth, and its efficiency.[61] Commenters generally agree that for a small smartphone form factor, such as a 4-inch device, there will be a reduction in antenna efficiency to support a larger bandwidth in the 600 MHz Band.[62] Qualcomm and AT&T focus on the 1 dB efficiency bandwidth, and suggest it is limited to about 60 megahertz.[63] T-Mobile argues that expanding this antenna bandwidth to about 80 megahertz would involve a performance penalty of about 0.32 dB,[64] but notes there is a variety of technologies that could be deployed in smartphones by early 2015 to eliminate this penalty.[65] Nokia compares a 25+25 megahertz Down from 51 plan covering 638 to 698 MHz, such as the AT&T and Qualcomm band plan proposals, to a 30+30 megahertz Down from 36 and 51 band plan covering 578 to 698 MHz, and concludes that the latter band plan, spanning 120 megahertz, will have a penalty of 1.0 to 1.5 dB relative to the band plan spanning 60 megahertz, for a 4 inch device.[66] Ericsson states that its experience with digital video support in handsets in Europe indicates that performance at 470 MHz could involve a performance penalty of up to 4 dB.[67] Nokia

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[58] *See, e.g.*, Intel Reply at 2.

[59] *See* § III.A.2.a (All-Paired, Down From 51 Band Plan).

[60] *See 600 MHz Band Plan Workshop Transcript* at 105–120.

[61] *See, e.g.*, AT&T Comments, Exh. A at 22–23; Ericsson Reply at 29–30.

[62] *See, e.*g., Letter from Derek Khlopin, Head of Government Relations, North America for Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 15 (filed Mar. 18, 2013) (Nokia Mar. 18, 2013 *Ex Parte* Letter).

[63] *See* Qualcomm Comments at 13–14.

[64] T-Mobile Reply, Exh. A at 16–17.

[65] T-Mobile Reply, Exh. A at 17–18 ("Many recent technology advances have made it possible to address the performance limitations and size issues associated with traditional passive antennas by utilizing microstrip and active antenna technologies . . . advances which include isolated Mode Antenna Technology (iMAT), surface mounted band switching and active impedance matching, printed loop antennas, ceramic substrates, and helical antennas, among others.").

[66] Letter from Derek Khlopin, Head of Government Relations, North America for Nokia, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 18 (filed May. 6, 2013) (Nokia May 6, 2013 *Ex Parte* Letter).

[67] Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 107.

shows that these penalties will be reduced in 5-inch and 6-inch devices.[68] These comments are summarized in Table 4.

Commenter	Antenna Bandwidth	Degradation
Qualcomm	60 MHz	Baseline = 0 dB
T-Mobile	80 MHz	0.3 dB
Nokia	120 MHz	1.0 to 1.5 dB
Ericsson	228 MHz[69]	4 dB

Table 4. Antenna Performance versus Antenna Bandwidth

34. Taken together, these comments show a clear progression of degradation as the antenna bandwidth increases. This progression emphasizes that there is not an absolute limit to the supportable antenna bandwidth, but rather a continuous degradation as larger bandwidths are supported. For example, extrapolating these numbers implies that 140 megahertz of bandwidth would correspond to approximately a 2 dB penalty and 180 megahertz of bandwidth would correspond to approximately a 3 dB penalty. These penalties are for small smartphone form factors (i.e., 4-inch devices). Larger smartphones, "phablets,"[70] tablets, home modems, or other devices may perform better. And, as mentioned above, there are a number of antenna technologies that can reduce these penalties, including tunable antennas as well as isolated Mode Antenna Technology ("iMAT"), surface-mounted band switching and active impedance matching, printed-loop antennas, ceramic substrates, and helical antennas.[71]

35. Managing Antenna Degradation. As discussed in the Order, the antenna performance penalties that result from offering more than 84 megahertz in the 600 MHz Band are outweighed by the benefits of making more paired spectrum available for wireless broadband service, and our technical analysis corroborates this approach.[72] Ericsson and Verizon's statements at the Band Plan Workshop support this view.[73]

36. To place this impact of antenna degradation in perspective, we can compare the relative propagation characteristics of the sub-1 GHz bands used for cellular technologies. Cellular coverage is generally limited by the uplink band, and the worst coverage will be at the highest uplink frequency. Table 5 shows a simple propagation comparison based on the frequency dependent factor used in the Hata propagation model ($26.16\text{Log}_{10}(f)$[74]):

Band	Highest Uplink	$26.16\text{Log}_{10}(f)$	Relative

[68] Nokia May 6, 2013 *Ex Parte* Letter, Att. at 15–17.

[69] From 470 MHz to 698 MHz is 228 megahertz.

[70] The term "phablet" is often used to describe devices considered between phones and tablets in size, typically including traditional phone functions. These are often 6-inch devices. *See, e.g.*, http://www.pocket-lint.com/news/124518-best-phablets-2014-the-best-big-screened-phones-to-buy-right-now (last visited Apr. 8, 2014).

[71] T-Mobile Reply, Exh. A at 18.

[72] *See* § III.A.2.f.ii (Mobile Antenna Considerations).

[73] Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 106–109; Sanyogita Shamsunder, Verizon, *600 MHz Band Plan Workshop Transcript* at 131–132.

[74] In the Okumura-Hata model the frequency also affects the correction factors for suburban and rural environments, although this is a smaller effect. Real world propagation may also be affected by other factors, such as building penetration varying by frequency. However, using the $26.16 \log_{10}(f)$ is adequate for placing the losses discussed in context.

	Frequency		Performance
Cellular	846.5 MHz	76.6 dB	-2.2 dB
SMR	824.0 MHz	76.3 dB	-1.9 dB
Upper 700 MHz	787.0 MHz	75.8 dB	-1.4 dB
Lower 700 MHz	716.0 MHz	74.7 dB	-0.3 dB
600 MHz, highest carrier	698.0 MHz	74.4 dB	0.0 dB
600 MHz, using lowest carrier for 126 MHz scenario	673.0 MHz	74.0 dB	0.4 dB

Table 5. Propagation of Sub-1 GHz bands

37. This table shows performance relative to the highest carrier in the 600 MHz Band, with negative numbers indicating worse performance. So, for example, the Cellular Band has roughly 2.2 dB worse performance than the 600 MHz Band. Using this table we can see that an antenna performance penalty of 1.5 dB would mean that the performance of the 600 MHz Band would be about the same as the Upper 700 MHz Band, while a penalty of 2.0 dB would result in performance similar to the 800 MHz Bands, all else being equal. Also, in the case of the 600 MHz Band's 126 megahertz scenario, propagation for the lowest carrier in the 600 MHz Band is 0.4 dB better than the highest carrier, so although spectrum in the lower 600 MHz Band may be more challenging for the antenna, this may be offset by improved propagation.[75] Put another way, the effects of antenna degradation from extending the band plan below channel 37 would make the spectrum comparable to the highly valued and widely deployed 700 MHz and 800 MHz bands. From a coverage perspective, providers already using low-band spectrum could overlay 600 MHz spectrum onto their existing "cell grid" without introducing coverage gaps. Similarly, antenna performance issues would not meaningfully reduce the value of the spectrum to new entrants or providers not already using low-band spectrum in their networks.

38. Furthermore, the antenna degradation can be reduced if wireless providers use a tunable approach. Referring back to Table 2, the Down from 51 plan requires antenna bandwidth of 123 megahertz for 10 sets of paired blocks, up to 143 megahertz for 12 sets of paired blocks, which could correspond to a 2 to 3 dB performance penalty based on our analysis above. However, the tunable antenna bandwidths are much lower, from 93 to 103 megahertz for the same scenarios. That is, even the largest amounts of repurposed spectrum would require antenna bandwidths of less than 103 megahertz, resulting in performance penalties of less than 1.5 dB for tunable antennas. Commenters indicate that tunable antennas will be widely available by the time this spectrum is deployed in user devices.[76] In addition, as mentioned above, there are a number of antenna technologies that can reduce these penalties and, as also mentioned above, these penalties only apply to smaller devices, not all devices that may be used in this band.

39. An alternative mitigation approach proposed by some commenters is to adopt a band plan that limits the paired spectrum to 25+25 megahertz or 35+35 megahertz and allocate any additional cleared spectrum as supplemental downlink ("SDL" or "downlink-only") spectrum.[77] However, we reject this approach. As discussed above, commenters' band plan proposals that use this mitigation technique limit the antenna bandwidth for the paired spectrum from 60 to 80 megahertz. In these cases there is also a second band of SDL spectrum that requires antenna bandwidths of 25 to 57 megahertz as shown above in Figure 4. These SDL blocks must be supplemental to another band. However, as some commenters explain, it can be difficult to aggregate two low bands together, so carriers might choose to pair these

[75] *See also* Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 108.

[76] *See, e.*g., Craig Sparks, Sprint, *600 MHz Band Plan Workshop Transcript* at 121.

[77] Qualcomm Comments at 6–7.

downlink-only blocks with a high band such as PCS or AWS.[78] As a result, while the low frequency propagation advantages will increase the downlink throughput, the cell radius or coverage area of the downlink-only blocks' carrier will be limited by the uplink using the high band, and therefore will be limited by the propagation characteristics of the high band spectrum. On the other hand, even if the paired spectrum does suffer a 2 dB penalty, as discussed above, it will still have better coverage characteristics than spectrum in the highly-valued 800 MHz Band. Therefore, even with an antenna performance penalty, paired spectrum will better support our goal of making high-quality coverage spectrum available.[79] Although allocating a separate downlink-only band for large clearing targets may appear to mitigate antenna performance issues by breaking the higher bandwidth band into two distinct lower bandwidth bands, the limitations of downlink-only blocks actually reduce the utility of such an approach more than the antenna performance by requiring disparate band use far separated in frequency for control and scheduling of the supplemental downlink, so our all-paired approach results in higher spectrum utility.

C. Intermodulation Interference

40. Commenters raise two primary concerns about intermodulation causing harmful interference to mobile broadband users in the 600 MHz Band. Specifically, commenters argue that television stations should not be placed between the mobile uplink and downlink bands in order to accommodate market variation.[80] We disagree. In addition, commenters state that in-band third order intermodulation products formed by the UE transmission combining with itself could fall into the downlink pass band.[81] As discussed below in greater detail, accommodating market variation by placing television stations between the uplink and downlink bands does not cause harmful interference arising from intermodulation products. Further, we have appropriately sized the duplex gap to prevent in-band third order intermodulation products from falling in the downlink pass band.[82] These determinations are corroborated by our analysis below.

1. Accommodating Market Variation

41. Several commenters argue that placing television stations between the 600 MHz uplink and downlink bands[83] creates intermodulation scenarios that would lead to harmful interference,[84] and

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[78] Karri Kuoppamaki, T-Mobile, *600 MHz Band Plan Workshop Transcript* at 119 ("And the supplemental downlink spectrum . . . most likely would be carrier aggregated with the high band rather than with the 600 MHz Band"); *see also 600 MHz Band Plan Workshop Transcript* at 226–229.

[79] *See* § III.A.2 (Band Plan for the New 600 MHz Band).

[80] *See* Alcatel-Lucent Comments at 3, 14–16; Block Stations *Band Plan PN* Comments at 2–3; CEA *Band Plan PN* Comments at 3; Letter from Julie M. Kearney, Vice President, Regulatory Affairs for Consumer Electronics Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 5–6 (filed Aug. 1, 2013); Ericsson Reply at 4, 9–10, 17; Google Reply at 3, 8–9; Motorola Comments at 9–10; Motorola *Band Plan PN* Comments at 4; NAB Comments at 6; NAB Reply at 7; NAB *Band Plan PN* Reply at 1–2; TechAmerica Reply at 4; US Cellular *Band Plan PN* Comments at 3; US Cellular *Band Plan PN* Reply at 8–9.

[81] *See* Alcatel-Lucent Comments at 3, 14–16; Ericsson Reply at 10, App. A at A-1–A-3; Motorola Comments at 10.

[82] *See* Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

[83] This is referred to by some commenters as "television in the duplex gap." However use of this term is not consistent; for example, some commenters use it to refer to all frequencies between the uplink and downlink bands, while others use it to mean only the portion that is used in all band plans. *See, e.g.*, CEA *Band Plan PN* Comments at 3; CTIA *Band Plan PN* Comments at 4–5, 8, 12–15. *See also* Technical Appendix § II.A (Mobile Filter Considerations).

[84] The FCC defines "interference" as "[t]he effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance

(continued….)

therefore argue that the Commission should not adopt any band plans that place television stations between the uplink and downlink bands.[85] Although we defer our decision on how to accommodate market variation, we recognize that placing television stations between the uplink and downlink bands may be necessary to accommodate market variation,[86] and from a technical perspective, the benefits of doing so outweigh the costs because the intermodulation interference is manageable.[87]

a. Calculating Intermodulation Interference with Television Stations Between the 600 MHz Uplink and Downlink Bands

42. We calculate the likely strength of intermodulation products generated in the UE receiver based on the expected key inputs and the values shown below in Table 6. Our rationale for choosing these values is explained below in the Section II.C.1.c of the Technical Appendix (Explanation of Inputs).

(Continued from previous page)
degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy." 47 C.F.R. §2.1(c). It also defines "harmful interference" as "[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with [the International Telecommunications Union] Radio Regulations." 47 C.F.R. § 2.1(c). In addressing the potential for intermodulation interference, we must eliminate all instances of "harmful interference" as opposed to all instances of "interference."

[85] *See* Alcatel-Lucent Comments at 3, 14–16; Ericsson Reply at 10, App. A at A-1–A-3; Motorola Comments at 10.

[86] *See* § III.A.2.d (Market Variation).

[87] *See* Technical Appendix §II.C (Intermodulation Interference).

Input	Value
Television signal strength received by UE	-23 dBm
UE transmit power	18 dBm
UE receive filter attenuation	25 dB
UE interference threshold	-92 dBm / MHz
UE LNA IP3 point[88]	-5 dBm

Table 6. Inputs for Intermodulation Calculations

43. The intermodulation products will be generated by non-linearities in the Low Noise Amplifier ("LNA").[89] As can be seen in Figure 7, both the UE transmit signal and the received television signal must pass through the receive filter before reaching the LNA, and therefore both will be attenuated by the receive filter, resulting in powers of 18-25=-7 dBm and -23-25=-48 dBm respectively at the LNA input.

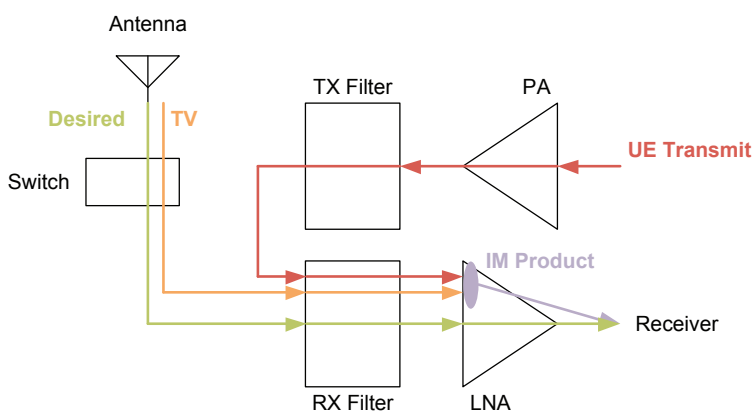

Figure 7. Signal Paths for Intermodulation in the LNA Input

44. In the 600 MHz Band Plan, the uplink band is a higher frequency than the downlink band[90] so the UE transmit ("TX") is higher in frequency than the broadcast signal and the product of concern is the $2f_1$-f_2 signal.[91] Accordingly, the power and bandwidth of the intermodulation product are given by:

$$P_{\mathrm{IM}} = 2P_{\mathrm{f1}} + P_{\mathrm{f2}} - 2\,I_{\mathrm{ip3}} \qquad \text{for } 2f_1 + f_2,\ 2f_1 - f_2$$
$$B_{\mathrm{IM}} = 2B_{\mathrm{f1}} + B_{\mathrm{f2}} \qquad \text{for } 2f_1 + f_2,\ 2f_1 - f_2$$

Using the IP3 point from Table 6 above and the just calculated power values, this results in a power of

[88] The third order intercept, or IP3 point, is value that measures the non-linearity of a device and allows the power of the intermodulation products to be calculated. *See e.g.* Lou Frenzel, *What's The Difference Between The Third-Order Intercept And The 1-dB Compression Points?*, Electronic Design, Oct. 24, 2013, http://electronicdesign.com/what-s-difference-between/what-s-difference-between-third-order-intercept-and-1-db-compression-point (last visited Apr. 23, 2014).

[89] We consider intermodulation products generated in other components in the next section, see Technical Appendix § II.C.1.b (Additional Considerations).

[90] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

[91] In this Technical Appendix we use f_1 to refer to the lower of the two combining signals and f_2 to refer to the higher of the two signals.

2(-48)+(-7)-2(-5) = -96-7+10 = -93 dBm, a bandwidth of at least 2(5.38 MHz)+180kHz=10.94 MHz, [92] and a power spectral density ("PSD") of at most -93-10log$_{10}$(10.94)=-104 dBm/MHz. The -104 dBm/MHz is 12 dB below the threshold of interference in Table 6 above, and provides a significant margin of error. Based on these calculations, harmful interference will not occur if broadcast stations are placed between the mobile uplink and downlink bands.

45. Ericsson and Alcatel-Lucent disagree with this conclusion, and assert that intermodulation interference will cause harmful interference to mobile broadband users of the 600 MHz Band.[93] Our calculations differ from Ericsson and Alcatel-Lucent because these commenters assume little or no attenuation of the television signal between the uplink and downlink bands.[94] Our calculations would also show a potential problem with no filter attenuation. However, attenuation of signals in the duplex gap is minimal only if the signal is too close to the downlink pass bands.[95] In a narrow duplex gap, such as in the PCS band, signals anywhere in the duplex gap are unlikely to be attenuated.[96] However, with a wider duplex gap, signals can be attenuated as long as there is adequate separation from the downlink band. If we determine it is necessary to place broadcast stations between the uplink and downlink bands, we will provide adequate frequency separation between the downlink band and the broadcast signals to allow for attenuation of the broadcast signals.[97]

b. Additional Considerations

46. *Reverse Intermodulation*. A few commenters argue that reverse intermodulation could also cause harmful interference to 600 MHz Band receivers.[98] Here, "reverse intermodulation" refers to

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[92] A DTV signal occupies 5.38 megahertz of the six megahertz channel. *See* ATSC A/53 Part 2: RF/Transmission System Characteristics, section 5.4, 15 Dec. 2011, available at http://www.atsc.org/cms/index.php/standards/standards/50-atsc-a53-standard (last visited Apr. 23, 2014). The narrowest UE signal we consider is an LTE UE transmitting on a single 180 kHz resource block See 3GPP TS 36.211 V12.1.0 at 15 (5.2.3) available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.211/36211-c10.zip (last visited Apr. 23, 2014). A UE using more resource blocks, or another technology such as HSPA, would have a larger bandwidth and therefore the intermodulation product would be more spread out and have a lower PSD.

[93] *See* Ericsson Reply at 10, App. A at A-1–A-3; Alcatel-Lucent Comments at 14–16.

[94] Ericsson Reply, App. A at A-2–A-3 (calculating attenuation of 10 dB); Alcatel-Lucent Comments at 15.

[95] As discussed above, "close" means about 1% of the frequency, or about seven megahertz, because at separations less than that the filter attenuation may not be adequate. *See* Technical Appendix § II.A (Mobile Filter Considerations).

[96] This is further discussed above in Section II.A of the Technical Appendix (Mobile Filter Considerations). For the PCS band, the duplex gap is only 0.80% (15 megahertz), so it is reasonable in that case to assume that the entire duplex gap is used for the filter transition band, and attenuation of signals in the duplex gap may be minimal.

[97] Other commenters concur with our conclusion the broadcast stations can operate between the uplink and downlink bands. *See, e.g.*, T-Mobile *Band Plan PN* Reply at 6 ("[T]he presence of television in a portion of the uplink spectrum (duplex gap) should not pose any special technical concern[s]"); Verizon *Band Plan PN* Comments at 7 ("Locating broadcasters (especially high-powered operations) between uplink and downlink operations is not a preferred solution and should not be contemplated on a pervasive basis. To the extent it is necessary to accommodate some markets that do not reach the minimum threshold (generally 72 megahertz or 84 megahertz), however, broadcasters in low-clearing markets could be located on channels that correspond to the paired uplink and paired downlink blocks in the higher-clearing markets."); T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter, Att. at 2 (band plan proposal places a television station between the uplink and downlink blocks).

[98] Motorola states that reverse intermodulation products would be generated by mixing television transmissions and mobile device transmit signals (e.g., handsets transmitting at 685.5 MHz would mix with television channel 42 signals centered at 641 MHz to create in band intermodulation products at 596.5 MHz). Motorola Comments at 10. However, DISH states that the claims of intermodulation, reverse intermodulation, and harmonic interference by opponents of the Commission's band plan are exaggerated because there are technical solutions to deal with them. DISH Reply at 8–10; DISH *Band Plan PN* Comments at 5–6.

intermodulation generated by non-linearities in the PA output, rather than the LNA input. As demonstrated in Figure 8, this reverse intermodulation case, where the television signal combines with the UE transmission to generate a product that falls on the UE receive frequency, is essentially the same as Channel 51 broadcast stations potentially causing intermodulation interference to Lower 700 MHz Band licensees.[99]

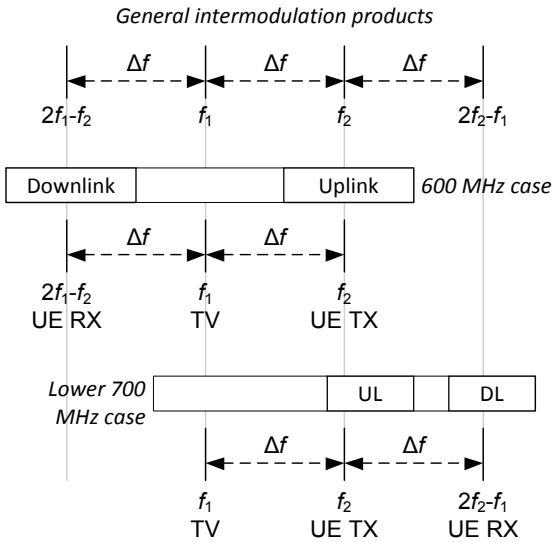

Figure 8. Comparison of 600 MHz and 700 MHz Intermodulation Scenarios

47. To analyze this case, we use the inputs discussed in Table 6 above, and also assume the UE Power Amplifier ("PA") to have an output IP3 point of +45 dBm.[100] If we take the worst case of the television signal falling inside the pass band of the UE TX filter then the power levels at the PA output are +18 dBm for the UE transmission and -23 dBm for the television signal. Then, using the formulas above, we find that the intermodulation product power is -118 dBm.[101] As can be seen in Figure 9, the product must pass through the TX and receive ("RX") filters after being generated in the PA output. As it falls on the RX frequency, it will not be attenuated by the RX filter, but it will be attenuated by the TX filter. In fact, to prevent self-desensitization from the transmitter OOBE, the TX filter typically has a rejection of at least 50 dB,[102] so this signal will be attenuated to -168 dBm. As before, the product bandwidth is at least10.94 MHz[103] and therefore the PSD is at most -168-10log$_{10}$(10.94)=-179 dBm/MHz. This result of -179 dBm/MHz is 87 dB below our threshold of interference, and therefore harmful interference will not occur.

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[99] CCA argues that the Commission should seize the opportunity to immediately clear Channel 51, because interference concerns involving Channel 51 already have hampered base station deployment in the Lower 700 MHz Band. CCA Comments at 13–14; CCA *Band Plan PN* at 5. Mobile Future argues that the Commission should allow broadcasters operating in Channel 51 to relocate to different spectrum in advance of the incentive auction, without adversely affecting their rights to participate in the reverse auction because it would help address interference issues that have hindered adjacent band Lower 700 MHz A Block licensees from deploying mobile broadband. Mobile Future Reply at 10–11.

[100] How we arrived at the UE PA having an output IP3 point of +45 dBm is discussed further in Section II.C.1.c of the Technical Appendix (Explanation of Inputs).

[101] $P_{\mathrm{IM}} = 2P_{\mathrm{f1}} + P_{\mathrm{f2}} - 2\,I_{\mathrm{ip3}}$ = 2(-23 dBm)+(18 dBm)-2(45 dB) = -46+18-90 = -118 dBm.

[102] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[103] *See* Technical Appendix n.92.

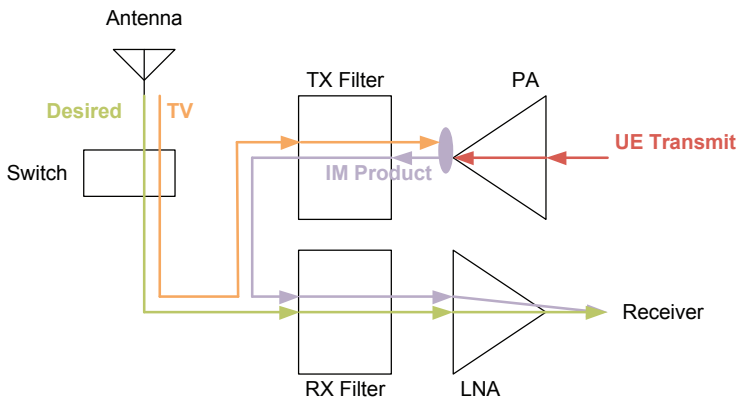

Figure 9. Signal Paths for Intermodulation in the LNA Input

48. *Intermodulation in other components*. AT&T suggests that intermodulation could also occur in the antenna switch or other components in front of the duplexer, where the television signal has not been attenuated.[104] However, these components generally have fairly high IP3 points. For example, in the Band Plan Workshop, Avago stated that a typical IP3 point for an antenna switch is +70 dBm.[105] Using this value, we would expect the product of the unattenuated signals to have a power of -168 dBm.[106] As before, the product bandwidth is at least 10.94 MHz,[107] and therefore the PSD is at most -168-10log$_{10}$(10.94)= -179 dBm/MHz, which is 87 dB below our threshold of interference. Accordingly, harmful interference will not occur.

49. *Multiple television stations*. AT&T argues that the situation in the 600 MHz Band is very different than in the Lower 700 MHz Band, because there is only one broadcast station to consider at any particular location in the Lower 700 MHz Band case while there could be multiple broadcast stations in one area in the 600 MHz Band duplex gap.[108] However, this ignores the fact that many channels below channel 51 are used for television. The reason there is limited concern over channel 50, which also forms frequency combinations that could theoretically cause interference, is that channel 50 is six megahertz further away from the edge of the Lower 700 MHz Band than the channel 51 broadcast stations and the channel 50 transmissions are easily attenuated. Second, a given UE at a given time is susceptible only to television signals that fall halfway between the transmit and receive frequencies it is actually using, not all television signals between the uplink and downlink bands.

50. Motorola states that two television station signals could combine and fall on a device's receive frequency.[109] Since the two television signals would each be -23 dBm, compared to the case we have been considering where the television signal is -23 dBm and the UE TX signal is +18 dBm, as long as these signals are attenuated, any products would be significantly weaker (by 18 dBm - -23 dBm = 41 dB). In other similar cases, the combining television signals have not caused harmful interference. For example, similar combinations of the form $2f_1+f_2$ and $2f_2+f_1$ (instead of $2f_1-f_2$ and $2f_2-f_1$) would affect PCS

[104] *See* Neeti Tandon, AT&T, *600 MHz Band Plan Workshop Transcript* at 42.

[105] *See* William Mueller, Avago, *600 MHz Band Plan Workshop Transcript* at 68–69.

[106] $P_{\mathrm{IM}} = 2P_{\mathrm{f1}} + P_{\mathrm{f2}} - 2\,I_{\mathrm{ip3}}$ = 2(-23 dBm)+(18 dBm)-2(70 dB)=-46+18-140 =-168 dBm.

[107] *See* Technical Appendix n.93.

[108] AT&T Comments, Exh. A at 12.

[109] Motorola Comments at 10. This is different from the case we have been considering where one television signal combines with the UE transmit signal.

handsets the same way, but television intermodulation concerns have not reduced the utility and value of the PCS band.[110]

51. *Severity of Interference*. Intermodulation between a television signal and the UE TX signal can only cause interference when the UE is both transmitting and receiving. In technologies such as LTE and WiMAX, even for applications where user data is being sent and received continuously (such as a VoIP call), the UE may not actually transmit and receive at the same time. For example, in an LTE FDD system, there are 20 slots in each 10 ms frame, and the resources assigned in a frame for the UE transmission and reception may not occur on the same slots. Further, with features in the LTE standard such as load balancing, robustness optimization, and dynamic scheduling, there is no fixed frequency relationship between the resource blocks assigned for transmit and receive, so although a television station may be in the (TX+RX)/2 point during part of a frame, it may not be in a subsequent frame. Finally, even if there is an actual decrease in the signal-to-noise ratio of some resource blocks, this may simply result in lowered throughput due to the system choosing lower rate modulation and coding schemes or retransmitting some data. Such temporary throughput reductions may not be perceptible to the end user and do not necessarily "repeatedly interrupt"[111] the service.

c. Explanation of Inputs

52. As described above, we use the framework set out in the Commission's rules defining "interference" and "harmful interference."[112] Below we discuss the other inputs we must consider, which include the power of television signals and user equipment, signal attenuation, the interference threshold, and IP3 points.

53. *Television Signal Power*. One input we must determine is the likely television signal level that a wireless device may experience. This issue has been discussed extensively in the *700 MHz Interoperability* proceeding where essentially the same intermodulation issue was raised.[113] In that proceeding, Qualcomm submitted drive tests from its proposed MediaFLO system, which operated a broadcast network limited to 50 kW effective isotropic radiated power ("EIRP"). [114] These plots show a significant number of data points above -46.8 dBm and -43.8 dBm,[115] while there are significantly fewer above -32.1 dBm,[116] and a very small number of points above -29.1 dBm.[117] After adjusting these figures upwards by 13 dB,[118] the broadcast signals experienced by outdoor mobile devices will rarely be

[110] Although not stated explicitly, it appears that Motorola is concerned about two television transmitters in the duplex gap but not elsewhere (such as next to the downlink band), because Motorola assumes that there will be no attenuation of the broadcast signals in the duplex gap. As discussed above, television in the duplex gap is not a concern as long as there is adequate frequency separation to attenuate the signals. *See* Technical Appendix § II.C.1 (Accommodating Market Variation).

[111] 47 C.F.R. § 2.1(c).

[112] *See* Technical Appendix n.85.

[113] *See, e.g.*, Qualcomm Comments, WT Docket No. 12-69 at 13–28 (filed June 1, 2012) (*Qualcomm 700 Comments*); V-COMM Reply Comments, WT Docket No. 12-69 at 11–23 (filed July 13, 2012) (*V-COMM 700 Comments*).

[114] *See Qualcomm 700 Comments* at 13, 18.

[115] *See Qualcomm 700 Comments* at 15–17.

[116] *See Qualcomm 700 Comments* at 27–28.

[117] *See Qualcomm 700 Comments* at 25–26.

[118] This 13 dB adjustment accounts for the difference between the 50 kW permitted in the MediaFLO spectrum and the 1 MW allowed for broadcast television.

above -15 dBm.[119] Similarly, V-Comm submitted an analysis of Channel 51 antenna patterns and power levels showing that the power levels exceeded -13 dBm in only 2 out of 24 studied stations.[120] V-Comm also submitted drive test data of several Channel 51 transmitters confirming almost no points above -13 dBm.[121] Both the Qualcomm and V-Comm studies specify the power that would be measured by a receiver with a 0 dBi antenna, which means, the UE antenna loss must be applied to these numbers.

54. In this proceeding, Ericsson suggests signal levels of up to -30 dBm could be received, citing a 3GPP contribution from Nokia.[122] The Nokia contribution measured transmissions from 50 kW and 600 kW transmitters, and applied an average antenna gain of -8 dBi, based on -6 dBi for a UE in a laptop position and -10 dBi for speech position.[123] To compare this figure to the Qualcomm and V-Comm studies, we need to adjust by 2 dB for the difference between 600 kW and 1 MW, and 8 dBi for the average antenna gain impact. Taking these together, the Ericsson and Nokia television signal level would be -20 dBm for a 1 MW station before applying UE antenna gain, which is a little lower than the -15 dBm value from the Qualcomm drive tests and -13 dBm from the V-COMM analysis. Google submitted predictions based on the principles of OET-69, showing areas around television transmitters of -15 dBm to -7 dBm.[124] These are based on predictions rather than measurements, however, and are therefore less reliable. Given these submissions, we will use the median value of -15 dBm, before antenna gain is applied, and follow the Nokia approach of applying -8 dBi of antenna gain to obtain a level of -23 dBm as the highest likely television signal level in our analysis.[125] This -23 dBm value is therefore used in Table 6 in the intermodulation calculations above.

55. *UE Signal Power*. We consider an LTE signal as a typical case, both because commenters have suggested it is a likely technology to be used in this band[126] and UE power levels for LTE are similar to many other cellular technologies.[127] The maximum UE transmit power for a typical LTE device is 23 dBm.[128] However, with power control the actual transmit power is often much lower, and can be as low as -40 dBm.[129] We also consider the correlation between the television signal input

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[119] Qualcomm also shows several plots of predicted coverage for Channel 51 signals with significant areas over -20 dBm, and some area over -10 dBm, *see Qualcomm 700 Comments* at 45–53. However, these predictions are for a receiver height of 10 m, which means they are significantly stronger than the signal that would be received by a mobile with a typical antenna height of 1.5 m. *See Qualcomm 700 Comments* at 44; *V-COMM 700 Comments* at 23.

[120] *See V-COMM 700 Comments* at 11–14. The V-COMM study assumed free space loss to a mobile with no further propagation or clutter losses, which means the received power levels are likely to be lower than its study indicates.

[121] *See V-COMM 700 Comments* at 17–22.

[122] *See* Ericsson Reply, App. at A-1; Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 35.

[123] Nokia, R-100430, *TV transmission power at UE antenna port*, 3GPP RAN WG4 #54 (Feb. 2010), *available at* ftp://ftp.3gpp.org/tsg_ran/WG4_Radio/TSGR4_54/Documents/R4-100430.zip.

[124] *See* Letter from Paul Margie, Counsel for Google to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268, Att. at 2 (Modeling Overview) (filed Jan. 30, 2014) (Google Jan. 30, 2014 *Ex Parte* Letter).

[125] For comparison, Alcatel-Lucent concludes from the Nokia study that the level should be -38 to -25 dBm, lower than our calculation. *See* Alcatel-Lucent Comments at 15.

[126] *See, e.g.*, AT&T Comments, Exh. A at 6 (agreeing with the Commission's assumption that the most efficient use of the 600 MHz Band will be for FDD LTE operation).

[127] *See, e.g.*, 3GPP TS 25.101 V12.3.0 at 26–27, available at http://www.3gpp.org/ftp/Specs/archive/25_series/25.101/25101-c30.zip (last visited Apr. 23, 2014), 3GPP2 C.S0011-0 v1.0 at 4–13, available at http://www.3gpp2.org/Public_html/specs/speclist.cfm (last visited Apr. 23, 2014).

[128] *See 3GPP RF UE Standard* at 40 (Table 6.2.2-1showing every band is limited to 23 dBm except for Band 14, which is a public safety band).

[129] *See 3GPP RF UE Standard* at 63 (6.3.2.1)

power and the UE transmit power. The locations where high television power levels are observed are not typically "edge of coverage" scenarios because these high levels are usually seen in urbanized areas outdoors in unobstructed areas where signal levels in wireless networks are generally good.[130] We estimate that the likely UE signal level in an urbanized area is at least 10 dB better than the "edge of coverage" because wireless carriers are likely to assume losses of 10 dB or more for building penetration that is needed in urbanized areas.[131] When the signal is 10 dB above the minimum required signal, we expect the UE TX power to be 5 to 10 dB below the maximum power, or 13 to 18 dBm for an LTE device.[132] For our analysis, we will use a UE TX power of 18 dBm, which is reflected in Table 6 above.

56. *Attenuation of signals*. If a signal passes through the pass band of a filter, such as a UE transmission through the UE transmit filter, or a receive frequency though a receive filter, we conservatively assume no attenuation, although in fact there could be some small insertion loss.[133] If the signal is not in the pass band, but is within seven megahertz of the pass band, we assume it falls within the transition band, and conservatively treat that as no attenuation as well, although in some cases it may be significantly higher.[134] We assume other frequencies are in the stop band, with an attenuation of 25 dB, except in the cases of the UE transmit filter with a frequency in the UE receive band and the UE receive filter with a frequency in the UE transmit band, where we assume the rejection is 50 dB.[135] The 25 dB attenuation is reflected in Table 6 above, while the 50 dB value was used in the subsequent discussion of reverse intermodulation, and below in Table 7 for UE self-intermodulation.

57. *Threshold for Interference*. When considering the power spectral density that may cause interference in the UE receiver, we will use a device noise figure of 12 dB and a criterion of a 3 dB noise rise.[136] Using these figures, we determine that: (1) the thermal noise in 1 MHz is -114 dBm/MHz; and (2) the noise in the device considering the noise figure is -102 dBm/MHz. In order to create at most a 3 dB noise rise, the PSD must be -102 dBm/MHz or less. This level affects UEs that are operating at the edge of coverage where the noise floor is the determining factor in their received signal quality. However, as discussed above for the UE transmit power, the situations in which high television power levels are observed are not typically "edge of coverage" scenarios.[137] Therefore, we assume that the UE will be 10 dB better than "edge of cell" coverage and that the intermodulation products would likely have to exceed -92 dBm/MHz to cause harmful interference. This -92 dBm/MHz number is reflected in Table 6 above.

58. IP3 Points. In the above analysis we used the IP3 point for the UE LNA. We also discussed IP3 points for a UE PA and antenna switch under "additional considerations." Both Alcatel-

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[130] Maps submitted by Qualcomm and Google both show the highest TV power levels in urban areas without considering clutter or building penetrations losses. *See Qualcomm 700 Comments* at 15–17; Google Jan. 30, 2014 *Ex Parte* Letter at Att.

[131] *See e.g.* Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene H. Dortch, FCC, WT Docket No. 12-268, Att. at 9 (filed Apr. 1, 2014) (T-Mobile assumes 14 dB for residential buildings and 20 dB for commercial buildings, both significantly more than our 10 dB assumption).

[132] *See* 3GPP TS 36.213 V12.1.0 at 12 and following, available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.213/36213-c10.zip (last visited Apr. 23, 2014).

[133] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[134] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[135] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[136] *See Service Rules for Advanced Wireless Services in the 2000–2020 MHz and 2180–2200 MHz Bands*, WT Docket No. 12-70, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102, 16124–25, paras. 57–58 (2012) (*AWS-4 Report and Order*) (parameters similar to those proposed by Motorola Mobility for evaluating mobile-to-mobile interference were found to be reasonable).

[137] *See* Technical Appendix para. 55.

Lucent and Ericsson provided typical LNA IP3 points of -5 dBm.[138] We used -5 dBm in Table 6. In the *700 MHz Interoperability* proceeding, Vulcan Wireless presented data for an Avago PA with an IP3 point of +50 dBm.[139] In the Band Plan Workshop, Avago indicated a typical IP3 point for a switch would be +70 dBm.[140] These high IP3 points are to be expected, because the switch and antenna are designed to handle the PA output without introducing additional distortion. These values are used in Section II.C.1.b of the Technical Appendix (Additional Considerations) where appropriate.

2. User Equipment Self-Intermodulation

59. This Section considers the potential for harmful interference from the in-band intermodulation products. Google and Alcatel-Lucent suggest that UE self-intermodulation is an important concern in sizing the duplex gap,[141] while AT&T suggests this type of intermodulation can be mitigated and is not a concern.[142] Our analysis confirms that this type of intermodulation is a concern, and by extending Alcatel-Lucent's approach, we confirm that we can create duplex gaps that are appropriately sized so that these intermodulation products do not fall into the downlink pass band. For self-intermodulation, the third order products outside the TX signal bandwidth appear as signals directly above and below the carrier with the same bandwidth as the carrier, as shown in Figure 10.

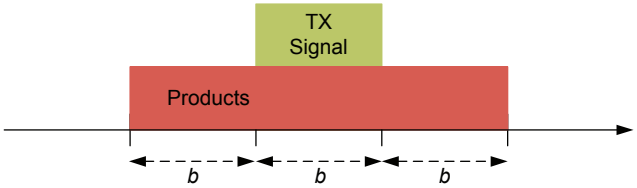

Figure 10. Self-Intermodulation Products

60. To evaluate self-intermodulation, we use a calculation similar to the one we in Section II.C.1.c of the Technical Appendix (Explanation of Inputs). First, we considered the correlation between a television signal and the UE TX signal, and concluded that when the television signal was very strong, we should assume 18 dBm for the UE signal. Here, there is no correlation to consider so we look at a UE signal of 23 dBm. This also applies to our consideration of the interference threshold, which becomes -102 dBm/MHz since it is no longer appropriate to assume the UE is not at the edge of coverage. Second, in Section II.C.1.c of the Technical Appendix (Explanation of Inputs) we considered a very narrow UE signal, 180 kHz, because that gave a conservatively high power spectral density. However, self-intermodulation of a 180 kHz signal only extends 180 kHz on each side, and is not likely to extend across a duplex gap. Here, wide UE signals should be looked at to consider how wide the duplex gap needs to be to prevent overlap, so we assume a 20 megahertz LTE carrier. Third, and finally, here, we are looking at the interference the duplexer is designed to prevent between the uplink and the downlink, so a tighter rejection of 50 dB is appropriate, as discussed in Section II.C.1.c of the Technical Appendix (Explanation of Inputs). Table 7 summarizes the inputs used with these revisions.

Input	Value
UE transmit signal strength	23 dBm
UE filter attenuation	50 dB

[138] Alcatel-Lucent Comments at 15; Ericsson Reply, App. at A-3.

[139] Letter from Michele C. Farquhar, Counsel to Vulcan, to Marlene H. Dortch, FCC, WT Docket No. 11–18, Att. at 13 (filed Nov. 30, 2011) (Vulcan Nov. 30, 2011 *Ex Parte*).

[140] William Mueller, Avago, *600 MHz Band Plan Workshop Transcript* at 68–69.

[141] *See* Google/Microsoft Comments, Att. at 4; Alcatel-Lucent Reply at 7.

[142] *See* AT&T Reply, App. A at 23.

UE interference threshold	-102 dBm/MHz
UE LNA IP3 point (input)	-5 dBm
UE PA IP3 point (output)	+45 dBm

Table 7. Inputs for Intermodulation Calculations

61. First we consider self-intermodulation at the PA, which is a common source of OOBE in mobile broadband systems. The power is calculated using:

$$P_{\mathrm{IM}} = 3P_{out} - 2\,I_{\mathrm{ip3}}$$

This yields a power of -21 dBm.[143] The intermodulation product ("IM") bandwidth is three times the occupied bandwidth, so for the widest LTE bandwidth, the 18 megahertz occupied bandwidth of a 20 megahertz carrier,[144] this yields a PSD of $-21-10\log_{10}(3\cdot 18)=-38$ dBm/MHz. This is then filtered 50 dB by the UE TX filter, so the PSD reaching the receiver is -88 dBm/MHz, 14 dB above our -102 dBm/MHz threshold of interference.

62. It is also possible that the IM will be generated in the LNA, in which case the signals are attenuated before reaching the point of intermodulation. If this occurs the input power would be -27 dBm,[145] and the power of the product is -71 dBm.[146] For the 18 megahertz bandwidth this yields a PSD of -83 dBm/MHz, which is 9 dB above our -102 dBm/MHz threshold of harmful interference.

63. Both cases create about the same power level, which is above our threshold of harmful interference. Therefore, we agree with Google, Microsoft, and Alcatel-Lucent that we should arrange the duplex gap so there is no overlap of the third harmonic self-interference of the UE transmit signal with the UE receive signal.[147]

64. To cause harmful interference with the device receiver, this product must fall on the device receive frequency. Therefore, this interference from the third order product is only possible if the separation between the edge of the receive channel and the edge of the transmit channel is less than the bandwidth of the transmit channel. The center-to-center frequency separation between the transmit and receive signals is known as the "duplex spacing." Since the uplink and downlink signals are the same bandwidth per each five megahertz block of paired spectrum, duplex spacing can also be measured lower edge to lower edge or upper edge to upper edge. This is shown in Figure 11.

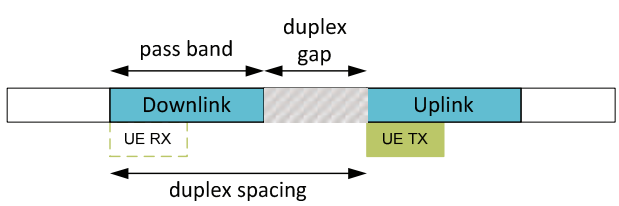

Figure 11. Relationship of duplex spacing, duplex gap, and pass band

[143] $P_{\mathrm{IM}} = 3P_{out} - 2\,I_{\mathrm{ip3}}$ = 3(23 dBm)-2(45dBm)=69-90=-21 dBm.

[144] For LTE carriers (except for a 1.4 megahertz carrier), the occupied bandwidth is 90% of the nominal bandwidth. In particular, 5, 10, 15, and 20 megahertz LTE carriers have occupied bandwidths of 4.5 megahertz, 9 megahertz, 13.5 megahertz, and 18 megahertz, respectively. *See* Alcatel-Lucent Reply at 7.

[145] Subtracting the 50 dB of attenuation from the 23 dBM power yields -27 dBm.

[146] $P_{\mathrm{IM}} = 3P_{out} - 2\,I_{\mathrm{ip3}}$ = 3(-27 dBm)-2(-5 dBm)=-81+10=-71 dBm.

[147] *See* Google/Microsoft Comments, Att. at 4; Alcatel-Lucent Reply at 7.

65. Because the receive signal bandwidth is equal to the transmit signal bandwidth, and they must be separated by the transmit signal bandwidth, the duplex spacing must be at least two times the widest transmit signal. This is illustrated in Figure 12.

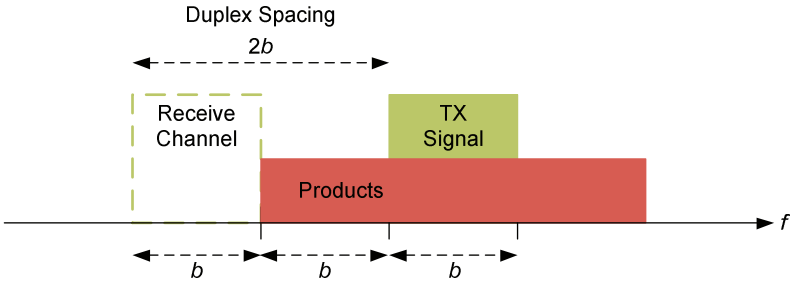

Figure 12. Duplex Spacing of 2b or More Prevents Overlap

66. The relationship of the duplex spacing to the duplex gap depends on the type of band plan and the amount of spectrum in the band plan.[148] For an FDD band with equal uplink and downlink bands, the duplex gap is equal to the duplex spacing minus the pass band size, see Figure 11 above. Google and Microsoft suggest that the duplex gap must equal the pass band size to prevent overlap of third order intermodulation products, but this assumes that the entire pass band can be used for the transmit signal.[149] As Alcatel-Lucent suggests, it is more realistic to assume that the widest transmit signal is a 20 megahertz LTE carrier, and furthermore, for LTE signals, the occupied bandwidth is 90% of the nominal carrier width, or 18 megahertz for a 20 megahertz RF carrier.[150] In addition, for an allocation of 15+15 megahertz or more, we assume that one operator is unlikely to acquire all the blocks, so the largest RF carrier would be at least five megahertz smaller than the total pass band, meaning the occupied bandwidths range from nine megahertz to 18 megahertz.[151] As Alcatel-Lucent points out, Google and Microsoft's analysis overstates the potential for third-order intermodulation interference, by assuming both more than the actual occupied bandwidth of the pass band for the transmit signal, and also that a single operator will acquire all of the five megahertz blocks. Figure 13 illustrates the duplex gap sizes needed to prevent overlap for various pass band sizes when these factors are taken into account.

[148] *See* Alcatel-Lucent Reply at 7.

[149] That is, for a 25+25 MHz FDD plan, the gap must be at least 25 MHz, for a 30+30 MHz FDD plan the gap must be at least 30 MHz, and so forth. *See* Google/Microsoft Comments, Att. at 4.

[150] *See* Alcatel-Lucent Reply at 7.

[151] *See, e.g.*, Alcatel-Lucent Reply at 7 (stating that even with a 25 megahertz pass band one operator having 20 megahertz is an unlikely case).

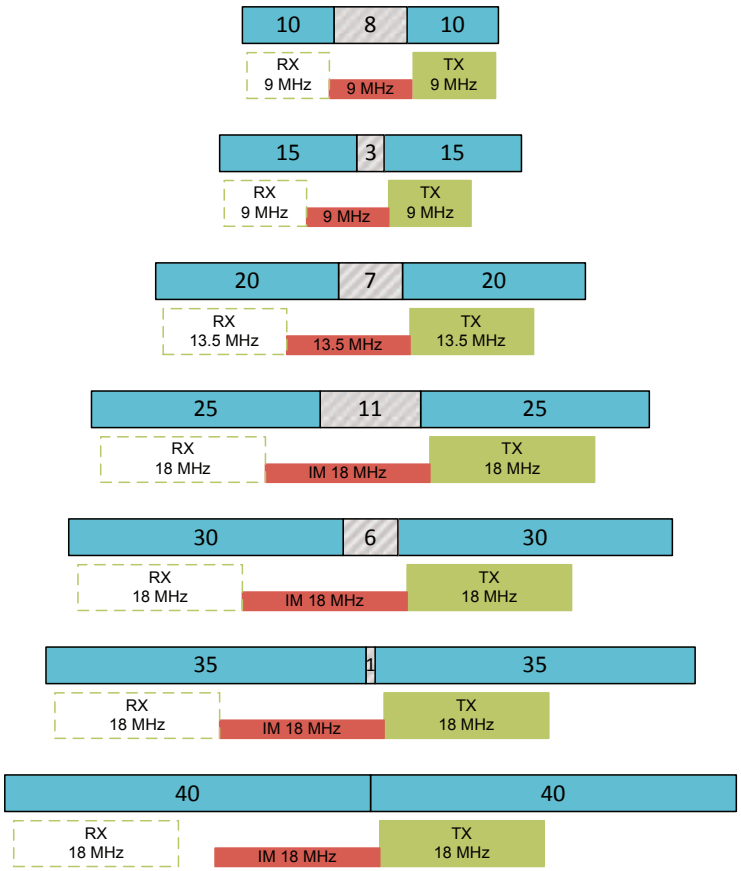

Figure 13. Minimum Duplex Gaps to Prevent Self-Intermodulation

67. These separations are summarized as follows:

Pass Band	Separation for no 3rd order overlap
10 MHz	8 MHz
15 MHz	3 MHz
20 MHz	7 MHz
25 MHz	11 MHz
30 MHz	6 MHz
35 MHz	1 MHz
40 MHz and above	0 MHz

Table 8. Separation to Prevent UE Self-Intermodulation

As discussed below in Section II.E.5 of the Technical Appendix (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)), we size the duplex gap at 11 megahertz, so in all cases there is adequate separation to prevent UE self-intermodulation.

D. Harmonic Interference

68. *Background.* Several commenters express concerns about harmonic interference from 600 MHz mobile devices to mobile devices in other bands such as the PCS band and the BRS/EBS

band.[152] Harmonics are a form of intermodulation product that are generated by self-intermodulation of a signal in a transmitter and appearing at multiples of the frequency of the desired transmit signal.[153] Most commenters focus on interference within the mobile device, which is caused by simultaneous use of certain bands via carrier aggregation.[154] In addition, other commenters argue that mobile-to-mobile interference could occur between 600 MHz devices and devices in other bands.[155] A number of commenters state that using the 643–667 MHz band for mobile uplink transmissions will result in harmonic interference.[156]

69. Not all commenters agree that the harmonics interference will result in harmful interference, however.[157] Alcatel-Lucent acknowledges that while the harmonics interference will occur, the harmonics that are generated from base station emissions are manageable.[158] Sprint argues that potential third-harmonic conflicts already exist in the U.S., and "yet we have seen little evidence of such interference problems to date."[159] T-Mobile explains that the vast majority of the time, the device transmitter will operate with far less than 23 dBm power and, as a result, produce far less desensitization into the PCS receiver.[160] As discussed below in greater detail, we agree with these commenters that any potential harmonics interference created in the 600 MHz Band can be effectively mitigated so that it does not result in harmful interference, which is corroborated by our analysis below.

70. *Mobile-to-mobile interference*. To determine if harmonic emissions are likely to cause harmful interference to devices in other bands, such as the PCS and BRS/EBS bands, we analyze the power levels involved. Because harmonics are self-intermodulation products, our calculations are similar to those in Section II.C.1.c of the Technical Appendix (Explanation of Inputs) for PA-generated self-intermodulation.[161] However, the harmonic region is far from the UE transmit and receive regions, and may not fall in a stop band of the UE TX filter, but rather in the other band. Furthermore, we must add the path loss between the two mobile devices. We assume a two-meter separation,[162] propagation

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[152] *See, e.g.*, Alcatel-Lucent Comments at 3, 13–14; AT&T Comments at 4, 19, 27, 29, Exh. A at 17–20; CTIA Comments at 26; Ericsson Reply at 31–32, App. A; Nokia Comments at 13–14; Qualcomm Comments at iii–iv, 6, 7, 13; Verizon Comments at 9–10, 14.

[153] For example, a transmitter at 700 MHz could have harmonics at 1400 MHz, 2100 MHz, 2800 MHz, and so forth.

[154] *See, e.g.*, Qualcomm Comments at iii–iv, 6, 7–13; Qualcomm Reply at 19–23. Qualcomm states that analysis "show[s] that it would be particularly challenging to support a 600 MHz uplink band that extends beyond 25 MHz in mobile devices that also support bands above 600 MHz." Qualcomm Comments at 6.

[155] *See, e.g.*, Alcatel-Lucent Comments at 3, 13–14. Alcatel-Lucent explains its assumptions: "Considering the body loss for both terminals, a new entrant's terminal transmitting, for example, at 650 MHz at 200 MWatts (23dBm) can inject -26dBm into a nearby PCS terminal's receive antenna." *Id*. at 13.

[156] Alcatel-Lucent Comments at 3, 13–14; AT&T Comments at 27, Exh. A at 17; CTIA Comments at 26; Ericsson Reply at 31–32; Nokia Comments at 13–14; Verizon Comments at 9–10, 14.

[157] Alcatel-Lucent Comments at 17; DISH Reply at 8–9; Sprint Comments at 25; T-Mobile Reply at 23–26, App. at 23–25; Letter from Trey Hanbury, Counsel for T-Mobile, to Marlene Dortch, Secretary, FCC GN Docket No. 12-268 at 7, 12, 21 (filed Apr. 17, 2013).

[158] Alcatel-Lucent Comments at 17.

[159] Sprint Comments at 25.

[160] T-Mobile Reply at 24.

[161] *See* Technical Appendix § II.C.2 (User Equipment Self-Intermodulation).

[162] *See AWS-4 Report and Order*, 27 FCC Rcd at 16124–25, paras. 57–58 (parameters similar to those proposed by Motorola Mobility for evaluating mobile-to-mobile interference were found to be reasonable).

centered at 665 MHz,[163] and, consistent with our approach above in determining television signal levels, -8 dBi of antenna gain on each mobile.[164] This leads to a total coupling loss of 51 dB between the mobiles.[165] Table 9 summarizes the inputs used with these revisions.

Input	Value
UE transmit signal strength	23 dBm
UE filter attenuation	25 dB
UE-to-UE coupling loss	51 dB
UE interference threshold	-102 dBm/MHz
UE PA IP3 point (output)	+45 dBm

Table 9. Inputs for Intermodulation Calculations

71. The harmonic power for the third harmonic is calculated using:

$$P_{\mathrm{IM}} = 3P_{out} - 2\,I_{\mathrm{ip3}}$$

This yields a power of -21 dBm.[166] The harmonic bandwidth is three times the desired signal bandwidth. Considering a five megahertz LTE carrier with an occupied bandwidth of 4.5 megahertz,[167] the PSD is $-21-10\log_{10}(3\cdot 4.5)= -32$ dBm/MHz. This is then filtered at least 25 dB by the UE TX filter, so the PSD reaching the antenna is at most -57 dBm/MHz. With the 51 dB of coupling, the interference level at the victim UE's receiver is at most -108 dBm/MHz, which is 6 dB below our -102 dBm/MHz threshold for harmful interference. Accordingly, third harmonic interference will not result in harmful mobile-to-mobile interference.

72. To calculate the power of fourth and higher harmonics in this way requires IP4[168] and higher intercept points, which are not commonly specified. However, higher order harmonics grow progressively weaker.[169] As a result, these other harmonics will not cause harmful mobile-to-mobile interference since the third order harmonics will not, as determined above.

73. *Mobile self-interference*. In the case of mobile self-interference, there is no propagation loss. Therefore, removing this factor from the previous calculation we find that the PSD of -57 dBm/MHz is well above the harmful interference threshold of -102 dBm/MHz. Therefore, if the mobile self-interference is not mitigated, it would appear that there is a significant risk of harmful interference. As discussed below, it is not necessary to limit the portion of the band available for uplink because: (1) the calculations are conservative; (2) the problem only affects a mobile device actively using two bands at

[163] 665 MHz is the center of 633–698 MHz, the largest uplink band considered in Section III of the Technical Appendix (Band Plan).

[164] *See* Technical Appendix § II.C.1.c (Explanation of Inputs).

[165] The free space path loss is 38 dB, to which we add the antenna loss, obtain a total coupling of 35 + 8 + 8 = 51 dB.

[166] $P_{\mathrm{IM}} = 3P_{out} - 2\,I_{\mathrm{ip3}}$ = 3(23dBm)-2(45dBm)=69-90= -21 dBm.

[167] A narrower carrier would yield a harmonic with a higher PSD, but also a very narrow harmonic which would be much less likely to land on a frequency actually being used by the victim mobile. Given this tradeoff between PSD and probability, we chose a middle value of a five megahertz carrier, rather than the extreme cases of a 180 kHz resource block and a 20 megahertz carrier we used in Section II.C of the Technical Appendix (Intermodulation Interference).

[168] The IP4 point is similar to the IP3, but used for the calculation of fourth order products. *See* Technical Appendix n.89.

[169] Qualcomm Comments at 10 n.15.

once; and (3) mobile self-interference has not prevented spectrum from being put to productive use where it occurs.

74. First, these calculations are conservative in several ways, including assuming time and frequency alignment of the use of the two bands in the device, and only 25 dB filtering of the harmonic by the TX filter. The calculations also consider a device at the edge of coverage in both bands, which, given the differing coverage of various frequencies, seems unlikely. For example, a device at the edge of BRS/EBS or PCS coverage would be well covered by the 600 MHz Band signal, and therefore transmitting well below maximum power, which in turn greatly reduces the strength of the harmonic.[170] These factors indicate that mobile self-interference can be mitigated by a variety of methods such as notch filtering of the harmonic or power control of the lower band in carrier aggregation operation.[171] Further, at our Band Plan Workshop, participants generally agreed that harmonic interference was a relatively minor problem.[172]

75. Second, the mobile self-interference problem only affects a mobile device actively using two bands at once, such as a carrier aggregation scenario in LTE. Not all bidders will plan to use carrier aggregation in the particular band combinations that are affected. In particular, given the Down from 51 band plan, mobile uplink will be in the upper part of the band where the harmonic concerns are with the PCS and BRS/EBS bands.[173] Therefore, carriers may not be able to aggregate certain 600 MHz blocks with these bands, but these blocks will still be usable if the carrier either does not aggregate them (as in current LTE networks), or aggregates them with other bands, such as AWS-1. Given that there are a variety of scenarios in which a paired block can be put to use by any operator, we decline to restrict offering these 600 MHz blocks because they cannot be aggregated under the particular scenario described above.

76. Third, we note that Bands 12 and 17 have harmonics that can fall in AWS-1, and Band 13 has harmonics that can fall in the GPS band. As many commenters have pointed out, these have presented technical challenges to the implementation of these bands,[174] however, these bands are being put to productive use and do not seem to have lost significant utility due to these challenges.

77. *Conclusion*. The risk of mobile-to-mobile harmful interference through harmonic interference is minimal. Although we recognize that harmful interference within a device could occur in a carrier aggregation scenario, we agree with commenters who suggest that this potential can be mitigated

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[170] This problem only occurs in carrier aggregation, in which case we expect both bands are transmitted from the same operator on the same tower.

[171] *See* Sprint *Band Plan PN* Comments at 15 ("Through standard Commission rulemaking (including reasonable out-of-band emissions limits) and modest industry resolve, such harmonic effects can easily be solved—particularly in the case of crucial low-band spectrum, which readily invites practical, technical solutions."); T-Mobile Reply at 24 ("While devices that incorporate both the interfering and victim frequencies could experience harmful interference under high-power conditions, operators have several techniques to prevent harmonic interference from ever occurring. These simple, cost-effective interference-avoidance techniques include improved filtering, careful block selection, and spectrum exchanges.").

[172] David Steer, BlackBerry, *600 MHz Band Plan Workshop Transcript* at 73; Richard Engelman, Sprint, *600 MHz Band Plan Workshop Transcript* at 75–76; Sanyogita Shamsunder, Verizon, *600 MHz Band Plan Workshop Transcript* at 78–79.

[173] *See, e.g.*, AT&T Reply Comments at 14.

[174] Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 69–70; Sumit Verma, Qualcomm, *600 MHz Band Plan Workshop Transcript* at 71 ("17+4" refers to the lower 700 band and AWS-1 being used simultaneously); Sanyogita Shamsunder, Verizon, *600 MHz Band Plan Workshop Transcript* at 79 (the second harmonic problem" and "GNSS" refer to the Upper 700 Band and GPS).

in various ways, and or technical analysis corroborates this approach.[175] As a result, as discussed in the Order, the potential cost of harmonics interference does not outweigh the benefit of maximizing paired spectrum, which is valued by wireless carriers.[176]

E. Effect of Frequency Separation on Inter- and Intra-service Interference (Guard Bands)

78. In this Section, we consider the impact of frequency separation on the likelihood of harmful interference between the new 600 MHz wireless broadband service and three incumbent services in the 600 MHz Band: television, Wireless Medical Telemetry Service ("WMTS"), and the Radio Astronomy Service ("RAS"). We chose reasonable technical parameters for our analysis, allowing us to prevent the likelihood of harmful interference while promoting the efficient use of spectrum. We reject the suggestion of Google and Microsoft that we must use "worst-case" assumptions because we will not know the actual band plan before the auction and the claimed "dearth" of studies on DTV-LTE interference scenarios.[177] Although we will not know the actual band plan until the auction concludes, we provide specific band plan scenarios below, and consider the appropriate guard band for each.[178] Furthermore, throughout this appendix we consider the known parameters of DTV and LTE as well as analysis submitted in the 700 MHz interoperability proceeding concerning DTV and LTE interference scenarios.[179] This analysis corroborates our conclusion that the guard bands in our 600 MHz Band Plan are technically reasonable to protect against harmful interference. As described below in Section III of the Technical Appendix (Band Plan), we have tailored the guard band between television and 600 MHz services to the technical properties of the 600 MHz Band under each spectrum recovery scenario.

1. Potential for Interference between Television and 600 MHz Services

79. *Background*. In the *NPRM*, the Commission proposed establishing guard bands between wireless broadband service and broadcast television operations to prevent inter-service interference.[180] As discussed in the Order, under our 600 MHz Band Plan, depending upon the amount of spectrum that is repurposed, television and the 600 MHz downlink band may be adjacent to each other.[181] If this occurs, there are two interference cases that we need to protect against. Specifically, we need to protect against a television transmitter interfering with a mobile broadband UE receiver, and a mobile broadband UE transmitter interfering with a television receiver.

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[175] *See* Sprint Reply at 18 ("With little additional low-band spectrum available, neither industry nor the Commission should preclude spectrally efficient, pro-competitive solutions simply because of harmonic issues that invite practical, technical solutions.").

[176] *See* § III.A.2.f.iv (Harmonic Interference) *see also* AT&T Comments at 18–19, Exh. A at 26; CCA Comments at 13; CEA Comments at 20; C Spire Comments at 6–7; Ericsson Reply at 17; Google/Microsoft Comments at 32–34; Leap Comments at 5–6; MetroPCS Comments at 21; Mobile Future Reply at 5; Motorola Comments at 10; RIM Comments at 8; US Cellular Reply at 17–19; Verizon Comments at 6.

[177] *See* Google/Microsoft Comments at 40.

[178] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

[179] *See e.g.* Technical Appendix §§ II.C.1.c (Explanation of Inputs), II.E.1 (Potential for Interference between Television and 600 MHz Services).

[180] *NPRM*, 27 FCC Rcd at 12412, para. 152.

[181] *See* § III.A.2.a (All-Paired, Down From 51 Band Plan)

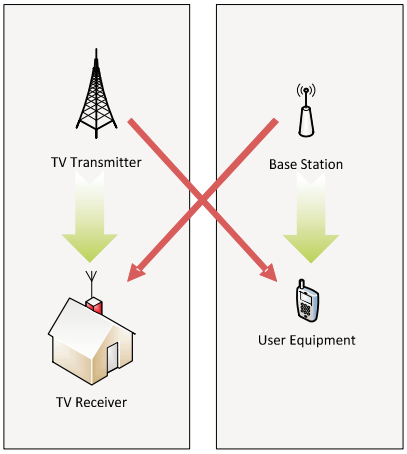

Figure 14. Interference Cases

80. Commenters assert that a guard band is needed for these interference cases.[182] They do not agree on the appropriate guard band size, arguing for sizes ranging from six megahertz to more than 12 megahertz.[183]

81. *Discussion*. Based on our review of the record, any allocated guard bands between the 600 MHz downlink and television will be at least seven megahertz; an 11 megahertz guard band will provide additional rejection in the television to downlink case, and in our judgment, is technically reasonable to protect against harmful interference between the 600 MHz downlink and television. In addition, an 11 megahertz guard band between the 600 MHz downlink and television allows for a large filter transition, which will simplify filter manufacturing.[184] These determinations are corroborated by our analysis below.

82. FDR Methodology. To calculate the amount of separation that is technically reasonable to prevent harmful interference between different licensed services outside the guard bands, we used frequency dependent rejection ("FDR") methodology. FDR is a methodology used by NTIA and other federal agencies to calculate the amount of attenuation offered by a receiver to a transmitted signal, especially between systems with disparate transmission bandwidth, out-of-band emissions, or receiver characteristics.[185] This methodology measures the extent to which frequency separation reduces the

[182] *See, e.g.*, CTIA Reply at 23–24; Ericsson Reply at 17; Google/Microsoft Comments at 39–42; Motorola Comments at 12–13.

[183] *Compare* xG Comments at 3 (xG supports "6 MHz guard bands between television operations . . . and 600 MHz downlink operations.") *with* PISC Reply at 11 (the "guard band below the auctioned downlink band . . . need[s] to be 10 to 12 MHz or more to avoid interference among licensed users."). In addition, we note that a number of commenters argued for a variety of guard bands, but in some cases provided no data to support their proposals. *See, e.g.*, Google Jan. 30, 2014 *Ex Parte* Letter at Att.

[184] *See* Technical Appendix § II.A (Mobile Filter Considerations).

[185] *See, e.g.*, Communications Receiver Performance Degradation Handbook, http://www.ntia.doc.gov/files/ntia/publications/jsc-cr-10-004final.pdf at 28–31(last visited Apr. 17, 2014); NTIA Technical Memo TM-09-461 (http://www.its.bldrdoc.gov/publications/2498.aspx) at 5–8, 5–9 (last visited Apr. 17, 2014); Frequency Dependent Rejection (FDR) Overview, http://ntiacsd.ntia.doc.gov/msam/FDR/FDRoverview.htm (last visited Apr. 17, 2014). In the *Inter-service Interference PN*, OET employed this methodology to determine harmful interference between television and wireless operations with respect to frequency separation. *Inter-service Interference PN*, 29 FCC Rcd at 731 (noting the FCC's use of NTIA's Microcomputer Spectrum Analysis Models (MSAM) FDR computer program to calculate off-frequency rejection (dB) as a function of frequency separation (i.e., determine harmful interference between digital television and wireless operations)).

potential for interference between a transmitter and a receiver.[186] Specifically, it compares the interference potential to a theoretical situation where all the transmitter power falls directly on the receiver's desired channel. For example, if a transmitted signal reaches a receiver at a power of -40 dBm, and the FDR is 50 dB, this means the interference is equivalent to -90 dBm in the receiver's channel. While FDR is generally lowest for no frequency separation, it is not necessarily zero in that case.[187]

83. The FDR value can also be viewed as a kind of net attenuation of transmitted signal at the receiver, as a function of the frequency separation between the receiver and transmitter. This attenuation takes into account the out-of-band transmissions of the transmitter, the receiver's rejection or blocking performance, the different bandwidths of the transmitter and receiver, and the amount of overlap between the transmitted signal and the receiver. It can be seen as the additional loss added to the typical signal propagation loss between the perfectly tuned transmitter and receiver. The mathematical formula for FDR[188] is:

$$FDR(\Delta f) = 10log_{10}\left[\frac{\int_{-\infty}^{+\infty} S(f)\,df}{\int_{-\infty}^{+\infty} S(f)R(f+\Delta f)df}\right]$$

where S(f) is the transmitted power spectral density, R(f) is the receiver selectivity tuned to the transmitter center frequency, and Δf is the center-to-center frequency separation between the transmitter and receiver. That is, Δf=0 means the signals have the same center frequency. If a six megahertz television channel and a five megahertz LTE channel are directly adjacent, Δf=5.5 MHz, and if there is a seven megahertz edge-to-edge guard band between them Δf=12.5 MHz. We utilized trapezoidal numerical integration to evaluate the integrals in this FDR equation using a frequency increment of 100 kHz.

84. Curves Used. To calculate the FDR, we need curves for the transmitter spectral density and the receiver frequency selectivity. In general, we follow the relevant assumptions laid out in the *Inter-Service Interference PN*,[189] which several commenters support.[190] Ericsson suggests these parameters should be used for analyzing guard bands as well as inter-service interference.[191] The National Association of Broadcasters, however, suggests that the LTE parameters should be replaced by the highest power allowed by our adopted rules.[192] We decline to adopt NAB's approach. In analyzing the

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[186] Specifically, the FDR methodology compares the interference potential to a theoretical situation where all the transmitter power falls directly on the receiver's desired channel. For example, if a transmitted signal reaches a receiver at a power of -40 dBm, and the FDR is 50 dB, this means the interference is equivalent to -90 dBm in the receiver's channel. While FDR is generally lowest for no frequency separation, it is not necessarily zero in that case. The FDR value can also be viewed as the amount of transmitted signal attenuation at the receiver, which depends on the frequency offset (separation) between the receiver and transmitter due to the receiver detuning and different receiver and transmitter bandwidth overlaps.

[187] Consider a six megahertz interfering signal and three megahertz receive channel. If the center frequencies are aligned, ignoring OOBE and blocking considerations, we expect an FDR of 3 dB, as only half the transmitter's power falls in the receiver channel. (Recall that 3 dB is a factor of two.) FDR calculations do take into account the transmitter OOBE and receiver blocking as well as the channel bandwidths and in-channel power, providing one number that accounts for both OOBE and blocking (or overload) interference.

[188] FDR Program, http://ntiacsd.ntia.doc.gov/msam/FDR/FDR_PROGRAM.doc at 1–2 (last visited Apr. 17, 2014).

[189] *See e.g.*, *Inter-service Interference PN*, 29 FCC Rcd at 730–34.

[190] *See, e.g.*, CTIA *Inter-service Interference PN* Comments at 7, Sprint *Inter-service Interference PN* Comments at 4–5.

[191] Ericsson *Inter-service Interference PN* Comments at 2.

[192] NAB *Inter-service Interference PN* Comments at 13.

impact of frequency separation on the likelihood of interference, the values we choose here will prevent the likelihood of harmful interference while promoting spectrum efficiency.

85. For the television transmitter, we use the mask set out in our rules and the maximum allowed EIRP.[193] AT&T and Intel suggest that we could reduce the potential for harmful interference by choosing to repack only transmitters at or below 50 kW adjacent to the guard band.[194] However, Google argues that to do so would "restrict the Commission's flexibility when repacking remaining broadcasters in each market in a manner that ensures optimal use of remaining television band spectrum."[195] We decline to consider this due to the increase in repacking complexity. For the television receiver, we use the adjacent-channel rejection provided by the ATSC Recommended Practice on receiver performance.[196] For the mobile broadband BS transmitter, we use an EIRP of 63 dBm and the OOBE mask we adopt in this Order, which is $43+10\log_{10}(P)$ measured in 100 kHz, or -13 dBm / 100 kHz, outside of the transmit channel.[197] For the mobile broadband receivers, we use the 3GPP standards for LTE UE receivers, assuming LTE performance will be representative of mobile broadband technologies deployed at 600 MHz.[198] The curves we use are shown in Figures 15 and 16. As an example, these curves are shown with an edge-to-edge offset of seven megahertz. However, all offsets are considered in calculating the FDR curves.

[193] 47 C.F.R. § 73.622(h).

[194] AT&T Comments at 22, Exh. A at 26–27; Intel Reply at 19–20.

[195] Google Reply at 6.

[196] *See* ATSC Recommended Practice A/74: Receiver Performance Guidelines, section 5.4.2, Adjacent Channel Rejection, 7 Apr. 2010, available at http://www.atsc.org/cms/standards/a_74-2010.pdf (last visited May 1, 2014).

[197] The EIRP, as in the *Inter-service Interference PN*, is based on a 2x40 watt PA (49 dBm), 15 dBi of antenna gain, and 1 dB of line loss in a 10 megahertz RF carrier. *Inter-service Interference PN*, 29 FCC Rcd at 733. (These values are expressed as ERPs in the *Inter-service Interference PN* while here they are expressed as EIRPs in the Order and Technical Appendix. *See e.g.* http://www.alcatel-lucent.com/products/multi-carrier-remote-radio-head (last visited Apr. 30, 2014). *See also* Letter from Steve B. Sharkey, Chief, Engineering and Technology Policy for T-Mobile USA, Inc. to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed May 7, 2014). The adopted OOBE level is discussed in Section VI.B.1.a (Out-of-Band Emission Limits).

[198] 3GPP TS 36.104 V12.3.0 (*3GPP RF BS Standard*) at 79 (7.5.1), 81 (7.6.1.1) available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.104/36104-c30.zip (last visited Apr. 24, 2014). *3GPP RF UE Standard* at 117 (7.5.1), 120 (7.6.1.1).

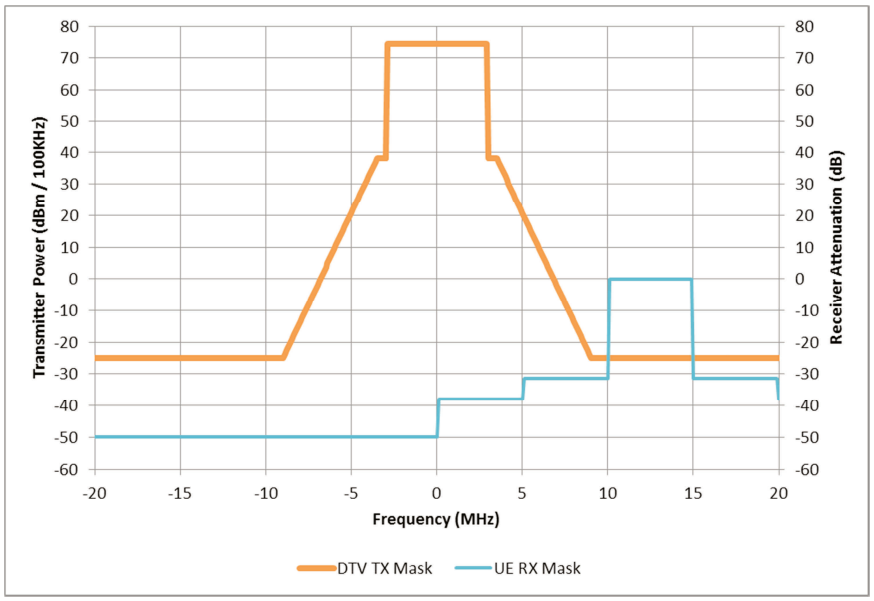

Figure 15. Television Transmitter into Mobile Device Receiver

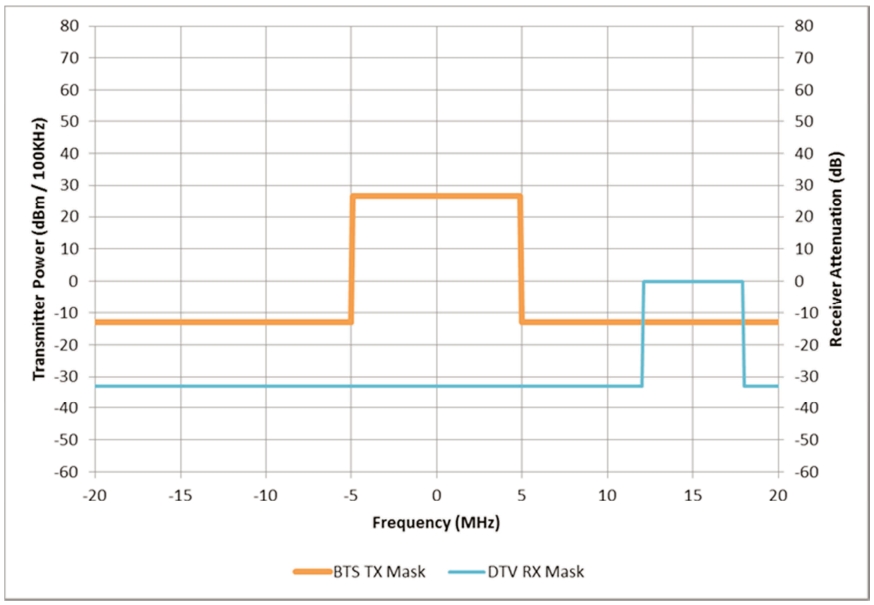

Figure 16. Base Station Transmitter into Television Receiver

86. FDR calculations. The resulting FDR curves for 600 MHz downlink and television are shown in Figure 17. This chart shows the edge-to-edge separation, rather than the center-to-center separation. As shown in Figure 17, when the edge-to-edge separation is negative, the television signal overlaps the LTE channel and the rejection is minimal for both television to LTE and LTE to television cases. Once there is no overlap, with an edge-to-edge separation, or guard band, of zero, the rejection climbs to 32 dB for the LTE UE and 33 dB for the television receiver. The television rejection stays constant with increasing separation, while the UE continues to improve up to 38 dB at five megahertz and to 50 dB at 10 megahertz.

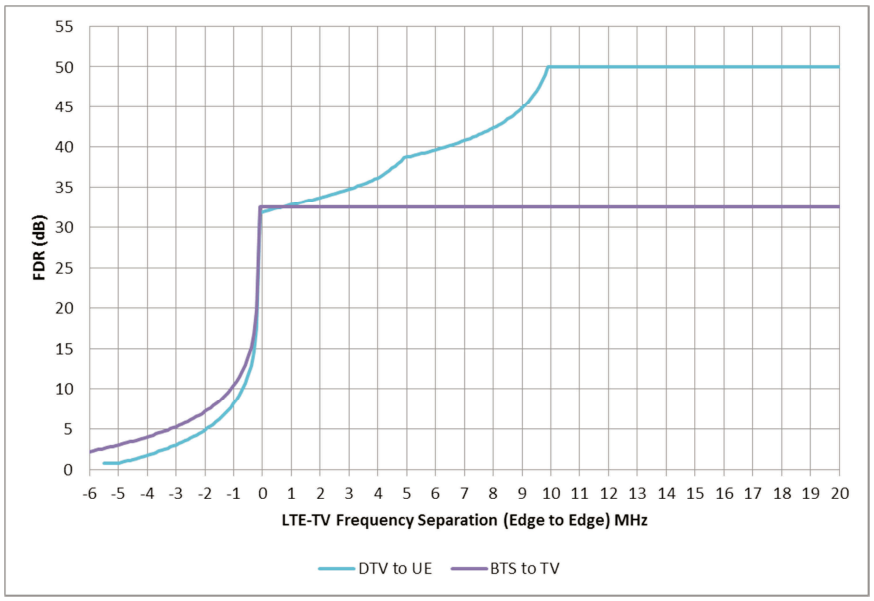

Figure 17. Television and 600 MHz Downlink FDR

87. Wireless broadband filters. The FDR calculations are based on using in-band requirements for the LTE system: the $43+10\log_{10}(P)$ requirement must be met inside the band (outside the operating channel), and the 3GPP blocking requirements used are in-band blocking requirements. In this case, where we are considering guard bands between services, the television service will be outside the band, and the transmit and receive filters of the LTE system provide additional rejection.[199] To take this into account, we consider two assumptions, the minimum reasonable transition bandwidth of seven megahertz, and the 11 megahertz which is achievable by all filter technologies and vendors. Assuming that both transmit and receive filters will provide 25 dB to any signals at least seven megahertz outside the band leads to the FDR results shown in Figure 18.[200]

[199] This is different from the situation considered in the *Inter-service Interference PN*, where the television station may be within the nationwide band plan, and so not necessarily outside the LTE filter pass bands. Therefore these FDR values are somewhat different from the OFR values in the *Inter-service Interference PN*. *Inter-service Interference PN*, 29 FCC Rcd at 731–732.

[200] *See* Technical Appendix § II.A (Mobile Filter Considerations). We apply these numbers to the LTE BS, although in fact it should have much better performance than that afforded by mobile SAW and BAW filters.

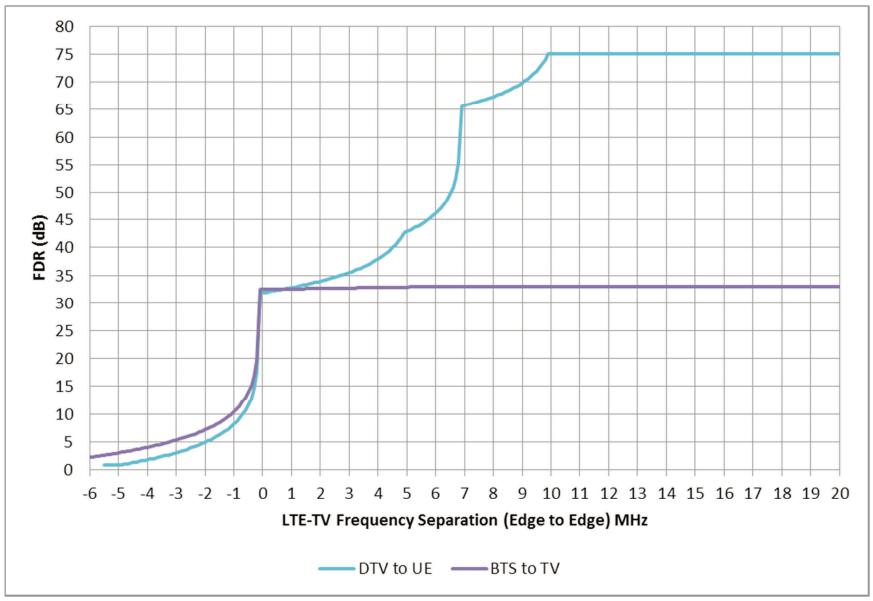

Figure 18. Television and 600 MHz Downlink FDR with Seven megahertz Transition Band

88. As shown above, UE rejection at seven megahertz is 65 dB, significantly higher than the values at five megahertz and below. It continues to improve to 75 dB at 10 megahertz, after which there is little additional improvement.[201] The television rejection is constant at 33 dB as long as there is no channel overlap. Figure 19 shows the results with a transition band of 11 megahertz.

[201] As discussed below, however, creating a guard band of 11 megahertz allows for a wider variety of filters to be used. *But see* Verizon Reply at 4 ("Guard bands . . . that are larger than 10 MHz . . . would be technically unnecessary and unreasonable from an engineering standpoint.").

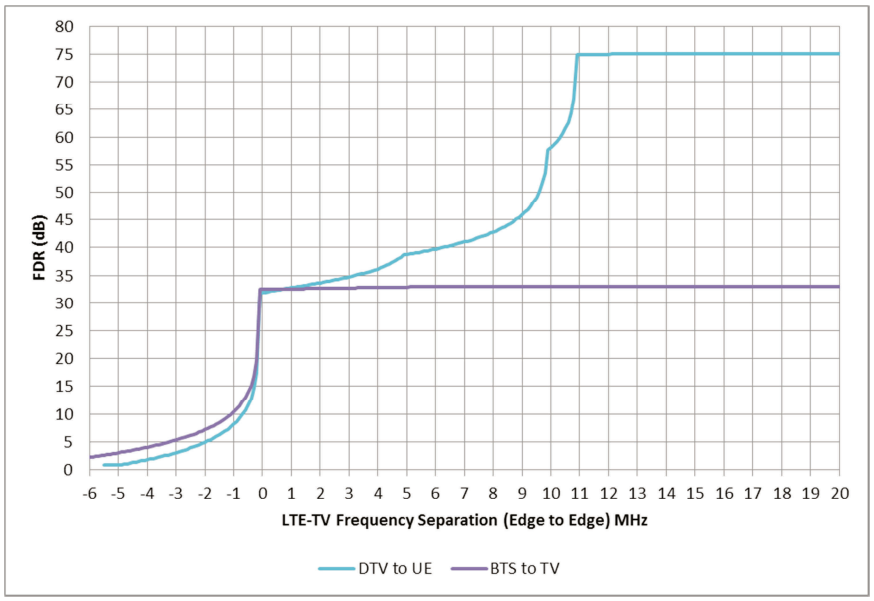

Figure 19. Television and 600 MHz Downlink FDR with 11 megahertz Transition Band

89. In this case, UE rejection at 10 megahertz is 58 dB, and improves to 75 dB at 11 megahertz, after which there is little additional improvement.[202] The television rejection is still nearly constant at 33 dB as long as there is some guard band.

90. Google argues that based on the TV signal strength experienced by the mobile, the TV to LTE downlink frequency separation should range from seven megahertz (for -27 dBm) to 12 megahertz (for -7 dBm), and then shows plots of TV signal strength with some areas of over -11 dBm, corresponding to 11 megahertz.[203] As discussed above, we consider a signal strength of over -23 dBm very unlikely, which using Google's table would require no more than eight megahertz of guard band.[204] In addition, Google provides no support for its table converting TV signal strength to guard band size, so we do not rely on it. Google and Microsoft also argue that guard bands of 6 to 12 megahertz allow significant reverse intermodulation interference to LTE,[205] but as discussed above we find no significant potential for reverse intermodulation interference.[206] Finally, Google and Microsoft argue that a Kansas University study shows that LTE levels of -34 dBm in a channel adjacent to DTV and -23 dBm in a second adjacent channel may cause interference to DTV receivers. The first adjacent channel does not occur in our proposal since our guard band is always more than six megahertz. Although Google states that the Kansas University study shows that DTV receivers are actually more susceptible to second adjacent interference, our television rules do not currently protect against second adjacent interference, and we have not seen any evidence of widespread problems resulting from this type of interference. Therefore we decline to consider this factor in setting the appropriate guard band size.

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[202] As discussed below, however, creating an 11 megahertz guard band allows for a wider variety of filters to be used. *But see* Verizon Reply at 4 ("Guard bands . . . that are larger than 10 MHz . . . would be technically unnecessary and unreasonable from an engineering standpoint.").

[203] *See* Google Jan. 30, 2014 *Ex Parte* Letter, Att. at 2 (Modeling Overview).

[204] *See* Technical Appendix § C.1.c (Explanation of Inputs); Google Jan. 30, 2014 *Ex Parte* Letter, Att. at 2 (Modeling Overview).

[205] *See* Google/Microsoft Comments, Att. at 5.

[206] *See* Technical Appendix § II.C.1.b (Additional Considerations).

91. Several commenters state that the 3GPP blocking specification of -44 dBm at 10 megahertz from a five megahertz LTE carrier implies that the guard band must be at least 10 megahertz.[207] For example, Alcatel-Lucent compares this to the likely TV power from the Nokia study, concludes that additional filter attenuation is needed, and suggests that at least 10 megahertz is need to achieve the filter attenuation.[208] The calculations of RIM and Intel are similar.[209] As mentioned above, in this Appendix we determine that a likely TV power at the UE is -23 dBm, so 21 dB of attenuation would be needed using this approach.[210] However, our analysis of mobile filters corroborates our conclusion that it is reasonable to expect 25 dB isolation or more at seven megahertz of separation, so a seven megahertz guard band is in fact adequate, although we also recognize that creating an 11 megahertz guard band allows for a wider variety of filters to be used. The FDR analysis above uses the 3GPP specification and our filter assumptions and the conclusion is consistent that the guard band should be at least seven megahertz, although larger guard bands offer some additional protection up to 11 megahertz. Taken with our filter analysis, this corroborates our decision that the guard band between television and 600 MHz services should be at least seven megahertz and no larger than 11 megahertz.

92. Nokia describes an Asia-Pacific study that suggested that a 5 to 6 megahertz guard band addresses some but not all interference cases studied, while a nine megahertz guard band improves but does not solve the interference cases, and makes several recommendations including improving LTE UE RX filters.[211] Nokia does not draw specific conclusions from this, and notes that it relies more heavily on the DVB-T standard than the ATSC standard used in the U.S. Google also mentions European and Asian-Pacific studies.[212] We consider our FDR analysis more relevant, as it is based on U.S. TV bandwidths and rules, rather than other standards. DISH and CCIA suggest that six megahertz is an adequate guard band, with DISH point out that six megahertz separation between Channel 51 and Band 17 has resulted in usable LTE spectrum.[213]

93. We consider all these factors in the assignment of specific guard bands in specific band plans below, assigning guard bands between seven and 11 megahertz in all cases.[214]

2. Potential for Interference between 600 MHz Downlink and WMTS

94. The decision in the Report and Order provides a three megahertz guard band between channel 37 and adjacent wireless broadband downlink stations to avoid harmful interference between new wireless base stations and WMTS stations. Below, we explain the methodology used to make this determination.

95. As an initial matter, we only consider the potential of adjacent channel interference — from OOBE and overload interference —because the new wireless base stations will not operate co-channel to any WMTS station. We consider the transmit characteristics of LTE wireless broadband base stations operating under differing conditions: (1) consistent with our treatment of base stations in the *Inter-Service Interference PN*;[215] (2) as adopted in the Order; and (3) as provided in the 3GPP standard.[216]

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[207] Alcatel-Lucent Comments at 15; RIM Comments at 11; Intel Comments at 18.

[208] Alcatel-Lucent Comments at 15.

[209] Rim Comments at 11; Intel Comments at 18.

[210] *See* Technical Appendix § II.C.1.c (Explanation of Inputs).

[211] Nokia Comments at 18–19.

[212] Google Comments at 40–41.

[213] CCIA Comments at 2; DISH Reply at 4.

[214] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

[215] *See* Technical Appendix n. 197.

We also use the receiver characteristics of WMTS stations and their protection criteria as provided by GEHC.[217]

96. Specifically, the *Inter-service Interference PN* considered transmit power of 2000 W/10 MHz or 200 W/MHz. The rules adopted in the Order specify that a 600 MHz band wireless broadband base station can operate with a maximum power of 1000 W/MHz ERP.[218] In addition, Section 27.53 of our rules specify that emissions outside of a licensee's band of operation be attenuated to at least -13 dBm (*i.e.,* emissions are reduced by at least 43 + 10 $\log_{10}$(P) dB). We also observe that the 3GPP standard provides an LTE spectrum emission mask that ranges from -7dBm/100 kHz at the channel edge to -14 dBm/100 kHz at 5 megahertz away from that edge.[219] We expect emissions from actual devices to decrease consistent with the roll-off specified in the 3GPP standard. Thus, we can provide analysis based on the typical power levels transmitted by wireless base stations[220] and a worst case analysis based on the use of the maximum allowable power under the rules. In both cases, we also conduct a worst case analysis based on the assumption of no reduction in out-of-band energy beyond the specified -13 dBm and a more realistic analysis where the out-of-band energy decreases with increasing frequency separation from the band edge.[221] By analyzing the potential for interference to WMTS from base stations operating at 200 W/MHz EIRP, we show that these stations are protected under the deployment scenarios carriers employ today. However, because of the nature of the applications provided by WMTS, we also conducted the analysis with respect to the maximum power allowed under the rules so that we ensure WMTS is still protected if there is an instance where a carrier deploys a higher powered base station.

97. GEHC specifies protection criteria that limiting the field strength as measured at the perimeter of a health care facility at the edge of channel 37 to 20mV/m/MHz would protect WMTS from overload interference. Similarly, limiting the field strength to 10µV/m/100 kHz would provide WMTS protection from out-of-band interference. GEHC also provides characteristics of a typical WMTS receiver bandpass filter designed to protect the low noise amplifier (LNA) of the receiver's front-end from overload by strong nearby signals.[222] Typically, such a filter is part of a distributed antenna system (DAS) active antenna module. The FCC transmit mask and out-of-band emissions mask, a more realistic emission mask that begins at -13 dBm/100 kHz and decreases at the same slope as the LTE 3GPP standard mask, as well as the WMTS protection criteria can be seen in Figure 20 and the WMTS bandpass filter frequency response is depicted in Figure 21.

(Continued from previous page)

[216] *See* 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) Radio Transmission and Reception (Release 10) (2013), at 32, Table 6.6.3.1-3 (3GPP Technical Standards); See § VI.B.1.b (Power Limits).

[217] GEHC Comments at 24.

[218] See § VI.B.1.b (Power Limits).

[219] *See* 3GPP Technical Standard at 32, Table 6.6.3.1-3.

[220] *See* T-Mobile *ex parte* filed May 7, 2014.

[221] We expect the emission mask for actual devices would meet or exceed our requirement that out-of-band emissions be below -13dBm/100 kHz at the channel edge. In addition, we expect that the out-of-band emissions would decrease in a manner consistent with the LTE 3GPP standard to levels less than -20 dBm/100 kHz at 5 megahertz away from the channel edge.

[222] GEHC Comments at 39 – 46. *See also*, Tai-Saw Technology Company product specification for Part No. TA0326A, 611 MHz SAW Filter available at http://www.taisaw.com/upload/product/TA0326A_Rev%204.0_.pdf.

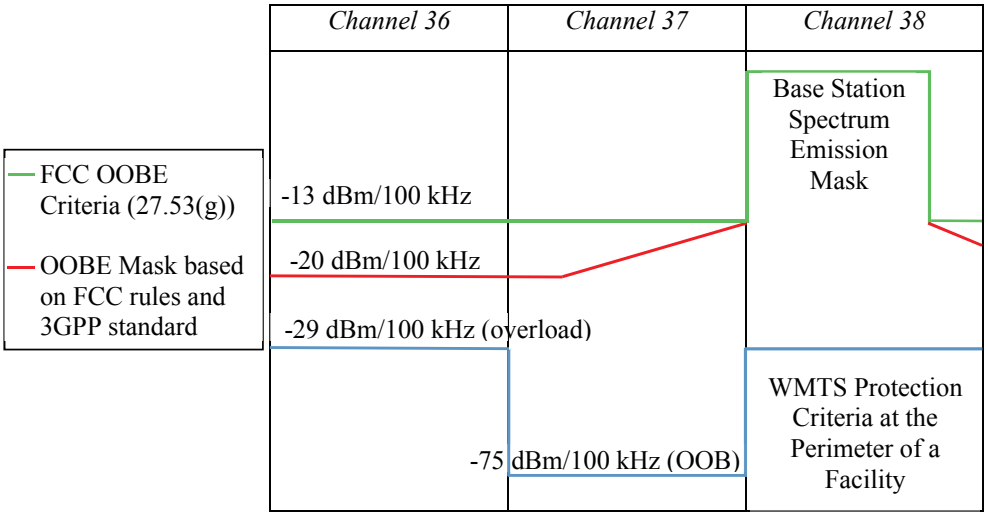

Figure 20. Base Station Spectrum Emission Masks and WMTS Protection Criteria Required at the Perimeter of a Facility

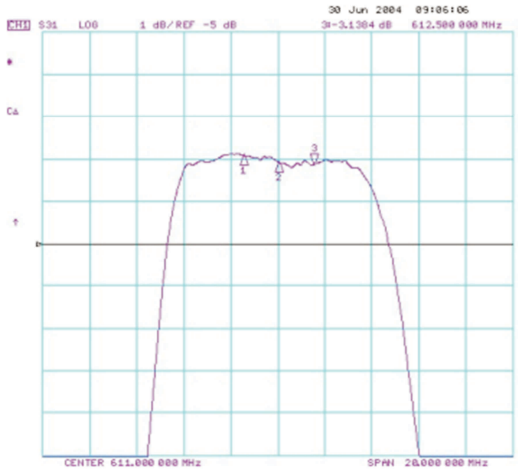

Figure 21. Typical Channel 37 SAW Band Pass Filter Frequency Response

98. For our analysis, we converted the WMTS field strength protection criteria to maximum allowable EIRP levels in dBm/100 kHz (see Figure 20) using the following formula:

$$\text{EIRP (dBm/100 kHz)} = \text{E(dB}\mu\text{V/m/100 kHz)} + 20\log_{10}(d) - 104.8$$

Assuming a standard three meter measurement distance, this formula simplifies to:

$$\text{EIRP (dBm/100 kHz)} = \text{E(dB}\mu\text{V/m/100 kHz)} - 95.3$$

The resulting EIRP limits at the perimeter of the healthcare facility to protect WMTS in channel 37 are:

-29dBm/100 kHz[223] for overload interference; and

[223] This is based on the provided protection criteria of 20mV/m/MHz = 20,000 µV/m/MHz = 2,000 µV/m/100kHz = 66 dBµV/m/100kHz.

-75dBm/100 kHz for out-of-band interference.

99. Referring back to Figure 20, we note that the power spectral density plot clearly shows that OOB and overload interference to WMTS with no guard band or distance separation is above the calculated protection limits. The separation distance necessary to protect WMTS receivers from wireless base stations can be calculated using a conservative free space propagation model (Equation 1).

$$d = \frac{c}{4\pi f}\sqrt{\frac{P}{P_r}} \quad \text{(Equation 1)}$$

where:
$P = P_t - L$ (EIRP in milliwatts)
P_t = total transmit EIRP (dBm) integrated over the 6 megahertz channel
L = excess loss (building attenuation, etc.)[224]
P_r = WMTS protection criteria (milliwatt) at the WMTS perimeter
f = frequency in Hz (611,000,000 Hz or 611 MHz)
c = speed of light ($3x10^8$ m/s)
d = separations distance (m)

100. To calculate the necessary separation distance to protect against overload interference, we consider in our analysis the rejection of the WMTS receive filter and the total power in the adjacent channel assuming a 5 megahertz full power wireless base station which results in 200 watts/megahertz for the typical case and 1000 watts/megahertz EIRP for the worst case. Various size guard bands are assumed by sliding the wireless base station power spectral density plot away from channel 37 in 1 megahertz increments. At each guard band the total average power in the adjacent channel is calculated and the separation distance necessary to protect WMTS is determined. Table 10 shows the distance needed to protect WMTS from adjacent channel interference for wireless base stations operating at typical power levels and in accordance with the Commission's out-of-band emission requirement. Table 11 shows the protection distances needed when the combined FCC and 3GPP emission masks are considered. Tables 12 and 13 similarly show the protection distances for the worst case of a base station operating at the maximum power allowed under the rules. Because overload interference is caused by the overlap of the WMTS filter into the adjacent channel (e.g., channel 38), the interference is dominated by the wireless base station in-band power which results in the same protection distances for a given transmit power regardless of emissions mask analyzed. This is shown by the identical results between Tables 10 and 11 and between Tables 12 and 13. Calculations were made using various values for additional loss ranging from the very conservative 0 dB to the 20 dB used by GEHC. The tables show that for a three megahertz guard band under both out-of-band emission conditions, the separation distance necessary to protect WMTS from overload interference is reasonably small regardless of transmitter power, even using a conservative value for additional loss. The distance is less than the distance that would be expected between the perimeter of a medical facility and a nearby wireless base station.[225]

[224] In its analysis, GEHC assumed 20 dB of excess loss due to building attenuation and other factors. GEHC Comments at 47–51.

[225] The worst case deployment scenario would entail a full power wireless base station located on a roof top across from the health care center with direct line of sight into that facility.

Frequency Offset (MHz)	Base Station Power in Adjacent Channel[226]		SAW Filter Rejection[227] (dB)	Protection Distance (m)		
	W/6 MHz	dBm/100 kHz		Additional Loss (dB)		
				0	10	20
0	1000	42.22	0.5	134.21	42.44	13.42
1	1000	42.22	1	126.71	40.07	12.67
2	800	41.25	3	90.02	28.47	9.00
3	600	40	10	34.82	11.01	3.48
4	400	38.24	14	17.94	5.67	1.79
5	200	35.23	18	8.00	2.53	0.80

Table 10. Separation Distances to Protect WMTS from Overload Interference (200 W/MHz Transmitter and Emission Mask with No Out-of-Band Roll-Off)

Frequency Offset (MHz)	Base Station Power in Adjacent Channel		SAW Filter Rejection (dB)	Protection Distance (m)		
	W/6 MHz	dBm/100 kHz		Additional Loss (dB)		
				0	10	20
0	1000	42.22	0.5	134.21	42.44	13.42
1	1000	42.22	1	126.71	40.07	12.67
2	800	41.25	3	90.02	28.47	9.00
3	600	40	10	34.82	11.01	3.48
4	400	38.24	14	17.94	5.67	1.79
5	200	35.23	18	8.00	2.53	0.80

Table 11. Separation Distances to Protect WMTS from Overload Interference (200 W/MHz Transmitter and Combined FCC/3GPP Emission Mask)

Frequency Offset (MHz)	Base Station Power in Adjacent Channel		SAW Filter Rejection (dB)	Protection Distance (m)		
	W/6 MHz	dBm/100 kHz		Additional Loss (dB)		
				0	10	20
0	5000	49.21	0.5	300.11	94.90	30.01
1	5000	49.21	1	283.32	89.59	28.33
2	4000	48.24	3	201.29	63.65	20.13
3	3000	46.99	10	77.87	24.62	7.78
4	2000	45.23	14	40.11	12.62	4.01
5	1000	42.22	18	17.89	5.66	1.79

Table 12. Separation Distances to Protect WMTS from Overload Interference (1000 W/MHz Transmitter and Emission Mask with No Out-of-Band Roll-Off)

[226] This is the total power of the base station transmitter across either channel 36 or channel 38.

[227] The filter rejection parameter is only used for overload interference calculations as there is no rejection in the filter passband to suppress transmitter out-of-band emissions.

Frequency Offset (MHz)	Base Station Power in Adjacent Channel		SAW Filter Rejection (dB)	Protection Distance (m)		
	W/6 MHz	dBm/100 kHz		Additional Loss (dB)		
				0	10	20
0	5000	49.21	0.5	300.11	94.90	30.01
1	5000	49.21	1	283.32	89.59	28.33
2	4000	48.24	3	201.29	63.65	20.13
3	3000	46.99	10	77.87	24.62	7.78
4	2000	45.23	14	40.11	12.68	4.01
5	1000	42.22	18	17.90	5.66	1.79

Table 13. Separation Distances to Protect WMTS from Overload Interference (1000 W/MHz Transmitter and Combined FCC/3GPP Emission Mask)

101. Similarly, the necessary separation distance to protect against OOB interference can be calculated. For this analysis, the average transmitter power into the passband of the WMTS receiver in channel 37 is determined by integrating the out-of-band transmitter power spectral density over the 6 MHz channel bandwidth for the various guard band sizes. Tables 14 through 17 show that for both transmit power cases and under both emission masks, a three megahertz guard band provides reasonable small separation distances to protect WMTS from OOB interference; even smaller than that needed to protect from overload interference. Thus, we conclude that a three megahertz guard band will protect WMTS devices from nearby wireless base stations.

Frequency Offset (MHz)	Base Station OOB Power into channel 37		Protection Distance (m)		
			Additional Loss (dB)		
	(mW/6 MHz)	(mW/100 kHz)	0	10	20
0	3	0.05	49.19	15.56	4.92
1	3	0.05	49.19	15.56	4.92
2	3	0.05	49.19	15.56	4.92
3	3	0.05	49.19	15.56	4.92
4	3	0.05	49.19	15.56	4.92
5	3	0.05	49.19	15.56	4.92

Table 14. Separation Distances to Protect WMTS from Out-of-Band Interference (200 W/MHz Transmitter and Emission Mask with No Out-of-Band Roll-Off)

Frequency Offset (MHz)	Base Station OOB Power into channel 37		Protection Distance (m)		
			Additional Loss (dB)		
	(mW/6 MHz)	(mW/100 kHz)	0	10	20
0	1.34	0.022	32.89	10.40	3.29
1	1.05	0.017	29.11	9.20	2.91
2	0.83	0.013	25.88	8.18	2.58
3	0.7	0.012	23.73	7.51	2.37
4	0.63	0.011	22.55	7.13	2.25
5	0.6	0.010	21.97	6.95	2.20

Table 15. Separation Distances to Protect WMTS from Out-of-Band Interference (200 W/MHz Transmitter and Combined FCC/3GPP Emission Mask)

Frequency Offset (MHz)	Base Station OOB Power into channel 37		Protection Distance (m)		
			Additional Loss (dB)		
	(mW/6 MHz)	(mW/100 kHz)	0	10	20
0	3	0.05	49.19	15.56	4.92
1	3	0.05	49.19	15.56	4.92
2	3	0.05	49.19	15.56	4.92
3	3	0.05	49.19	15.56	4.92
4	3	0.05	49.19	15.56	4.92
5	3	0.05	49.19	15.56	4.92

Table 16. Separation Distances to Protect WMTS from Out-of-Band Interference (1000 W/MHz Transmitter and Emission Mask with No Out-of-Band Roll-Off)

Frequency Offset (MHz)	Base Station OOB Power into channel 37		Protection Distance (m)		
			Additional Loss (dB)		
	(mW/6 MHz)	(mW/100 kHz)	0	10	20
0	1.34	0.022	32.89	10.40	3.29
1	1.05	0.017	29.11	9.20	2.91
2	0.83	0.013	25.88	8.18	2.58
3	0.7	0.012	23.73	7.51	2.37
4	0.63	0.011	22.55	7.13	2.25
5	0.6	0.010	21.97	6.95	2.20

Table 17. Separation Distances to Protect WMTS from Out-of-Band Interference (1000 W/MHz Transmitter and Combined FCC/3GPP Emission Mask)

102. Finally, we note that the three megahertz guard band will also provide protection under other deployment scenarios such as a 10 megahertz wide transmit channel. Based on the adopted out-of-band emission requirements and the 3GPP standard, the out-of-band characteristics are identical

regardless of whether the transmitter is 5 or 10 MHz wide.[228] Thus, the calculated separation distances will not change for such deployments.

3. Potential for Interference between 600 MHz Downlink and RAS

103. As noted in the Order, there will be a three megahertz guard band between channel 37 and adjacent wireless broadband downlink stations to avoid harmful interference between new wireless base stations and WMTS stations. Because RAS also operates in channel 37, RAS observatories will also benefit from this guard band. However, because the RAS stations are very sensitive, the Order also requires that new wireless base station installations near RAS locations to coordinate with the National Science Foundation (NSF) prior to commencing operation near RAS observatories.

104. We note that RAS observatories using channel 37 are single dish and Very Long Baseline Array (VLBA). As noted in the Order, the Commission already has existing rules currently in place that require notification to the single dish installations at Green Bank, WV and Arecibo, PR.[229] Therefore, we need only consider coordination distance criteria for those RAS stations that make up the VLBA.

105. We base our technical analysis on the RAS interference protection criteria published in ITU-R Recommendation RA.769 and both the FCC and combined FCC/3GPP OOBE limits.[230] The threshold level to protect VLBA stations from OOB interference, -149 dBm/100 kHz, is depicted in Figure 22 along with the wireless base station emission mask.

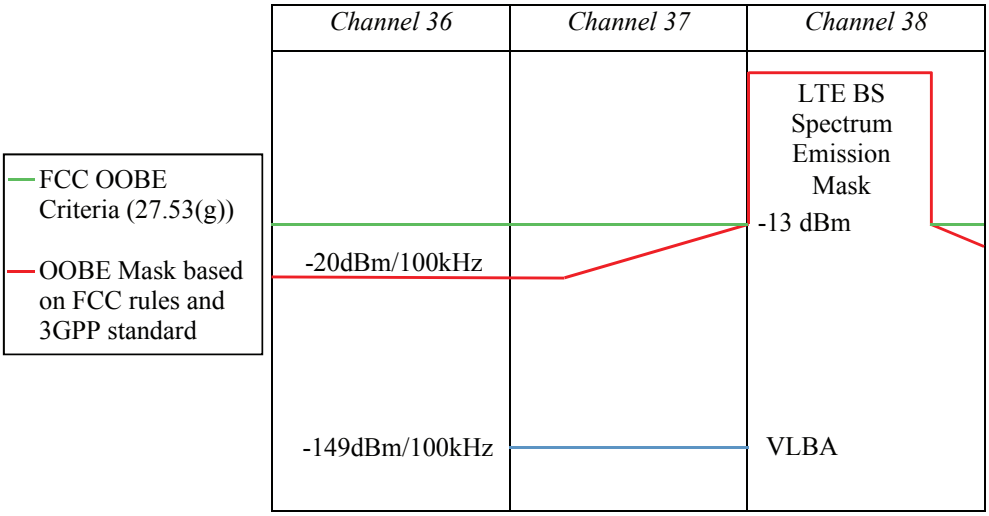

Figure 22. Wireless Base Station Spectrum Emission Mask and RAS Protection Criteria

106. We can therefore calculate the distance at which RAS facilities may be affected by new wireless base stations using a similar methodology as used in the analysis for WMTS. First, we note that NSF suggests a 35 km coordination zone around VLBA sites.[231] Using that as a basis, we can determine

[228] 3GPP Technical Standard at 32, Table 6.6.3.1-3.

[229] *See* 47 C.F.R. § 1.924.

[230] Recommendation ITU-R RA.769 ("Protecting Criteria used for radio astronomical measurements"), Section 27.53 (g) and 3GPP Technical Standard at 32, Table 6.6.3.1-3

[231] Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA to Julius Knapp, Chief, Office of Engineering and Technology, FCC, GN Docket No. 12-268 (filed May 6, 2014) forwarding comments from National Science Foundation (NSF).

the appropriate path loss exponent[232] for signals in the vicinity of RAS sites. In making this calculation, we are also mindful that these calculations are worst case as neither we nor NSF account for "discrete specific terrain shielding surrounding the observatories (such as large mountains)"[233] or any other additional losses. Thus, the path loss equation (Equation 2) with P_t = 0.05 mW/100 kHz (base station out-of-band energy from Table 14 of the WMTS analysis with no guard band) and the stated RAS protection criteria for P_r, we can solve for the path loss exponent, n. Under these conditions, n results in a value of 2.37. Therefore, we conclude that using a path loss exponent of 2.4 is appropriate for analyzing potential interference to VLBA sites. We now consider the more realistic out-of-band case where the energy rolls off at a rate comparable to that in the 3GPP standard. Referring to Table 15 of the WMTS analysis shows that the out-of-band energy into channel 37 when a three megahertz guard band is present is 0.012 mW/100 kHz. Then using Equation 2, a protection distance of 17.2 km is calculated.

$$d^n = \left(\frac{c}{4\pi f}\right)^2 \frac{P_t}{P_r} \qquad \text{(Equation 2)}$$

where:
P_t = total transmit EIRP (milliwatts) integrated over the 6 megahertz channel
P_r = RAS protection criteria (milliwatt)
f = frequency in Hz (611,000,000 Hz or 611 MHz)
c = speed of light ($3x10^8$ m/s)
d = separations distance (m)
n = path loss exponent (2.4)

107. Therefore, it is reasonable to require 600 MHz wireless licensees to conduct coordination with the NSF when deploying base stations in the 600 MHz downlink within 25 km of VLBA observatories so that the parties can take measures, if necessary, to reduce the potential for interference. In taking this action, we are providing for a zone of radius approximately 1.5 times greater than what we calculated (assuming no terrain shielding) in order to ensure that we provide ample protection to these sites. In addition, we note that we do not expect dense wireless base station deployments near VLBA sites as many are in remote areas.

4. Potential for Interference between 600 MHz Uplink and 700 MHz Uplink

108. The 600 MHz uplink band and the Lower 700 MHz A block (698 MHz to 704 MHz) are both used for terrestrial uplink services.[234] Commenters agree that because both of these bands are designed for terrestrial uplink systems, these bands are harmonized, i.e., the adjacent operations are compatible with and do not cause interference to each another, and no guard band is needed.[235] Accordingly, we do not establish a guard band between these two services.[236]

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[232] The path loss exponent describes the relationship between the average received power and distance. Under free space conditions the path loss exponent equals 2. The value under real world conditions usually varies between 2 and 4.

[233] *Id.*

[234] For example, 3GPP defines 699 MHz to 716 MHz for uplink operations in Band 12. *See 3GPP UE RF Standard* at 23 (Table 5.5-1).

[235] *See, e.g.*, Alcatel-Lucent Comments at 21 (no guard band is needed between 600 MHz uplink and lower 700 MHz uplink); CEA *Band Plan PN* Comments at 3 (the 600 MHz uplink block should be situated adjacent to the 700 MHz uplink block, eliminating any need for a guard band between those operations).

[236] The Commission has not created guard bands between harmonized wireless operations. *See* 47 C.F.R. §§ 22.905 (cellular), 24.229 (PCS), 27.5(h) (AWS). In each of these rule parts, examination of the frequencies ranges of each

(continued….)

5. Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)

109. *Background*. In the *NPRM*, the Commission sought comment on the size of the duplex gap.[237] To determine the appropriate duplex gap size, we must examine the potential for interference between the 600 MHz downlink and uplink bands. Many FDD technologies, including FD-LTE, allow simultaneous transmission and reception in the device. By virtue of being co-located within the same device with no propagation loss, the UE transmitter is perhaps the greatest interference threat to the UE receiver when they are in simultaneous use. For this reason, the FDD UE has a duplexer, which is simply a receive filter and a transmit filter designed to operate together to reduce the likelihood of this type of interference. The frequency separation between the two filters is often referred to as the duplex gap.[238] Factors that affect the impact of frequency separation on UE self-interference are the transmitter's OOBE and the capability of the UE filters.[239] Commenters do not agree about the appropriate size for the duplex gap. A number of device manufacturers and wireless carriers state that the duplex gap should be around 10 to 12 megahertz[240] while other commenters argue that a duplex gap of 20 megahertz or more is reasonable.[241]

110. *Discussion*. Based on our analysis of the record, a duplex gap of 11 megahertz is technically reasonable to prevent self-interference. This determination is corroborated by our technical findings, below.

111. OOBE. As discussed above in Section II.C.2 of the Technical Appendix (User Equipment Self-Intermodulation), the strongest OOBE will be in the areas covered by the third order self-

(Continued from previous page)
block shows that these blocks are contiguous without guard bands or other separations. *See also* Technical Appendix § II.E (Effect of Frequency Separation on Inter- and Intra-service Interference (Guard Bands)).

[237] *NPRM*, 27 FCC Rcd at 12417, para. 167.

[238] The duplex gap may also refer to all the frequencies between the two filters, and in this proceeding it has been used by commenters in several related but distinct senses, such as all frequencies between the uplink and downlink pass bands regardless of the filter arrangement. As discussed in the Order, the spectral separation to prevent interference between the uplink and downlink band in the 600 MHz Band is a guard band under the Spectrum Act. *See* § III.C.2.b (Guard Bands). To avoid confusion, we will refer to the spectrum between the uplink and downlink bands in the 600 MHz Band as a duplex gap even though it is technically a guard band.

[239] *See* Sumit Verma, Qualcomm, *600 MHz Band Plan Workshop Transcript* at 29–32.

[240] *See, e.g.*, Alcatel-Lucent Comments at 21 ("The duplex gap between wireless uplink and wireless downlink should be between 10 and 12 MHz"); AT&T Reply at 21 ("the size of the duplex gap needed to avoid such adjacent-channel interference is 10–12 megahertz"); Letter from H. Nwana, Executive Director, Dynamic Spectrum Alliance, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed May 7, 2014) ("[T]he duplex gap between uplink and downlink licensed operations must be 11 or 12 MHz at an absolute bare minimum to create one usable 6 MHz unlicensed channel and ensure that licensed devices are protected from harmful interference."); Letter from Michael Calabrese, New America Foundation, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 at 2 (filed May 6, 2014) ("The Order should find that a duplex gap of [at] least 11–12 MHz wide is technically reasonable."); Qualcomm Reply at 18 ("A duplex gap of approximately 11 to 12 MHz is the minimum needed to avoid interference between mobile downlink and uplink."); Verizon Comments at 18 ("The [duplex] gap must be at least 10 MHz (and possibly larger), depending on the overall band design."); Verizon Reply at 3–4 ("[D]uplex gaps that are larger than . . . 11 MHz . . . would be technically unnecessary and unreasonable from an engineering standpoint.").

[241] Comcast Comments at 44 ("the Commission is well within its authority to adopt the 'Down from 51' band plan proposal, designate at least a contiguous 20 MHz block as the duplex gap"); Free Press *Band Plan PN* Reply at 5 ("sound engineering suggests that a duplex gap of at least 20 megahertz would serve as a technically reasonable method of protecting against interference"); NTCA Reply at 3 ("a duplex gap of at least 20 MHz—is technically reasonable and is the best way to promote the objectives of the Spectrum Act and the public interest"); WSA Comments at 25 ("WSA recommends that a . . . duplex gap size could be 18–24 MHz").

intermodulation products.[242] Google, Microsoft, and Alcatel-Lucent suggest that the duplex gap should be wide enough so that no third order products from the transmit channel fall into the paired receive channel.[243] As discussed above, we agree that this is necessary, but disagree with Google and Microsoft's conclusion that the duplex gap must equal the pass band size (that is, over 25 megahertz for a 25+25 megahertz scenario).[244] Instead, we agree with Alcatel-Lucent's conclusion that the 25+25 megahertz scenario results in an 11 megahertz requirement, and extend the logic to other scenarios, all of which require less than 11 megahertz as summarized in Table 9.[245] Google also argues that 3GPP bands with larger gaps often have better receiver sensitivity, and therefore it is reasonable to enlarge the duplex gap to optimize receiver sensitivity.[246] However, this also increases the antenna bandwidth, and as discussed above, this may in turn lead to degradation, so there may not be improved UE performance with enlarged duplex gaps.[247]

112. Transition bandwidth. In some cases the requirement to avoid overlap of third order product leads to very small separations.[248] However, to achieve adequate rejection the transmit band must be in the stop band of the receive filter, and the receive band must be in the stop band of the transmit filter. This means the separation between the uplink and downlink must be at least as large as the transition band. Above we determined that the transition band must be at least seven megahertz to achieve 25 dB of rejection, but a larger transition band allows a wider variety of filter technologies and vendors, with 11 megahertz supportable by both SAW and BAW technologies and many filter vendors. However, as also discussed above, considerably greater rejection is needed to prevent self-interference, 50 dB or more. In addition, we note that while we consider meeting a seven megahertz transition bandwidth to be achievable, it may be more difficult to meet it on both sides on the downlink filter. Considering these factors, an 11 megahertz transition bandwidth is most appropriate, and technically reasonable, for the duplex gap.

113. Minimum duplex gap. Since the 11 megahertz transition bandwidth is also large enough to prevent overlap of third order self-intermodulation products in all cases, the minimum duplex gap considering both OOBE and transition bandwidth is 11 megahertz.

114. As we have pointed out, existing bands have duplex gaps of varying sizes, both in absolute terms and relative to the size of the pass band.[249] These gaps may result from a wide variety of factors, including what spectrum bands are available for pairing uplink and downlink for any given service. In considering what is technically reasonable to prevent harmful interference, we must balance the goal of optimizing receiver sensitivity against these other factors, including antenna performance and efficient use of spectrum. The fact that 3GPP has implemented bands with larger duplex gaps is therefore not an indication that these sizes are necessary or desirable for technical considerations.[250] There is

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[242] *See* Technical Appendix § II.C.2 (User Equipment Self-Intermodulation).

[243] *See* Google/Microsoft Comments, App. at 4; Alcatel-Lucent Reply at 7.

[244] We note that in their May 8, 2014 filing, Google and Microsoft express support for the establishment of a nationwide 11 MHz duplex gap. Letter from Paul Margie, Counsel, Google, Inc. and Microsoft, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-268 (filed May 8, 2014).

[245] *See* Technical Appendix § II.C.2 (User Equipment Self-Intermodulation).

[246] *See* Google/Microsoft Comments, App. at 2; *NPRM*, 27 FCC Rcd at 12421, para. 178 n.262.

[247] *See* Technical Appendix § II.B (Mobile Antenna Considerations).

[248] *See* Technical Appendix § II.C.2 (User Equipment Self-Intermodulation).

[249] *See* Technical Appendix Table 9.

[250] For this reason, Motorola's comment that the average duplex gap for bands below 1 GHz is 19 megahertz is not an argument that the duplex gap should be 19 megahertz. Although Motorola states the smallest duplex gap below 1 GHz is 10 megahertz, as shown in Table 1, it is currently five megahertz. As the Commission noted in the *H Block*

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substantial record support for our sizing of the duplex gap as technically reasonable to prevent harmful interference in light of the band plans adopted for the 600 MHz Band. These views are corroborated by the foregoing analysis.

III. BAND PLAN

A. Overview

115. As discussed in the Order, the amount of 600 MHz spectrum that we can repurpose for wireless services, which will determine the final 600 MHz Band Plan, will depend on the outcome of the incentive auction.[251] Therefore, instead of adopting a single band plan in the Order, we adopt a set of band plan scenarios that comprise the 600 MHz Band Plan, one of which will become the final 600 MHz Band Plan.[252] Below, we set forth these scenarios and demonstrate how we apply the technical considerations discussed above in practice. We will determine how these scenarios will be used in the incentive auction (i.e., how we will determine which scenario will apply at a given point in the incentive auction, including how the scenario that will become the final 600 MHz Band Plan will be determined) through pre-auction public notices, including the *Comment PN* and the *Procedures PN*, as discussed in the Order.[253]

116. Below we provide a diagram depicting all of the potential 600 MHz Band Plan scenarios we may use in the forward auction to license the 600 MHz Band.[254] In Section III.B of the Technical Appendix (Specific Band Plan Scenarios), we discuss in depth each of the potential scenarios.[255] We emphasize that we may not necessarily employ each of these scenarios in the forward auction for the reasons discussed above. Further, we do not offer a scenario for each possible number of cleared television channels. Because we are licensing paired 5+5 blocks (i.e., 10 megahertz) from cleared/repurposed six megahertz channels and need to account for spectrum for guard bands as well, we cannot always offer additional sets of spectrum blocks for each television channel cleared. As a result, for example, we can offer four sets of paired blocks from 60 megahertz (10 television channels) repurposed, (i.e., 60 megahertz is our "clearing target") and five sets of paired blocks from 72 megahertz (12 television channels) repurposed, but cannot offer a distinct scenario for a six megahertz clearing target because we cannot offer more sets of licensed blocks than what we are already offering under the 60 megahertz scenario.

(Continued from previous page)
Order, "[p]rivate standards bodies may have other bases for their determinations, which may reflect compromises among the participants that are not subject to the statutory mandates that must inform our actions." *Service Rules for Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915–1920 MHz and 1995–2000 MHz Bands*, Report and Order, WT Docket No. 12-357, 28 FCC Rcd 9483, 9509, para. 65 (2013) (*H Block Report and Order)*.

[251] *See* § III.A (Band Plan for the New 600 MHz Band).

[252] *See* § III.A (Band Plan for the New 600 MHz Band).

[253] *See* § IV.A (Overview and Integration of the Reverse and Forward Auctions).

[254] *See* Technical Appendix Fig. 23 (Band Plan Scenarios).

[255] *See* Technical Appendix § III.B (Specific Band Plan Scenarios).

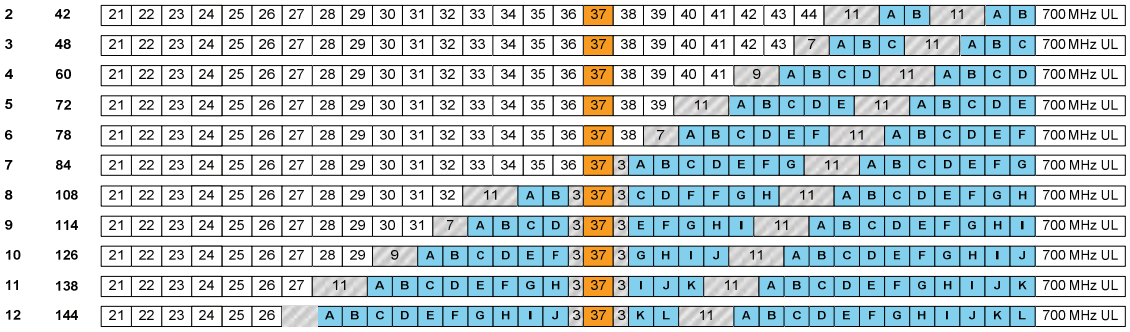

Figure 23. Band Plan Scenarios

B. Specific Band Plan Scenarios

117. Below we discuss in detail the specific 600 MHz Band Plan scenarios we may use in the forward auction. These range from offering two sets of paired blocks to 12 sets of paired blocks, in the configurations shown above. In this Section, we discuss the number of licensed blocks we can offer based on the amount of repurposed spectrum, and the size of the guard bands, including the duplex gap, under each of these scenarios. Section II of the Technical Appendix (Technical Considerations) above provides an extensive discussion of the issues raised here to support these conclusions and details on commenters' positions on these technical considerations that are summarized here.[256]

118. We note that we do not offer a scenario for fewer than two sets of paired blocks or more than 12 sets of paired blocks. As discussed in the Order, the costs outweigh the benefits of offering only one set of paired blocks, given that we would need to clear five television channels in this scenario.[257] Further, we decline to create scenarios for more than 12 sets of paired blocks, i.e., using more than a 144 megahertz clearing target.[258]

119. Specifically, we do not offer scenarios with 13 or more sets of paired blocks, due to the inefficiencies associated with the position of channel 37 (used for RAS and WMTS) in the 600 MHz Band. To offer 14 sets of paired blocks, we would need to place one downlink block above channel 37 and the rest of the downlink blocks below channel 37, resulting in an additional duplexer to support only this one block. Therefore, in this case the costs outweigh the benefits of placing only one downlink block above channel 37.

1. Two Sets of Paired Blocks (42 megahertz repurposed)

120. Under this scenario, shown in Figure 24, we create two sets of paired blocks from 42 megahertz of repurposed spectrum.[259] We establish an 11 megahertz duplex gap, which, as discussed above, is large enough to ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allows for a feasible transition band for the transmit and receive filters. We also use an 11 megahertz guard band between the 600 MHz downlink and television operations, which provides reasonable rejection and allows for an achievable transition bandwidth in the mobile

[256] *See* Technical Appendix § II (Technical Considerations).

[257] *See* § III.A (Band Plan for the New 600 MHz Band).

[258] *See* § III.A (Band Plan for the New 600 MHz Band).

[259] We note that we cannot use this scenario (two sets of paired blocks) for 36 megahertz of repurposed spectrum, because doing so would leave us with only 16 megahertz for guard bands – i.e., a five megahertz guard band between the downlink band and television operations and an 11 megahertz duplex gap, which would be difficult to achieve with mobile filters and below the minimum separation necessary between the 600 MHz downlink band and television operations.

filters. This scenario requires 10 megahertz filter pass bands and 31 megahertz of antenna bandwidth, which no commenters suggest present technical difficulties.

Figure 24. 42 megahertz scenario

2. Three Sets of Paired Blocks (48 megahertz repurposed)

121. The Band Plan scenario for three sets of paired blocks is shown below in Figure 25, which we will use if we have 48 megahertz of repurposed spectrum.[260] Under this scenario, we establish an 11 megahertz duplex gap, which is large enough to ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allows for a feasible transition band for the transmit and receive filters. We create a seven megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth. This scenario requires 15 megahertz filter pass bands and 41 megahertz of antenna bandwidth, which no commenters suggest present technical difficulties.

Figure 25. 48 megahertz scenario

3. Four Sets of Paired Blocks (60 megahertz repurposed)

122. Under this scenario, shown in Figure 26, we create four sets of paired blocks from 60 megahertz of repurposed spectrum.[261] We create an 11 megahertz duplex gap, which is large enough to ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allows for a feasible transition band for the transmit and receive filters. We also create a nine megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth. This scenario requires 20 megahertz filter pass bands and 51 megahertz of antenna bandwidth, which no commenters suggest present technical difficulties.

Figure 26. 60 megahertz scenario

4. Five Sets of Paired Blocks (72 megahertz repurposed)

123. The Band Plan scenario for five sets of paired blocks is shown below in Figure 27, which we will use if we have 72 megahertz of repurposed spectrum.[262] Under this scenario, we establish an 11 megahertz duplex gap, which is required in this case to ensure there is no overlap of third order intermodulation products between transmit and receive channels and allow for a transition bandwidth that can be supported by all mobile filter technologies.[263] We establish an 11 megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a

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[260] We note that we cannot use this scenario with 42 megahertz (or less) which provides only 12 megahertz for the guard band and duplex gap, which would be difficult to achieve with mobile filter technologies.

[261] We note that we cannot use this scenario with 54 megahertz (or less) which would provide only 14 megahertz for the guard band and duplex gap, which would be difficult to achieve with mobile filters.

[262] We note that we cannot use this scenario with 66 megahertz (or less) which would provide for a five megahertz guard band and an 11 megahertz duplex gap, below what is achievable with mobile filters.

[263] *But see* Alcatel-Lucent Reply at 7 (suggesting that in this case, a 10 megahertz duplex gap could be sufficient in practice because the probability of intermodulation products is low).

feasible transition bandwidth. This plan is similar to the illustrative band plan provided by AT&T, as well as the plans proposed by Intel and Qualcomm.[264] This scenario requires 25 megahertz filter pass bands and 61 megahertz of antenna bandwidth, which no commenters suggest present significant technical difficulties.[265]

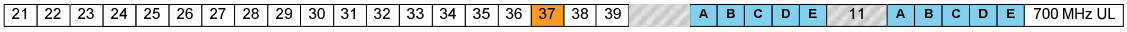

Figure 27. 72 megahertz scenario

5. Six Sets of Paired Blocks (78 megahertz repurposed)

124. Under this scenario, shown in Figure 28, we create six sets of paired blocks from 78 megahertz of repurposed spectrum.[266] We create an 11 megahertz duplex gap, which, as discussed above, is required to ensure there is no overlap of third order intermodulation products between transmit and receive channels and allow for a transition bandwidth that can be supported by all mobile filter technologies. We establish a seven megahertz guard between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth. This scenario has a 30 megahertz pass band in the uplink and downlink bands.

125. As discussed above in Section II.A of the Technical Appendix (Mobile Filter Considerations), some commenters suggest we should limit paired spectrum to 25 megahertz pass bands (i.e., five sets of paired blocks) due to mobile filter limitations. However, we reject this limitation because we recognize that technology improves over time and 30 megahertz mobile filter pass bands may become feasible,[267] and, as discussed in Section II.A of the Technical Appendix (Mobile Filter Considerations), the 600 MHz Band could be implemented with multiple filters (duplexers) if necessary, similar to the APT 700 band and T-Mobile and Verizon's 600 MHz band plan proposal.[268]

126. This scenario requires 71 megahertz of antenna bandwidth, which is somewhat above the approximately 60 megahertz limit some commenters propose for the 600 MHz Band.[269] As discussed in the Mobile Antenna Considerations Section above, and in the Order, we reject this limit and agree with T-Mobile that any performance degradation will be small (less than 1 dB) and can be mitigated by using tunable antennas or other technologies.[270]

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[264] *See, e.g.*, AT&T Comments, App. A at 29; Intel Comments at 5; Qualcomm Comments at 15.

[265] Qualcomm suggests that 62 megahertz of antenna bandwidth is "challenging but technically possible." Qualcomm Comments at 13.

[266] We note that we cannot use this scenario with 72 megahertz (or less) which would provide only 12 megahertz total for both the guard band and duplex gap, which would be difficult to achieve with mobile filter technologies.

[267] IWPC mentions that lithium niobate filters can provide 6% pass bands today, corresponding to 36 megahertz. Although, such filters provide lower Q values, which may translate into wider transition bands or lower stop band rejection. IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 14.

[268] APT700 refers to the Asia-Pacific Telecommunity band for 700 MHz, *see* T-Mobile Reply at 21, n 67. For the T-Mobile and Verizon proposal, *see* T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter.

[269] In Section § II.B of the Technical Appendix (Mobile Antenna Considerations), we discuss commenter views in greater detail.

[270] T-Mobile Reply, Exh. A at 16. We note that if we offer a Band Plan scenario with more than 84 megahertz, there is a decrease of 1 or 2 dB in antenna performance. *See* Technical Appendix § II.B (Mobile Antenna Considerations).

127. Finally, some commenters suggest the uplink pass band should be limited to 25 megahertz due to the potential for harmonic interference with the BRS/EBS band.[271] As discussed above, the likelihood of such interference is low, and it does not prevent use of the spectrum; it only limits the potential for carrier aggregation with the BRS/EBS band. As addressed in the Order, this potential limitation is outweighed by the benefit of making more spectrum available, and as a result, we determine that we should not limit the size of the paired bands if enough repurposed spectrum is available.[272]

Figure 28 – 78 megahertz scenario

6. Seven Sets of Paired Blocks (84 megahertz repurposed)

128. The Band Plan scenario for seven sets of paired blocks is shown below in Figure 29, which we will use if we have 84 megahertz of repurposed spectrum. Under this scenario, we establish an 11 megahertz duplex gap, which, as discussed above, will ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allow for a transition bandwidth that can be supported by all mobile filter technologies. We create a three megahertz guard band between the mobile downlink and WMTS services in channel 37, which as discussed above, will minimize the likelihood of harmful interference to WMTS devices.[273] We also note that this three megahertz guard band combined with channel 37 forms an effective nine megahertz guard band between the downlink band and television operations, which, as discussed above, provides reasonable rejection and allows for a feasible transition bandwidth. This plan is the same as the joint T-Mobile-Verizon Wireless plan for 84 megahertz, which is also supported by AT&T in the event 84 megahertz of spectrum is repurposed.[274]

129. This scenario has a 35 megahertz pass band in both the uplink and downlink bands, and requires 81 megahertz of antenna bandwidth in a static approach. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes and antenna bandwidth limits proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns.[275] For the reasons discussed

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[271] Qualcomm Comments at 11. In its table, "analysis block 19," corresponding to the uplink A block in this 78 megahertz scenario, has "H4" in the BRS/EBS row, indicating a fourth harmonic falls in some portion of the BRS/EBS band, in this case only the 2672 to 2690 MHz portion.

[272] *See* § III.A (Band Plan for the New 600 MHz Band).

[273] *See* Technical Appendix § II.E.2 (Potential for Interference between 600 MHz Downlink and WMTS).

[274] *See* T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter, Att. at 1; AT&T Oct. 21, 2013 *Ex Parte* Letter.

[275] *See* Qualcomm Reply at 25 ("2 x 35 MHz — or wider — FDD band plan at 600 MHz would require user devices to incorporate both an additional large antenna and a second duplexer. This would unacceptably increase the cost and size of today's space constrained smartphones"). *But see* T-Mobile/Verizon Sept. 16, 2013 *Ex Parte* Letter at 1 ("Our band plan is based on a 35x35 MHz Frequency Division Duplexing ("FDD") pairing, which offers more opportunity for carriers to acquire paired spectrum than any FDD proposal. While delivering more paired spectrum, our band plan also has fewer design trade-offs and interference hazards than alternative proposals."); Qualcomm *Band Plan PN* Comments at 8–9 ("On the other hand, a straight DF51 2 x 35 MHz plan that divides the band into two adjacent segments that lie above Channel 37 — a 2 x 15 MHz segment and a 2 x 20 MHz segment — could be supported by a single antenna provided that an adequate tuner is available."). *See also* Qualcomm Comments at 11 (where the table shows "analysis blocks" 18 and 19, corresponding to the A and B uplink blocks in this scenario, have some third and fourth harmonics falling in the PCS and BRS/EBS bands). *But see* Sprint Comments at 25 ("Potential third-harmonic conflicts already exist in the U.S., and yet we have seen little evidence of such interference problems to date. The solutions that work today to avoid interference in these situations are also likely to be effective for 600 MHz transmissions."); T-Mobile Reply at 23–26 (concluding "[w]here, as here, the potential for harmonic interference is limited and manageable and the benefits of maximizing paired spectrum are extensive

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above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.

Figure 29. 84 megahertz scenario

7. Eight Sets of Paired Blocks (108 megahertz repurposed)

130. Under this scenario, shown in Figure 30, we create nine sets of paired blocks from 108 megahertz of repurposed spectrum.[276] We create an 11 megahertz duplex gap, which will ensure there is no overlap of third-order intermodulation products between transmit and receive channels, and allow for a feasible transition bandwidth. Under this scenario, we establish two three megahertz guard bands between the mobile downlink band and WMTS services in channel 37 (both above and below channel 37), which will minimize the likelihood of harmful interference to WMTS devices. We also establish an 11 megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth, as discussed above.

131. This scenario has a 40 megahertz pass band in the uplink band, and two pass bands in the downlink band (30 megahertz above channel 37 and 10 megahertz below channel 37), which will require implementing two to three duplexers. Under a two duplexer approach, the band would be split into 30+30 megahertz and 10+10 megahertz. Although a 30+30 megahertz duplexer exceeds the 25 megahertz pass band discussed above, IWPC mentions that alternate technologies such as lithium niobate may allow for larger pass bands (up to 36 megahertz).[277] Although lithium niobate offers lower Q values and therefore potentially larger transition bands, as can be seen in the diagram below, the 30+30 megahertz filter would be 33 megahertz from television operations, allowing a very large transition band for this filter; while the 10+10 megahertz duplexer would need an 11 megahertz transition bandwidth, which is feasible today. Alternatively, this scenario could be implemented using three duplexers, with two duplexers in the 30+30 megahertz portion, similar to the APT 700 band and T-Mobile and Verizon's band plan proposal, as discussed above in Section II.A of the Technical Appendix (Mobile Filter Considerations). Under either a two or three duplexer approach, the duplex spacing of the lower 10+10 megahertz portion would be different from the upper 30+30 megahertz portion. This does not present an implementation challenge; in the past 3GPP has approved a band with different duplex spacing for different blocks within the band.[278]

132. In addition to creating a 40 megahertz pass band in the uplink band, this configuration requires 103 megahertz of antenna bandwidth in a static approach, but only 73 megahertz in a tunable approach. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns. For the

(Continued from previous page)
and broad-based, the Commission can and should take note of successful, real-world spectrum-management practices and auction the maximum amount of paired for commercial wireless broadband use.").

[276] We note that we cannot use this scenario with 102 megahertz (or less) which would allow for only a five megahertz guard band between television operations and the 600 MHz downlink band, which would be difficult to achieve with mobile filters.

[277] IWPC Nov. 27, 2012 *Ex Parte* Letter, Att. at 14.

[278] Specifically, different duplex spacing was approved for Band 23, which consisted of one block at 2000–2010 MHz paired with 2190–2200 MHz, and the second block at 2010–2020 MHz paired with 2180–2190 MHz. *See* 3GPP TS 36.101 V10.3.0 at 18, 26 (Tables 5.5-1, 5.7.4-2), available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.101/36101-a30.zip (last visited May 2, 2014). This was removed in V10.6.0 to reflect the consolidation of Band 23 spectrum under a single operator. *See* 3GPP R4-120615, available at http://www.3gpp.org/ftp/tsg_ran/wg4_radio/TSGR4_62/Docs/R4-120615.zip (last visited May 2, 2014)

reasons discussed above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.

Figure 30. 108 megahertz scenario

8. Nine Sets of Paired Blocks (114 megahertz repurposed)

133. The Band Plan scenario for nine sets of paired blocks is shown below in Figure 31, which we will use if we have 114 megahertz of repurposed spectrum.[279] As discussed above in Section II.E.5 of the Technical Appendix (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)), we establish an 11 megahertz duplex gap to ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allow for a feasible transition bandwidth. In this scenario, we create two three megahertz guard bands between the mobile downlink and WMTS services in channel 37, both above and below channel 37, which will minimize the likelihood of harmful interference to WMTS devices.[280] We establish a seven megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth.

134. This scenario has a 45 megahertz pass band in the uplink band and two pass band in the downlink band (25 megahertz above channel 37 and 20 megahertz below channel 37), which can be implemented with two duplexers, 25+25 megahertz and 20+20 megahertz, within the capabilities of current mobile filter technology. This plan has similarities to the FDD plan for 120 megahertz of repurposed spectrum proposed by Ericsson, however the uplink and downlink blocks are arranged as a single FDD band, rather than two distinct FDD bands with two separate duplex gaps.[281] It requires 88 megahertz of antenna bandwidth using a tunable antenna, and may have some degradation. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes and antenna bandwidth limits proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns. For the reasons discussed above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.

Figure 31. 114 MHz Band Plan Scenario

9. Ten Sets of Paired Blocks (126 megahertz repurposed)

135. Although commenters focus on how to configure a band plan for 120 megahertz of repurposed spectrum or less, as discussed in the Order, we provide scenarios for more than 120 megahertz should we have sufficient repurposed spectrum and decide to offer more than 120 megahertz in the forward auction. As discussed above and in the Order, we note that we have not yet determined our initial clearing target, so we may not necessarily offer these scenarios in the forward auction. We will provide further guidance in the *Comment PN* and *Procedures PN*.

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[279] We note that we cannot use this scenario with 108 megahertz (or less), because we would have only one megahertz remaining for the guard band between television operations and the 600 MHz downlink band, which would be very difficult to achieve with mobile filters, and is below the necessary minimum separation.

[280] *See* § III.D.1 (Channel 37 Services).

[281] Ericsson Reply at 18.

136. Under this scenario, shown in Figure 32, we create 10 sets of paired blocks from 126 megahertz of repurposed spectrum.[282] As discussed above, we create an 11 megahertz duplex gap in this case to ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allow for a feasible transition bandwidth. In this scenario, we create two three megahertz guard bands between the mobile downlink band and WMTS services in channel 37 (both above and below channel 37), which as discussed in the Order, will minimize the likelihood of harmful interference to WMTS devices.[283] We also create a nine megahertz guard band between the downlink band and television operations, which provides reasonable rejection and allows for a feasible transition bandwidth for all filter technologies, as discussed above.

137. This scenario has a 50 megahertz pass band in the uplink band, and two pass bands in the downlink band (30 megahertz below channel 37 and 20 megahertz above channel 37), which, as in the 108 megahertz scenario above, could be implemented with two or three duplexers. This scenario requires 93 megahertz of antenna bandwidth assuming a tunable antenna, and may have some degradation. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes and antenna bandwidth limits proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns. For the reasons discussed above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.[284]

Figure 32. 126 megahertz scenario

10. Eleven Sets of Paired Blocks (138 megahertz repurposed)

138. The Band Plan scenario for 11 sets of paired blocks is shown below in Figure 33, which we will use if we have 138 megahertz of repurposed spectrum.[285] In this scenario, we create an 11 megahertz duplex gap, which will ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allow for a feasible transition bandwidth.[286] In this scenario, we establish two three megahertz guard bands between the mobile downlink band and WMTS services in channel 37 – both above and below channel 37 – which, as discussed above, will minimize the likelihood of harmful interference to WMTS devices. We also create an 11 megahertz guard band between the downlink band and television operations, which, as discussed above, provides reasonable rejection and allows for a feasible transition bandwidth.

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[282] We note that we cannot use this scenario with 120 megahertz (or less) which would leave enough spectrum for only a three megahertz guard band between the downlink band and television operations, which would be very difficult to achieve with mobile filters, and is therefore below the minimum necessary separation.

[283] *See* § III.D.1 (Channel 37 Services).

[284] Further, we agree with Ericsson that if we can offer 120 megahertz or more, antenna issues would need to be addressed in any case, and the benefits of offering more spectrum to interested bidders outweigh the costs. Christian Bergljung, Ericsson, *600 MHz Band Plan Workshop Transcript* at 128–129 ("As we mentioned in terms of antenna performance, of course, as you go down in frequency, there is a penalty to be paid and we quoted some numbers out of the previous experience. . . . However, we see this as one of the biggest opportunities to realize part of the 500 MHz spectrum in the National Broadband Plan, so if it can be extended to 120 megahertz, I think we should do our utmost to make that—to realize that spectrum.").

[285] We note that we cannot use this scenario with 132 megahertz (or less), because the guard band between television operations and the downlink band would be five megahertz, which would be difficult to achieve with mobile filters.

[286] See Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

139. This scenario has a 55 megahertz pass band in the uplink band, and two pass bands in the downlink band (40 megahertz and 15 megahertz), which would most likely be implemented with three duplexers. This scenario requires 98 megahertz of antenna bandwidth assuming a tunable antenna, and may have some degradation. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes and antenna bandwidth limits proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns. For the reasons discussed above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.

Figure 33. 138 megahertz scenario

11. Twelve Sets of Paired Blocks (144 megahertz repurposed)

140. The Band Plan scenario for 12 sets of paired blocks is shown below in Figure 34, which we will use if we have 144 megahertz of repurposed spectrum.[287] In this scenario, we create an 11 megahertz duplex gap, which will ensure there is no overlap of third order intermodulation products between transmit and receive channels, and allow for a feasible transition bandwidth.[288] In this scenario, we establish two three megahertz guard bands between the mobile downlink band and WMTS services in channel 37 – both above and below channel 37 – which, as discussed above, will minimize the likelihood of harmful interference to WMTS devices. We also create a seven megahertz guard band between the downlink band and television operations, which, as discussed above, provides reasonable rejection and allows for a feasible transition bandwidth.

141. This scenario has a 60 megahertz pass band in the uplink band, and two pass bands in the downlink band (50 megahertz and 10 megahertz), which would most likely be implemented with three duplexers. This scenario requires 103 megahertz of antenna bandwidth assuming a tunable antenna, and may have some degradation. As discussed above in Section III.B.5 of the Technical Appendix (Six Sets of Paired Blocks (78 megahertz repurposed)), this configuration exceeds the pass band sizes and antenna bandwidth limits proposed by some commenters to address mobile filter, antenna bandwidth, and/or harmonic interference concerns. For the reasons discussed above, and in the Order, we decline to limit the amount of paired spectrum we will offer in the forward auction, should we have enough repurposed spectrum available.

Figure 34. 144 megahertz scenario

[287] We note that we cannot use this scenario with 138 megahertz (or less), because the guard band between television operations and the downlink band would be only two megahertz, which would be very difficult to achieve with mobile filters, and is therefore below the minimum necessary separation.

[288] See Technical Appendix § II.E.5 (Potential for Interference between 600 MHz Uplink and 600 MHz Downlink (Duplex Gap)).

APPENDIX D

Commenter Short Names

Short name	Name of Filer
4 NY Broadcasters	American Broadcasting Companies, Inc., WBNG License, Inc., United Communications
4G Americas	4G Americas
A. Weiss	Adrienne Weiss
ACTBN	Action Community Television Broadcasting Network, Inc.
Affiliates Associations	ABC Television Affiliates Association, CBS Television Network Affiliates Association
AIC	Azteca International Corporation
Alcatel-Lucent	Alcatel-Lucent
Alcatel-Lucent et al.	Alcatel-Lucent, AT&T, Ericsson, Intel, NAB, Qualcomm and VZ
American Tower	American Tower Corporation
Anon. Broadcaster 1	Anonymous Broadcast Licensees
Anon. Broadcaster 2	Prospective Reverse Auction Participant
Anon. Broadcaster 3	Broadcaster for the Promotion of Channel Sharing Arrangements
Anon. Broadcaster 4	Broadcast Licensee
Anon. Citizen	Anonymous
Anon. Part 90	Blooston Part 90 Licensees
APTS [see joint comments PTV]	Association of Public Television Stations
ASHE	American Society for Healthcare Engineering
AT&T	AT&T, Inc. or AT&T Services, Inc.
ATBA	Advanced Television Broadcasting Alliance
Atlantic Telephone	Atlantic Telephone Membership Corporation
B. Kobb	Bennett Z. Kobb
Bahakel	Bahakel Communications, Ltd.
Belo	Belo Corp.
Block Stations	Lima Communications, Corp./Independence Television Company/WAND TV Partnership/Idaho Independent Television, Inc./West Central Ohio Broadcasting, Inc.
Blooston Rural	Blooston Rural Carriers
Bluegrass	Bluegrass Cellular, Inc.
Boeing	The Boeing Company
Bonten	Bonten Media Group, Inc.
Brattle	The Brattle Group
Broadcast Networks	Broadcast Networks (CBS/FOX.NBCU/Disney/Univision)
Broadcom	Broadcom Corporation
Broadcom/CSR/Marvell	Broadcom, CSR Technology, Inc., and Marvell Semiconductor
Broadway League	The Broadway League, Inc.
C Spire	Cellular South, Inc. (d/b/a C Spire Wireless)
Capitol	Capitol Broadcasting Company, Inc.
Casa	Casa En Denver, Inc.
Cavell, Mertz (see R. Mertz)	Cavell, Mertz & Associates, Inc.
CBS	CBS Corporation

CCA	Competitive Carriers Association
CCB	Carolina Christian Broadcasting, Inc.
CCIA	Computer & Communications Industry Association (CCIA)
CEA	Consumer Electronics Association
Cellular One	Texas 10, LLC d/b/a Cellular One and Central Louisiana Cellular
Channel 32	Channel 32 Montgomery LLC
Chat Mobility	Chat Mobility
Cisco	Cisco Systems, Inc.
CIT	CIT Group, Inc.
Clearwire	Clearwire Corporation
Cohen	COHEN, DIPPELL AND EVERIST, P.C.
Collective Wireless Microphone Interests	Collective Wireless Microphone Interests
Comcast	Comcast
Comcast and NBC Universal	Comcast Corporation and NBC Universal Media, LLC
Comm. Tech	Communications Technologies, Inc.
CompTIA	Computing Technology Industry Association
Copper Valley	Copper Valley Wireless, LLC
Council Tree	Council Tree Investors, Inc.
Cox Media	Cox Media Group
CP Comm.	CP Communications PA, LLC
CPB [see joint comments PTV]	Corporation for Public Broadcasting
CSR	CSR Technology, Inc.
CTI	Community Television, Inc.
CTIA	CTIA - The Wireless Association
D. Honig, MMTC	David Honig (president for MMTC)
Dielectric	Dielectric LLC
DIRECTV/DISH	DIRECTV and DISH Network
DISH	DISH Network Corporation
Disney	The Walt Disney Company
Dispatch	The Dispatch Printing Company, d/b/a the Dispatch Broadcast Group
DTVAmerica	DTVAmerica Corporation
Dynamic Spectrum Alliance	Dynamic Spectrum Alliance
Entravision	Entravision Holdings, LLC
EOBC	Expanding Opportunities for Broadcasters Coalition
Ericsson	Ericsson Inc
FMBC	Fort Myers Broadcasting Company
Free Press	Free Press
GatesAir	GatesAir, Inc.
GEHC	GE Healthcare
Globe	Globe LPTV LLC
Google	Google Inc.
Google/Broadcom	Google Inc. and Broadcom Corporation
Google/Microsoft	Google Inc. and Microsoft Corporation
Grain Management	Grain Management, LLC
Gray TV	Gray Television, Inc.
H. Uhi	Harrison Uhl

Harris Broadcast	Harris Corporation, Broadcast Communications Division or HBC Solutions, Inc. (Harris Broadcast)
HTSC	High Tech Spectrum Coalition (HTSC)
IAA	Incentive Auction Advocates
IBN	INTERNATIONAL BROADCASTING NETWORK
ICN	International Communications Network, Inc.
IEEE 802	IEEE 802 LMSC or IEEE 802 LN/Man Stds Cmte
Intel	Intel Corporation
ITI	Information Technology Industry Council
J. Pavlica	John Pavlica, Jr.
J. Pila	Joshua Pila (LIN)
J. Pratt	Joshua Pratt
Joint Reply of the Commissioner of Baseball, NBA, NFL, NHL, NCAA, NASCAR	Office of the Commissioner of Baseball, National Basketball Association, National Football League, National Hockey League, National Collegiate Athletic Association, and National Association for Stock Car Auto Racing
KAZN	KAZN License, LLC
KLCS	KLCS
KRBK	KRBK, LLC
KSW	King Street Wireless, LP
Leadership Conference	Leadership Conference on Civil and Human Rights
Leap	Leap Wireless International and Cricket Communications
Lectrosonics	Lectrosonics, Inc.
Leggett	Nickolaus E. Leggett
LeSEA	LeSEA Broadcasting Corporation
LIN	LIN Television Corporation
Lincoln	Lincoln Broadcasting, LLC
Local Media	Local Media TV Holdings, LLC
LPTV Spectrum	LPTV Spectrum Rights Coalition
M. Gravino	Michael Gravino
Mako	Mako Communications, LLC
Marvell	Marvell Semiconductor
McBride	McBride Spectrum Partners, LLC
Media General	Media General, Inc.
MetroPCS	MetroPCS Communications, Inc.
Microsoft	Microsoft Corporation
Mike Gravino	Mike Gravino (LPTV Spectrum Rights Coalition)
MMTC	Minority Media and Telecommunications Council (MMTC)
Mobile Future	Mobile Future
Motorola	Motorola, Inc.
Motorola Mobility	Motorola Mobility LLC
MSGPR	MSGPR Ltd Co
NAB	National Association of Broadcasters (NAB)
NABOB	National Association of Black Owned Broadcasters, Inc.
NAS-CORF	National Academy of Sciences -- CORF
NATE	National Association of Tower Erectors
NCTA	National Cable & Telecommunications Association
NERA	NERA Economic Consulting

Neul	Neul Ltd
New America Found.	New America Foundation
NFL	National Football League
NHMC	National Hispanic Media Coalition
Nokia	Nokia Siemens Networks US LLC
NPR	National Public Radio, Inc.
NRAO	National Radio Astronomy Observatory
NRB	National Religious Broadcasters
NTA	National Translator Association
NTCA	National Telecommunications Cooperative Association
NTCA	NTCA-The Rural Broadband Association
NTCA	The Rural Broadband Association (NTCA)
NTIA	National Telecommunications and Information Administration
NYSBA	New York State Broadcasters Association, Inc.
Parker	Parker Broadcasting of Louisiana, LLC
PBS [see joint comments PTV]	Public Broadcasting Service
Performing Arts	Performing Arts Wireless Microphones Working Group
Philips Healthcare	Philips Healthcare
Pioneer	Pioneer Communications, Inc.
PISC	Public Interest Spectrum Coalition (PISC)
Polnet	Polnet Communications Ltd.
Post-Newsweek	Post-Newsweek Stations, Inc.
PTV	Association of Public Television Stations, Corporation for Public Broadcasting, Public Broadcasting Service
Public Knowledge	Public Knowledge
Public Service Wireless	Public Service Wireless Services, Inc.
Public TV Licensees	Public TV Licensees
Qualcomm	QUALCOMM Incorporated
R. Brey	Ronald J Brey
R. Mertz or Cavell, Mertz	Richard H. Mertz (on behalf of Cavell, Mertz & Associates, Inc.)
Raycom	Raycom Media, Inc.
RIM	Research In Motion Corporation
RTG	Rural Telecommunications Group, Inc.
RWA	Rural Wireless Association, Inc.
SAG-AFTRA	SAG-AFTRA, AFL-CIO (Screen Actors Guild-American Federation of Television and Radio Artists)
Samsung	Samsung Electronics America, Inc. and Samsung Telecommunications America, LLC
SBBC	School Board of Broward County, Florida
SBE	Christopher D. Imlay
SEI	SpectrumEvolution, Inc.
Select Spectrum	Select Spectrum, LLC
Sennheiser	Sennheiser Electronic Corporation
Shure	Shure Incorporated
Signal Above	Signal Above, LLC
Sinclair	Sinclair Broadcast Group, Inc.
Sony	Sony Electronics Inc.
Spectrum Bridge	Spectrum Bridge Inc.

Sprint	Sprint Nextel Corporation or Sprint Corporation
SSN	Silver Spring Networks
Stainless	Stainless, LLC
State Broadcaster Associations	Named State Broadcasters Associations
TechAmerica	TechAmerica
TechFreedom	TechFreedom
Thompson Engineering	Jeff C Tappenden
TIA	Telecommunications Industry Association
T-Mobile	T-Mobile USA, Inc.
Tribune	Tribune Company
TTBG	TTBG, LLC
UCC	United Communications Corporation
Univision	Univision Communications Inc.
US Cellular	United States Cellular Corporation or U.S. Cellular Corp
UVM	Una Vez Mas, L.P.
Venture	Venture Technologies Group, LLC
Verizon	Verizon and Verizon Wireless
Vision	Vision Communications, LLC
WatchTV	WatchTV, Inc.
Weigel	Weigel Broadcasting Company
WGAL	WGAL Hearst Television, Inc.
WGAW	Writers Guild of America, West
Wi-Fi Alliance	Wi-Fi Alliance
Wireless Microphone Interests	Wireless Microphone Interests
WISPA	The Wireless Internet Service Providers Association
WISPA	Wireless Internet Service Providers Association
WLFM	WLFM, LLC
WMTS Coalition	The WMTS Coalition
WMTS Coalition	WMTS Coalition
WSA	WhiteSpace Alliance
WSDAG	White Space Database Administrator Group
Young Broadcasting	Young Broadcasting, LLC

STATEMENT OF
CHAIRMAN TOM WHEELER

Re: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268.

Today we take a huge step towards turning an innovative approach to making efficient, market-driven use of our spectrum resources from concept to reality.

The Incentive Auction is a once-in-a-lifetime opportunity to expand the benefits of mobile wireless coverage and competition to consumers across the Nation, offering more choices of wireless providers, lower prices, and higher quality mobile services. The auction will also provide a game-changing financial opportunity to broadcasters and fully fund the Public Safety Trust Fund (PSTF) for FirstNet. Maximizing participation by both broadcasters and wireless providers in the auction will be crucial to achieving these goals.

There has been much discussion about how we should define success for the Incentive Auction, with most of the talk focused on how many megahertz of spectrum will be repurposed for broadband and how much revenue will be raised from the auction.

Obviously, those are important objectives.

But we should not lose sight of the fact that simply creating a marketplace that enables us to buy spectrum, re-band it, and then re-sell it, and to do these three things nearly simultaneously, will be a tremendous accomplishment in and of itself.

This new approach to the marketplace could revolutionize how spectrum is allocated. The Incentive Auction will harness market forces to reallocate valuable low-band (below 1 GHz) spectrum from television broadcasters who voluntarily choose to relinquish some or all of their spectrum usage rights in exchange for incentive payments, to wireless providers who will bid against each other to buy those frequencies to provide mobile broadband services. The low-band spectrum we will auction is particularly valuable because it has physical properties that increase the reach of mobile networks over long distances at far less cost than spectrum above 1 GHz. It also reaches deep into buildings and urban canyons.

What happens in this new marketplace in terms or spectrum repurposed and revenue raised will depend on the fundamental economic concept of supply and demand. The rules we adopt today will help to establish a marketplace that will be attractive to both buyers and sellers, and will protect and promote competition.

Television broadcasters' participation in the Incentive Auction will be purely voluntary, and participation in the Incentive Auction does not mean they have to leave the over-the-air TV business entirely. New channel-sharing technologies offer broadcasters a rare opportunity for an infusion of cash to expand their business model and explore new innovations, while continuing to provide their traditional services to consumers. We will ensure that broadcasters have all of the information they need to make informed business decisions about whether and how to participate – including providing information about likely opening bids and a projected timeline of actions leading up to the auction.

Consistent with the requirements of the Spectrum Act, we will make available a significant amount of unlicensed spectrum (think Wi-Fi) on a nationwide basis, providing economic value to businesses and consumers alike.

We are also taking steps today to address the needs of wireless microphone users, which include broadcasters reporting on breaking news, and providers at sports and entertainment events, schools, places of worship and business venues. These users provide invaluable services to American consumers, and we will continue to develop a framework of solutions to ensure that the spectrum needs of these users will be met in the future.

Thank you to the dozens of staff from across the Commission for your unprecedented efforts to bring us to this point. I am confident that you will continue to make policy recommendations that will result in a successful auction in the middle of next year.

STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN

Re: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268.

Like many of you in this room I spend a fair amount of time in airports. During my early days of travel, newspapers, and magazines were the must-have, must-read attachments for any trip. Today -- not so much. If you take the Metro or other short haul services, you more likely will find riders glued to a tablet, cell phone, or other wireless device.

News, information, entertainment or even basic communication is now delivered anytime and everywhere. School-aged children, old-school stalwarts, people from all walks of life are adopting the ubiquitous and utilitarian tools of today, which make our lives more convenient, more accessible and more efficient.

This is the world in which we live, and it is a wonderful place indeed.

But as our societal appetite for feature rich content increases, and in order for us to continue along this path, we must position ourselves to provide this nation with an adequate amount of spectrum -- making this proceeding one of most important and challenging of the day.

Innovation in mobile broadband, has spurred spectrum demand, at a breathtaking pace. I still marvel at the fact, that when I first took office in the summer of 2009, tablet computers had not even hit the market. Now estimates are that by 2016, more than 100 million people in our nation will own one.

Those tablets use 121 times as much spectrum, as the traditional cellphone, so if we want all communities to have access to the most advanced wireless technologies, our regulatory policies must keep pace and that includes repurposing more spectrum for commercial wireless services.

In 2012, Congress took a dramatic step by giving us statutory authority to conduct the world's first voluntary incentive auction in a way that also preserves the integrity of the broadcast TV industry. Now, the Commission must move expeditiously and carefully to carry out this directive.

Designing this auction is daunting and unprecedented. It must integrate three major elements: (1) the reverse auction for those TV stations that want to relinquish their spectrum rights for payment, (2) the repacking of broadcast TV stations that want to stay on the air, and (3) the "forward auction" which would license repurposed spectrum for wireless services. Each element presents its own set of difficult, technical issues; but further complicating the task is that Congress imposed specific requirements for each element.

However, the Commission staff has shown that it is more than up to the challenge. In this NPRM, the staff set us on a course that indeed would benefit both the broadcast TV and wireless industries and advance communications policy objectives, such as participation by smaller companies, competition, and accommodating other existing services that have proven so valuable. With this Order, the staff has recommended rules that improve on those goals.

I am particularly pleased that the Order does more to promote participation, by designated entities, or DEs, and small businesses. We make clear we intend to initiate a rulemaking that would revisit a number of DE rules, including increasing bidding credits and the attributable material relationship rule and wrap up that proceeding early enough so parties can account for any rule changes as

they plan for the incentive auction. We also state that we intend to resolve a pending request to waive the material relationship rule in the near term.

Another noteworthy change in the forward auction rules will promote more competition. It is important that our wireless auctions also attract carriers, who may have a smaller service footprint and less capital than nationwide providers, yet possess a strong desire to acquire more spectrum in order to serve a particular footprint. This approach promotes competition in local markets and has the added benefit of ensuring that the auction promotes efficient allocation of spectrum to the highest and best use. This is particularly important, in this case, since we must incentivize broadcast TV stations to participate in the reverse auction. We can promote these goals by auctioning smaller block sizes of spectrum in smaller geographic area licenses. So I am glad that we pushed large and small carriers to develop a consensus so we could shift from the larger Economic Areas to smaller Partial Economic Areas.

I am also pleased that we have reaffirmed our commitment to ensuring that unlicensed spectrum in the 600 MHz band, can be used to provide broadband service. I have been a strong advocate for unlicensed use of TV White Spaces since we adopted final rules in 2010. This technology, which takes advantage of the excellent signal propagation characteristics of below 1 GHz spectrum, has great potential to provide wireless broadband services in low income communities that are often difficult to serve. There are initiatives such as AIR.U – a partnership between New America Foundation, technology companies, and GIG.U, -- that are finding solutions for universities in rural areas. This past summer, AIR.U worked with West Virginia University to launch a pilot program that provides campus-wide Wi-Fi services, using TV White Spaces. I commend Chairman Wheeler for considering an alternative plan that would provide for more unlicensed spectrum in the 600 MHz band. This is sure to spur new innovations in unlicensed broadband services worldwide.

The Order also provides more protection, for certain services, than the NPRM originally proposed. For example, I have been concerned about the impact that the 2012 statute and this proceeding could have on low power TV stations, or LPTVs, and translators. LPTVs provide diverse and local television programming and translator stations in particular are an important free over-the-air television resource in the most remote of locations. It was important to me that the Commission explored all reasonable options to allow these stations to continue to broadcast, after the auction. The NPRM sought comment on allowing these stations to channel share. This Order goes further by explaining that the Commission will initiate a more comprehensive rulemaking proceeding to explore several other options for LPTVs. In addition to channel sharing, it will explore: (a) allowing these stations to transition to VHF channels; (b) using the repacking software to help LPTVs, find new locations to operate; and (c) extending the September 2015 deadline for converting digital services, so LPTVs do not have to relocate to meet that deadline, and relocate yet again, after the incentive auction. The Order also adopts a rule that would allow these stations to continue, post auction, to serve in a 600 MHz license area until a wireless carrier commences operation. The wireless carrier must notify LPTVs, 120 days in advance, of that date.

I also commend the staff, for working hard to find solutions, for wireless microphones. Broadcasters and other entities, which rely on wireless microphones for late breaking electronic news gathering or live events, need the assurances of reliable, high quality audio. In the Incentive Auction Order, we will permit wireless mics to operate in 4 megahertz of the duplex gap, and in the naturally occurring empty TV channel, in every market. And in the companion wireless microphone Order, we also adopt today, we are granting to professional sound companies and venues that routinely use 50 or more wireless microphones the same rights as low power auxiliary station licensees. This will provide a meaningful benefit to entities that require the protection a license affords without unduly reducing the amount of spectrum available for other uses in the television bands.

This Order marks an important milestone for this proceeding, but as it makes clear, our work is

not over. We must seek comment on auction design and other issues to address important policies before conducting the auction. And we have greatly benefitted thus far, from the input of many in the industry. Still needed, however, is continued participation to ensure that we get the final details right. I thank Gary Epstein, Bill Scher, and Edward "Smitty" Smith for their presentations, and I wish to extend special thanks to all the staff members who spent hours briefing me and working with me to address my questions about the item particularly my Wireless Legal Advisor, Louis Peraertz, who of course, I also wish to thank. I also want to thank Paul D'Ari, Bill Stafford, Brenda Boykin, and Sade Oshinube for their work on the wireless microphone order.

STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL

Re: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268.

A few weeks ago, during a long road trip, my family pulled off the highway and rolled into a restaurant for dinner. You know the place. The adults get the laminated full-sized menus and the kids get the paper menus with coloring games and puzzles.

Armed with only a cheap crayon and what I like to think is wisdom beyond her years, I watched my daughter whip through a maze on her menu without lifting the crayon off the paper. She accomplished this feat by beginning at the finish line of the maze and ending at the start. It dawned on me that I was watching my child play out the old management maxim: "Begin with the end in mind."

I think that our Report and Order today begins with the end in mind. The Chairman and his hard-charging auction team have focused on the finish line—freeing up more spectrum for mobile broadband, providing more opportunities for broadcasters, and raising funds to support our first responders.

I am also pleased that our Report and Order is largely faithful to the four central building blocks to a successful incentive auction that have guided my thinking since we began this process in 2012: simplicity, fairness, balance, and public safety.

Simplicity is key. Incentive auctions are an undeniably complex undertaking. But at every structural juncture, I believe that a bias towards simplicity is crucial. So I am pleased that we choose simplicity with the descending clock auction rules we adopt today. This design provides a simple onramp to the auction and allows broadcasters to come armed with little more than a willingness to participate, not a bevy of experts and lawyers.

Fairness is essential. This is especially true with regard to the treatment of broadcasters that do not participate in the auction. Fairness demands that we consider how to accomplish repacking by minimizing unnecessary disruption and maximizing the ability of the public to continue to receive free, over-the-air television.

Balance is necessary. None of the three legs of the incentive auction—the reverse auction, the repacking, or the forward auction—can stand on its own. And we must realize that the choices we make in one area have implications throughout the auction.

I am particularly excited, however, that we have found creative ways to strike the right balance between licensed and unlicensed spectrum. This creativity started with ditching the tired notion that we face a choice between licensed and unlicensed spectrum. This is a simplistic relic from the past that we should have long since retired—because good spectrum policy requires both. Moreover, we recognized that other services striving for white space in the 600 MHz band—like wireless microphones, low-power television, and medical telemetry—matter. So by being creative we found ways to expand the duplex gap, find new locations for unlicensed microphones, and provide unlicensed opportunities in channel 37—while also protecting existing users. This approach can increase the value of licensed spectrum without diminishing the number of licenses we sell at auction. It is all-around good.

Finally, public safety is fundamental. Built into the fabric of our upcoming incentive auctions is a recognition that they are intertwined with the future of public safety communications. The revenues we

raise are designated to support a nationwide, interoperable, wireless, broadband network for public safety. This is important.

Although I am pleased with the general framework we put in place today, I would like to suggest a few areas where we should pause and "lift our crayon from the paper" to do more in the name of simplicity and fairness.

Simplicity remains key. As I have said upfront, station owners that operate small-and medium-sized businesses should be able to understand their options without hiring high-priced auction experts. To this end, I am pleased that with the assistance of KCLS and KJLA in Los Angeles we have explored the technical feasibility of channel sharing, which could provide some broadcasters with a new way to operate. As a result, the technical parameters of sharing are now better understood. However, we know too little about the legal and business arrangements that are needed to put sharing into operation. For instance, how do you address property ownership issues between commercial and non-commercial broadcasters? Should we consider developing some "off the rack" templates that assist with putting these sharing arrangements in place? I am concerned that without this kind of groundwork, we risk broadcasters sitting this opportunity out.

Fairness remains essential. We are asking broadcasters to make a fair assessment of the opportunities this auction provides the industry. I have spoken with many broadcasters—large and small—about what the Commission can do to help them make a decision about how to proceed. Every meeting yields the same refrain: "We need a number." This does not need to be difficult or resource intensive. But until the agency can provide broadcasters with a better sense of what price their spectrum might yield, including the tax consequences, broadcasters do not have the tools to make smart and dispassionate decisions about whether or not to participate. This is not just a matter of fundamental fairness; this is a threshold matter that could very well determine whether or not these auctions achieve their lofty goals.

So we have come a long way. Chairman Wheeler deserves tremendous credit. So does our whip-smart auction team. They took the difficult maze of issues involved in incentive auctions and put us on a path to get this done. This is historic. This is exciting. I am pleased to be a part of it and I am pleased that we began with the end in mind.

DISSENTING STATEMENT OF COMMISSIONER AJIT PAI

Re: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268.

When the Commission adopted its Notice of Proposed Rulemaking (NPRM) in this proceeding twenty months ago, I shared several principles that would guide my deliberations.[1] In particular, I said that we should keep the auction as simple as possible, be fair to all stakeholders, and remain faithful to the statute passed by Congress.

Unfortunately, this item strays from each of these principles. In both the reverse and forward auction, the Commission forsakes simplicity for unnecessary complexity, primarily for the purpose of manipulating the market to suit its chosen ends. The rules that we adopt are not fair to many important constituencies, including taxpayers, public safety officials, broadcasters, rural Americans, and those wireless carriers that have chosen to participate in past auctions. And the Commission at key junctures substitutes its own policy preferences for the direction provided by Congress in the Spectrum Act. For all of these reasons, I respectfully dissent.

I.

Let's start with simplicity. The world's first spectrum incentive auction was always going to be complicated. There are many pieces of the puzzle that have to fit together for this project to succeed, including a reverse auction, a forward auction, and a repacking plan. Doing any one of these things individually would be a significant undertaking for the Commission. Doing all of them in unison is a daunting proposition indeed. The Chairman has aptly compared this to solving a Rubik's Cube.

That's why I thought that it was important for the Commission to keep the incentive auction as simple as possible. We do not need to introduce unnecessary complexities that could lead to failure. But this item makes precisely that error.

A.

Take, for example, the reverse auction. Pursuant to this item, the Commission will be setting individualized prices for each participating broadcast station (keep in mind that there could be over a thousand such stations) through a process known as scoring. How, specifically, will the Commission value each broadcast station's spectrum? That is unclear, to say the least. At one point, the Commission tells us that the price "takes into account objective factors, such as location and potential for interference with other stations, that affect the availability of channels in the repacking process and, therefore, the value of a station's bid to voluntarily relinquish spectrum usage rights."[2] Later on, the item says that "[p]ossible factors include the number of stations that a station would interfere with and block from being assigned channels, the population the station covers, or a combination of such factors."[3]

The Commission's market manipulations don't stop there. It also decides to intervene in the middle of the reverse auction through something called a dynamic reserve price. Specifically, if the

[1] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Notice of Proposed Rulemaking, 27 FCC Rcd 12357, 12557 (2012) (*NPRM*) (Statement of Commissioner Ajit Pai, Approving in Part and Concurring in Part).
[2] *Report and Order* at para. 450.
[3] *Id*. at para. 451 (footnotes omitted).

Commission concludes that a participating broadcast station's provisionally accepted bid is too high due to a lack of competition, the Commission will unilaterally lower the price offered to that station.

How will the Commission determine when to impose a dynamic reserve price (or what that price will be)? The item leaves that question for another day. But the concept itself is guaranteed to generate considerable consternation, and implementation will be even more challenging. What happens if a bidder refuses to accept a lower price and chooses to exit the reverse auction? The Commission must find a channel placement for that station, creating more impaired spectrum in the forward auction and lowering the revenues it will generate.

It is not the Commission's place to impose a value on particular stations in the reverse auction. An auction should be a market-based mechanism where prices are set through competitive bidding, not centralized planning. We should let prices be set by supply and demand, not a complicated formula—no matter how distinguished the economists who crafted it might be. Market forces are the more likely route to success.

This is why we should adopt a simultaneous multiple round format for the reverse auction, a format with which the Commission is well-acquainted. Such a process would be simple—no scoring, no dynamic reserve pricing. Each participating broadcast station would make its own opening bid. Using those bids, the Commission would calculate the optimal way to meet the spectrum clearing target. Participants would be told which, if any, of their bids are provisionally winning. Losing bidders could then lower their asking prices. This process would repeat itself until no participating broadcast station is willing to lower its bid.

In addition to eschewing the complications of scoring and setting dynamic reserve prices, this proposal has several advantages compared to the Commission's complicated descending-clock format.[4] Most importantly, it would encourage more participation by broadcasters in the reverse auction. Under my plan, broadcasters could name their own price in the opening round. Under the Commission's plan, by contrast, broadcasters may be deterred from entering the auction if they are dissatisfied with their Commission-set score.

My proposal has other advantages. For instance, under my plan, we could optimize the repacking of broadcast stations. Under the Commission's plan, optimization is impossible, and we will be reduced to checking only whether various repacking scenarios are feasible. Under my plan, participants could simultaneously place bids on different options, such as relinquishing spectrum and moving to VHF. The Commission has no plan for handling multiple bids. Under my plan, bids in the reverse auction could carry over from one stage to the next. The Commission hasn't decided how that would work. My plan would also minimize the cost of clearing each spectrum target, thus producing more net revenues and increasing the amount of spectrum that could be cleared. The Commission's plan will not.

[4] Simple clock auctions (as adopted herein) are designed to efficiently allocate multiple copies of homogeneous goods among multiple bidders. *See, e.g.*, Lawrence M. Ausubel, *An Efficient Ascending-Bid Auction for Multiple Objects*, 94 American Economic Review 1452 (Dec. 2004). By contrast, clock auctions of heterogeneous goods must include dynamic price vectors that can increase or decrease to be efficient. *See* Lawrence M. Ausubel, *An Efficient Dynamic Auction for Heterogeneous Commodities*, 96 American Economic Review 602 (June 2006). A simple clock auction cannot adequately account for the fact that each broadcaster offers a unique good—the value of which depends not only on that broadcaster's interference patterns and estimated repacking costs but also on the constantly-evolving bids, interference patterns, and estimated repacking costs of every other broadcaster in the country. Nor can the scoring and dynamic reserve prices adopted today remedy this underlying design flaw.

B.

In the forward auction, there are yet more rules designed to manipulate the market. In my statement on the mobile spectrum aggregation item, I will set forth in detail why I believe that the bidding restrictions placed by the Commission on wireless carriers in the forward auction are unnecessary, will depress revenues, and will delay build-out to the detriment of consumers. Here, I will just focus on the issue of complexity.

My vision of the forward auction is as straightforward as eBay's. Let *anyone* bid on *any* block of spectrum and let the highest bidder win. This system has served the Commission well in past auctions, and I am confident that it would work here as well.

The Commission's vision is more difficult to explain. Bidding in the forward auction will start off on the right foot. But once bids reach a certain amount, a complex set of restrictions will kick in. Specifically, certain blocks of spectrum in a given Partial Economic Area (PEA) will be reserved for nationwide carriers with less than one-third of low-band spectrum in that PEA or non-nationwide carriers, while other blocks of spectrum will be open to all bidders. And that's not all. Should there be insufficient demand for so-called "reserved spectrum," then some or all of it could become unreserved once again.

This complicated scheme provides the Commission with at least three levers for manipulating the market in order to pick winners and losers. First, the Commission must choose at which point spectrum will be divided into reserved and unreserved blocks. Second, the Commission must decide how much spectrum will be placed in the reserved and unreserved spectrum buckets for each clearing target. Those seemingly arbitrary decisions are made in the mobile spectrum aggregation item. And third, the Commission must decide when formerly reserved spectrum will become unreserved due to a lack of demand.

This scheme does not reflect faith in the market. And I fear it will take us down a road the Commission has traveled before. In the 700 MHz auction, for example, the Commission drafted elegant and well-intentioned rules for the D-Block, designed to facilitate the construction of a nationwide, interoperable public-safety broadband network. And what did these complicated rules produce? Nothing other than a failed D-Block auction—and, ironically, a 2012 statutory mandate to conduct an incentive auction partly to fund construction of that same network.

II.

Turning from simplicity to fairness, I have indicated repeatedly that the Commission must treat all stakeholders in a just manner. Unfortunately, today's order also fails this critical test.

A.

Most importantly, this item is unfair to taxpayers and public safety officials. Congress charged the FCC with the twin goals of pushing new spectrum into the commercial marketplace and raising $27.95 billion for two critical national priorities: public safety and deficit reduction. Regarding the former, a successful auction will deliver not just the $7 billion in funding Congress specified for FirstNet but also the $135 million it marked for state and local public safety officials, the $300 million it identified for the research and development of wireless public safety communications, and the $115 million it sought for the deployment of Next Generation 911.[5]

[5] *See* Spectrum Act § 6413(b)(2), (4), (6), & (7).

As for deficit reduction, our upcoming auctions, including the incentive auction, hold the promise of raising more than $20 billion to help reduce our national debt.[6] Just yesterday, Senators John Cornyn, Charles Schumer, John Thune, and Sherrod Brown called these funds a "critical return for the sale of a valuable taxpayer asset."[7] Indeed, Congress counted on us meeting this target when it passed the Spectrum Act, so much so that it already spent those funds. If we don't meet it, the Commission will be responsible for increasing the budget deficit above the Congressional Budget Office's current projections.

I am therefore disappointed that the Commission is not structuring the incentive auction to maximize net revenues. To be sure, the item does attempt to raise money for FirstNet, and in some ways this is an improvement over the proposal set forth in the NPRM. But what about deficit reduction? What about the deployment of Next Generation 911? What about wireless public safety communications research and development? The unmistakable message of today's item is that these priorities don't matter.

It would have been easy for us to establish auction rules that would have maximized net revenues. The incentive auction would contain a minimum of two stages, and the auction would continue until a stage raised less net revenues than the preceding stage. At that point, the outcome of the preceding stage would yield the final results of the auction. By contrast, the rules contained in this item will end the auction after any stage where we can cover necessary funds for FirstNet, pay broadcasters in the reverse auction, and deposit $1.75 billion into the relocation fund.

My approach would have raised more money for the important national priorities contained in the Spectrum Act. In particular, it would have been better for FirstNet. Suppose, for example, that we head into this auction still needing to raise $4 billion for FirstNet, but no stage of the auction is able to produce more than $3 billion in net revenues. Under the Commission's approach, the incentive auction would fail and produce no money for FirstNet. Under my approach, the auction would succeed and FirstNet would receive $3 billion. As they say, a bird in the hand is worth two in the bush.

Maximizing net revenues is also the right call from an economic perspective. Spectrum should be directed to its highest value use. In some ways, that is what the concept of an incentive auction is all about. So if we must pay broadcasters $500 million to clear a channel for which wireless carriers are prepared to pay $1 billion, that's not just a win for the taxpayers but also an efficient allocation of resources. However, once we reach the point where we are paying broadcasters $1 billion to clear a channel for which wireless carriers are only prepared to pay $500 million, that's a loss to the taxpayers and an inefficient allocation of resources. But that's precisely what could happen under the rules adopted by the Commission today.

B.

This order also treats unfairly those broadcasters that choose not to participate in the auction. Congress established a $1.75 billion fund to reimburse the relocation expenses of broadcasters that choose to stay in business and will be required to relocate as a result of the incentive auction.[8] And, in my view, the Commission should have adopted a $1.75 billion budget for any repack.[9] But the Commission

[6] *Id*. § 6413(b)(5).

[7] Letter from Hon. John Cornyn, et al. to Hon. Thomas Wheeler, Chairman, FCC (May 14, 2014).

[8] *See* 47 U.S.C. § 309(j)(8)(G)(iii)(I). This fund will also reimburse multichannel video programming distributors for expenses incurred in order to continue carrying repacked broadcast television stations. *See* Spectrum Act § 6403(b)(4)(A)(ii).

[9] Because it will not be possible beforehand to calculate precisely the cost of the repack, I would have adopted a $1.75 billion budget for the estimated costs.

declines to establish any limit on estimated repacking costs. As a result, the incentive auction may produce a repacking plan that will cost $2 billion or $3 billion to implement, with repacked broadcasters stuck footing much of the bill.

This outcome would be unfair. Broadcasters that do not participate in the incentive auction are not asking for special treatment. They are not asking to be among the many winners of a successful incentive auction. Whereas wireless carriers will obtain beachfront spectrum for mobile broadband and participating broadcasters may receive substantial amounts of money, non-participating broadcasters are simply asking to be held harmless rather than being made losers. This is a reasonable request, and we should have granted it.

Indeed, I believe that this was Congress's intent. Remember that Congress specifically provided that participation in the incentive auction would be voluntary.[10] But if broadcasters that stay in business cannot recover their relocation costs, is the incentive auction truly voluntary? Think about the following scenario. I inform you that you aren't going to be allowed to stay in your house and give you a choice. Either you sell me your house or I'll seize it but give you a replica of your house for free on the lot next door. Now imagine that I present you with a different choice: Either you sell me your house or I'll seize it and give you a replica of your house on the lot next door so long as you kick in $40,000 to help defray the construction costs. Under the second scenario, am I not coercing you into selling your house?

C.

I am also concerned that today's order is unfair to rural Americans. Those who live in rural areas often rely on translators for free, over-the-air television service. The incentive auction will require many of these translators to relocate, and some may disappear entirely because there will not be room for them once spectrum is reallocated and television stations are repacked.

There is nothing that the Commission could have done to avoid these consequences entirely. But we could have done more to mitigate their impact. Specifically, when the time comes for the Commission to find room for low-power television stations and translators after repacking, we proposed in the NPRM to give a preference to applicants providing a community with its only local, over-the-air television service.

I am disappointed that the Commission rejects taking even this modest step in today's item. The fair distribution of broadcast stations has been at the core of the Commission's policies for decades, both with respect to radio and television. That policy no more implicates First Amendment concerns than our longstanding preferences for radio stations providing a community with its first or second aural service.[11] But we turn our back on that policy today.[12] As a result, there is a greater risk that some Americans will be left without *any* over-the-air television service after the incentive auction. This is wrong. As is too often the case, rural America may be left behind.

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[10] *See* Spectrum Act § 6403(a)(1).

[11] *See, e.g.*, *Revision of FM Assignment Policies and Procedures*, BC Docket No. 80-130, Second Report and Order, 90 FCC 2d 88 (1982).

[12] To be sure, the item points out that the Commission's policies promoting the fair distribution of broadcast stations have not traditionally applied to low power television stations and translators. *See Report and Order* at note 1867. But that decision was based, in part, on the existence of a full service television allotment scheme that *was* informed by those policies. *See Low Power Television and Television Translator Service*, 2 FCC Rcd 1278, 1281 (1987). And because the incentive auction will change that allotment scheme for full-power stations *without regard* to the Commission's fair distribution policies, it only makes sense to take the relatively minor step of providing a preference for displacement applications filed by low power television stations or translators that would provide a community with its only local, over-the-air television service.

D.

Additionally, I do not believe that the bidding restrictions we adopt today are fair to those carriers that have participated in past FCC auctions for low-band spectrum. The Commission today prevents nationwide carriers with at least one-third of the low-band spectrum in a given PEA from bidding for certain blocks of spectrum in that PEA. But carriers didn't commandeer that spectrum. In many cases, they bought licenses to use it at spectrum auctions.

AT&T and Verizon, for example, spent billions of dollars purchasing spectrum in the 700 MHz auction. Their participation was a good thing. It helped to make the auction a success and raised substantial amounts of money for the Treasury. And that spectrum is being used today to deliver high-speed 4G LTE service to Americans across the country. But today, we are effectively penalizing these carriers for their past participation in that auction by limiting their ability to bid in this auction.

And who do these restrictions benefit? Carriers that chose to sit out the 700 MHz auction. To be clear, that was their decision, and I do not fault them for it. It is certainly not my position to weigh in on corporate strategy. But I do object to rewarding these carriers for their failure to bid in prior auctions, as we are doing here.

To summarize, the Commission is punishing past bidders with new restrictions and rewarding those who have not participated before with set-asides. In my view, this policy creates perverse incentives. Our goal should be to encourage robust participation in *all* of our auctions rather than holding open the prospect that those who forgo participation will qualify for special favors in future auctions.

III.

Shifting from fairness to the rule of law, I do not believe that this item stays faithful to the terms of the Spectrum Act. Most importantly, our rules run afoul of Congress's mandate during the repacking process, to "make all reasonable efforts to preserve, as of the date of enactment of this Act, the coverage area and population served of each broadcast licensee, *as determined using the methodology described in OET Bulletin 69* [OET-69] *of the Office of Engineering and Technology of the Commission*."[13]

In this item, the Commission decides to use, for repacking purposes, *TVStudy* software that departs in several respects from the methodology described in OET-69. To be clear, from a policy perspective, I generally agree with the Commission's decisions in this regard. For the most part, these departures from the OET-69 methodology appear to be changes for the better. I fear, however, that they will be all for naught if a court postpones or invalidates the incentive auction having found these changes to be unlawful.

To be sure, the item spends about fifteen pages explaining why the Commission is not straying from the OET-69 methodology and thus is complying with the Spectrum Act. I know firsthand that the attorneys in our Office of General Counsel are extremely talented, and they have certainly done yeoman's work here in developing arguments to support the Commission's position. But at the end of the day, they are trying to fit a square peg into a round hole.

For the most part, the item posits that the Commission is changing "input values" rather than the OET-69 "methodology." But it is unable to point to any Commission precedent distinguishing between the two. Indeed, this argument stands in stark contrast to prior Commission pronouncements.

Consider, for example, the issue of census data. The item maintains that census data represents an input value rather than part of the OET-69 methodology. Accordingly, we are free to substitute 2010

[13] *See* Spectrum Act § 6403(b)(2) (emphasis added).

census data for 2000 census data. But this contradicts the position taken by the FCC in 2007 before the DTV transition. Then, the Commission stated as follows: "We will revise the OET 69 interference analysis *methodology* to make the results more accurate and ensure consistent methodology. Specifically, we adopt the use of 2000 census data for use in all applications . . . ."[14] In other words, we have previously recognized that switching census data means revising the OET-69 methodology.

Or take the default vertical antenna patterns set forth in Table 8 of OET-69. In 2006, the Commission described these default vertical antenna patterns as "inherent in the OET-69 methodology."[15] In this item, however, the Commission decides to use the actual beam tilt value contained in our Consolidated Database System rather than the default patterns, criticizing the latter as "using the same electrical beam tilt for every location, regardless of the actual beam tilt value." This might very well be a positive change. But the Commission's own words, it is not only a change to the OET-69 methodology, but something inherent in that methodology.

Indeed, the Commission considered making a similar change just before the DTV transition. In 2007, it considered whether to "retain the existing OET 69 vertical pattern" or use "actual vertical patterns" that "would result in more accurate modeling of station coverage."[16] And it rejected making such a change in a section with the following heading: "Post-Transition Interference Standards and Analysis *Methodology*."[17]

Given that Congress specifically instructed the Commission to use a discrete methodology (the OET-69 methodology) for a discrete event (the incentive auction), the item understandably does not claim that we have the authority to depart from the OET-69 methodology explicitly. But neither do we have the authority to do so through sleight of hand. We can't take elements that were part of the OET-69 methodology at the time the Spectrum Act was passed and simply assert by fiat that they are no longer part of that methodology but merely inputs.

But even absent Commission precedent, I would still reach the conclusion that many of the changes made in this item are unlawful. For instance, take the issue of whether to use three arc-second terrain elevation data or one arc-second terrain elevation data. The methodology described in OET-69 clearly involves the use of three arc-second data. OET-69 states that "[t]he FCC computer program is linked to a terrain elevation database with values every 3 arc-seconds of latitude and longitude."[18] Today,

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[14] *Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 07-91, Report and Order, 23 FCC Rcd 2994, 3067, para. 155 (2007) (*Third Periodic Review*).

[15] *Qualcomm Incorporated Petition for Declaratory Ruling*, WT Docket No. 05-7, Order, 21 FCC Rcd 11683, 11690 (2006) (*Qualcomm Declaratory Ruling*). The Commission seeks to distance itself from its prior description of default vertical antenna patterns as being "inherent in the OET-69 methodology" by arguing that this phrase was simply used to summarize reply comments. *See Report and Order* at note 512. However, the critical sentence, read in its entirety, makes clear that the relevant characterization was being made by the Commission, not a commenter: "As for the vertical patterns that Qualcomm will actually use, compared with the default vertical antenna patterns inherent in the OET-69 methodology, Qualcomm asserts that it re-computed its sample analyses using the actual MediaFlo antenna patterns and the results are identical under either condition." *See Qualcomm Declaratory Ruling*, 21 FCC Rcd at 11690. Moreover, the Qualcomm reply comments under discussion nowhere characterized default vertical antenna patterns as being part of the OET-69 methodology, let alone as being inherent in that methodology, again making clear that the description at issue was that of the Commission. *See* Qualcomm Inc. Reply Comments, WT Docket No. 05-7 (filed Mar. 25, 2005).

[16] *Third Periodic Review*, 23 FCC Rcd at 3071, para. 166.

[17] *Id.* at 3067 (emphasis added).

[18] OET Bulletin No. 69, at 6 (Feb. 6, 2004) (OET-69), *available at* http://go.usa.gov/84A5.

however, the Commission adopts the use of one arc-second terrain elevation data instead. The item justifies this change by arguing that OET-69's reference to three arc-second data "is a descriptive statement about an input database . . . not a prescriptive element of the OET-69 methodology."[19] This, however, is too cute by half.

For one thing, the statute requires the Commission to use the "methodology *described* in OET Bulletin 69" so calling the statement in question "descriptive" actually undermines the Commission's case. Moreover, the distinction between "an input database" and "the OET-69 methodology" is an artificial one.[20] Pursuant to the OET-69 methodology, a television station's service is evaluated at one-kilometer increments.[21] That service determination, in part, depends upon the elevation of terrain between the transmitter and each point,[22] and that elevation is determined by a terrain elevation database with values every 3 arc-seconds of latitude or longitude.[23] So the database, in reality, is part of the methodology.

Also, consider the implications of the Commission's position. For example, would it constitute a change to the OET-69 methodology to replace a terrain elevation database of the United States with a database where terrain elevations were randomly generated for each geographic location? Surely, the answer to this question must be yes. But according to the Commission's logic, the answer must be no since all that is being changed is an "input database."

Stepping back from the trees to examine the forest, there is a larger question that needs to be asked: Why is all of this being done? To be sure, the Commission maintains that certain changes had to be made to our computer software so that it could successfully support the incentive auction. And I do not object to those changes since they do not alter the OET-69 methodology. But the changes discussed above do not fall into this category. They are luxuries, not necessities. They might be nice to have, but they are not must-haves. And they certainly aren't worth the risk that a court will delay or invalidate the incentive auction because of our failure to comply with the Spectrum Act.

Turning from questions of substance to those of process, I am also troubled by the manner in which this issue has been handled. These changes should have been the subject of a notice-and-comment rulemaking. They were not. Instead, the Office of Engineering and Technology simply sought input through a Public Notice.[24] This stands in stark contrast to the last time the Commission considered

[19] *Report and Order* at para. 151.

[20] Neither of the two orders cited by the Commission, *see Report and Order* at note 453, distinguishes between an "input" and a part of a "methodology." Indeed, both of those orders were issued a decade prior to the publication of OET-69 and consequently lend no insight into what elements comprise the OET-69 methodology.

[21] *See* OET-69 at 6–7.

[22] *See Qualcomm Petition for Declaratory Ruling*, 24 FCC Rcd 13392, 13393 (2009) ("OET-69 is an engineering methodology developed to evaluate TV coverage and interference, using predictions of radio field strength at specific geographic points while accounting for the terrain between the transmitter and each specific reception point"); *Study of Digital Field Strength Standards and Testing Procedures*, ET Docket No. 05-182, Report to Congress on the Satellite Home Viewer Extension and Reauthorization Act of 2004, 20 FCC Rcd 19504, 19562 (2005).

[23] *See id*.

[24] *See Office of Engineering and Technology Releases and Seeks Comment on Updated OET-69 Software*, ET Docket No. 13-26, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 950 (Off. Engineering & Tech. 2013).

making changes to OET-69 right before the DTV transition. There, the Commission issued an NPRM and engaged in a by-the-book administrative process.[25]

I will leave it up to the courts to decide whether the process here violates the Administrative Procedure Act. I'll simply note that I don't believe that excluding the Commissioners from the deliberative process until today's vote was the right thing to do. Moreover, it is not even clear to me what today's vote means. In the item, the Commission states that it will "use *TVStudy* . . . in the incentive auction."[26] But what version of *TVStudy* will we use? We don't know because OET has been regularly releasing updated versions of the software and apparently will continue to do so even after today.

I am also disturbed by the continued confusion over whether the *TVStudy* software is operating properly. Last week, for instance, the National Association of Broadcasters (NAB) told the Commission that *TVStudy* "has yet to be capable of replicating OET-69's results. Holding the OET-69 methodology constant (i.e., using all of the calculations as they exist in OET-69 pre-TVStudy), *TVStudy* inexplicably results in a loss of coverage area for approximately 88 percent (1978 stations out of 2232)."[27] According to NAB, these findings suggest either that there are errors in our new software or that changes have been made to OET-69 that no one has been told about. The item attempts to rebut NAB's assertions, and I don't claim to have the technical expertise to know whether one side is right or the truth lies somewhere in middle.[28] Whatever the case, I would urge OET and NAB to work together collaboratively to resolve these issues. The last thing we need is another major government project going awry because of IT failures.

IV.

A year ago, I spoke of an additional principle that should guide our decision-making in this proceeding: respect for the laws of physics. As I said at the time, "we must deal with the world the way that it is, not as we might wish it were. The laws of physics aren't liberal or conservative, Democratic or Republican; they are immutable."[29]

I therefore am pleased that the band plan adopted by the Commission is consistent with this principle. It embraces the "Down from Channel 51" approach that I endorsed last May and contains guard bands and a duplex gap that are technically reasonable.[30] The journey to this band plan has been a bumpy one.[31] But I'm glad that we ended up in the right place.

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[25] *See Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 07-91, Notice of Proposed Rulemaking, 22 FCC Rcd 9478 (2007).

[26] *Report and Order* at para. 130.

[27] *See* National Association of Broadcasters Comments, ET Docket No 13-26, GN Docket No. 12-268, at 4 (May 8, 2014).

[28] *See Report and Order* at para. 161. I am nevertheless troubled that by item's statement that "*TVStudy* is not designed to produce the identical results produced by earlier software," *id.*, to the extent this means that *TVStudy* is not designed to replicate the earlier software's output of coverage area and population served for each station even if both programs are given the same inputs.

[29] Opening Remarks of Commissioner Ajit Pai at CTIA 2013's Panel on the Spectrum Incentive Auctions: Step Right Up!, Las Vegas, Nevada, at 1 (May 22, 2013).

[30] *See id*.

[31] *Wireless Telecommunications Bureau Seeks to Supplement Band the Record on the 600 MHz Band Plan*, GN Docket No. 12-268, Public Notice, 28 FCC Rcd 7414 (Wireless Telecommunications Bur. 2013); Statement of Commissioner Ajit Pai on the Public Notice of the Wireless Telecommunications Bureau to Supplement the Record on the 600 MHz Band Plan at 2 (May 17, 2013) (criticizing Public Notice for "refocus[ing] the agency's and the public's attention on a variety of band plans with little or no support in the record").

Going forward, however, I am concerned by our proposal to make available six megahertz in the duplex gap for unlicensed broadband device operations without any analysis that doing so is technically possible without harming the licensed services surrounding that gap. We should have sought comment in a neutral manner on whether the duplex gap should be available for unlicensed operations, wireless microphones, or any use at all. I am all in favor of making more spectrum available for unlicensed use. If we can do so here without causing interference to the licensed spectrum we will be auctioning, that is something we should seriously consider. But I am worried that we may be making promises that the laws of physics won't allow us to keep.

V.

Last but not least, a brief word about delegation. I do not dispute that for the incentive auction to be a success, we must delegate certain tasks to the Commission's talented staff. But today's item moves too much responsibility away from the five Commissioners who have been appointed by the President and confirmed by the Senate, and who theoretically "direct[]" the agency.[32]

I objected to no fewer than ten such delegations of authority. I'll mention just three of them here. First, the Commission delegates to the Media Bureau the authority to decide how to allocate money if the expenses incurred by broadcasters and MVPDs are greater than the $1.75 billion contained in the relocation fund.[33] In my view, this issue implicates policy judgments that should be made by the Commission. Second, we delegate to the Media Bureau the authority to establish a set of construction deadlines for relocated broadcast stations.[34] Once again, I believe that such decisions are important enough to be made by the Commission. And third, we delegate to a broad range of Bureaus and Offices the authority to change the rules adopted in this item as necessary to conform them to the text of the Order.[35] This last delegation, in particular, I find curious. I had always thought that the Commission's orders were designed to explain the rules that we adopt and intend to publish in the Code of Federal Regulations, not the other way around.

* * *

To conclude, I am disappointed with where we find ourselves today. Conducting the incentive auction is one of the FCC's most prominent responsibilities, and it would have been ideal to move forward on a bipartisan basis. But fundamental decisions about the shape of this item were made long ago, and while I cannot speak for my colleagues, they were made without my input. I cannot, in good conscience, endorse those decisions when I believe that they: (1) will produce an incentive auction that is unnecessarily complicated; (2) are not fair to all stakeholders; and (3) are not faithful to the terms of the Spectrum Act. For all of these reasons, I must respectfully dissent.

[32] "What We Do," http://www.fcc.gov/what-we-do (last visited May 14, 2014).

[33] *See Report and Order* at para. 650.

[34] *Id*. at para. 560.

[35] *Id*. at para. 811.

DISSENTING STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY

Re: *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268.

Let me start by thanking the Incentive Auction Task Force and all of the Commission staff who worked long hours to get us to this point. I appreciate your incredible efforts to consider the many complex legal and technical challenges posed by this Broadcast Incentive Auction. I took my obligation to dig deeply into the voluminous item before us very seriously, and I am immensely grateful for the numerous briefings provided to me and my staff, some of which went late into the evening.

Unfortunately, I must dissent from the order. Although the bidding restrictions are embedded in the separate Mobile Spectrum Holdings item that the Commission also adopts today, these two orders are inextricably linked. Bifurcating them does not allow me to ignore Congressional intent or my own principles. Establishing a spectrum set-aside for well-capitalized companies is so fundamentally harmful that it taints the entire Incentive Auction process and I genuinely fear the auction may fail as a result. Separately, I have a number of other fundamental concerns about the Incentive Auction structure itself that should have been addressed.

First, I disagree with the item's "final stage rule," which will determine whether the auction can successfully close. In the order, the auction can end once enough revenue is raised to cover the payout to the participating stations, the Commission's administrative expenses, the $1.75 billion repacking budget for the remaining broadcasters, and any remaining amount that is needed to pay for the First Responder Network Authority (FirstNet). While I strongly support meeting the statutory funding target for FirstNet, I do not believe the Commission has the right to pick and choose which of the Congressional funding priorities it is going to favor. The simple fact is Congress has already allocated the funding expected from a successful Incentive Auction for many purposes. Accordingly, the final stage rule should continue the auction until it has raised as much revenue as it can beyond the payments to effectuate the reallocation of broadcast spectrum to wireless broadband use—with the remaining revenues going to the list of Congress' priorities. Or it should incorporate all of the items, including deficit reduction, into the final stage rule. Choosing just one program for guaranteed funding smacks of politics and tarnishes the agency's credibility.

Second, I am concerned about the extent to which the order delegates authority to various bureaus to make important decisions to implement the statute. As I have stated before, such decisions should be voted on at the Commission level. For example, the Media Bureau is given broad authority to determine how the Commission reimburses repacking costs, including how to prioritize allocation of funds if $1.75 billion does not cover all repacking expenses. The Media Bureau will also decide the specific construction deadlines for individual stations, what service rule waivers will be allowed in lieu of reimbursement of repacking costs, and the priority in which the Commission will consider certain broadcaster requests to change channels following the repacking process. At least, as of now, the Auction Comment and Procedures Public Notices—normally done by the Wireless Telecommunications Bureau—will be considered and voted on by the Commissioners.

Third, although the Commission is adopting rules now, it defers to future rulemakings or public notices specific details about how many of these rules will work. For instance, the Commission acknowledges that it needs additional information on how to set prices for the reverse auction. Further consideration will also occur on the extended round rule, which can be used to continue the auction if the revenue raised to clear a certain spectrum target is close but not quite enough to meet the final stage rule. The item also defers deciding the methodology for preventing adjacent and co-channel interference

between wireless and broadcasting services in impaired markets and determining an aggregate interference cap for broadcasters. Too many important pieces are punted to a later day, especially since the item admits that decisions made today may be "refined" in the future. So, instead of establishing a solid framework with a firm foundation, these may be, at best, temporary decisions.

Fourth, I have serious concerns about the questionable dynamic reserve price mechanism whereby broadcasters could accept the Commission's offer to cease broadcasting only to have the Commission request to lower that amount afterwards if there is a lack of competition. Although the specifics must be worked out, I worry about establishing a mechanism that could cause more market impairments, thereby lowering auction participation and revenues. We should do all we can to avoid market impairments, except in very extreme circumstances.

Fifth, I am worried that the adoption of a standardized 11 megahertz duplex gap, instead of 6 to 11 megahertz depending on the spectrum clearing target as originally contemplated, was an unnecessary change, not a decision grounded solely on what is technically reasonable to prevent harmful interference. I am a strong proponent of unlicensed services and have backed up my words with actions, but I have very real concerns that the uniform duplex gap is a political solution, potentially exposing the American taxpayers to a significant loss of revenue in any auction except one that clears 84 megahertz of spectrum.

Finally, I will suggest that there are legitimate questions as to whether this item complies with the requirement in the statute to protect the broadcasters who chose not to participate in the auction and their corresponding viewers. The item seems to skid across the line in a couple of instances and I expect a court may find difficulty in supporting the Commission here, notwithstanding any normal deference given. Congress was abundantly clear that it wanted to hold harmless non-participating broadcasters in their ability to serve their over-the-air viewers. I am disappointed to see this directive not sufficiently honored.

Although I respectfully dissent on today's item, I recognize that this auction is of utmost importance. Americans will benefit from putting the spectrum to its highest valued use, the construction of a public safety network and deficit reduction. I hope to collaborate with my colleagues and the entire Incentive Auction Team going forward to ensure that this auction has the greatest chance at success. A lot of uncertainty remains and many details still need to be finalized, but I am hoping for the best.