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

In the Matter of	)	
	)	
Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands	)	WT Docket No. 12-70
	)	
Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz	)	ET Docket No. 10-142
	)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands	)	WT Docket No. 04-356

REPORT AND ORDER AND ORDER OF PROPOSED MODIFICATION

Adopted: December 11, 2012 **Released: December 17, 2012**

By the Commission:

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I. INTRODUCTION

1. With this Report and Order, we increase the Nation's supply of spectrum for mobile broadband by adopting flexible use rules for 40 megahertz of spectrum in the 2 GHz band (2000-2020 MHz and 2180-2200 MHz), which we term the AWS-4 band. In so doing, we carry out a recommendation in the *National Broadband Plan* that the Commission enable the provision of stand-alone terrestrial services in the 2 GHz Mobile Satellite Service (MSS) spectrum band, thus dramatically increasing the value of this spectrum to the public.[1] Specifically, we remove regulatory barriers to mobile broadband use of this spectrum, and adopt service, technical, and licensing rules that will encourage innovation and investment in mobile broadband and provide certainty and a stable regulatory regime in which broadband deployment can rapidly occur.

[1] *See infra* ¶ 4.

2. To create a solid and lasting foundation for the provision of terrestrial services in this spectrum and to make this spectrum available efficiently and quickly for flexible, terrestrial use, such as mobile broadband, we will assign the spectrum to the incumbent MSS operators. Thus, together with this Report and Order, we issue an Order of Proposed Modification, proposing to replace the incumbent MSS operators' Ancillary Terrestrial Component (ATC) authority with full flexible use terrestrial authority. Additionally, we decline to adopt the alternative band plan proposals presented in the *AWS-4 NPRM and NOI*, including shifting the AWS-4 uplink spectrum up five or ten megahertz or further exploring the larger and more complex 2 GHz Extension Band Concept.[2]

II. BACKGROUND

A. The Growing Spectrum Demands of Mobile Broadband Services

3. Demand for wireless broadband services and the network capacity associated with those services is surging, resulting in a growing demand for spectrum to support these services. Adoption of smartphones increased at a 50 percent annual growth rate in 2011, from 27 percent of U.S. mobile subscribers in December 2010 to nearly 42 percent in December 2011.[3] Further, consumers have rapidly adopted the use of tablets, which were first introduced in January of 2010.[4] By the end of 2012, it is estimated that one in five Americans—almost 70 million people—will use a tablet.[5] Between 2011 and 2017, mobile data traffic generated by tablets is expected to grow at a compound annual growth rate of 100 percent.[6] New mobile applications and services, such as high resolution video communications, are also using more bandwidth. For example, a single smartphone can generate as much traffic as thirty-five basic-feature mobile phones,[7] while tablets connected to 3G and 4G networks use three times more data than smartphones over the cellular network.[8] All of these trends, in combination, are creating an urgent need for more network capacity and, in turn, for suitable spectrum.

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[2] *See Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands*, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, *Notice of Proposed Rulemaking and Notice of Inquiry*, 27 FCC Rcd 3561, 3570-3571, 3577, 3607-3611 ¶¶ 21, 42-43, 137-147 (2012) (*AWS-4 NPRM* and *AWS-4 NOI*, respectively); *infra* Sections III.A.1. (AWS-4 Frequencies and Paired Spectrum (uplink/downlink), VI. (Notice of Inquiry: 2 GHz Extension Band Concept).

[3] comScore 2012 Mobile Future in Focus (2012) at 16 http://www.comscore.com/Press_Events/Presentations_Whitepapers/2012/2012_Mobile_Future_in_Focus (last visited Nov. 30, 2012).

[4] Implementation of Section 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, 9754 ¶ 145 (*Fifteenth Mobile Wireless Competition Report*).

[5] Press Release, eMarketer, *Tablet Shopping Growing, but Retailers Must Keep Up* (June 15, 2012), *available at* http://www.emarketer.com/Article.aspx?R=1009120&ecid=a6506033675d47f881651943c21c5ed4 (last visited Nov. 30, 2012).

[6] Ericsson, Traffic and Market Report: On the Pulse of the Networked Society (June 2012), available at http://www.ericsson.com/res/docs/2012/traffic_and_market_report_june_2012.pdf (last visited Nov. 30, 2012).

[7] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016 (February 2012), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html (last visited Nov. 30, 2012).

[8] Kevin Fitchard, 3G/4G tablets suck up 3x more data than smartphones, GIGAOM, May 15, 2012, available at http://gigaom.com/mobile/study-3g4g-tablets-suck-up-3x-more-data-than-smartphones/ (last visited Nov. 30, 2012).

4. The widely-acknowledged need for more broadband spectrum has spurred several initiatives across the U.S. government. The 2010 *National Broadband Plan* recommended the Commission undertake to make 500 megahertz of spectrum available for broadband use within ten years, including 300 megahertz within five years.[9] The Commission has taken numerous steps to achieve these goals, including recently adopting a notice of proposed rulemaking on conducting the world's first incentive auction to repurpose broadcast spectrum for wireless broadband use,[10] and updating the Commission's rules for the 2.3 GHz Wireless Communications Service (WCS) band to permit the use of the most advanced wireless technologies in that band.[11] Similarly, the Administration has recognized the need to make more spectrum available for broadband. In 2010, the President directed the National Telecommunications and Information Administration (NTIA) to collaborate with the Commission to "make available a total of 500 MHz of Federal and non-Federal spectrum over the next ten years, suitable for both mobile and fixed wireless broadband use."[12] NTIA undertook a "fast-track" review of several bands that could be reallocated to mobile use[13] and proposed exploring Federal / non-Federal sharing of the 1755-1850 MHz band.[14]

B. The Spectrum Act

5. In February 2012, Congress enacted Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (the "Spectrum Act").[15] The Spectrum Act includes several provisions to make more spectrum available for commercial use, including through auctions, and to improve public safety communications.[16] Among other things, the Spectrum Act requires the Commission, by February 23, 2015, to allocate the 1915-1920 MHz band and the 1995-2000 MHz band (collectively, the "H Block") for commercial use, and to auction and grant new initial licenses for the use of each spectrum band, subject to flexible use service rules.[17] Congress provided, however, that if the Commission determined

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[9] Connecting America: The National Broadband Plan, Recommendation 5.8 at 84-85 (2010) (*National Broadband Plan*), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296935A1.pdf (last visited Nov. 30, 2012)

[10] *See* Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Docket No. 12-268, *Notice of Proposed Rulemaking*, 27 FCC Rcd 12357 (2012) (*Incentive Auction NPRM*); *National Broadband Plan* at 81-82.

[11] *See* 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 (2012) (*2012 WCS Order*); *see also, 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, GEN Docket No. 90-357, RM-8610, *Report and Order and Second Report and Order*, 25 FCC Rcd 11710 (2010) (*2010 WCS Order*).

[12] Memorandum of June 28, 2010—Unleashing the Wireless Broadband Revolution, 75 Fed. Reg. 38387 (July 1, 2010).

[13] *See* U.S. Department of Commerce, *An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands* (Oct. 2010), available at http://www.ntia.doc.gov/reports/2010/FastTrackEvaluation_11152010.pdf ("*NTIA Fast Track Report*") (last visited Nov. 30, 2012).

[14] *See NTIA Fast Track Report* at pp. 2-3-2-5.

[15] *See generally* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) (Spectrum Act).

[16] Spectrum Act §§ 6001-6703.

[17] *See* Spectrum Act § 6401(b), codified at 47 U.S.C. § 1451(b).

that either of the bands could not be used without causing harmful interference to commercial licensees in 1930-1995 MHz (PCS downlink), then the Commission was prohibited from allocating that specific band for commercial use or licensing it.[18] Additionally, Sections 6401(f) and 6413 of the Spectrum Act specify that the proceeds from an auction of licenses in the 1995-2000 MHz band and in the 1915-1920 MHz band shall be deposited in the Public Safety Trust Fund and then used to fund the Nationwide Public Safety Broadband Network ("FirstNet").[19] The H block spectrum could be the first spectrum specified by the Spectrum Act to be licensed by auction, and thus could represent the first inflow of revenues toward this statutory goal.[20]

C. MSS and Terrestrial Use in the 2 GHz Band

6. As the Commission explained in the *AWS-4 NPRM*, in 1997 the Commission reallocated 70 megahertz of spectrum in the 2 GHz band from a terrestrial Fixed and Mobile allocation to a Mobile Satellite allocation.[21] MSS is a radiocommunication service involving transmission between mobile earth stations and one or more space stations.[22] The Commission intended for MSS to provide communications in areas where it is difficult or impossible to provide communications coverage via terrestrial base stations and at times when coverage may be unavailable from terrestrial-based networks.[23] The Commission adopted MSS rules for the 2 GHz band in 2000,[24] and in 2001 the International Bureau authorized eight satellite operators to provide MSS in this band.[25] By February 2003, the International Bureau cancelled three MSS authorizations for failure to meet their system implementation milestones.[26]

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[18] *See* Spectrum Act § 6401(b)(4), codified at 47 USC § 1451(b)(4).

[19] Spectrum Act §§ 6401(f), 6413, codified at 47 U.S.C. §§ 309(j)(8)(D)(ii), 1457. Amounts remaining in the Public Safety Trust Fund after fiscal year 2022 are required to be deposited into the Treasury's general fund for the purpose of deficit reduction.

[20] Concurrently with the issuance of this Report and Order, the Commission is issuing a Notice of Proposed Rulemaking that proposes service, technical, and licensing rules for the H block. *See generally*, Service Rules for the 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, WT Docket No. 12-357, *Notice of Proposed Rulemaking*, FCC 12-152 (rel. Dec. 17, 2012) (*H Block NPRM*).

[21] *AWS-4 NPRM*, 27 FCC Rcd at 3563-64 ¶ 3 (*citing* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, *First Report and Order and Further Notice of Proposed Rule Making*, 12 FCC Rcd 7388 at 7391, 7395 ¶¶ 5-6, 14 (1997)).

[22] *See* 47 C.F.R. § 2.1(c).

[23] *See* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, IB Docket No. 01-185, ET Docket No. 95-18, *Notice of Proposed Rulemaking*, 16 FCC Rcd 15532 ¶ 1 (2001).

[24] Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, IB Docket No. 99-81, *Report and Order*, 15 FCC Rcd 16127 (2000).

[25] Third Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services, Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services, IB Docket Nos. 09-16, IB Docket No. 10-99, *Third Report*, 26 FCC Rcd 17284, 17310 ¶ 56 (2011) (*Third Satellite Competition Report*).

[26] Mobile Communications Holdings, Inc. and ICO Global Communications (Holdings) Limited for Transfer of Control, *Memorandum Opinion and Order*, 18 FCC Rcd 1094, 1099-1103 ¶¶15-24 (2003); Application of Globalstar, L.P. for Modification of License for a Mobile-Satellite Service System in the 2 GHz Band, *Memorandum Opinion and Order*, 18 FCC Rcd 1249, 1251-55 ¶¶ 6-15 (2003).

7. At the same time, the Commission took two actions in this band to respond to the growth in terrestrial wireless services. First, the Commission reallocated 30 megahertz of MSS spectrum for terrestrial Fixed and Mobile use, reducing the spectrum allocated to MSS to 40 megahertz.[27] Second, the Commission established ATC rules, which allowed authorized MSS operators to augment their satellite services with terrestrial facilities.[28] ATC consists of terrestrial base stations and mobile terminals that re-use frequencies assigned for MSS operations.[29] To ensure that ATC would be ancillary to the provision of MSS, the Commission determined that ATC authority would be limited to MSS operators who met specific "gating" criteria.[30]

8. Significantly, in establishing ATC, the Commission determined that only existing MSS operators would be permitted to receive ATC authority. The Commission found that:

> [S]haring between MSS and terrestrial mobile services is neither advisable, nor practical. Revocation of the authority of operational MSS systems and those MSS licenses that have met their implementation milestones in good faith is unreasonable and unwarranted. And our detailed technical analyses demonstrate that a third party cannot operate in the licensed MSS spectrum without compromising the operations of existing and future MSS licensees.[31]

Further, "based on the record and our detailed technical analysis, . . . granting shared usage of the same MSS frequency band to separate MSS and terrestrial operators would likely compromise the effectiveness of both systems."[32] Therefore, the Commission decided against adopting a licensing framework that would allow the acceptance of mutually exclusive applications that would be resolved by auction and instead concluded that ATC authority would be granted through a license modification.[33]

9. Three additional MSS operators surrendered their licenses in 2005.[34] This left only two MSS operators in the 2 GHz band, DBSD (then known as ICO) and TerreStar (then known as TMI), each of which had the right to use 20 megahertz of 2 GHz band spectrum to provide MSS.[35]

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[27] Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, IB Docket No. 99-81 RM-9911, RM-9498, RM-10024, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223, 2238-40 ¶¶ 28-32 (2003) (*AWS Third Report and Order*).

[28] *See* Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, IB Docket Nos. 01-185, 02-364, *Report and Order and Notice of Proposed Rulemaking*; 18 FCC Rcd 1962, 1964 ¶ 1 (2003) (*ATC Report and Order*).

[29] *See* Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, *Report and Order*, 26 FCC Rcd 5710, 5711-12 ¶ 5 (2011) (*2 GHz Band Co-Allocation Report and Order*).

[30] 47 C.F.R. § 25.149(b); *ATC Report and Order*, 18 FCC Rcd at 1990-95, 2068-71 ¶¶ 47-55, 221-26; *see ATC Report and Order*, 18 FCC Rcd at 1999-2011 ¶¶ 66-93 (gating criteria); Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands, IB Docket No. 01-185, *Memorandum Opinion and Order and Second Order on Reconsideration*, 20 FCC Rcd 4616, 4625-26 ¶¶ 24-27 (2005) (*ATC Second Reconsideration Order*).

[31] *ATC Report and Order*, 18 FCC Rcd at 1999 ¶ 65.

[32] *Id*. at 1965 ¶ 2; *see also id.* at 1993 ¶ 52.

[33] *See id.* at 2068-69 ¶ 221.

[34] *Third Satellite Competition Report*, 26 FCC Rcd at 17310 ¶ 56.

10. DBSD and TerreStar launched their satellites in April 2008 and July 2009, respectively, and met their operational milestones in May 2008 and August 2009, respectively.[36] DBSD and TerreStar received ATC authority in 2009 and 2010, respectively.[37] Despite having MSS and ATC authority and an orbiting satellite, DBSD never offered either commercial satellite or terrestrial service and TerreStar offered only minimal satellite service (partnering with AT&T to offer a non-ATC satellite/terrestrial service using AT&T terrestrial spectrum and TerreStar satellite spectrum).[38] To date, there remains little commercial use of this spectrum for MSS and none for terrestrial (ATC) service.[39]

11. The *National Broadband Plan* in 2010 recommended that the FCC "accelerate terrestrial deployment in 90 megahertz" of MSS spectrum.[40] The *National Broadband Plan* proposed different approaches to expanding terrestrial services in different MSS bands.[41] For the 2 GHz MSS band, the Plan recommended that the "FCC should add a primary 'mobile' (terrestrial) allocation to the S-Band, consistent with the international table of allocations, which will provide the option of flexibility to licensees to provide stand-alone terrestrial services using the spectrum."[42] Additionally, the Plan recommended that "[e]xercise of this option should be conditioned on construction benchmarks, participation in an incentive auction, or other conditions designed to ensure timely utilization of the spectrum for broadband and appropriate consideration for the step-up in the value of the affected spectrum."[43]

12. In July 2010, the Commission issued a Notice of Proposed Rulemaking proposing to add Fixed and Mobile allocations to the 2000-2020 MHz and 2180-2200 MHz bands.[44] The Commission adopted this proposal in April 2011, thereby establishing the predicate for more flexible use of the band

(Continued from previous page)

[35] *See* Use of Returned Spectrum in the 2 GHz Mobile Satellite Service Frequency Bands, IB Docket Nos. 05-220, 05-221, *Order*, 20 FCC Rcd 19696 at 19707 ¶ 26 (2005). Prior to this action, DBSD and TerreStar shared this spectrum allocation equally with the other MSS operators.

[36] *See* Improving Public Safety Communications in the 800 MHz Band, WT Docket No. 02-55, ET Docket No. 00-258, ET Docket No. 95-18, *Fifth Report and Order, Eleventh Report and Order, Sixth Report and Order, and Declaratory Ruling*, 25 FCC Rcd 13874, 13877 ¶ 7 (2010) (*2010 BAS Ruling*).

[37] New ICO Satellite Services G.P., Application for Blanket Authority to Operate Ancillary Terrestrial Component Base Stations and Dual-mode MSS/ATC Mobile Terminals in the 2 GHz MSS Bands, *Order and Authorization*, 24 FCC Rcd 171 (2009) (*ICO Waiver Order*); TerreStar Networks Inc., Application for Blanket Authority to Operate Ancillary Terrestrial Component Base Stations and Dual-Mode MSS/ATC Mobile Terminals in the 2 GHz MSS Bands, *Order and Authorization*, 25 FCC Rcd 228 (2010) (*TerreStar Waiver Order*).

[38] *Fifteenth Mobile Wireless Competition Report*, 26 FCC Rcd at 9701 ¶ 38 n.98.

[39] *See* Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, *Notice of Proposed Rulemaking and Notice of Inquiry*, 25 FCC Rcd 9481, 9483 ¶ 6 (2010) (*MSS Fixed and Mobile Allocation NPRM*) ("The deployment of MSS and ATC in the 2 GHz band has been a slow process.").

[40] *National Broadband Plan*, Recommendation 5.8.4 at 87-88.

[41] *Id.* at 88.

[42] *Id.* at 87-88.

[43] *Id.* at 87-88.

[44] Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz, ET Docket No. 10-142, *Notice of Proposed Rulemaking and Notice of Inquiry*, 25 FCC Rcd 9481 (2010) (*2 GHz Band Co-Allocation NPRM* and *2010 MSS NOI*, respectively).

for terrestrial mobile broadband services.[45] The Commission also declared its intent to initiate a service rules rulemaking proceeding, stating that "having added co-primary Fixed and Mobile allocations to the 2 GHz band, we anticipate issuing a notice of proposed rulemaking on subjects raised in the *2010 MSS NOI*, including possible service rule changes that could increase investment and utilization of the band in a manner that further serves the public interest."[46] The Commission expected that this rulemaking would include an examination of the relationship of the 2 GHz band with neighboring bands.[47]

13. In May 2011, the Commission's Spectrum Task Force issued a public notice requesting technical input on approaches to encourage the growth of terrestrial mobile broadband services in the 2 GHz spectrum range that is allocated for fixed and mobile use. Specifically, the Spectrum Task Force sought information on "developing a cohesive approach that maximizes the terrestrial mobile broadband potential of this spectrum."[48] The public notice specifically focused on the 2 GHz MSS band and neighboring Advanced Wireless Services (AWS) blocks, including the AWS-2 Upper "H" block spectrum at 1995-2000 MHz; the AWS-2 paired "J" block spectrum at 2020-2025 MHz and 2175-2180 MHz; and the AWS-3 spectrum at 2155-2175 MHz.[49] In response, several parties offered comments on potential changes to the existing 2 GHz MSS band plan.[50]

14. In 2011, DISH Network Corporation (DISH) acquired both TerreStar and DBSD out of bankruptcy, paying approximately $1.4 billion for each company.[51] DISH filed applications with the Commission for approval to transfer control of the MSS licenses, including ATC authority, of each of TerreStar and DBSD to two separate subsidiary companies of DISH.[52] At the same time, DBSD and TerreStar filed requests to modify their respective ATC authorities, including for a waiver of certain non-technical ATC rules, such as the integrated service and spare satellite rules, and of certain ATC technical rules.[53] On March 2, 2012, the International Bureau granted the applications for transfer of control of the MSS licenses, including ATC authority, of DBSD and TerreStar to DISH. As a result, in New DBSD

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[45] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5710 ¶ 2.

[46] *Id.* at 5716 ¶ 13.

[47] *Id.* at 5716 ¶ 13.

[48] Spectrum Task Force Invites Technical Input on Approaches to Maximize Broadband Use of Fixed/Mobile Spectrum Allocations in the 2 GHz Range, ET Docket No. 10-142, WT Docket Nos. 04-356, 07-195, *Public Notice*, 26 FCC Rcd 7587 (2011) (*2 GHz Public Notice*).

[49] *See generally*, *2 GHz Public Notice*, 26 FCC Rcd 7587.

[50] *See, e.g.*, Comments of TerreStar Networks Inc., ET Docket No. 10-142, WT Docket Nos. 04-356, 07-195 (July 8, 2011); Comments of T-Mobile USA, Inc., ET Docket No. 10-142, WT Docket Nos. 04-356, 07-195 (July 8, 2011); Comments of Ericsson, ET Docket No. 10-142, WT Docket Nos. 04-356, 07-195 (July 8, 2011).

[51] *See* DISH Network Corporation Files to Acquire Control of Licenses and Authorizations Held By New DBSD Satellite Services G.P, Debtor-in-Possession and TerreStar License Inc., Debtor-in-Possession, IB Docket No. 11-150, *Public Notice*, 26 FCC Rcd 13018 (2011) (*DBSD and TerreStar Transfer of Control Public Notice*); http://www.sec.gov/Archives/edgar/data/1001082/000110465911061256/a11-25886_110q.htm#TableOfContents (last visited Dec. 10, 2012).

[52] *See* DISH Network Corporation Files to Acquire Control of Licenses and Authorizations Held By New DBSD Satellite Services G.P, Debtor-in-Possession and TerreStar License Inc., Debtor-in-Possession, IB Docket No. 11-150, *Public Notice*, 26 FCC Rcd 13018, 13020-1 (2011) (*DBSD and TerreStar Transfer of Control Public Notice*).

[53] New DBSD Satellite Service G.P., Debtor-in-Possession, and TerreStar Licensee Inc., Debtor-In-Possession, Request For Rule Waivers And Modified Ancillary Terrestrial Component Authority, IB Docket No. 11-149, *Public Notice*, 26 FCC Rcd 13011 (2011); *see* 47 C.F.R. §§ 25.149(b)(2), (4), 25.252.

Satellite Services G.P., a wholly owned subsidiary of DISH, obtained control of the former DBSD MSS license, including ATC authority, and Gamma Acquisition L.L.C., also a wholly owned subsidiary of DISH, obtaining control of the former TerreStar MSS license, including ATC authority.[54] In granting these applications, the International Bureau denied the non-technical rule waiver requests and deferred to the technical rule waivers to a rulemaking proceeding, stating that "[s]ince the release of the National Broadband Plan . . . the Commission has been clear about its intent to remove regulatory barriers in this band through a rulemaking to unleash more spectrum for mobile broadband."[55]

15. In March 2012, the Commission adopted the *AWS-4 NPRM*, which consisted of a Notice of Proposed Rulemaking and Notice of Inquiry.[56] In the *AWS-4 NPRM*, the Commission proposed to increase the Nation's supply of spectrum for mobile broadband by removing barriers to flexible use of spectrum currently assigned to the MSS.[57] The Commission proposed terrestrial service rules for the 2 GHz band that would generally follow the Commission's Part 27 flexible use rules, modified as necessary to account for issues unique to the particular spectrum bands.[58] The proposed rules were designed to provide for flexible use of this spectrum, to encourage innovation and investment in mobile broadband, and to provide a stable regulatory environment in which broadband deployment could develop.[59] The proposed rules also included aggressive build-out requirements and concomitant penalties for failure to build out designed to ensure timely deployment of wireless, terrestrial broadband in the band.[60] Additionally, in the Notice of Inquiry, the Commission sought comment on potential ways to free up additional valuable spectrum to address the Nation's growing demand for mobile broadband spectrum, including through examination of alternative band plans incorporating the Federal 1695-1710 MHz band.[61]

16. Comments on the *AWS-4 NPRM* were due by May 17, 2012 and reply comments were due by June 1, 2012. Thirty-four comments and twenty-one reply comments were filed in response to the *AWS-4 NPRM*. A list of commenters and reply commenters can be found in Appendix C. In addition, as permitted under our rules, there have been ex parte presentations.[62]

III. REPORT AND ORDER: AWS-4

17. In this *AWS-4 Report and Order*, we build on the Commission's recent actions to increase the availability of spectrum by enabling terrestrial mobile broadband service in 40 megahertz of spectrum in the 2000-2020 MHz and 2180-2200 MHz spectrum bands.[63] As explained below, we adopt

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[54] New DBSD Satellite Service G.P., Debtor-in-Possession, and TerreStar Licensee Inc., Debtor-In-Possession, Request for Rule Waivers and Modified Ancillary Terrestrial Component Authority, IB Docket Nos. 11-149, 11-150, *Order*, 27 FCC Rcd 2250, 2251, 2255, 2262 ¶¶ 1, 13, 31, 33 (2012) (*DISH Transfer Order*).

[55] *DISH Transfer Order*, 27 FCC Rcd at 2261-62 ¶¶ 29, 34.

[56] *See AWS-4 NPRM*, 27 FCC Rcd 3561.

[57] *Id.* at 3563 ¶ 1.

[58] *Id.* at 3594 ¶ 103.

[59] *Id.* at 3563 ¶ 1.

[60] *Id.* at 3589-3592 ¶¶ 90-98.

[61] *Id.* at 3607-3611 ¶¶ 138-147.

[62] *See* 47 C.F.R. § 1.1415(d); 47 C.F.R. §§ 1.1200-1.1216.

[63] The 2000-2020 MHz and 2180-2200 MHz bands are the fourth spectrum bands that the Commission has sought to make available for Advanced Wireless Service (AWS) use. The Commission assigned licenses for the 1710-1755 (continued….)

AWS-4 terrestrial service, technical, and licensing rules that generally follow the Commission's Part 27 flexible use rules, modified as necessary to account for issues unique to the AWS-4 bands. First, we establish 2000-2020 MHz paired with 2180-2200 MHz as the AWS-4 band plan.

18. Second, we adopt appropriate technical rules for operations in the AWS-4 band. This includes rules governing the relationship of the AWS-4 band to other bands. For example, as explained below, we require the licensees of AWS-4 operating authority to accept some limited interference from operations in the adjacent upper H block at 1995-2000 MHz, and impose more stringent out-of-band emission (OOBE) limits and power limits on these licensees to protect future operations in 1995-2000 MHz. With respect to adjacent operations at 2200 MHz, we permit operator-to-operator agreements to address concerns regarding interference and also establish default rules to protect against harmful interference. Further, we require licensees of AWS-4 authority to comply with the OOBE limits contained in a private agreement entered into with the Global Positioning Systems (GPS) industry.

19. Third, mindful that AWS-4 spectrum is now allocated on a co-primary basis for Mobile Satellite and for terrestrial Fixed and Mobile services and that MSS licensees already have authorizations to provide service in the band,[64] we determine that the AWS-4 rules must provide for the protection of 2 GHz MSS systems from harmful interference caused by AWS-4 systems.[65] In addition, consistent with our determination below to grant AWS-4 terrestrial operating authority to the incumbent 2 GHz MSS licensees, we propose to assign terrestrial rights by modifying the MSS operators' licenses pursuant to Section 316 of the Communications Act.

20. Fourth, we adopt performance requirements for the AWS-4 spectrum. Specifically, licensees of AWS-4 operating authority will be subject to build-out requirements that require a licensee to provide terrestrial signal coverage and offer terrestrial service to at least 40 percent of its total terrestrial license areas' population within four years, and to at least 70 percent of the population in each of its license areas within seven years, and will be subject to appropriate penalties if these benchmarks are not met.

21. Fifth, we adopt a variety of regulatory, licensing, operating, and relocation and cost sharing requirements for licensees of AWS-4 operating authority.

(Continued from previous page)
MHz and 2110-2155 MHz bands (AWS-1) in 2003. 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 (2003) (*AWS-1 Report and Order*); *modified by* 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 (2005). The Commission proposed licensing as AWS spectrum the following bands: AWS-2 (H blocks: 1915-1920 MHz and 1995-2000 MHz; and J blocks: 2020-2025 MHz and 2175-2180 MHz) in 2004; AWS-3 (2155-2180 MHz) in 2007 and 2008, Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands, WT Docket No. 04-356, Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 19 FCC Rcd 19263 (2004) (*AWS-2 NPRM*); Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, WT Docket No. 07-195, *Notice of Proposed Rulemaking*, 22 FCC Rcd 17035 (2007) (*AWS-3 NPRM*), and Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band, WT Docket No. 07-195, *Further Notice of Proposed Rulemaking*, 23 FCC Rcd 9859 (2008) (*2008 Further Notice*), respectively. The Commission has yet to adopt service rules or assign licenses for the AWS-2 and AWS-3 bands, but is issuing a rulemaking to adopt service rules for and subsequently assign the AWS-2 H block spectrum concurrently with this Report and Order. *See H Block NPRM.*

[64] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5714-16 ¶¶ 8-13.

[65] *See infra* Section III.C. (Protection of MSS Operations). Unless otherwise indicated, the term "AWS-4" refers to terrestrial service and the term "2 GHz MSS" refers to satellite service in the 2 GHz frequencies discussed in this item.

22. Sixth, we eliminate the ATC rules for the 2 GHz MSS band and propose to modify the 2 GHz MSS operators' licenses to eliminate their ATC authority.

23. Seventh, consistent with the scope of the *AWS-4 NPRM*, we take no action on the Commission's ATC rules for other MSS bands.[66]

24. In reaching these conclusions below, we consider other possible outcomes for this spectrum, proposed in the *AWS-4 NPRM* or by commenters in response thereto, but ultimately decline to adopt them. For example, we decline to adopt any of the proposed alternative band plans, including shifting the AWS-4 uplink spectrum or pursuing the 2 GHz Extension Band Concept that was set forth in the *AWS-4 NOI*. Similarly, we reject calls to reduce or take back spectrum allocated to the 2 GHz MSS licensees and decline to assign AWS-4 terrestrial rights through an auction. We also decline to adopt the interim build-out benchmarks and their associated penalties as proposed in the *AWS-4 NPRM*. Further, we decline to impose restrictions on transferring or assigning AWS-4 spectrum beyond the general requirements applicable to Wireless Radio Service spectrum generally. Nor do we impose any roaming or wholesale obligations beyond those contained in the Commission's rules, or "use it or share it" obligations. Rather, the rules we adopt today represent the Commission's efforts to make more spectrum available for terrestrial flexible use, including for mobile broadband, in the public interest, without imposing undue restrictions on the use of the spectrum.

25. We emphasize that we find the rules we adopt and the actions we take and propose to take today to be in the public interest based on the totality of the facts and circumstances before us considered as a whole.

A. AWS-4 Band Plan

26. Band plans establish parameters and provide licensees with certainty as to the spectrum they are authorized to use. Here, the band plan relates to the use of the spectrum by any licensee of AWS-4 terrestrial authority, including the existing 2 GHz MSS licensees, or by any other future licensee.[67] In establishing the band plan, the Commission defines the frequency range(s), as well as specific block(s), block sizes, and geographic areas to enable licensees to optimize their individual service needs and business plans. As discussed below, the Commission in the *AWS-4 NPRM* proposed that the AWS-4 band plan follow the existing 2 GHz MSS band plan, and that AWS-4 spectrum be licensed in paired, 10 + 10 megahertz blocks on an Economic Area (EA) geographic-area basis.[68] The Commission sought comment on these proposals, as well as on possible alternatives, notably including proposals that would shift the lower AWS-4 band up five megahertz to 2005-2025 MHz or shift the band up ten megahertz while compressing the band to 2010-2025 MHz. The Commission also sought comment on the potential costs and benefits associated with the band plan. Finally, in the *AWS-4 NOI*, the Commission sought comment on an alternative band plan that would include the 1695-1710 MHz Federal band, which NTIA has indicated could be reallocated to non-Federal use.[69]

27. As explained below, based on the record before us, we adopt as the AWS-4 band plan 2000-2020 MHz paired with 2180-2200 MHz, configured in two consistently-spaced 10 megahertz blocks. (*See* Figure 1, below.) Further, we will license the blocks on an EA basis.

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[66] *AWS-4 NPRM*, 27 FCC Rcd at 3563, 3607 ¶¶ 2, 136.

[67] *AWS-4 NPRM*, 27 FCC Rcd at 3570 ¶ 19.

[68] *Id.* at 3570-73 ¶¶ 19-27.

[69] *Id.* at 3607-3611 ¶¶ 137-147.

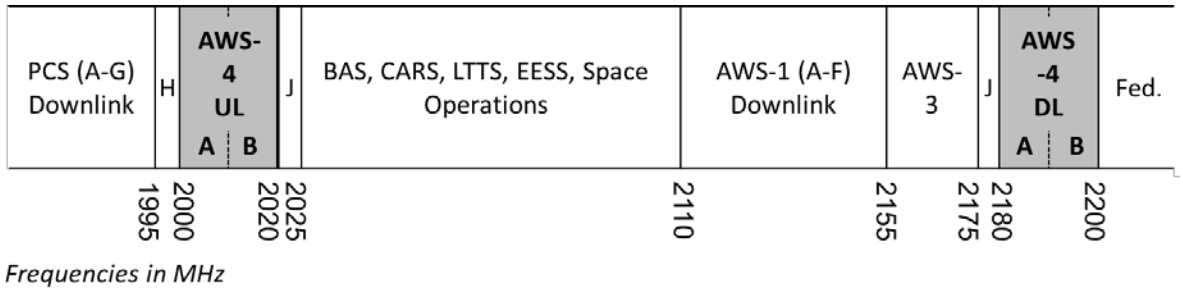

Figure 1 – AWS-4 Band Plan

1. AWS-4 Frequencies and Paired Spectrum (uplink/downlink)

a. Background

28. In the *AWS-4 NPRM*, the Commission proposed and sought comment on establishing the AWS-4 bands at 2000-2020 MHz and 2180-2200 MHz, consistent with the existing frequencies for the 2 GHz MSS band.[70] The Commission also proposed pairing the AWS-4 spectrum in a manner that is consistent with the existing 2 GHz MSS band plan.[71] The spectrum is currently licensed as paired spectrum for mobile satellite use, with the 2000-2020 MHz band serving as the MSS uplink band and the 2180-2200 MHz band serving as the MSS downlink band.[72] In the *AWS-4 NPRM*, the Commission proposed adopting the same uplink and downlink pairing designations for providing terrestrial service as the 2 GHz MSS bands.[73]

29. The Spectrum Act directs the Commission to make available for commercial use through a system of competitive bidding several spectrum blocks, including 1995-2000 MHz (the AWS-2 upper H block), unless doing so would cause interference with operations at 1930-1995 MHz (the broadband PCS downlink band).[74] Concerned about whether use of the 1995-2000 MHz band would conflict with use of the 2000-2020 MHz for AWS-4 uplink, the Commission sought comment on alternative band plan proposals wherein the uplink band would be shifted up 5 megahertz to 2005-2025 MHz or up 10 megahertz and compressed to 2010-2025 MHz.[75] For both of these alternative proposals, the Commission proposed that the spectrum shift would apply to both terrestrial and satellite service, which would result in a modified 2 GHz MSS uplink band at 2005-2020 MHz or 2010-2020 MHz, respectively. Because the

[70] *Id.* at 3577 ¶ 43.

[71] *Id.* at 3570-73 ¶¶ 19-27.

[72] The Commission allocated the uplink and downlink bands for the 2 GHz MSS spectrum in a companion item to the Commission's decision to permit MSS providers with the flexibility to integrate ATC into their MSS networks. *See ATC Report and Order*, 18 FCC Rcd at 1964 ¶ 1 n.1 (2003); *see also 2 GHz Public Notice* (seeking comment on whether to pair this spectrum and, if so, the appropriate designation of uplink and downlink bands for possible wireless terrestrial use in this spectrum, including on whether to adopt uplink and downlink designations opposite of those currently specified for 2 GHz MSS).

[73] *AWS-4 NPRM*, 27 FCC Rcd at 3570-71 ¶ 21.

[74] Spectrum Act § 6401(b)(4), codified at 47 U.S.C. § 1451(b)(4).

[75] *AWS-4 NPRM*, 27 FCC Rcd at 3570-71 ¶ 21.

2020-2025 MHz block is allocated for terrestrial service, but not for satellite service, the Commission did not propose to add this five megahertz to the 2 GHz MSS band in either of these proposals.[76]

30. Some commenters supported the proposal to establish the AWS-4 bands at 2000-2020 MHz and 2180-2200 MHz.[77] For example, DISH states that the Commission's proposed band plan would enable the quickest road to the deployment of service in the band, would promote competition, is consistent with international harmonization, and accords with its existing authorization to provide MSS.[78] DISH opposes the alternative band plan proposals on the grounds that they are generally less likely to yield such benefits, would complicate and delay deployment of the band, and would reduce DISH's MSS spectrum rights.[79] Alcatel argues that shifting the lower band of the AWS-4 spectrum is unnecessary and unwarranted. Alcatel anticipates that the H Block would remain lightly used and effectively serve as a guard band.[80] Further, Alcatel states that setting the AWS-4 band plan to mirror the existing MSS band plan would allow for the most efficient use of the spectrum, whereas dividing the spectrum for use by separate MSS and terrestrial licenses would restrict data rates and capacity of each, and would render part of the MSS spectrum unusable.[81] The Computer and Communications Industry Association (CCIA), in support of the Commission's proposed band plan, states that the Commission should "reach an equitable solution" between protecting future 1995-2000 MHz operations and AWS-4 deployment.[82]

31. A number of other commenters argued in favor of shifting the uplink spectrum 5 megahertz. These commenters generally claim that five or ten megahertz of frequency separation between AWS-4 and PCS or the 1995-2000 MHz band is necessary to avoid harmful interference.[83] For example, AT&T, Greenwood and Motorola recommended a shift of 5 megahertz.[84] Sprint noted that the 5 MHz shift warranted serious consideration as it could protect PCS with a minimal disruption to nearby licensees.[85] Sprint also commended the shift as a good way to put the lower J Block to productive use.[86] US Cellular supported the 10 megahertz shift, suggesting that 10 megahertz of separation may be needed between AWS-4 spectrum and the 1995-2000 MHz band.[87] Additionally, various parties argue that, while frequency separation is one way to protect future use of 1995-2000 MHz, there may be other technical solutions, as well. For instance, Sprint argues that the Commission should take steps to ensure

[76] *Id.* at 3577 ¶ 43.

[77] *See, e.g.*, Alcatel Comments at 5, DISH Comments at 33; Globalstar Comments at 5-6, NRTC at 1, 3 (generally supporting the expeditious adoption of proposals).

[78] DISH Reply Comments at 3; Letter from Jeffrey H. Blum, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Aug. 28, 2012).

[79] DISH Comments at 34.

[80] Alcatel Comments at 9, 12

[81] *Id.* at 5, 7, 9, 12-13.

[82] Letter from Catherine R. Sloan, Vice President, Government Relations, Computer & Communications Industry Association, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Sep. 10, 2012).

[83] AT&T Comments at 7; Motorola Comments at 4.

[84] AT&T Comments at 7; Motorola Comments at 3.

[85] Sprint Comments at 11.

[86] *Id*. at 11.

[87] USCC Comments at 5.

that AWS-4 spectrum will not cause interference with future use of the 1995-2000 MHz band, either though frequency separation or through the adoption of other technical rules that will protect the 1995-2000 MHz band.[88]

32. Other parties argued for more fundamental changes to the band plans identified in the *AWS-4 NPRM*. For example, T-Mobile argues that DISH should be given the opportunity to relinquish 20 MHz of MSS spectrum in return for full terrestrial rights on the remaining 20 megahertz.[89] This would provide 20 megahertz of valuable terrestrial spectrum to be awarded through competitive bidding, and would offer benefits such as preventing windfalls and promoting competition and a diversity of ownership.[90] MetroPCS advocates a "fresh start" for the 2 GHz band, offering two proposals which, it argues, could allow benefits to the public by obtaining due compensation for the increased value that a grant to DISH of terrestrial rights would provide.[91] The first proposal would have DISH relinquish 20 megahertz of MSS spectrum and the Commission grant DISH terrestrial rights to the remaining 20 megahertz of spectrum, with the released spectrum being made available through a competitive bidding process.[92] MetroPCS's other proposal would allow DISH to retain all 40 megahertz of spectrum for coexisting MSS and terrestrial service outside the top 100 metropolitan statistical areas (MSAs).[93] Within the top 100 markets, DISH would be allowed to retain only 10 megahertz for either MSS or terrestrial use.[94] The remaining 30 megahertz could be made available for terrestrial-only service through a competitive bidding process.[95] In addition, AT&T, while supporting the proposal to provide two 10 + 10 megahertz terrestrial licenses to the incumbent MSS licensees, argues that the MSS allocation should be reduced to a single 10 + 10 megahertz frequency pair.[96] This would allow for one of the new AWS-4 blocks to operate free from the coordination and interference challenges stemming from sharing by MSS and terrestrial systems.[97] AT&T further claims that MSS has not succeeded in the 2 GHz band and that any unmet MSS demand could be served by a single 10 + 10 megahertz allocation.[98] TIA similarly offers support to encourage licensees to relinquish a certain amount of spectrum in exchange for a portion of the proceeds of an auction for new terrestrial-only licenses.[99] One party, CCIA, counters the proposals to cut back on the amount of spectrum as impractical and would make it difficult to be an effective national competitor with only 20 megahertz of spectrum.[100]

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[88] Sprint Reply Comments at 8-10; Letter from Lawrence R. Krevor – Vice President, Legal and Government Affairs –Spectrum, Sprint, and Rafi Martina –Counsel, Legal and Government Affairs, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 5-6 (filed Oct. 22, 2012).

[89] T-Mobile Comments at 17.

[90] *Id.* at 17-23.

[91] MetroPCS Comments at 5, 29-35.

[92] *Id.* at 30-31.

[93] *Id.* at 31-33

[94] *Id.* at 5, 31-33.

[95] *Id.* at 5, 31-33.

[96] AT&T Comments at 2-4.

[97] *Id.* at 2

[98] *See id.* at 2-3.

[99] TIA Comments at 12

[100] CCIA Reply comments at 8

b. Discussion

33. We adopt the Commission's proposed band plan and spectrum pairing, and establish the AWS-4 spectrum band as 2000-2020 MHz uplink band paired with 2180-2200 MHz downlink band.[101]

(i) AWS-4 Frequencies

34. We establish the AWS-4 band as 2000-2020 MHz and 2180-2200 MHz. After considerable analysis of the facts and the record before us, we conclude that this band plan will result in the most efficient use of spectrum for mobile broadband and, when paired with appropriate technical rules,[102] will not impair the future use of the 1995-2000 MHz band, thereby enabling us to best fulfill our obligations under the Spectrum Act and our general obligation to maximize the benefits of the spectrum for the public interest.[103]

35. Establishing these frequencies for AWS-4 terrestrial spectrum is the culmination of several years of Commission effort exploring this path. As discussed above, in July 2010, the Commission adopted the *MSS NPRM and NOI* in which it proposed to add co-primary Fixed and Mobile allocations for this spectrum. In April 2011, the Commission added these terrestrial allocations, thereby "lay[ing] the foundation for more flexible use of the band . . . [and] promoting investment in the development of new services and additional innovative technologies."[104] In that order, the Commission also stated its intent to initiate a rulemaking—this proceeding—to explore "service rule changes that could increase investment and utilization of the band in a manner that serves the public interest . . . [including examining] potential synergies with neighboring bands."[105] The record before us demonstrates nearly unanimous support to add terrestrial rights to the 2 GHz MSS band generally.[106]

36. We adopt this band plan because, of the options available to us, it should enable the use of the spectrum for mobile broadband in the most expeditious and efficient manner. Setting the AWS-4 band as 2000-2020 MHz and 2180-2200 MHz mirrors the existing 2 GHz MSS band.[107] Because the existing 2 GHz MSS licensees will have AWS-4 operating authority, under this band plan they will be able to offer both terrestrial and satellite service using the same spectrum.[108] In contrast, because the

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[101] *See supra* Figure 1.

[102] *See infra* Section III.B. (Technical Issues).

[103] *See* Spectrum Act § 6401(b); 47 USC § 309.

[104] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5716 ¶ 13.

[105] *Id.*

[106] Alcatel Comments at 2; CCIA Comments at 4; CEA Comments at 3; COMPTEL Comments at 1; CTIA Comments at 8; DISH Comments at 4; Globalstar Comments at 3; ITI Comments at 1; Motorola Comments at 7; Nokia Comments at 1; NRTC Comments at 2; USGIC Comments at 2; US Cellular Comments at 2; Verizon Wireless Comments at 4; *but see* AT&T Comments at 2 (arguing to reduce the MSS authorization to 20 megahertz); MetroPCS Comments at 5, 20 (arguing to reduce MSS authorization and that sharing of terrestrial and satellite spectrum is technically feasible); T-Mobile Comments at 6 (supporting terrestrial flexibility in the band, but opposing some of the specific proposals contained in the *AWS-4 NPRM* such as stricter build-out requirements, reassigning at least 20 megahertz through competitive bidding, and FCC approval of wholesale agreements).

[107] *AWS-4 NPRM*, 27 FCC Rcd at 3570 ¶ 20, citing Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands and Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, IB Docket Nos. 01-185, 02-364, *Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 11030 (2003).

[108] *See infra* Section III.D. (Assignment of AWS-4 Operating Authority).

2020-2025 MHz band is not allocated for MSS, shifting the AWS-4 band up to include this spectrum would necessarily create a mismatch between the spectrum available to provide terrestrial service and the spectrum available to provide satellite service.[109]

37. We decline to adopt our alternative proposals to shift the spectrum in the lower portion of the AWS-4 band plan. We acknowledge that setting the lower AWS-4 band at 2000-2020 MHz gives rise to potential interference issues between the AWS-4 band and the 1995-2000 MHz band (AWS-2 upper H block). This raises particular concerns because, as discussed below, Congress has directed the Commission to assign licenses in the 1995-2000 MHz band through a system of competitive bidding—a system that, among other things, promotes efficient and intensive use of that spectrum and recovers a portion of the value of the spectrum resource.[110] Regulatory actions that might compromise the utility of the 1995-2000 MHz band cannot easily be reconciled with the purposes of the Spectrum Act's mandate that this band be licensed through a system of competitive bidding. We find, however, that the tension between this mandate and the public interest benefits of the band plan we are adopting can be resolved by promulgating appropriate technical rules for the AWS-4 band, as described below.[111]

38. Because we resolve these interference issues through technical rules, we decline to adopt any of the three alternative band plans proposed in the *AWS-4 NPRM*: (1) 2005-2025 MHz paired with 2180-2200 MHz; (2) 2010-2025 MHz paired with 2180-2200 MHz;[112] and (3) the alternative NOI proposal, as well as any of the alternative band plan proposals presented by commenters.[113] We decline to shift the band because we find that the technical rules we adopt below offer a better solution than shifting the band. Further, nothing in the record has convinced us that the 2020-2025 MHz band cannot be put to productive use in the future. We decline to pursue the alternative NOI proposal for the reasons discussed in section VI. below.[114] Finally, we decline at this time to adopt more aggressive proposals that would reduce the amount of MSS spectrum or return licenses to the Commission, because we believe the approach adopted herein will lead to faster and more efficient terrestrial deployment in the AWS-4 band.

(ii) Paired Spectrum

39. For the AWS-4 band plan, we adopt the same uplink and downlink pairing designations as those currently used in the 2 GHz MSS band. Specifically, for AWS-4 spectrum, the lower band (2000-2020 MHz) will be the uplink band and the upper band (2180-2200 MHz) will be the downlink band. As we noted in the *AWS-4 NPRM*, "[a]dopting the same uplink/downlink pairing approach for AWS-4 as for 2 GHz MSS may facilitate the continued use of existing satellites for MSS."[115] Thus, it is consistent with our determination, *infra*, to require AWS-4 operators to protect 2 GHz MSS operations from harmful interference.[116] Stated otherwise, having the AWS-4 band parallel the spectrum pairing of the 2 GHz MSS band, in terms of their uplink and downlink designations, will minimize the possibility that AWS-4 operations could interfere with 2 GHz MSS operations and will offer the greatest opportunity for synergies between the two mobile services. Our finding is supported by the record. For example,

[109] DISH Comments at 34.

[110] *See* 47 U.S.C. §§ 309(j)(3)(C)-(D).

[111] *See infra* Section III.B. (Technical Issues).

[112] *AWS-4 NPRM*, 27 FCC Rcd at 3570-71 ¶¶ 20-21.

[113] *Id.* at 3607-11 ¶¶ 137-147.

[114] *See infra* Section VI. (Notice of Inquiry: 2 GHz Extension Band Concept).

[115] *AWS-4 NPRM*, 27 FCC Rcd at 3570-71 ¶ 21.

[116] *See infra* Section III.C. (Protection of MSS Operations).

Alcatel states that adoption of this proposal will contribute to making the AWS-4 spectrum quickly available for terrestrial broadband use.[117] No commenter objected to this pairing of uplink and downlink spectrum.

2. Spectrum Block Size and Duplex Spacing

a. Background

40. The 2 GHz MSS spectrum is currently assigned as two paired 10 + 10 megahertz blocks, in an A-B/B-A duplex configuration: Block A pairs 2000-2010 MHz with 2190-2200 MHz and Block B pairs 2010-2020 MHz with 2180-2190 MHz. To define AWS-4 licenses, the Commission proposed licensing the AWS-4 spectrum in paired 10 + 10 megahertz blocks because the MSS band is currently licensed as paired 10 + 10 megahertz blocks.[118] In proposing these spectrum block sizes, however, the Commission noted that the 3GPP standards organization was in the process of examining whether to change the duplex spacing for this spectrum to remove the variable duplex spacing (i.e., to change from an A-B/B-A configuration to an A-B/A-B configuration).[119] The Commission also noted that issuing AWS-4 licenses with equivalent bandwidth would facilitate coordination between MSS and AWS services.[120] Finally, the Commission proposed a flexible paired single block option that, in the event a single licensee holds both the A and B blocks, that licensee would be allowed to combine the blocks into one paired 20 + 20 megahertz block.[121]

b. Discussion

41. We adopt our proposal to license the AWS-4 spectrum in two paired 10 + 10 megahertz blocks, but, in doing so, we adopt a consistent (*i.e.*, non-variable) duplex spacing. The AWS-4 band will therefore consist of two paired 10 + 10 megahertz blocks as follows: Block A pairs 2000-2010 MHz with 2180-2190 MHz and Block B pairs 2010-2020 MHz with 2190-2200 MHz.

42. *Block Size.* We adopt 10 megahertz blocks as the block size for the AWS-4 band. This block size has several advantages. First, it mirrors the current MSS/ATC block size. Second, spectrum bands of this size will encourage technologies that utilize wider bandwidth, and will encourage the adoption of and use of next generation technologies. This is particularly the case in a band, such as this one, where large contiguous blocks are readily configurable.[122] We expect that use of wide, contiguous blocks of spectrum will support continued innovation and deployment of mobile broadband technologies, such as Long Term Evolution ("LTE"), to meet higher data rates and wider bandwidths.[123] Additionally, 10 + 10 megahertz blocks allow for the possibility that multiple providers may make use of the spectrum (including through the operation of secondary markets), but can also be used as a single 20 + 20 megahertz block if a single operator controls both blocks in a market.[124] The record supports both the 10 + 10 MHz blocks and the ability for a single operator to combine both blocks into a 20 + 20 MHz

[117] Alcatel Comments at 5-6.

[118] *AWS-4 NPRM*, 27 FCC Rcd at 3571-72 ¶ 22.

[119] *Id.* at 3571-72 ¶ 22.

[120] *Id*. at 3572 ¶ 23.

[121] *Id*. at 3572 ¶ 24.

[122] TIA Comments at 8; Nokia Comments at 4.

[123] AT&T Comments at 10 ("10 megahertz pairs will be more useful in support of LTE and other mobile broadband technologies than smaller blocks.").

[124] TIA Comments at 8.

block.[125] For example, Nokia argued that the allocation must allow channel sizes of at least 20 MHz of spectrum (10 MHz in each direction) for the effective content delivery today and will need to be even wider in the near future. No one submitted comments in opposition to the 10 + 10 block size for AWS-4 terrestrial licenses.[126] Thus, to support the continued innovation of mobile broadband technologies by providing wide, contiguous channels, we adopt our proposal to license the AWS-4 spectrum in paired 10 + 10 megahertz blocks.

43. In the *AWS-4 NPRM*, the Commission proposed that, in the event that a single licensee holds both the A and the B Blocks, that licensee should be permitted to combine the blocks into one paired 20 + 20 megahertz block.[127] We adopt this proposal. We find it consistent with the record,[128] with our decision to permit flexible use of AWS-4 spectrum, and with our technical findings below. The rules adopted herein will allow a licensee holding all paired 20 + 20 megahertz of AWS-4 spectrum to make use of that spectrum as it sees fit, so long as such use otherwise complies with the Commission's rules, including the technical and interference rules established herein.[129] Thus, we will provide a licensee holding AWS-4 terrestrial authority with the opportunity to design its network in a manner that enables it to best respond to its business and technical needs.[130] For example, combining these blocks may enable a licensee to benefit from establishing larger channel bandwidths, such as paired 15 + 15 megahertz or 20 + 20 megahertz blocks, which can result in greater spectral efficiency and network capacity and, consequently, improved customer experiences.[131]

44. *Duplex Spacing.* We find that the paired 10 megahertz blocks should operate with a consistent duplex spacing. Thus, block A will pair 2000-2010 MHz with 2180-2190 MHz and Block B will pair 2010-2020 MHz with 2190-2200 MHz. We license the AWS-4 spectrum such that duplex spacing of the spectrum blocks will be uniform. Although some commenters support using the existing 2 GHz MSS duplex spacing for AWS-4,[132] we concur with other parties, such as AT&T, that to "facilitate the deployment of terrestrial AWS-4 service, the Commission should adopt an A-B/A-B configuration, similar to the consistent duplex spacing used in other AWS and 3GPP standards."[133] Further, this is

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[125] Alcatel Comments at 5; AT&T Comments at 10; DISH Comments at 32; Nokia Comments at 4; TIA Comments at 8; NRTC Comments at 7-8

[126] However, AT&T argued that the MSS allocation be reduced to one single 10 + 10 MHz block. AT&T Comments at 2-4. DISH opposed AT&T's alternative plan. DISH Reply at 18-22. We decline to pursue AT&T's request that we reallocate part of the 2 GHz band. As the Commission stated in 2011 when adding the co-primary fixed and mobile allocations to the band, "MSS remains co-primary in the 2 GHz MSS band…Both of the MSS licensees in the band will continue to operate under the terms of their existing licenses." *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5714-15 ¶ 110.

[127] *AWS-4 NPRM*, 27 FCC Rcd at 3572 ¶ 24.

[128] *See, e.g.*, DISH Comments at 32; Alcatel Comments at 6; NRTC Comments at 7-8.

[129] *See infra* Section III.B.1. (Interference Between Adjacent Block AWS-4 Licensees), Section III.B.2. (Co-Channel Interference Among AWS-4 Systems)

[130] *AWS-4 NPRM*, 27 FCC Rcd at 3572 ¶ 24.

[131] NRTC Comments at 7-8.

[132] *See, e.g.*, Motorola Comments at 2-3; Alcatel Comments at 7 (Alcatel comments that the AWS-4 licensee should have the choice of keeping the 2 GHz MSS allocation of A-B/B-A or changing the allocation to A-B/A-B.) The 2 GHz MSS band is currently assigned in two blocks: Block A pairs 2000-2010 MHz with 2190-2200 MHz; Block B pairs 2010-2020 MHz with 2180-2190 MHz.

[133] AT&T Comments at 5.

consistent with the recent change by 3GPP in band class 23 to shift from an A-B/B-A pairing to an A-B/A-B pairing.[134] Thus, to promote uniformity among mobile wireless bands and to maintain consistency with standards setting bodies, we find it appropriate to license AWS-4 spectrum bands in A-B/A-B paired blocks.

45. *Changes to MSS Duplex Spacing*. Currently, the two MSS licenses in the band are arranged with one license authorized to use of 2000-2010 MHz as uplink paired with 2190-2200 MHz as downlink, and the other authorized to use 2010-2020 MHz uplink paired with 2180-2190 MHz downlink. That is, there are effectively two blocks, each 10 + 10 megahertz, paired A-B/B-A. In the *AWS-4 NPRM*, we suggested mirroring this approach for the AWS-4 license, in part to facilitate coordination between MSS and AWS-4 services.[135] However, as discussed above, we are establishing the AWS-4 blocks in an A-B/A-B pairing, rather than an A-B/B-A pairing. There remains, however, a need to coordinate between MSS and AWS-4 operations. In fact, as discussed below**,** we have found that the assignment of AWS-4 terrestrial use rights must be made to the existing MSS authorization holders to allow coordination and prevention of harmful interference.[136] Therefore, we determine to also align the MSS blocks with the AWS-4 blocks.[137] Because, as AT&T states, the MSS satellites should be "capable of providing service under a modified A-B/A-B configuration," this rearrangement should be feasible and not present a significant burden on the MSS licensees.[138] Consequently, we adopt a rearrangement of the 2 GHz MSS blocks as follows: the first block shall be 2000-2010 MHz uplink paired with 2180-2190 MHz downlink, and the second block shall be 2010-2020 MHz paired with 2190-2200 MHz. This rearrangement results in the first MSS block aligning with the AWS-4 A block, and the second MSS block aligning with the AWS-4 B block.[139]

46. *Interoperability*. The *AWS-4 NPRM* also sought comment on whether the Commission should take action to ensure that equipment for the AWS-4 band is interoperable across both paired blocks.[140] No commenters discussed this issue. As the AWS-4 spectrum will be licensed to the existing 2 GHz MSS licensees,[141] and the commenter controlling both licensees has stated its desire to operate across the entire band,[142] we anticipate that its operations would result in devices that operate across the entire AWS-4 band. We therefore take no action at this time on this issue. We observe, however, that the

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[134] Compare Older LTE RF standard for user equipment, 3GPP TS 36.101 R10.5.0, at 26, available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.101/36101-a50.zip (last visited Nov. 30, 2012) (*Older LTE RF standard for UE*) with 3GPP Specification TS 36.101 v10.8.0 available at http://www.3gpp.org/ftp/Specs/archive/36_series/36.101/36101-a80.zip at 28. (*LTE RF Standard for UEs*) (last visited Dec. 4, 2012). While the 3GPP standard shows evidence of the utility of consistent duplex spacing, we emphasize that we are not making our decision based on the determination of a third party standards body. *See also* AT&T Comments at 5.

[135] *AWS-4 NPRM*, 27 FCC Rcd at 3570 ¶ 20.

[136] *See infra* Section III.D. (Assignment of AWS-4 Operating Authority)

[137] *See supra* Section III.A.1.b.ii. (Paired Spectrum).

[138] *See* AT&T Comments at 5-6.

[139] We address the assignment of the A and B blocks below. *See infra* Section III.D. (Assignment of AWS-4 Operating Authority).

[140] *AWS-4 NPRM*, 27 FCC Rcd at 3570 ¶ 20.

[141] *See infra* Section III.D. (Assignment of AWS-4 Operating Authority)

[142] DISH Comments at 31-32.

Commission is investigating interoperability issues in other contexts.[143] We continue to believe that interoperability is an important aspect of future deployment of mobile broadband services. We will closely examine any actions taken that have the potential to undermine the development of interoperability in the AWS-4 band and may take action on this issue if it is warranted in the future.

3. Geographic Area Licensing

a. Background

47. In the *AWS-4 NPRM*, the Commission proposed to license the AWS-4 spectrum using a geographic area approach.[144] The Commission made this proposal, in part, to be consistent with other AWS bands.[145] The Commission also proposed licensing AWS-4 spectrum on a geographic area basis because such an approach is well suited for the types of fixed and mobile services likely to be deployed in the band.[146] The Commission then proposed that the geographic areas should be Economic Areas (EAs).[147] No commenters opposed the proposal to adopt geographic-area licensing, as compared to other approaches, such as site-based licensing. Comments were varied regarding the proposal to use EAs as basis for geographic licensing.

b. Discussion

48. We will assign terrestrial spectrum use rights in the AWS-4 band on a geographic-area basis. A geographic-area licensing approach is well suited for the types of fixed and mobile services we expect to be deployed in this band. Further, geographic-area licensing will maintain consistency between the AWS-4 band and the AWS-1 band.

49. We will award terrestrial rights for the AWS-4 spectrum on an EA basis. In doing so, we observe that the record is mixed on this issue. Some commenters argue that an EA based licensing approach establishes geographic areas that are too small for nationwide service. For example, DISH comments that AWS-4 should be licensed on a nationwide basis because EAs are more difficult to administer than nationwide licenses and do not serve the demand for broad geographic service coverage.[148] SIA argues that it is not practical to constrain MSS and AWS licensees in the same frequency bands by limited geographic areas.[149] Additionally, AT&T asserts that EAs are too small and that AWS-4 license areas should be based on the 52 Major Economic Areas (MEAs), rather than the 176 EAs.[150] Conversely, several parties assert that EAs are the proper size and that they enable the proper

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[143] *See*, Promoting Interoperability in the 700 MHz Commercial Spectrum, WT Docket No. 12-69, *Notice of Proposed Rulemaking*, 27 FCC Rcd 3521 (2012).

[144] *AWS-4 NPRM*, 27 FCC Rcd at 3572-73 ¶¶ 25-27.

[145] *Id*. at 3572-73 ¶¶ 25-27. (AWS-1 is licensed on a geographic basis, and geographic licensing schemes have been proposed for both AWS-2 and AWS-3. *See AWS-1 Report and Order*, 18 FCC Rcd 25162*; AWS-2 NPRM*, 19 FCC Rcd 25162*; AWS-3 NPRM*, 22 FCC Rcd 17035.

[146] *AWS-4 NPRM*, 27 FCC Rcd at 3572 ¶ 25.

[147] *Id*. at 3572-73 ¶ 26.

[148] DISH Comments at 32.

[149] SIA Comments at 4.

[150] AT&T Comments at 10.

balancing between encouraging wide-spread geographic build-out and providing licensees with sufficient flexibility in developing individual business plans.[151]

50. Having examined the record, we adopt an EA licensing area scheme. We do so for four reasons. First, addressing the concerns of those seeking larger license areas, EA license areas are a useful and appropriate geographic unit that Commission has used for similar bands. Notably, AWS-1 Blocks B and C spectrum is licensed on an EA basis. EA licenses can be aggregated up to larger license areas, including into MEAs or larger units, including nationwide.[152] Second, EA-based licensing is consistent with the other requirements adopted herein, most notably the performance requirements discussed below, which establish EA-based build-out requirements.[153] Third, licensing AWS-4 on an EA basis best balances the Commission's goals of encouraging the offering of broadband service both to broad geographic areas and to sizeable populations.[154] For example, as one commenter notes, licensing in smaller geographic blocks averts the phenomenon of huge tracts of licensed territory being left unserved.[155] Finally, contrary to DISH's unsubstantiated claim that "[s]mall EA licenses are more difficult to administer and do not serve the demand for broad geographic coverage"[156] we do not believe that licensing on an EA basis impairs nationwide operations. Indeed, other than the PCS G block, all other major terrestrial spectrum bands are licensed in discrete geographic areas, including AWS-1, several blocks of which are licensed on an EA-basis.[157] These bands have not proven unduly difficult for licensees to administer. Consequently, because EAs allow licensees to build their geographic coverage as needed, are consistent with the other requirements established for this band, and promote the Commission's goal of widespread broadband service, we adopt the proposal in the *AWS-4 NPRM* to assign AWS-4 spectrum rights on an EA basis.

51. *Gulf of Mexico*. In the *AWS-4 NPRM*, the Commission sought comment on how to include the Gulf of Mexico in its licensing scheme.[158] The Commission questioned if the Gulf should be licensed in a similar fashion as the Upper 700 MHz band, where the Gulf was included as part of larger service areas, or whether the Gulf should be licensed separately.[159] The Commission has addressed the issue of licensing the Gulf of Mexico in other proceedings and we will follow the established policy on this issue.[160] Therefore, because we are adopting an EA-based licensing scheme,[161] and the Commission received no comments directly addressing this issue, we will license the Gulf of Mexico as EA licensing

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[151] NTCH Comments at 10-11; NRTC Comments at 6; *see also* U.S. Cellular Comments at 6-7 (suggesting EAs should be used "at a minimum," but "smaller CMAs would better serve the public interest.").

[152] Any such aggregation, however, would not relieve a licensee from obligations that are based on the original EA license area, such as, importantly, build-out requirements. *See infra* Section III.E. (Performance Requirements) (discussing build-out requirements).

[153] *See* Section III.E. (Performance Requirements).

[154] NRTC Comments at 6.

[155] NTCH Comments at 10; USCC Reply Comments at 7.

[156] DISH Comments at 32.

[157] See 47 C.F.R. § 27.6(h)(2).

[158] *AWS-4 NPRM*, 27 FCC Rcd at 3573 ¶ 27.

[159] *Id*. at 3573 ¶ 27.

[160] *See, e.g.*, *AWS-1 Report and Order*, 18 FCC Rcd at 25177 ¶ 40.

[161] *See supra* ¶¶ 49-50.

area 176.[162] As we did in licensing other Part 27 services, the Gulf of Mexico service area is comprised of the water area of the Gulf of Mexico starting 12 nautical miles from the U.S. Gulf coast and extending outward.[163]

B. Technical Issues

52. Pursuant to its statutory direction in the Communications Act, the Commission adopts rules for commercial spectrum in a manner that furthers and maximizes the public interest. For example, allowing spectrum to be repurposed for its highest and best use serves this end as more efficient spectrum use, among other things, spurs investment and benefits consumers through better performance and lower prices.[164] Deciding how best to further and maximize the public interest, moreover, is not an assessment that is made in a vacuum. Notably, when developing policies for a particular band, the Commission looks at other bands that might be affected, particularly the adjacent bands. In revising its rules, therefore, the Commission often must strike a balance among competing interests of adjacent bands, and between sometimes competing public interest considerations.

53. The rules for one band, particularly the interference protection rules, affect the use and value of other bands and thus the public interest benefits that can be realized through the use of those adjacent bands. Moreover, the public interest analysis, and the balancing of interests across bands, does not necessarily reduce to an inquiry about the amount of spectrum that is or could be made available in the relevant bands. Not all spectrum use has equal value or leads to the same public interest benefits. For example, as explained below, wireless providers tend to use more downlink than uplink spectrum.[165] Therefore, it is not clear that the loss of some uplink spectrum would diminish the value of, or the public's interest in, a large paired band when compared to the value that would be created in enabling a smaller full power downlink band. Indeed, the public interest benefits of a fully usable new downlink spectrum band likely are substantially greater than a fully usable equal sized addition of uplink spectrum that is a part of a larger band.[166] The balancing between adjacent bands may be weighted further if one band will enable the combination of spectrum bands, including the aggregation of smaller bands, while the other band does not.

54. When the Commission adopted the MSS/ATC regime in 2003, it addressed intra-service and adjacent-band interference concerns, and enacted unique MSS/ATC technical rules in Part 25 of the Commission's rules. These rules did not fully align with the technical rules for similar terrestrial operations in other bands.[167] Subsequently, in 2009 and 2010, in addressing requests for ATC authority by the two 2 GHz MSS authorization holders, ICO and TerreStar, the Commission granted waivers of several of the Part 25 ATC interference rules.[168] These waivers resulted in better aligning the terrestrial

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[162] *See* 47 C.F.R. § 27.6(a)(1).

[163] 47 C.F.R. §§ 27.6(a)(2), (c)(2)(ii).

[164] *See, e.g.*, *Incentive Auction NPRM*, 27 FCC Rcd at 12357 ¶ 4 (discussing that additional spectrum will "promote economic growth and enhance America's global competitiveness, increase the speed, capacity and ubiquity of mobile broadband service, such as 4G LTE and Wi-Fi like networks, and accelerate the smartphone- and tablet-led mobile revolution, benefitting consumers and businesses throughout the country").

[165] *See infra* ¶ 80.

[166] *See infra* ¶¶ 66, 68, 80.

[167] The ATC interference rules for the 2 GHz MSS band are contained in rule 25.252. *See* 47 C.F.R. § 25.252; *ATC Report and Order*, 18 FCC Rcd at 2020-2030 ¶¶ 109-127.

[168] *See ICO Waiver Order*, 24 FCC Rcd 171, 183-197 ¶¶ 35-64, 68-69; *TerreStar Waiver Order*, 25 FCC Rcd 228, 235-237, 239-240 ¶¶ 20-27, 33-34.

requirements for the 2 GHz MSS band operators with the Part 27 technical rules that apply to AWS-1 license holders. Earlier this year, the International Bureau denied requests to waive additional technical rules, deferring those issues to this proceeding, as contemplated in the *2 GHz Band Co-Allocation Report and Order*.[169]

55. In this section, we adopt the technical operating rules (*e.g.*, interference rules) that will govern AWS-4 operations and licensees. In general, our aim in establishing technical rules is to maximize the flexible use of spectrum while appropriately protecting operations in neighboring bands.[170] We also specifically consider here our statutory obligations set forth in the Spectrum Act with respect to the 1995-2000 MHz band. We base the technical rules we adopt below on the rules for AWS-1 spectrum, with specific additions or modifications designed to protect operations in adjacent bands from harmful interference. These bands include (1) the existing 1930-1995 MHz broadband PCS service; (2) future services operating in the 1995-2000 MHz band; and (3) Federal operations in the 2200-2290 MHz band.

1. OOBE Limits

56. In this section we adopt interference rules for operations between AWS-4 blocks within the AWS-4 band and between AWS-4 blocks and adjacent and nearby bands. In the event that, once individual systems are deployed and operational, it is determined that these limitations do not prevent an AWS-4 fixed or mobile transmitter from causing harmful interference, we shall, at our discretion, require the licensee of that transmitter to provide greater emission attenuation consistent with the typical treatment of Part 27 services.[171]

a. Interference Between Services in Adjacent AWS-4 Blocks

(i) Background

57. To minimize harmful interference between adjacent spectrum blocks, the Commission's rules generally limit the amount of radio frequency (RF) power that may be emitted outside of the assigned block of an RF transmission. The Commission has previously concluded that attenuating OOBE by $43 + 10 \log_{10}(P)$ dB at the edge of an assigned block, where P is the transmit power in watts, is appropriate to minimize harmful electromagnetic interference between terrestrial base station operations in the 2180-2190 MHz and 2190-2200 MHz blocks[172] and between terrestrial mobile emissions in the 2000-2010 MHz 2010-2020 MHz blocks.[173] Further, when establishing AWS-1 service rules, the Commission concluded that such a level of attenuation was appropriate for protecting terrestrial wireless systems that will operate in the AWS bands.[174] This level of attenuation is now codified in the Commission's rules for the AWS-1 band, for both mobile station and base station emissions.[175]

58. To fully define an emissions limit, the Commission's rules generally specify details of the measurement procedure to determine the power of the emissions, such as the measurement bandwidth.

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[169] *See* New DBSD Satellite Services G.P., Debtor-in-Possession; TerreStar Licensee Inc., Debtor-in-Possession; Requests for Rule Waivers and Modified Ancillary Terrestrial Component Authority, *Order*, 27 FCC Rcd 2250 (2012); *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5716 ¶ 13.

[170] *See AWS-4 NPRM*, 27 FCC Rcd at 3573 ¶ 29.

[171] *See* 47 C.F.R. § 27. 53(n).

[172] *AWS-4 NPRM*, 27 FCC Rcd at 3574 ¶ 32; *see also ICO Waiver Order*, 24 FCC Rcd at 187 ¶ 44.

[173] *AWS-4 NPRM*, 27 FCC Rcd at 3574 ¶ 32; *see also ICO Waiver Order*, 24 FCC Rcd at 194 ¶ 62.

[174] *AWS-4 NPRM*, 27 FCC Rcd at 3574 ¶ 32; *see also AWS-1 Report and Order*, 18 FCC Rcd at 25198 ¶ 92.

[175] *See* 47 C.F.R. § 27.53(h). This OOBE limit also applies in the broadband PCS band. *See* 47 C.F.R. § 24.238.

The Part 25 ATC rules determine mobile station compliance with the OOBE limit based on a measurement bandwidth of 1 MHz or greater.[176] For AWS-1, the measurement bandwidth used to determine compliance with this limit for both mobile stations and base stations is generally 1 MHz, with some modification within the first 1 MHz.[177] Previously, the Commission concluded the AWS-1 measurement procedure was also appropriate for mobile stations operating in 2000-2020 MHz.[178] At that time the Commission did not address the measurement procedure for base stations operating in 2180-2200 MHz.[179] For these reasons, the Commission believed it was similarly reasonable to apply the AWS-1 procedure to both mobile and base transmissions in the AWS-4 band.[180] Therefore, in the *AWS-4 NPRM*, the Commission proposed that Section 27.53(h) of the Commission's rules, which includes OOBE attenuation of $43 + 10 \log_{10}(P)$ dB and the associated measurement procedure, be expanded to apply to AWS-4 operations in the 2000-2020 MHz and 2180-2200 MHz bands.[181]

(ii) Discussion

59. We adopt the above proposals regarding interference between adjacent AWS-4 blocks and the corresponding measurement procedures. Specifically, we require fixed and mobile transmitters operating in 2000-2020 MHz and 2180-2200 MHz bands to attenuate emissions outside the licensed channels in these bands by $43 + 10 \log_{10}(P)$ dB, unless all affected parties agree otherwise. This limit of $43 + 10 \log_{10}(P)$ dB is consistent with other CMRS bands, including the AWS-1 band that forms the basis for many of the technical rules we adopt herein. This specific emission limit, as well as the principle of adopting the same limits across multiple CMRS bands, is supported by the record. For example, AT&T, NRTC, and SIA comment that OOBE limits in AWS-4 should be consistent with rules for other CMRS services.[182] Further, we disagree with DISH's assertion that its intent to operate unified operations in the band makes it unnecessary for us to establish emissions levels between adjacent block AWS-4 operations.[183] We observe, however, that to the extent a service provider establishes unified operations across the AWS-4 blocks, that operator may choose not to observe this emission level strictly between its adjacent block AWS-4 licenses in a geographic area, so long as it complies with other Commission rules and is not adversely affecting the operations of other parties by virtue of exceeding the emission limit.

60. Additionally, we adopt the proposed measurement procedures. The record supports applying the proposed measurement procedures found in Section 27.53(h) to AWS-4 mobile and base stations.[184] Specifically, we require a measurement bandwidth of 1 MHz or greater, with an exception allowing a smaller measurement bandwidth within the first megahertz outside the channel. In sum, after

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[176] *See* 47 C.F.R. § 25.252(c)(4).

[177] *See* 47 C.F.R. § 27.53(h)(1).

[178] *See ICO Waiver Order*, 24 FCC Rcd at 194-195 ¶¶ 63-64.

[179] This has been noted by DBSD and TerreStar, both of whom suggested that the mobile measurement procedure be used for base stations as well. *See* New DBSD Satellite Services G.P., Debtor-in-Possession, Application for Modification of Ancillary Terrestrial Component Authority, IB Docket No. 11–149, at 8-9 (Aug. 22, 2011); TerreStar License Inc., Debtor-in-Possession, Application for Modification of Ancillary Terrestrial Component Authority, IB Docket No. 11–149, at 12 n.23 (Aug. 22, 2011) (*TerreStar Waiver Request*).

[180] *AWS-4 NPRM*, 27 FCC Rcd at 3574 ¶ 32.

[181] *Id*. at 3574-75 ¶ 33

[182] AT&T Comments at 4, 9; NRTC Comments at 9; SIA Comments at 2.

[183] DISH Comments at 29.

[184] *See* DISH Comments at 29-30. No party opposed the proposal.

reviewing the record and finding it supports the Commission's proposals, we conclude that the potential benefits of our proposals would outweigh any potential costs and adopt the proposed OOBE limit and measurement procedures.

b. Interference with Services in Adjacent and Other Bands

61. Having established interference rules for operations between adjacent AWS-4 blocks, we next set rules for AWS-4 operations relative to operations in adjacent and nearby spectrum bands. In so doing, wherever possible, we establish rules that permit flexible use of the AWS-4 band, while effectively protecting adjacent and nearby bands from harmful interference resulting from AWS-4 emissions. As a preliminary matter, we observe that the Commission frequently applies a minimum attenuation level of $43 + 10 \log_{10}(P)$ dB to protect operations in adjacent frequency bands.[185]

(i) Interference with operations below 1995 MHz

62. *Background*: The AWS-4 uplink band is proximate to the broadband Personal Communications Service (PCS) downlink band at 1930-1995 MHz. To protect PCS mobile receivers from harmful electromagnetic interference from mobile stations transmitting in 2000-2020 MHz, the ATC rules specify an attenuation of $70 + 10 \log_{10}(P)$ dB below 1995 MHz.[186] In the *AWS-4 NPRM*, the Commission proposed that this emission limit should continue to apply to terrestrial operations in the 2000-2020 MHz band, and that a rule should be added to Part 27 that fixed and mobile transmitters operating in 2000-2020 MHz must attenuate emissions below 1995 MHz by $70 + 10 \log_{10}(P)$ dB.[187] We also proposed that this attenuation should be measured using the existing measurement procedure per Section 27.53(h).[188]

63. *Discussion*: We conclude that fixed and mobile transmitters operating in the 2000-2020 MHz AWS-4 uplink band must attenuate emissions below 1995 MHz by $70 + 10 \log_{10}(P)$ dB. We also apply the existing measurement procedure contained in Section 27.53(h) of our rules, whereby a measurement bandwidth of 1 MHz or greater is required, with an exception allowing a smaller measurement bandwidth in the first megahertz outside the channel. This emission level is supported by the record. AT&T, CTIA, Sprint, and T-Mobile all support the need to protect PCS operations below 1995 MHz.[189] DISH, Greenwood, Motorola, Nokia, and Sprint all support our proposed OOBE limit of $70 + 10 \log_{10}(P)$ dB below 1995 MHz for AWS-4 emissions.[190] No commenters opposed this OOBE limit.[191] Given the record before us, we therefore conclude that the potential benefits of our proposals

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[185] *See e.g.*, *AWS-1 Report and Order*, 18 FCC Rcd at 25198 ¶ 92; 47 C.F.R. § 24.238.

[186] *See* 47 C.F.R. § 25.252(c)(2). This value was not waived or requested to be waived during any of the ATC designation or other MSS/ATC related procedures.

[187] *AWS-4 NPRM*, 27 FCC Rcd at 3575 ¶ 35.

[188] *Id*. *See* 47 C.F.R. § 27.53(h).

[189] AT&T Comments at 6-7; CTIA Comments at 2-3, 10-11 and CTIA Reply at 6-8; Sprint Comments at 8-9 and Sprint Reply at 5; T-Mobile Comments at 7-8, 24-25.

[190] DISH Comments at 26; Greenwood Comments at 15; Motorola Comments at 6; Nokia Reply Comments at 4; Sprint Comments at 10-11.

[191] We observe that DISH and Sprint have disagreed as to the technical standards that the 3rd Generation Partnership Project (3GPP) had established to protect operations in 1990-1995 MHz from interference from 2 GHz MSS/ATC operators. This disagreement was resolved on Nov. 13, 2012 in 3GPP as -40 dBm/MHz, equivalent to $70 + 10 \log_{10}(P)$ dB, although DISH has expressed concern that Sprint might reopen this issue. We decline to insert ourselves into this dispute before an external standards organization. *See e.g.*, Letter from Lawrence R. Krevor, Vice President, Legal and Government Affairs - Spectrum, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket (continued….)

would outweigh any potential costs and adopt this out-of-band emission limit below 1995 MHz for all fixed and mobile transmitters operating in the AWS-4 uplink band.

(ii) Interference with operations in 1995-2000 MHz

64. *General Considerations*. As explained above, in considering the rules that should govern potential interference between the spectrum being repurposed—here, AWS-4 spectrum—and the adjacent bands, to maximize the public interest, the Commission must consider the value of potential uses in both bands. We are thus generally disinclined to treat an adjacent band as a permanent guard band, which, by definition, would preclude most use of that spectrum for the provision of full flexible use service to the public, or as a limited use band, which would have considerably less economic value than would a full flexible use band.

65. Here, one of the adjacent bands—the 1995-2000 MHz portion of the H block—is not in use today, but Congress has directed that it be licensed via a system of competitive bidding by February 2015.[192] As explained below, this adjacent band raises particularly difficult technical issues because it may result in an uplink band (2000-2020 MHz) adjacent to a downlink band (1995-2000 MHz).[193] The technical rules we adopt today, therefore, are designed to protect future operations in the 1995-2000 MHz band from harmful interference by future operations in the repurposed AWS-4 band.[194] Moreover, enabling full flexible use of the 1995-2000 MHz band may lead to the pairing of this band with the 1915-1920 MHz band, which would thereby maximize the public interest benefit of both of these five megahertz bands.[195] Furthermore, we recognize that in establishing rules that allow the 1995-2000 MHz

(Continued from previous page)

Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Sep. 17, 2012) (*Sprint Sep. 17 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at Appendix 2-4 (filed Sep. 24, 2012) (*DISH Sep. 24 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at 2 (filed Nov. 14, 2012) (*DISH Nov. 14 Letter*); Letter from Marc S. Martin, Counsel for Sprint Nextel Corporation, K&L Gates LLP, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Nov. 14, 2012) (*Sprint Nov. 14 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at Appendix 2-4 (filed Nov. 26, 2012).

[192] *See infra* ¶ 81 (discussing the H block provisions of the Spectrum Act). This requirement is subject to one exception, that the operations in the 1995-2000 MHz band not interfere with operations in the 1930-1995 MHz band. There is no technical information in the record to indicate that such interference would occur.

[193] In 2004, the Commission determined to pair the 1915-1920 MHz band with the 1995-2000 MHz band, and contemplated that the lower band would be used for mobile transmissions. Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, RM-9498, RM-10024, 19 FCC Rcd 20720, 20739-20740 ¶ 38-41 (2004) (*AWS Sixth Report and Order*). In particular, the Commission determined that these bands were comparable to the 1910-1915 MHz and 1990-1995 MHz PCS bands, which are used as uplink and downlink bands, respectively. *Id.*, 19 FCC Rcd at 20740 ¶ 39 ("We also find that due to similar characteristics and proximity to Broadband PCS, the 1915-1920 MHz and 1995-2000 MHz band pairing is comparable to the 1910-1915 MHz and 1990-1995 MHz band pairing"); *see also 2008 Further Notice*, 23 FCC Rcd at 9860-61 ¶ 4 (2008) (proposing that the 1995-2000 MHz band be used for downlink and that mobile transmissions be prohibited in the band).

[194] *See infra* Section III.B.1.b.ii (Interference with operations in 1995-2000 MHz), Section III.B.4.b. (Mobile Stations); *see supra* Section III.A.1. (AWS-4 Frequencies and Paired Spectrum (uplink/downlink)) (defining the frequencies being repurposed here).

[195] The Spectrum Act also requires the Commission to make available the 1915-1920 MHz band unless its use would cause interference with operations in the 1930-1995 MHz band. *See* Spectrum Act § 6401(b); *see supra* Section II.B (The Spectrum Act).

spectrum band to be put to its highest and best use, we also further Congress's objectives related to the use of public safety broadband spectrum in the 700 MHz band. The Spectrum Act directs that the proceeds from the auction of licenses in the 1995-2000 MHz band be deposited into the Public Safety Trust Fund, which will be used to fund FirstNet.[196]

66. In considering the rules that should govern potential interference between the 1995-2000 MHz band, which the Commission envisions as a downlink band,[197] and the adjacent AWS-4 uplink band, the Commission must consider the public interest benefits associated with potential uses in both bands, including, but not limited to, the net effect on the economic values of these bands, and adopt technical rules accordingly. The public interest in the 1995-2000 MHz band is almost certainly maximized if the band is used as an additional PCS band.[198] DISH, conversely, argued first that the Commission should effectively treat the 1995-2000 MHz band as a guard band, which would eliminate most of its value.[199] DISH then argued that the H block should not be made available for full power use,[200] and instead could be auctioned for air-to-ground or small cell use,[201] although both of these uses would, in our assessment, have considerably less economic value and other public interest benefits than an additional PCS downlink band.[202] Limiting the use of the band to air-to-ground operations would be

[196] *See* Spectrum Act §§ 6401(f), 6413.

[197] *H Block NPRM*, at ¶ 23-25 (proposing the 1995-2000 MHz band be made available as a downlink band). In addition, in 2008, the Commission specifically proposed that the 1995-2000 MHz band be made available for downlink transmissions only. *2008 Further Notice*, 23 FCC Rcd at 9860-61 ¶ 4 ("Prohibit mobile transmissions in the 1995-2000 MHz band); *see also AWS Sixth Report and Order*, 19 FCC Rcd at 20739 ¶ 39 ("We also find that due to similar characteristics and proximity to broadband PCS, the 1915-1920 MHz and 1995-2000 MHz band pairings is comparable to the 1910-1915 MHz and 1990-1995 MHz band pairing.").

[198] *See H Block NPRM*, at ¶¶ 1, 8.

[199] *See, e.g.*, DISH Comments at 28 (arguing for strict emissions and power limits on 1995-2000 MHz).

[200] Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 2 (filed Oct. 11, 2012) (*DISH Oct. 11 Letter*).

[201] *See e.g.*, Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Oct. 3, 2012) (*DISH Oct. 3 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 5-6 (filed Oct. 17, 2012) *DISH Oct. 17 Letter*).

[202] *See* Letter from Marc S. Martin, Counsel for Sprint Nextel Corporation, K&L Gates LLP, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1-2 (filed Nov. 2, 2012) (*Sprint Nov. 2 Letter*); Letter from Marc S. Martin, Counsel for Sprint Nextel Corporation, K&L Gates LLP, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1-2 (filed Oct. 31, 2012) (*Sprint Oct. 31 Letter*). DISH argues that limiting the band to small cells would not reduce its value. *See* Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at 2 (filed Nov. 6, 2012) (*DISH Nov. 6 Letter*). However, DISH bases its argument, in part, on the inappropriate assumption that the 1995-2000 MHz band will be limited to low power in any case, arguing that this band will need to parallel power limitations DISH presumes will be adopted in the 1915-1920 MHz band. *See id*. at 2. First, although commenters have suggested power limitations in the 1915-1920 MHz band, (*See e.g.*, Joint Reply Comments of Sprint Corporation, Verizon Wireless and Nextel Communications, WT Docket Nos. 04-356, 02-353 at 2-3 (filed Feb. 8, 2005) (*Joint Reply Comments on H Block*)) we have not yet adopted H block rules. Second, and more importantly, even if such power limits are adopted, parallel limits will not necessarily be needed for 1995-2000 MHz in the event the band is paired. Rather, with data technologies, more power can be used to increase data speeds, and higher speeds are needed on the downlink than on the uplink [*see* (continued….)

inconsistent with the Spectrum Act's direction to license the 1995-2000 MHz band for flexible use. Additionally, both the air-to-ground and small cell proposals, by precluding the possibility of full power cellular operations, would restrict the value of the band in a way that we believe does not promote the public interest in this particular instance given specific characteristics of the band and the available alternative of higher power use. All four nationwide wireless providers have broadband PCS spectrum, as do regional and rural providers, and any of these providers could use additional PCS spectrum to expand capacity. One analyst projected that the value of the paired H block would be $2-3 billion, which implies a price of at least $0.67-$1.00 per MHz POP, or $1-$1.5 billion for the downlink band.[203] We note that economists frequently consider it a rule of thumb that the public benefit of a licensed spectrum band typically equates to about ten times its value at auction.[204] Although as a matter of practice the Commission does not predict auction prices, we reference these figures as an indicator of the economic value or public benefit that could be derived from the spectrum, if it is usable for high power commercial services.[205] Indeed, Sprint suggests that auctioning the H block will produce "enormous public benefits,"[206] that the H block will be highly valued because it is cleared and ready for deployment,[207] and that it will help carriers meet needs for throughput, peak speeds, and capacity.[208]

67. The public interest benefits of the AWS-4 spectrum, including its economic value,[209] will also increase significantly once it is available for terrestrial use. The largest increase in value would occur if AWS-4 operations did not need to protect any adjacent bands. But that is not the case here. For example, DISH has acknowledged the need for AWS-4 operations to comply with technical rules designed to prevent harmful interference below 2180 MHz and above 2200 MHz.[210] However, DISH argues that, while licensees of AWS-4 authority should also be subject to technical rules for operations

(Continued from previous page)
infra ¶ 80, so there is no need to balance the uplink and downlink as suggested by DISH. *See DISH Nov. 6 Letter* at 3 (indicating downlink power will be "wasted").

[203] Jonathan Chaplin, Spencer Kurn, *Sprint/Softbank Details Emerge; Positive For Sprint And Other Carriers; Mixed For Towers*, Credit Suisse, Equity Research - Wireless Telecommunication Services, at 3 (Oct. 15, 2012); *see also* Philip Cusick, CFA, Eric Pan CFA, Richard Choe, Derya Erdemli, CFA, *DISH Network, Wireless Business Update: We Estimate $5.5b NPV of Business Based on Shared Network Buildout*, at 2, 4 (Nov. 26, 2012) (estimating the value of the paired H block at $1-2 billion).

[204] *See e.g.*, Gregory L. Rosston, The Long and Winding Road: The FCC Paves the Path with Good Intentions, 27 Telecomms. Pol'y 501 (2003).

[205] Thus, contrary to DISH's suggestion, auction revenues are not dictating our public interest determination. *See* Letter from Jeffrey H. Blum, Senior Vice President & Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3-4 (filed Nov. 26, 2012) (*DISH Nov. 26 Ex Parte Letter*).

[206] Letter from Rafi Martina, Staff Attorney, Government Affairs, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Jul. 2, 2012) (*Sprint Jul. 2 Letter*).

[207] *See e.g.*, Letter from Trey Hanbury, Director, Government Affairs, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Jul. 24, 2012) (*Sprint Jul. 24 Letter*).

[208] Letter from Rafi Martina, Staff Attorney, Government Affairs, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Sep. 17, 2012) (*Sprint Second Sep. 17 Letter*).

[209] *See* Stifel Nicolaus, *FCC Staff Eyes Limits on Dish MSS/AWS-4 Spectrum Lower Edge to Shield H Block*, at 1, Nov. 13, 2012 ("But even with added limitations on the lower end, we still expect FCC approval of broad terrestrial wireless rights would make the MSS spectrum worth much more than the roughly $3 billion Dish paid for it."); *see also* Wells Fargo Securities, DISH: The Spectrum Story Just Got A LOT MORE Interesting!, at 6, Nov. 19, 2012.

[210] *See e.g.*, DISH Comments at 29.

below 2000 MHz, these rules should not restrict AWS-4 operations even if they limit the efficient use of the spectrum below 2000 MHz.[211] DISH identifies certain costs associated with such technical rules, including the claimed loss of the ability to use 5 MHz of uplink spectrum.[212] Sprint suggests that this impact can be mitigated through base station receive filters, co-location of base stations, and LTE interference mitigations.[213] DISH counters that filters would require 5 megahertz of transition band, co-location is not possible in all cases, and the LTE features mentioned by Sprint are more effective for UE-to-UE interference than base-to-base interference.[214] DISH has not attempted to quantify the economic value of its possible loss of some of the use of this 5 MHz to society, but simply argues that there is no net gain in spectrum because the Commission would be trading 5 MHz of AWS-4 uplink spectrum for 5 MHz of H block downlink spectrum.[215] This argument ignores the possibility of the Commission pairing 1995-2000 MHz with 1915-1920 MHz, as previously proposed[216] and proposed again in the *H Block NPRM*,[217] in which case making the 1995-2000 MHz band available may enable a total of 10 megahertz of spectrum by completing the pairing. Moreover, the 1915-1920 MHz and 1995-2000 MHz bands could be used by PCS operators to expand, for example, from 5 + 5 megahertz blocks to 10 + 10 megahertz blocks, or to otherwise aggregate PCS blocks. Also, as explained below, the technical rules we adopt do not prevent the use of 5 megahertz of spectrum; rather, they merely limit its use, and make provisions for improving its usability.[218]

68. More importantly, as explained above, the amount of spectrum is not the only question that the Commission must consider as we evaluate the rules that will govern the AWS-4 band. Rather, we must evaluate how best to serve and maximize the public interest with respect to all relevant bands. Because, as explained below, companies tend to use more downlink than uplink spectrum today,[219] it is not clear that the loss of some uplink spectrum would significantly diminish the utility (and economic value) of the paired AWS-4 spectrum. At a minimum, it appears that the public interest benefit (including economic value) of a fully usable 1995-2000 MHz band, which the Commission envisions as a downlink PCS band, is substantially greater than that of a fully usable additional 5 MHz of AWS-4 uplink—perhaps an order of magnitude greater. This may be particularly so if the 1995-2000 MHz band is ultimately paired with the 1915-1920 MHz band and the paired band is combined with other PCS spectrum to create, for example, 10+10 megahertz of PCS spectrum.

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[211] *DISH Sep. 24 Letter* at 4-5; *DISH Oct. 17 Letter* at 5.

[212] *See DISH Oct. 17 Letter*, at 3.

[213] *Sprint Nov. 2 Letter*, at 2-3.

[214] *DISH Nov. 6 Letter*, at 7-8.

[215] *See e.g.*, *DISH Oct. 17 Letter*, at 4. Similarly, DISH states that impacting 5 megahertz of AWS-4 uplink to enable full power H block may be against the public interest; *see DISH Nov. 6 Letter*, at 7. In addition to this argument, DISH also argues that the network build costs for AWS-4 will be increased by 15-30%. *DISH Oct. 17 Letter*, at 4). *See infra* ¶ 84.

[216] *AWS Sixth Report and Order* at 20739 ¶ 39 ("We also find that due to similar characteristics and proximity to broadband PCS, the 1915-1920 MHz and 1995-2000 MHz band pairings is comparable to the 1910-1915 MHz and 1990-1995 MHz band pairing.")

[217] *See H Block NPRM*, ¶ 25.

[218] *See infra* ¶¶ 89, 90, 91, 96.

[219] *See infra* ¶ 80.

69. Further, DISH incorrectly argues that the Spectrum Act precludes auctioning the 1995-2000 MHz band.[220] DISH reaches this conclusion by claiming the record shows that 1915-1920 MHz will interfere with the 1930-1995 MHz band, that the Commission has paired 1915-1920 MHz with 1995-2000 MHz, and therefore that the 1995-2000 MHz band is precluded from auction.[221] DISH similarly states that engineering analysis showing that interference to the 1930-1995 MHz band has not been done, and may preclude auction of the 1995-2000 MHz band when completed.[222] Conversely, Sprint argues that the Spectrum Act requires the auction of the 1995-2000 MHz band,[223] that the record shows that interference from 1915-1920 MHz is avoidable,[224] and that the deployment of LTE technology will further mitigate any potential interference.[225] DISH responds that is premature to reach any conclusions on the use of the 1995-2000 MHz band, and that its future is uncertain.[226] We do not reach any conclusions on the specific future use of the 1995-2000 MHz band in this proceeding; such determinations are outside its scope.[227] However, in our role as spectrum managers we do establish rules for AWS-4 that do not preclude uses of the 1995-2000 MHz band, or prejudge it to be unusable. And, although we do not make a final determination on the use of 1995-2000 MHz, we note that DISH's arguments have several flaws. First, many commenters on the H block proceeding have suggested that with appropriate technical limitations, the 1915-1920 MHz band will not interfere with the 1930-1995 MHz band.[228] Thus, such interference may not present a problem, or, if it does, the problem may be partially overcome. Second, although the Commission has proposed pairing 1915-1920 MHz with 1995-2000 MHz, the Spectrum Act does not require this, and a finding that 1915-1920 MHz cannot be auctioned due to interference with 1930-1995 MHz does not, in and of itself, release us from our obligation to auction the 1995-2000 MHz band.

70. DISH has put forward a technical proposal that it feels balances the usability of the 1995-2000 MHz band with the usability of the AWS-4 uplink band, while also speeding deployment in AWS-4 by minimizing the impact of our rulemaking on the 3GPP standards body.[229] This proposal includes

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[220] *DISH Sep. 24 Letter* at 4-5; *DISH Oct. 3 Letter* at n.3.

[221] *DISH Sep. 24 Letter* at 4-5.

[222] *DISH Oct. 17 Letter* at 4.

[223] *See e.g., Sprint Jul. 2 Letter* at 1; *Sprint Jul. 24 Letter* at 1.

[224] *See e.g., Sprint Jul. 2 Letter* at 2; *Sprint Jul. 24 Letter* at 2.

[225] *Sprint Jul. 2 Letter* at 2.

[226] *DISH Oct. 11 Letter* at 2; Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 5 (filed Oct. 10, 2012) (*DISH Oct. 10 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Oct. 15, 2012) (*DISH Oct. 15 Letter*); *DISH Nov. 26 Ex Parte Letter* at 1-2; *but see* Letter from Lawrence R. Krevor, Vice President, Legal and Government Affairs - Spectrum, Rafi Martina, Staff Attorney, Government Affairs, Sprint, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Oct. 22, 2012) (*Sprint Oct. 22 Letter*) (arguing that DISH is effectively urging that consequences of AWS-4 rules for H block be ignored.).

[227] *See H Block NPRM*.

[228] *Joint Reply Comments on H Block* at 2.

[229] Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 2 (filed Dec. 3, 2012) (*DISH Dec. 3 Letter*); Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 2 (filed Dec. 7, 2012) (*DISH Dec. 7 Letter*).

DISH voluntarily designating 2000-2005 MHz as a terrestrial guard band, proposing the Commission set an emissions limit of 60 + 10 $\log_{10}$(P) dB for AWS-4 emissions into the 1995-2000 MHz band, and asking the Commission to limit any emissions from the 1995-2000 MHz band by 79 + 10 $\log_{10}$(P) dB above 2005 MHz. As discussed further below, we decline to adopt this proposal because we find that it will not speed deployment of the AWS-4 band or allow for full flexible use of the 1995-2000 MHz band.[230] Moreover, DISH's request that we establish OOBE limits for the 1995-2000 MHz band is not within the scope of this proceeding. Rather these limits will be addressed in our companion *H Block NPRM*.[231]

71. Consequently, while the Commission has not adopted rules for the 1995-2000 MHz band, we are adopting technical rules for the AWS-4 uplink band that we predict will, in light of the record and of our assessment of the nature and characteristics of both bands, ensure efficient use of the AWS-4 band while preserving our ability to auction licenses for operations in the 1995-2000 MHz band. Moreover, we find that the approach and the technical rules we adopt will best serve the public interest by striking an appropriate balance that will enable both the AWS-4 band and the 1995-2000 MHz band that is adjacent to the AWS-4 uplink band (2000-2020 MHz) to be used for providing flexible use services in the most efficient manner possible.[232] In this way, we further and fully comply with our statutory mandates, including our responsibilities under the Communications Act to manage the spectrum in the public interest and Congress's specific direction regarding the 1995-2000 MHz band in the Spectrum Act. Furthermore, we recognize that in establishing rules that will enable the 1995-2000 MHz spectrum to be put to its highest and best use, we also further Congress's objectives related to the use of public safety broadband spectrum in the 700 MHz band. The Spectrum Act directs that the proceeds from the auction of licenses in the H Block, including 1995-2000 MHz, be deposited into the Public Safety Trust Fund, which will be used to fund FirstNet.[233]

72. Therefore, as explained below, we establish carefully calibrated, limited technical restrictions on AWS-4 operations in 2000-2005 MHz, the lowest five megahertz of the AWS-4 uplink band. In particular, as explained below, we are imposing (1) increased OOBE limits at and below 2000 MHz, (2) reduced power limits for mobile terrestrial operations in 2000-2005 MHz, and (3) requirements that a licensee of AWS-4 terrestrial rights or of 2 GHz MSS rights must accept harmful OOBE interference, if any occurs, from future operations in the 1995-2000 MHz band into the 2000-2005 MHz portion of the AWS-4 and 2 GHz MSS uplink bands and harmful overload interference, if any occurs, from operators in the 1995-2000 MHz band into the AWS-4 and 2 GHz MSS uplink bands.[234] We do this to protect future operations in the 1995-2000 MHz band from harmful interference; to ensure the possibility of flexible commercial use of that band, consistent with Congressional direction; and to strike a balance in ensuring the efficient use of both the AWS-4 and the 1995-2000 MHz bands. The Communications Act established "that the Commission's powers are not limited to the engineering and technical aspects of radio communications."[235] Rather, the Communications Act directs the Commission

[230] *See infra* ¶¶ 86, 87, 95, 147.

[231] *See H Block NPRM*, at ¶ 37.

[232] We disagree with DISH's assertion that the Commission has a "first-in-time" policy that requires us to grant DISH "full rights" to use AWS-4 spectrum and, only thereafter, begin to examine the rules for the 1995-2000 MHz band. *See DISH Nov. 26 Ex Parte Letter* at 3. We are aware of no Commission rule requiring the application of a generic first-in-time priority between adjacent spectrum bands.

[233] Spectrum Act.

[234] *See infra* Section III.B.5. (Acceptance of Interference into the AWS-4 Uplink Band).

[235] National Broadcasting Co. v. United States, 319 U.S. 190, 215 (1943) (*NBC*).

to "encourage the larger and more effective use of radio in the public interest" and to adopt "such rules and regulations and prescribe such restrictions and conditions . . . as may be necessary to carry out the provisions of this Act."[236] As explained below, we deem it necessary to set these technical limits to best maximize AWS-4 and 1995-2000 MHz spectrum for flexible terrestrial use by minimizing harmful interference between the bands. We believe that the technical rules we adopt today to protect against harmful interference will promote more effective and efficient use of the 1995-2000 MHz band and the AWS-4 band and we believe that the benefits of these rules will outweigh any restrictions on the use of a portion of the AWS-4 uplink band. Moreover, any restrictions on the use of a portion of the AWS-4 band would be more than offset by the considerable increase in flexibility that the authorization holders will receive in obtaining overall terrestrial use rights under the Commission's Part 27 flexible use rules instead of under the existing ATC rules.

73. Finally, we adopt rules that allow for the restrictions specified above to be modified by private agreement, thereby providing a licensee of AWS-4 operating authority with the ability to utilize this five megahertz of spectrum through deployment of higher performance technologies, commercial agreements with future 1995-2000 MHz band licensees, or other means. This will also provide greater flexibility to any operators that obtain licenses for both the AWS-4 A block and the 1995-2000 MHz band, as could be the case for a licensee of AWS-4 authority who bids on the 1995-2000 MHz band.

74. *Background*: In the *AWS-4 NPRM*, we sought comment on how licensees of AWS-4 operating authority should protect future adjacent channel H block operations at 1995-2000 MHz.[237] The *AWS-4 NPRM* discussed how current ATC rules, which establish a linear interpolation of OOBE attenuation between $70 + 10 \log_{10}(P)$ dB at 1995 MHz and $43 + 10 \log_{10}(P)$ dB at 2000 MHz, do not allow for full use of the 1995-2000 MHz band by future licensees.[238] Against this backdrop, and recognizing that any future H block service rules may contemplate downlink (base-to-mobile) transmissions in the 1995-2000 MHz band, the Commission sought comment on three alternative OOBE limits to address potential OOBE interference from the AWS-4 uplink band into the 1995-2000 MHz band.[239]

75. First, the Commission sought comment on maintaining the existing ATC rule, which sets an OOBE limit of $70 + 10 \log_{10}(P)$ dB at 1995 MHz and an OOBE limit of $43 + 10 \log_{10}(P)$ dB at 2000 MHz with a linear interpolation between these two frequencies.[240] Second, the Commission sought comment on requiring fixed and mobile transmitters operating in 2000-2020 MHz to attenuate emissions below 2000 MHz by $70 + 10 \log_{10}(P)$ dB, consistent with the emissions limit below 1995 MHz.[241] Third, the Commission sought comment on requiring fixed and mobile transmitters operating in 2000-2020 MHz to attenuate emissions below 2000 MHz by $43 + 10 \log_{10}(P)$ dB, symmetric with existing limits for PCS emissions outside the 1930-1995 MHz band and broadly consistent with Commission rules.[242] For all three OOBE limits, the Commission proposed using the existing measurement procedure of Section 27.53(h) of the Commission's rules.[243]

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[236] 47 U.S.C. §§ 303(g), (r).

[237] *AWS-4 NPRM*, 27 FCC Rcd at 3575-77 ¶¶ 36-43.

[238] *AWS-4 NPRM*, 27 FCC Rcd at 3575-76 ¶ 36; *see also* 47 C.F.R. § 25.252(c)(2)

[239] *AWS-4 NPRM*, 27 FCC Rcd at 3576-77 ¶¶ 37-41.

[240] *Id*. at 3576 ¶ 38.

[241] *Id*. at 3576 ¶ 39.

[242] *Id*. at 3576-77 ¶ 40.

[243] *Id*. at 3577 ¶ 41.

76. In addition to the proposals discussed above, the Commission also sought comment on two proposals to mitigate interference issues associated with the 1995-2000 MHz band through a shift of the 2000-2020 MHz band.[244] Under the first proposal, the band would be shifted up five megahertz to 2005-2025 MHz.[245] The second proposal involved a ten megahertz shift and band compression, which would move the band to 2010-2025 MHz.[246]

77. In response to the *AWS-4 NPRM*, the Commission received comments favoring and opposing the proposals discussed above. Some parties commented that using linear interpolation with a $43 + 10 \log_{10}(P)$ dB limit at 2000 MHz tapering to $70 + 10 \log_{10}(P)$ dB at 1995 MHz is appropriate.[247] Other parties proposed different approaches. For example, Greenwood suggested that no taper is required as "filters will provide the requisite roll-off as well as provide necessary attenuation between 1995-2000 MHz."[248] Motorola recommended that a flat $43 + 10 \log_{10}(P)$ dB OOBE limit would allow for typical signal roll-off and normal variations in commercial filter performance and enable AWS-4 to conform with other commercial mobile bands, thereby eliminating the need to impose costly operational limits on AWS-4.[249] DISH suggested that the existing linear interpolation be maintained, but interpreted in watts, not dB,[250] that a limit of $43 + 10 \log_{10}(P)$ dB at 2000 MHz would not preclude full use of the 1995-2000 MHz band,[251] and, alternatively, that a limit of $60 + 10 \log_{10}(P)$ dB at 2000 MHz would provide adequate protection of the 1995-2000 MHz band.[252]

78. Additionally, commenters discussed the merits of using 1995-2000 MHz as a guard band.[253] For example, AT&T commented that both 1995-2000 MHz and 1915-1920 MHz should be guard bands.[254] In contrast, Sprint and U.S. Cellular argued that 1995-2000 MHz should not be used as a guard band, but rather made available for commercial use.[255] U.S. Cellular did, however, suggest using 2000-2010 MHz as a guard band, by prohibiting AWS-4 operations in that range.[256] Furthermore, comments regarding the proposed spectrum shifts were mixed. For example, AT&T, Greenwood, and Motorola all supported the proposed shift.[257] These parties suggest that a 5 megahertz shift would reduce potential interference between AWS-4 and the PCS bands.[258] Conversely, both Alcatel and DISH argue a

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[244] *Id*. at 3577 ¶¶ 42-43.

[245] *Id*. at 3577 ¶ 42.

[246] *Id*. at 3577 ¶ 42.

[247] DISH Comments at 27; Nokia Reply at 4.

[248] Greenwood Reply at 7-8.

[249] Motorola Comments at 6.

[250] DISH Comments at 27-28.

[251] *DISH Nov. 14 Letter* at 2.

[252] *DISH Dec. 7 Letter* at 3-5.

[253] *See* AT&T Comments at 7-8, Reply at 5-7; DISH Comments at 28; Greenwood Comments at 18; Sprint Reply at 6-8; TIA Comments at 12; and U.S. Cellular Comments at 5-6, Reply at 4.

[254] AT&T Comments at 7-8, Reply at 5-7.

[255] Sprint Reply at 4; U.S. Cellular Comments at 3-7.

[256] U.S. Cellular Comments at 5.

[257] AT&T Comments at 3, 5-8; Greenwood Comments at 19; Motorola Comments at 2-4.

[258] AT&T Comments at 3, 5-8; Greenwood Comments at 19; Motorola Comments at 2-4.

5 megahertz shift is unnecessary as it would curtail the rights of the 2 GHz MSS licensees by effectively making portions of the 2 GHz MSS spectrum unusable for the existing satellites, cause delays in deployment, and create additional interference issues.[259]

79. *Discussion*: For AWS-4 operations in 2000-2020 MHz, we adopt an OOBE limit of 70 + 10 $\log_{10}$(P) dB at and below 2000 MHz, which is the second of the three proposals from the *AWS-4 NPRM*, discussed above.[260] This limit promotes the public interest for several reasons: (1) it promotes the best and highest use of spectrum, (2) it fulfills our statutory obligations, (3) it provides consistent levels of protection for the adjacent 1990-1995 MHz and 1995-2000 MHz downlink bands, and (4) it maintains consistency with past Commission actions.

80. *Best and highest use of adjacent spectrum*. DISH has stated that a required attenuation of 70 + 10 $\log_{10}$(P) dB below 2000 MHz would have a negative impact on operations in the AWS-4 uplink band.[261] While this is correct, we seek to balance this negative impact on a portion of the AWS-4 uplink spectrum with the positive impact on the usability of the 1995-2000 MHz band, to obtain the most efficient use of both bands, and to maximize the overall public interest. To this end, we observe that mobile broadband uses far more downlink than uplink spectrum. For example, at an FCC forum on the future of wireless band plans, Nokia Siemens Networks presented data showing a typical LTE network producing 13 times more downlink data than uplink data, while Alcatel Lucent showed 17 to 30 times more downlink data than uplink data.[262] Accordingly, there is a more pressing need for downlink spectrum than for uplink spectrum. Therefore, a possible limited reduction in uplink capacity may not present a hardship to a licensee of AWS-4 operating authority. In addition, as discussed further below, while some of the uplink spectrum may be restricted in power, our rules do not eliminate the use of any uplink spectrum.[263] Furthermore, extensions of existing bands can typically be put to use more cost-effectively than new bands.[264] Finally, to the extent some spectrum may have reduced utility to address interference issues, a fixed spectrum impact will represent a larger fraction of the 5 megahertz band from 1995 to 2000 MHz than of the lower 10 megahertz block in the 2000-2020 MHz band. Therefore, because 1995-2000 MHz can be used as a small downlink expansion of the existing PCS band, while 2000-2020 MHz is the larger uplink of a new band, these factors indicate that more efficient use of spectrum can be realized by promoting usability of 1995-2000 MHz even if it decreases the usability of a limited portion of the 2000-2020 MHz AWS-4 band.[265]

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[259] Alcatel Comments at 9, 12-13; DISH Comments at 34, Reply at 24-28.

[260] *See supra* ¶ 75.

[261] DISH Comments at 27.

[262] *See* Nokia Siemens Networks presentation at FCC forum on the future of wireless band plans at 2, available at http://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting71612/PANEL2.1-Jette-NokiaSiemensNetworks.pdf (last visited Dec. 4, 2012) and Alcatel Lucent presentation at FCC forum on the future of wireless band plans at 2, available at http://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting71612/PANEL2.2-Wilkus-Alcatel-Lucent.pdf (last visited Dec. 4, 2012).

[263] *See infra* ¶¶ 89, 91, 138.

[264] For example, a new device supporting an extended band may be able to replace existing components one-for-one maintaining existing cost and size, while a device supporting a new band may have to add components for the new band while keeping previous components. Also, a new network being built in an extension of a band can reuse the site locations of existing band networks.

[265] In a 2003 notice of proposed rulemaking the Commission envisaged that new operations in the 1990-2000 MHz band would "need to take into account" MSS operations, including ATC, above 2000 MHz and that these licensees "should take measures both to ensure that their operations are protected from MSS/ATC operations and will protect (continued….)

81. *Statutory obligations*. We find this OOBE limit, combined with the mobile power limits and requirement to accept interference within the 2000-2005 MHz band from lawful operations in the 1995-2000 MHz band, which we establish below,[266] allows us to fulfill our spectrum manager role under the Communications Act by balancing the public interest goals of enabling efficient use of both the 1995-2000 MHz band and the AWS-4 band. Moreover, this limit enables us to fulfill our obligations under the Spectrum Act with regard to the 1995-2000 MHz band. The Spectrum Act requires the Commission, among other things, to make available via a system of competitive bidding the 1995-2000 MHz band.[267] We believe it is consistent with Congress's specific direction to auction this spectrum to preserve our ability to reach a possible finding that this band should support the deployment of full, robust, commercial service—including for mobile broadband. DISH suggests that we could restrict an auction of 1995-2000 MHz to small cell operations or as part of a paired air-to-ground / ground-to-air band.[268] We decline to so limit the potential uses of the 1995-2000 MHz band at this time, because this would likely diminish the efficiency and usefulness of the spectrum given the significant value we believe exists for high power uses in the 1995-2000 MHz band.[269] Further, the Spectrum Act specifically calls for flexible use of 1995-2000 MHz, and limiting the band to be suitable only for small cell or air-to-ground services may improperly curtail such flexible use if full terrestrial use remains a reasonable possibility for the band. While flexible use rules that permit higher power terrestrial use could also permit small cell or air-to-ground services, the reverse is not true—a band limited to either of those uses could not also be used for full power terrestrial operations.[270] DISH fails to explain how we can fulfill our statutory obligation to make the 1995-2000 MHz band available for flexible use via a system of competitive bidding without a strong OOBE limit. Moreover, it is not clear if either small cell or air-to-ground use would result in an improved interference environment as compared to full power use.[271] Should the Commission ultimately

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MSS and ATC operations from interference." Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, IB Docket No. 99-81, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223, 2249 ¶ 51 (2003) (*AWS Third Report and Order*). The Commission sought comment on this matter and did not subsequently adopt rules or otherwise decide the matter.

[266] *See infra* Section III.B.4.b. (Mobile Stations), Section III.B.5. (Acceptance of Interference into the AWS-4 Uplink Band).

[267] The Spectrum Act makes an exception in the case of interference to the 1930-1995 MHz PCS band, however, no technical information in the record indicates that the 1995-2000 MHz band would cause interference to the 1930-1995 MHz band. *See* Spectrum Act § 6401(b)(4).

[268] *See e.g., DISH Oct. 3 Letter* at 2-3.

[269] *See e.g., Sprint Oct. 31 Letter* at 2; *Sprint Nov. 2 Letter* at 2.

[270] *See e.g., Sprint Oct. 31 Letter* at 2.

[271] Sprint argues that due to the difficulty of co-location with small cells and the potentially large number of small cells, interference could be worse, not better, in the small cell scenario. *See Sprint Oct. 31 Letter* at 2. DISH counters with calculations showing at least 60 dB less signal from small cells, implying at least a million small cells would be needed to generate as much interference as one macro cell. *DISH Nov. 6 Letter* at 3. However DISH's calculations assume small cells are limited to 200 mW, limited to indoor use, and deployed only at low heights, all of which are significant restrictions on the flexible use of 1995-2000 MHz. In addition, DISH's calculation includes 30-50 dB of attenuation due to the indoor use and low antenna height restrictions, but does not explain how DISH obtained this range, including what antenna heights, penetration losses, or propagations models it has assumed. No parties addressed the interference characteristics of air-to-ground systems in any detail.

determine, in the forthcoming proceeding on this band, to limit the permissible services in this band, DISH or any other party is free to petition us to revisit the technical rules we adopt herein.[272]

82. *Consistent Protection Levels*. To promote more effective and efficient use of the 1995-2000 MHz band, we believe the same OOBE limit the Commission adopted to protect current PCS operations below 1995 MHz—70 + 10 $\log_{10}$(P) dB—will be both necessary and sufficient to protect future operations in the 1995-2000 MHz band.[273] This creates consistency in our rules, by affording the 1995-2000 MHz band the same protections as the existing PCS band.

83. *Past Commission Actions*. The Commission has long sought to put the 1995-2000 MHz band to productive commercial use. In 2004, 2007, and 2008, the Commission undertook efforts to make this spectrum available for full flexible use.[274] We therefore reject the approach advocated by some that the 1995-2000 MHz band should be used as a guard band between the extended PCS downlink band from 1990-1995 MHz and the AWS-4 uplink band.[275] Setting aside this block for no use is directly at odds with the Commission's past actions. Further, in 2010, the National Broadband Plan recommended that the Commission make this band available through auction.[276] Thus, the public has long been on notice that the 1995-2000 MHz band is not intended for use as a guard band.[277] Such notice significantly predates the current MSS licensee's acquisition of DBSD and TerreStar in 2011.

84. *The Record*. The proposed OOBE limit of 70 + 10 $\log_{10}$(P) dB at and below 2000 MHz received some support in the record. For example, Sprint supports this OOBE level as necessary to protect the 1995-2000 MHz band.[278] U.S. Cellular proposed a limit of 70 + 10 $\log_{10}$(P) dB at and below 2000 MHz to protect the 1995-2000 MHz band.[279] Several other commenters indirectly support an OOBE limit of 70 + 10 $\log_{10}$(P) at 2000 MHz, which will be five megahertz away from full power use of the AWS-4 uplink band,[280] by stating that this level is necessary to protect PCS operations below 1995 MHz without assuming any reduction in power between 2000-2005 MHz.[281] To achieve this level of protection for the 1995-2000 MHz band without applying this OOBE limit at 2000 MHz and lower power limits in 2000-2005 MHz, we would need to create frequency separation between the 1995-2000 MHz

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[272] We could also have delayed establishing AWS-4 rules until we first established services rules for the 1995-2000 MHz band, but decline to take this route.

[273] *See e.g.*, 47 CFR 25.252(c)(2).

[274] *See AWS-2 NPRM, AWS-3 NPRM, 2008 Further Notice*, and *National Broadband Plan*. We observe in all cases 1995-2000 MHz was proposed for licensed, full power, terrestrial use. *See e.g.* AWS-2 NPRM, 19 FCC Rcd at 19305 ¶110; *2008 Further Notice*, 23 FCC Rcd at 9860-61 ¶4.

[275] *See e.g.* AT&T Comments at 7-8, Reply at 5-7; TIA Comments at 12.

[276] *National Broadband Plan*, Recommendation 5.8.3 at p. 86.

[277] In general, designating spectrum for guard bands reduces their utility. *See e.g.* DISH Comments at 28. Therefore, it is generally good spectrum management to minimize the designation of spectrum to guard bands. However, in some circumstances it may be in the public interest to designate spectrum for guard bands. For example, we propose technically reasonable guard bands between different high-power services in our incentive auction NPRM. *Incentive Auction NPRM*, 27 FCC Rcd at 12412-15 ¶¶ 152-159. However, we find that the balance of the record before us in this proceeding does not require allocation 1995-2000 MHz as a guard band.

[278] *Sprint Sep. 17 Letter* at 6.

[279] U.S. Cellular Comments at 5.

[280] *See infra* Section III.B.4.b (Mobile Stations).

[281] *Id*.

band and the AWS-4 uplink band. For the reasons explained above, however, we decline to shift the AWS-4 uplink band up 5 megahertz (or more) to 2005-2025 MHz. DISH makes several arguments objecting to this OOBE limit as unprecedented, unnecessary, and restrictive.[282] DISH also asserts that this limit would affect AWS-4 operations, including negative impacts for AWS-4 devices, rendering 25% of the AWS-4 uplink unusable, slowing DISH's deployment due to delays in the 3GPP standards process, requiring as many as 15-30% additional sites for licensees of AWS-4 authority, and not creating a net gain of spectrum for broadband.[283] DISH proposed that we instead adopt an OOBE limit of 43 + 10 $\log_{10}$(P) dB at 2000 MHz[284] and separately that we adopt an OOBE limit of 60 + 10 $\log_{10}$(P) dB at 2000 MHz.[285] We are not persuaded by these arguments.

85. We adopt the specific level of 70 + 10 $\log_{10}$(P) dB because it provides a reasonable level of protection for the 1995-2000 MHz band, there is directly applicable precedent in the existing protection of the PCS G block from MSS/ATC, and it is superior to other attenuation levels raised in the record. As DISH correctly notes,[286] the interference from the AWS-4 uplink to operations in the 1995-2000 MHz band is likely to be mobile-to-mobile interference, and is therefore probabilistic, meaning the probability of interference depends on the likelihood of the interfering and victim mobiles passing close enough to each other under the right conditions. However, determining that interference is probabilistic does not mean that it should be ignored; rather, it means that rules should be set to ensure that the probability of interference is reasonably low.[287] To evaluate this probability, we make reasonable assumptions about interference and look at the separation needed between mobile devices to prevent interference with those assumptions. A larger resulting separation indicates a higher likelihood of interference. In its comments on this proceeding, Motorola proposes assumptions for the protection of the 1930-1995 MHz band that we find reasonable, with one modification, and applicable to the 1995-2000 MHz band.[288] Using the proposed assumptions with this modification, 70 + 10 $\log_{10}$(P) dB yields a separation of 1.4 meters (under 5 feet), similar to the separation of 2 meters (about 6 feet) proposed by Motorola and the separations

[282] *See e.g., DISH Nov. 6 Letter* at 1, 4.

[283] *See* DISH Comments at 27; *DISH Oct. 17 Letter* at 3.

[284] *See e.g., DISH Nov. 6 Letter* at 4.

[285] *See DISH Dec. 7 Letter* at 3-5.

[286] *See e.g., DISH Nov. 6 Letter* at 6.

[287] In fact, this unpredictability of a mobile interferer makes this type of interference hard to identify and mitigate, so the probabilistic nature can make it more important to set rules to prevent it, not less. For example, DISH argued in the case of possible BAS interference that DISH would need to plan for the worst case when a mobile electronic news gathering (ENG) truck set up with a DISH base station in the line between the truck and the receive site, even though the probability of such an event is low. *See e.g.*, Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at attached Wireless Strategy study 7. (filed Sep. 17, 2012).

[288] The exception is that Motorola applies body loss only to the transmitting mobile, and fails to apply it to the receiving mobile. *See* Motorola Comments, Technical App. at A-1. Applying it to both handsets is more reasonable, and is in fact the approach that Motorola takes in their own submissions to 3GPP. *See e.g.*, 3GPP R4-080710, available at http://www.3gpp.org/ftp/tsg_ran/wg4_radio/TSGR4_46bis/Docs/R4-080710.zip (*3GPP R4-080710*) (last visited Dec. 4, 2012); 3GPP R4-114592, available at http://www.3gpp.org/ftp/tsg_ran/wg4_radio/TSGR4_60/Docs/R4-114592.zip (*3GPP R4-114592*) (last visited Dec. 7, 2012). Motorola concludes that a level of 77 + 10 $\log_{10}$(P) dB is appropriate (this is equivalent to -47 dBm / MHz). Motorola Comments, Technical App. at A-1. However, adjusting their calculation by applying body loss to both devices lowers this to 67 + 10 $\log_{10}$(P) dB, very close to our proposal of 70 + 10 $\log_{10}$(P) dB.

typically used in 3GPP standards.[289] 70 + 10 $\log_{10}$(P) dB is also the level that Sprint recommends as necessary to protect the 1995-2000 MHz band. [290] As another reference point, 3GPP adopts a similar but more stringent level of 80 + 10 $\log_{10}$(P) dB for the protection of mobile receivers from mobile transmitters in most cases.[291]

86. DISH's initial proposal of 43 + 10 $\log_{10}$(P) dB does not provide adequate protection to the 1995-2000 MHz band. Applying the same calculations to the level of 43 + 10 $\log_{10}$(P) dB yields a separation of 32 meters (over 100 feet). [292] This represents a dramatic increase in the probability in interference, because it is far more likely that two mobiles will pass within 100 feet of each other, rather than 5 feet of each other.[293]

87. Although DISH provides more technical support for its later proposal of 60 + 10 $\log_{10}$(P) dB, including references to two 3GPP submissions, from Qualcomm and Intel respectively, and one CEPT (European Conference of Postal and Telecommunications Administrations) study that proposed levels less stringent than 60 + 10 $\log_{10}$(P) dB in various situations, [294] we observe that applying the above assumptions to the 60 + 10 $\log_{10}$(P) dB level would result in a separation of 14 meters (about 46 feet), an unacceptably high separation compared to industry norms.[295] In addition, each of these studies considers a different case than we consider here, and thus is not directly applicable.[296] Finally, we note that despite

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[289] *See e.g., 3GPP R4-080710; 3GPP R4-114592*.

[290] *Sprint Sep. 17 Letter* at 6.

[291] *See LTE RF Standard for UEs* at 68-71. (-50 dBm / MHz is equivalent to 80 + 10 $\log_{10}$(P)).

[292] *See e.g., DISH Nov. 6 Letter* at 8; , Letter from Jeffrey H. Blum, Senior Vice President and Deputy General Counsel, DISH to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at 2 (filed Nov. 8, 2012) (*DISH Nov. 8 Letter*); *DISH Nov. 14 Letter* at 2 (where DISH argues that a limit of 43 + 10 $\log_{10}$(P) dB does not preclude use of the 1995-2000 MHz band. DISH also argues that setting symmetric limits of 43 + 10 $\log_{10}$(P) dB both from AWS-4 to the 1995-2000 MHz band and vice-versa will facilitate market-based solutions, as suggested in the AWS-4 NPRM.) *See DISH Nov. 6 Letter* at 4; *AWS-4 NPRM*, 27 FCC Rcd at 3567 ¶ 39. However, since we conclude that this level does not adequately protect the 1995-2000 MHz band, it is not clear if operators would take the risk of acquiring 1995-2000 MHz, and therefore it is not clear if these market forces would come into play.

[293] The area over which a mobile can cause interference is proportional to the square of this number. Since $100^2 / 5^2 = 400$, interference may be 400 times more likely with a limit of 43 + 10 $\log_{10}$(P) dB than with a limit of 40 + 10 $\log_{10}$(P) dB.

[294] *See DISH Dec. 7 Letter* at 4.

[295] *See e.g., 3GPP R4-080710; 3GPP R4-114592, see also* Letter from Marc S. Martin, K&L Gates LLP, Counsel for Sprint Nextel Corporation, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 3 (filed Dec. 6, 2012) (*Sprint Dec. 6, 2012 Letter*) (an OOBE of 60 + 10 $\log_{10}$(P) dB would triple the separation distance and "could result in widespread interference to future H Block users").

[296] The Qualcomm study considers interference to narrow band public safety devices in the 800 MHz band, the Intel study considers interference between the extended 800 MHz band and the 700 MHz Asia Pacific band, and the CEPT study considers TDD- FDD coexistence in the 2.6 GHz band. *See* Derivation of a Block Edge Mask (BEM) for Terminal Stations in the 2.6 GHz Frequency Band (2500-2690 MHz), ECC Report 131 (Jan. 2009), available at http://www.erodocdb.dk/Docs/doc98/official/pdf/ECCREP131.PDF (last visited Dec. 10, 2012); 3GPP TSG RAN WG4 R4-B26ah-0009, Results of Monte Carlo Simulations for Band 26 Coexistence Scenarios, Qualcomm, Incorporated (Jan. 17-19, 2012), available at http://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_AHs/R4_AH_Band-26/Docs/R4-B26ah-0009.zip (last visited Dec. 10, 2012); 3GPP TSG RAN WG4 R4-B26ah-0035, Band 26 UE Spurious Emission on 850 MHz Lower Band (continued….)

these studies, 3GPP has adopted the level of 80 + 10 $\log_{10}$(P) dB for the protection of the vast majority of bands,[297] and offering a level of only 60 + 10 $\log_{10}$(P) dB may not allow full use of the 1995-2000 MHz band.[298] Further, DISH argues that independent of the OOBE level, interference can only occur 0.25% of the time.[299] However, DISH offered no data to support its conclusions.[300] In sum, contrary to DISH's assertions that this emission limit is not necessary to protect the 1995-2000 MHz band,[301] we find attenuating OOBE in 1995-2000 MHz by a factor of 70 + 10 $\log_{10}$(P) dB will provide needed protection to the 1995-2000 MHz band.

88. In addition to providing reasonable protection from interference, 70 + 10 $\log_{10}$(P) dB is the level the Commission has already determined appropriate for protection of PCS operations below 1995 MHz, and given the expected similarity of operations in the 1995-2000 MHz band, this level is also applicable to AWS-4 emissions into the 1995-2000 MHz band. DISH suggests that this is not an applicable precedent because it was previously applied at 5 megahertz separation from the MSS/ATC band, not at the band edge.[302] DISH suggests that precedents such as 60 + 10 $\log_{10}$(P) dB, 55 + 10 $\log_{10}$(P) dB, or 43 + 10 $\log_{10}$(P) dB are more relevant.[303] We disagree with DISH because we find that the interference in the 1995-2000 MHz band will be driven by the AWS-4 OOBE into the 1995-2000 MHz band itself, not by the emission levels of the transmissions outside these frequencies. Therefore, the frequency separation from the band edge is not determinative of establishing the OOBE limit.[304] In addition, the 60 + 10 $\log_{10}$(P) dB level is from a study of TDD to FDD interference released by the Commission's Office of Engineering and Technology (OET), which did not result in the adoption of this limit into our rules.[305] Although this study considers a similar case of mobile-to-mobile interference, the difference results from differing assumptions, including assumptions that the victim handset is using UMTS and can tolerate an interfering signal 11.8 dB stronger than its desired signal.[306] LTE mobiles, however, cannot necessarily tolerate such high levels of interference, and we find, in agreement with the

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(Band 27), Intel Corporation (Jan. 17-19, 2012) ("Intel Band 26/APAC700 Study"), available at http://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_AHs/R4_AH_Band-26/Docs/R4-B26ah-0035.zip (last visited Dec. 10, 2012).

[297] *See LTE RF Standard for UEs* at 68-71.

[298] *See Sprint Dec. 6, 2012 Letter* at 3 (DISH's proposed OOBE limit "could lead to widespread interference to future H Block users and [could lead to] significantly decreased interest from potential H Block auction bidders").

[299] *See DISH Dec. 7 Letter* at 4.

[300] *Id*. at 3-4.

[301] *See e.g., DISH Oct. 11 Letter* at 1. DISH also argues that imposing this limit in 1995-2000 MHz is not necessary to protect the PCS G block at 1990-1995 MHz. *See DISH Oct. 15 Letter* at 1. We agree, and our adoption of 70 + 10 $\log_{10}$(P) in 1995-2000 MHz is to protect 1995-2000 MHz, as discussed in the previous section, we are protecting 1990-1995 MHz by adopting an OOBE limit of 70 + 10 $\log_{10}$(P) in 1990-1995 MHz.

[302] *DISH Nov. 6 Letter* at note 13 (inapplicability of 70 + 10 $\log_{10}$(P)).

[303] *DISH Oct. 10 Letter* at 4 (60 + 10 $\log_{10}$(P) in a Commission Office of Engineering and Technology study); *DISH Nov. 8 Letter* at 3 (55 + 10 $\log_{10}$(P) in BRS/EBS spectrum); *DISH Nov. 6 Letter* at 4 (43 + 10 $\log_{10}$(P) in 700 MHz spectrum).

[304] Emissions outside the band can cause overload interference, but this discussion is concerned with interference due to OOBE. Overload interference is discussed below. *See infra* Section III.B.4.b (Mobile Stations).

[305] The FCC's Office of Engineering and Technology Releases Analysis of AWS-3 Interference Tests, WT Docket Nos. 07-195 and 04-356, *Public Notice*, 23 FCC Rcd 14669 at 14670 (2008) (*OET Interference Study*) (study titled "Advanced Wireless Service Interference Test Results and Analysis" released as a Public Notice.).

[306] *OET Interference Study*, 23 FCC Rcd at 14679.

modified Motorola assumptions discussed above, that the interfering signal should be no stronger than the mobile's noise floor. Applying this one change to the assumptions of the OET study would result in level of at least 71 + 10 $\log_{10}$(P) dB. DISH also argues that the 55 + 10 $\log_{10}$(P) level, used in BRS, is a similar case of TDD to FDD interference. There are many differences between the BRS band and the 1995-2000 MHz band, including the flexibility of BRS operators to synchronize their systems to avoid interference and the greater ease of achieving frequency separations in a 194 megahertz band. In addition, we note that the BRS rules apply a level of 67 + 10 $\log_{10}$(P) to fixed stations in the event of interference complaints, much closer to the 70 +10 $\log_{10}$(P) level we adopt here. Further, as discussed above, the 43 + 10 $\log_{10}$(P) dB level does not provide adequate protection from interference in this case and so is not appropriate here.[307]

89. Although applying this limit of 70 +10 $\log_{10}$(P) dB at the edge of the AWS-4 band may be more restrictive than applying it at 1995 MHz and below, we find DISH's assertions that adopting this limit at and below 2000 MHz would increase the cost of mobile devices, require significant power reductions, and require a roll-off region to be poorly supported and unpersuasive.[308] DISH did not quantify these hardships with specific cost numbers, filter insertion losses, power reduction requirements, or the amount of spectrum impacted. Nor did DISH explain what factors would increase the cost of the mobile devices, so it is not clear if these impacts would be independent of or additive to one another. For example, there is a trade-off between filter roll-off and filter cost (and therefore device cost), so it may not be reasonable to assert both hardships will result. Further, we note that to the extent there is a roll-off region or power reduction region, these reduce the power in the lower part of the AWS-4 uplink band, but do not necessarily render it unusable. For example, if there is reduced coverage in the first 5 megahertz, it may still be usable for capacity in areas of good coverage. In fact, with technological advancements it may be put to use dynamically. For example, a base station scheduler using a 10 megahertz carrier in 2000-2010 MHz could assign mobiles in good signal conditions (and therefore requiring less power to close the link) to the lower 5 megahertz, and mobiles in poor signal conditions (requiring higher power) to the upper 5 megahertz, thereby making use of all of the spectrum.

90. Similarly, we find to be flawed DISH's arguments that the limit of 70 + 10 $\log_{10}$(P) dB at and below 2000 MHz would render 25% of the AWS-4 uplink spectrum unusable and increase AWS-4 deployment costs by 15-30%[309] DISH's argument for rendering 25% of the uplink unusable actually asserts that base station operations in the 1995-2000 MHz band would potentially overload its AWS-4 base station receivers; DISH does not make an argument based on the AWS-4 uplink OOBE limit.[310] Therefore, this argument is not relevant to the OOBE limits on AWS-4 devices. However, we do discuss potential interference from the 1995-2000 MHz band to AWS-4 base stations below.[311] Similarly, DISH argues that the anticipated OOBE from 1995-2000 MHz band transmitters above 2005 MHz will require

[307] DISH argues that 43 + 10 $\log_{10}$(P) maintains flexibility, referring to the use of this limit in the 700 MHz band. *See DISH Nov. 6 Letter* at 4-5. However, it is inadequate protection against interference, and therefore would greatly reduce the flexibility of use of 1995-2000 MHz. The flexible use of the AWS-4 is discussed below. *See infra* Section III.G.1.a. (Flexible Use).

[308] DISH comments at 27.

[309] *See e.g., DISH Oct. 17 Letter* at 3-4.

[310] *Id*. at 3.

[311] Although we do not establish rules for the 1995-2000 MHZ band here, below we require AWS-4 operators to accept some interference from future 1995-2000 MHz operations. *See infra* Section III.B.5. (Acceptance of Interference into the AWS-4 Uplink Band).

additional site builds where colocation is not possible,[312] and makes some high-level, general statements that the impact represents about a 15% increase in the number of sites to be built.[313] This is also not relevant to the limit of 70 + 10 $\log_{10}$(P) dB at 2000 MHz for the AWS-4 uplink. The technical requirements for base stations in the 1995-2000 MHz band are outside the scope of this Report and Order and will be addressed in the *H Block NPRM*.[314]

91. We also find for the reasons stated above that, to the extent imposing a limit of 70 +10 $\log_{10}$(P) dB at and below 2000 MHz does have some negative impact on the usability of the AWS-4 uplink, this impact is balanced by the increased utility of the 1995-2000 MHz band.[315] DISH argues that its claimed loss of 25% of its uplink spectrum to enable the full flexible use of the 5 megahertz of the 1995-2000 MHz band will result in no net increase in the amount of spectrum available for broadband.[316] However, this claim overlooks the fact that if 1995-2000 MHz is paired with 1915-1920 MHz, the calibrated restrictions we place on AWS-4 may enable the Commission to make available 10 megahertz of broadband spectrum. Moreover, the restrictions would still allow the full use of at least 5 megahertz (if not more) of uplink (*i.e.*, at least 2005-2010 MHz of the 2000-2010 MHz uplink segment) and the full 10 megahertz of paired downlink spectrum (*i.e.*, 2180-2190 MHz). This would not be the case if the restrictions at issue were imposed on 1995-2000 MHz in a scenario where that spectrum is only paired with another 5 megahertz. And, even if 1995-2000 MHz becomes an unpaired downlink band, DISH's argument rests on the assumption that 5 megahertz of uplink in the 2000-2020 MHz band is equivalent to 5 megahertz of downlink in the 1995-2000 MHz. As discussed above, this argument is flawed, because (1) there is more need for downlink spectrum than uplink spectrum, (2) the restricted use of 5 megahertz would have less of an impact to a 10 or 20 megahertz carrier in the AWS-4 band than it would to a 5 megahertz carrier in the 1995-2000 MHz band, including a carrier that would use the 1995-2000 MHz band to expand an existing use of the PCS band, (3) given the downlink-limited nature of broadband capacity, the loss of 5 megahertz of uplink spectrum in a band with two paired 10 + 10 megahertz blocks may have no impact on actual network capacity,[317] and (4) an extension of an existing band is more easily utilized than a new band.[318]

92. We are also not convinced by DISH's argument that adopting this limit will protect and favor an unassigned band over an assigned band.[319] Because there has been no deployment of terrestrial services, devices, or base stations in either band, we find this argument unpersuasive. DISH further argues that adopting this limit places "the entire burden" on AWS-4,[320] and that imposing this limit is premature and an attempt to predetermine the rules for the 1995-2000 MHz band.[321] We disagree. We do

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[312] DISH refers only to the OOBE above 2005 MHz, apparently since they argue earlier in the letter that 2000-2005 MHz will be unusable due to overload interference from 1995-2000 MHz band transmitters.

[313] DISH Oct. 17 Letter at 3.

[314] *See H Block NPRM*, at ¶¶ 34-37.

[315] *See supra* ¶¶ 64-73, 80.

[316] *See e.g., DISH Oct. 17 Letter* at 4. DISH also argues further, but without explanation, that new emissions limits would result in a net loss of spectrum in all bands. *DISH Oct. 11 Letter* at 1.

[317] This is due to the asymmetry of downlink and uplink traffic. *See supra* ¶ 80.

[318] *See id*.

[319] *DISH Nov. 6 Letter* at 4.

[320] *Id*. at 6.

[321] *DISH Oct. 15 Letter* at 3.

not set rules for 1995-2000 MHz in this proceeding; rather, we set some limitations on AWS-4 which are balanced by promoting the usability of the 1995-2000 MHz band.

93. In addition, the likely practical impact of technical protections for the 1995-2000 MHz band in the AWS-4 uplink is small. We are not reclaiming any spectrum; rather, we are implementing an OOBE limit that may reduce the power levels on some uplink spectrum.[322] As discussed above, with newer technologies such as LTE, power reductions of a portion of a carrier do not prevent it from being put to use in some portions of a cell and augmenting capacity. Further, current broadband networks use far more downlink capacity than uplink capacity.[323] Based on prevailing traffic patterns, a licensee of AWS-4 authority with 20 MHz of downlink capacity is very likely to have excess uplink capacity in any case. DISH states that this line of reasoning is "misguided",[324] because DISH needs 40 megahertz to compete,[325] and needs "more spectrum, not less".[326] However, DISH fails to address the asymmetry of traffic, and only makes the blanket statement that it needs more spectrum. Of course, like all operators, DISH is free to acquire more spectrum as needed, and in fact we observe that DISH has spectrum in other bands, including in the 700 MHz Band. In any case, we are creating 40 megahertz of terrestrial rights. Although the rules we adopt may limit the power levels in part of the uplink spectrum, they do not prohibit its use, and as discussed below, they leave room for the licensee of AWS-4 operating authority to find technical or business approaches to increase the utility of the uplink spectrum if needed.

94. Finally, we find DISH's arguments that adopting this emission limit would delay its deployment time frame by causing delay in equipment standards in 3GPP to be unpersuasive.[327] First, the Commission has historically not based its decisions regarding the appropriate technical rules for a wireless service merely on the potential of those decisions to delay the development of private party technical standards. Second, DISH is not required to await 3GPP standards resolution to design, test, and deploy equipment, particularly if it is the only operator in the band. Rather, a decision to wait until 3GPP has established final standards is an internal business decision, not a delay imposed by the Commission's development of technical rules for the service. Third, the only change necessary in the 3GPP standard would be modifying band 23 to accommodate the emission limit at 2000 MHz (and the power limits for operations in 2000-2005 MHz); many of the other parameters for this band (*e.g.*, OOBE at 2020 MHz; duplex spacing; frequencies; channel numbers; and so forth) could remain the same.[328] Sprint has indicated that this additional work should take less than 6 months,[329] and it has stated its commitment to

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[322] And, as discussed below, imposing a power restriction on the first 5 megahertz. *See infra* Section III.B.4.b. (Mobile Stations).

[323] *See e.g., Sprint Nov. 2 Letter* at 3, n.3.

[324] *DISH Nov. 6 Letter* at 7.

[325] *DISH Oct. 11 Letter* at 2.

[326] *DISH Oct. 17 Letter* at 7.

[327] *See e.g. DISH Oct. 17 Letter* at 3.

[328] We also note Sprint's commitment to facilitate the 3GPP process, and the recent agreement of 3GPP on Band 23 emissions limits. *See e.g* Sprint Nov.4 Letter; Letter from Marc S. Martin, , to Julius Genachowski, Chairman, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Oct. 2, 2012) (*Sprint Oct. 2 Letter*); *Sprint Nov. 14 Letter*.

[329] Letter from Stephen Bye, Chief Technology Officer and Vice President of Technology Development and Strategy, Lawrence R. Krevor, Vice President, Legal and Government Affairs - Spectrum, Sprint, to Julius Genachowski, Chairman, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Oct. 2, 2012) (*Sprint Oct. 2 Letter*).

facilitating relevant work in 3GPP.[330] Fourth, DISH can also mitigate a delay in obtaining final standards in several ways. For example, in its comments, DISH identifies several groups of tasks that would need to be completed prior to the launch of service, but states that the task groups must be performed serially, taking four years in sum.[331] We do not believe that either engineering or business practices require these tasks be completed in a serial process; rather, we believe that they can be accomplished in part in parallel. Indeed, in the WCS proceeding, AT&T indicated that about half of the time needed to develop standards would overlap with equipment design and equipment testing.[332] If DISH were to apply a similar level of overlap to the tasks it outlines, it would still be able to meet its proposed 4 year timeline for launching service.[333] In sum, while DISH makes unsupported, speculative, and vague statements as to the possible impact of 3GPP timing on its market entry, the impact of not adopting these rules is clear and detrimental to the public interest.

95. As discussed above,[334] DISH also proposed a combination of rules and commitments that it says will allow full use of the 1995-2000 MHz band while preventing any 3GPP delay.[335] In addition to finding above that this proposal does not facilitate full flexible use of the 1995-2000 MHz band,[336] we also find that it does not reduce the likelihood of 3GPP delays. DISH bases its argument on its assertion that integration of an external duplexer will allow it to meet a level of $60 + 10 \log_{10}(P)$ dB without changing the design of its chipset.[337] However, as DISH has pointed out, the 3GPP standards contain the current ATC rule for OOBE in 1995-2000 MHz in the device co-existence table,[338] and regardless as to whether the limit is $60 + 10 \log_{10}(P)$ dB or $70 + 10 \log_{10}(P)$ dB, 3GPP may choose to update this table and evaluate the impact of the new level on device design. Further, since the level of $60 + 10 \log_{10}(P)$ dB affords less protection than $70 + 10 \log_{10}(P)$ dB, it may create more contention and delay in 3GPP than our proposal. In summary, we do not find support in the record that adopting a level of $60 + 10 \log_{10}(P)$ dB will bring operations in the AWS-4 band to market sooner than the attenuation of $70 + 10 \log_{10}(P)$ dB that we do adopt.

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[330] *See e.g.*, Letter from Richard B. Engelman, Director, Spectrum Resources, Sprint to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142 at 2 (filed Oct. 5, 2012). We observe that Sprint and DISH have recently been able to resolve previously contentious Band 23 emissions limits in 3GPP, *see Sprint Nov. 14 Letter*.

[331] DISH Comments at 20-22. These groups of tasks generally fall into the following categories: complete standards, infrastructure and device development, develop and test retail and billing operations, and deployment/launch service. DISH claims that these tasks will take 48 months after standards are set (or 30, 9, and 9 months respectively for the later 3 task groups). *Id*.

[332] *See* Letter from Joan Marsh, Vice President – Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Sec'y, FCC, WT Docket No. 07-293, IB Docket No. 95-91, GEN Docket No. 90-357, at 3-6 (filed June 15, 2012).

[333] *See* DISH Comments at 20-22.

[334] *See supra* ¶ 70.

[335] *See DISH Dec. 3 Letter*; *DISH Dec. 7 Letter*.

[336] *See supra* Section ¶ 86-87.

[337] *See DISH Dec. 7 Letter* at 2-3. Although DISH does not explain exactly what is meant here, it appears to be an assumption that the A-MPR tables would not need to be updated. DISH also does not provide any technical support, such as duplexer curves, showing why it believes $60 + 10 \log_{10}(P)$ dB is achievable without modification of the A-MPR tables, but $70 + 10 \log_{10}(P)$ dB is not.

[338] *See DISH Oct.10 letter at 3*.

96. *Private Agreements*. We recognize that technological improvements in devices in the 1995-2000 MHz band, as well as willingness on the part of licensees of the 1995-2000 MHz band to accept a higher probability of interference, could reduce the need for OOBE restrictions in 1995-2000 MHz. Therefore, we allow for licensees of AWS-4 authority to enter into private operator-to-operator agreements with all 1995-2000 MHz licensees to operate in 1995-2000 MHz at OOBE levels above 70 + 10 $\log_{10}$(P) dB.

97. *Summary*. We find that while DISH argues that the imposition of an OOBE limit of 70 + 10 $\log_{10}$(P) dB on AWS-4 uplink operations will render 5 megahertz of the AWS-4 uplink unusable and create delays in 3GPP, these arguments are unsupported, speculative, and vague, and in some cases not relevant to the uplink OOBE limit. Similarly, we do not find DISH's recent proposal of 60 + 10 $\log_{10}$(P) dB at 2000 MHz to be an appropriate limit. While we acknowledge that imposition of the limit of 70 + 10 $\log_{10}$(P) dB may have a negative impact on the usability of a portion of the AWS-4 uplink band, this is more than offset by the public interest benefits of increasing the usability of the 1995-2000 MHz band. Moreover, some of DISH's objections are not relevant to the OOBE limit on the AWS-4 uplink, but instead have to do with power and OOBE for operations in the 1995-2000 MHz band. As discussed below, DISH in fact does also suggest OOBE and power limitations for the 1995-2000 MHz band. As discussed elsewhere,[339] we have had an open proceeding since 2004 that proposed full power use in 1995-2000 MHz, and an OOBE limit of 43 + 10 $\log_{10}$(P) dB for H block transmitters.[340] Therefore, DISH has been aware of these issues for some time. These issues, moreover, can be addressed in the *H Block NPRM*.[341] Further, even if our actions do in fact create only 15 megahertz of usable uplink for terrestrial use, this Report and Order still creates a large increase in the overall utility of this spectrum. That is, 15 megahertz of full usable terrestrial uplink can be put to more productive use than 20 megahertz of MSS/ATC uplink spectrum. For example, one commenter suggested that this conversion creates billions of dollars in value.[342] For all these reasons, we find that requiring an attenuation of 70 + 10 $\log_{10}$(P) dB at and below 2000 MHz is appropriate for the AWS-4 uplink.

98. Finally, we decline to address the request by DISH that we clarify that the existing linear interpolation of the OOBE between 2000 MHz and 1995 MHz should be calculated in watts, rather than in dB.[343] Because we adopt a flat OOBE limit across 1995-2000 MHz, this issue is moot, and we do not make a determination on it.

99. *Measurement Procedure*. We adopt the measurement procedure set forth in Section 27.53(h) of our rules to determine compliance with this limit. This section requires a measurement bandwidth of 1 megahertz or greater with an exception allowing a smaller measurement bandwidth in the first megahertz adjacent to the channel.[344]

100. In sum, in order to maximize the public interest, comply with Congressional direction, and best balance the most efficient use of all relevant spectrum bands, including enabling future operations in the 1995-2000 MHz band and creating a useful AWS-4 band, we set the OOBE limit of 70 + 10 $\log_{10}$(P) dB at all frequencies at or below 2000 MHz.

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[339] *See supra* ¶ 83; *see infra* Section III.B.1.viii. (Interference with Other Bands).

[340] *See e.g., AWS-2 NPRM*, 19 FCC Rcd at 19035 ¶110.

[341] *See H Block NPRM*, at ¶¶ 34-37.

[342] PIO Comments at 2.

[343] DISH Comments at 27-28; Greenwood Reply Comments at 7-8.

[344] See 47 C.F.R. § 27.53(h)

(iii) Interference with operations in 2020-2025 MHz

101. *Background*. The AWS-4 uplink band will be adjacent to the AWS-2 Lower J block (2020-2025 MHz). Although the Part 25 ATC rules adopted in 2003 originally attenuated the mobile station emissions in this frequency range by a linear interpolation from 43 + 10 $\log_{10}$(P) dB at 2020 MHz to 70 + 10 $\log_{10}$(P) dB at 2025 MHz, [345] the Commission separately proposed in 2004 to apply a standard of 43 + 10 $\log_{10}$(P) to the 2020-2025 MHz (AWS-2 lower J) block.[346] In 2009, in the *ICO Waiver Order*, the Commission waived the Part 25 ATC rules and instead applied the 43 + 10 $\log_{10}$(P) limit to OOBE in 2020-2025 MHz from transmitters operating in the 2000-2020 MHz band.[347] In the *AWS-4 NPRM*, the Commission proposed that no additional attenuation beyond 43 + 10 $\log_{10}$(P) dB is needed to protect services in the 2020-2025 MHz band. The *AWS-4 NPRM* also noted that the *ICO Waiver Order* modified the measurement procedure for determining AWS-4 compliance with the OOBE to conform to the procedure for both broadband PCS and AWS-1 mobiles.[348]

102. *Discussion*. We conclude that the 43 + 10 $\log_{10}$(P) dB OOBE limit and the measurement procedure set forth in Section 27.53(h) are appropriate for protecting the 2020-2025 MHz band. No commenters opposed this proposal. Thus, for the reasons articulated in the *AWS-4 NPRM* and in the *ICO Waiver Order*, we find that this OOBE limit remains appropriate.

(iv) Interference with operations above 2025 MHz

103. *Background*. The AWS-4 uplink band is 5 megahertz from the 2025-2110 MHz band. That band is utilized by non-Federal broadcast auxiliary service (BAS) and cable television service (CARS) operations, as well as certain Federal government operations.[349] The MSS/ATC rules originally limited the mobile emissions from operations in the ATC uplink band to 70 + 10 $\log_{10}$(P) above 2025 MHz.[350] In 2009, the Commission waived the Part 25 ATC rule for a specific licensee and instead applied the 43 + 10 $\log_{10}$(P) standard.[351] The Commission also modified the measurement procedure for measuring compliance with this limit to require a measurement bandwidth of 1 MHz or greater with exceptions as noted in Section 27.53(h).[352] Accordingly, the *AWS-4 NPRM* proposed to require AWS-4 uplink operations to attenuate operations at a level of at least 43 + 10 $\log_{10}$(P) dB above 2025 MHz with the measurement procedure defined in the *ICO Waiver Order* and sought comment on this proposal.[353] We received no comments seeking a different OOBE limit for mobile devices operating in the AWS-4 uplink band.

104. *Discussion*: We conclude the 43 + 10 $\log_{10}$(P) dB OOBE limit and the associated measurement procedure defined in 27.53(h) are appropriate for protecting federal operations and BAS and CARS operations at 2025-2110 MHz. This limit is consistent with the record. For example, Motorola

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[345] *See* 47 C.F.R. § 25.252(c)(2).

[346] *See e.g., AWS-2 NPRM,* 19 FCC Rcd at 19301 ¶ 98.

[347] *See ICO Waiver Order,* 24 FCC Rcd at 193-194 ¶ 61.

[348] *See AWS-4 NPRM,* 27 FCC Rcd at 3577-78 ¶ 44; *see also* 47 C.F.R. § 24.238(b) and 27.53(h).

[349] *AWS-4 NPRM,* 27 FCC Rcd at 3578 ¶ 45.

[350] *See* 47 C.F.R. § 25.252(c)(2).

[351] *See ICO Waiver Order,* 24 FCC Rcd at 193-194 ¶ 61.

[352] *Id*. at 183 ¶ 34.

[353] *AWS-4 NPRM,* 27 FCC Rcd at 3578 ¶ 45.

supports a 43 + 10 $\log_{10}$(P) OOBE limit for the AWS-4 uplink band edge.[354] In addition, although EIBASS comments that an OOBE limit of 43 + 10 $\log_{10}$(P) is not sufficient for fixed or base transmissions originating in the 2020-2025 MHz band, EIBASS also states that it has no objection to an OOBE limit of 43 + 10 $\log_{10}$(P) if transmissions in the 2020-2025 MHz band are other than fixed or base station.[355] Here, as discussed above, the band plan calls for 2000-2020 MHz to be part of the mobile uplink band. This *Report and Order* does not authorize any services, fixed or mobile, in the 2020-2025 MHz band. No commenters disagreed with a 43 + 10 $\log_{10}$(P) OOBE limit above 2025 MHz, thus we conclude the record indicates that the benefits of the proposal outweigh any potential costs. Thus, we find it appropriate to continue to apply the 43 + 10 $\log_{10}$(P) OOBE limit and its associated measurement procedure that has effectively been in place since 2009.

(v) Interference with operations below 2180 MHz

105. *Background*. The AWS-4 downlink band, 2180-2200 MHz, is adjacent to the AWS-2 Upper J block, 2175-2180 MHz, which is itself adjacent to the AWS-3 band, 2155-2175 MHz.[356] The Spectrum Act refers to these adjacent bands as a single 2155-2180 MHz band.[357] The Commission observed in the *AWS-4 NPRM* that it had previously proposed an OOBE attenuation of 43 + 10 $\log_{10}$(P) dB as an appropriate base station emission limit to prevent harmful electromagnetic interference in the AWS-2 and AWS-3 bands.[358] This 43 + 10 $\log_{10}$(P) dB attenuation is generally our standard prescribed OOBE limit when like services are considered. Because circumstances had not changed significantly since that attenuation level was proposed for the AWS-2/3 bands, the Commission proposed that no additional attenuation beyond 43 + 10 $\log_{10}$(P) dB was needed for AWS-4 transmissions below 2180 MHz.[359]

106. *Discussion*: We adopt the proposal to apply the 43 + 10 $\log_{10}$(P) dB OOBE limit as appropriate for protecting wireless systems that will operate below 2180 MHz. This conclusion is supported by the record. DISH, for example, comments that the proposed 43 + 10 $\log_{10}$(P) dB is sufficient.[360] Furthermore, we anticipate future operations in the 2155-2180 MHz band will be similar in design and use to cellular and PCS systems, in which the 43 + 10 $\log_{10}$(P) dB limit has been used effectively in limiting adjacent channel interference between systems operating in the same direction (*e.g.*, downlink next to downlink). Indeed, Nokia commented that "[t]his level should be sufficient to protect systems in the adjacent spectrum blocks when they are deployed with the same duplex directions – meaning, uplink next to uplink and downlink next to downlink."[361] We therefore adopt the 43 + 10 $\log_{10}$(P) dB OOBE limit below 2180 MHz for all transmitters operating in the 2180-2200 bands. With no commenters opposing this emission limit, we further conclude that its benefits outweigh any potential costs.

[354] *See* Motorola Comments at 4.

[355] *See* EIBASS Comments at 1-3.

[356] *AWS-4 NPRM*, 27 FCC Rcd at 3578 ¶ 46.

[357] Spectrum Act, § 6401(b)(2)(D).

[358] *AWS-4 NPRM*, 27 FCC Rcd at 3578 ¶ 46; *see also, e.g., 2008 Further Notice*, 23 FCC Rcd at 9860-9861 ¶ 4.

[359] *AWS-4 NPRM*, 27 FCC Rcd at 3578 ¶ 46.

[360] DISH Comments at 29.

[361] Nokia Reply Comments at 5 n.17.

(vi) Interference with operations above 2200 MHz

107. *Background*. In the *AWS-4 NPRM*, the Commission sought comment on the appropriate OOBE limit for licensees of AWS-4 downlink spectrum at 2180-2200 MHz in order to protect adjacent block operations, including federal operations at 2200-2290 MHz.[362] The Commission observed that the Part 25 rules set forth strict emission limitations (-100.6 dBW/4 kHz EIRP) in the 2180-2200 MHz band, including at the 2200 MHz band edge.[363] The rules also prohibit the location of 2180-2200 MHz base stations within 820 meters of a Federal earth station operating in the 2200-2290 MHz band.[364] In 2009, however, the Commission waived the Part 25 emission limit (-100.6 dBW/4kHz EIRP) rule for one of the 2 GHz MSS/ATC licensees with regard to operations at or above 2200 MHz; instead of the rule, that licensee was required to satisfy the terms of an operator-to-operator agreement between the MSS/ATC licensee and certain federal operators in the 2200-2290 MHz band.[365] That agreement specified that, in certain circumstances, the MSS/ATC licensee was required to satisfy the Part 25 emission limit, but in other circumstances, only had to satisfy the standard Commission emission limit of $43 + 10 \log_{10}(P)$ dB.[366]

108. In the *AWS-4 NPRM*, the Commission sought comments on several ways that OOBE limit restrictions on downlink operations in the 2180-2200 MHz band could be established so that band can be fully utilized while still adequately protecting Federal earth station receive sites.[367] We received few comments on this issue. Alcatel asserts the Commission should take a flexible approach.[368] In particular, Alcatel supports an approach of setting a power flux density (PFD) limit at Federal sites as an optional alternative to setting an emission limit applicable for all AWS-4 base stations.[369] Nokia states that the Part 25 emissions limit "is considerably more stringent than the standard OOBE limit of $43 + 10 \log_{10}(P)$ dB."[370] Nokia states that to meet this OOBE limit above 2200 MHz, a filter between 1 and 5 MHz of bandwidth is needed for rolloff.[371] To minimize the impact of such a rolloff on AWS-4 operations and allow use of the entire 20 MHz of AWS-4 spectrum, Nokia suggests creating a guard band above 2200 MHz.

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[362] *AWS-4 NPRM*, 27 FCC Rcd at 3577-78 ¶ 44. The Commission identified the most prevalent Federal government uses of the 2200-2290 MHz band in the *AWS-4 NPRM*. *See AWS-4 NPRM*, 27 FCC Rcd at 3578 ¶ 47 (*citing*, U.S. Department of Commerce, *An Assessment of the Viability of Accommodating Wireless Broadband in the 1755-1850 MHz Band* (Mar. 2012), available at http://www.ntia.doc.gov/files/ntia/publications/ntia_1755_1850_mhz_report_march2012.pdf (last visited Dec. 4, 2012).

[363] *AWS-4 NPRM*, 27 FCC Rcd at 3579 ¶ 48

[364] *Id*. at 3579 ¶ 48.

[365] *AWS-4 NPRM*, 27 FCC Rcd at 3579 ¶ 48.

[366] Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, to Julius Knapp, Chief, Office of Engineering and Technology, Federal Communications Commission, File No. SES-LIC-20071203-01646, SES-AMD-20080118-00075, SES-AMD-20080219-00172, Call Sign: E070272, Attachment at 2 (Jan. 6, 2009).

[367] *AWS-4 NPRM*, 27 FCC Rcd at 3580 ¶¶ 52-54.

[368] Alcatel Comments at 14-15.

[369] *Id*.

[370] Nokia Reply at 4.

[371] *Id*. The specific size of any rolloff would depend upon the size, complexity and cost of the filter. *Id*.

109. In December 2012, DISH and federal users of the 2200-2290 MHz band entered into an operator-to-operator agreement, which the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce transmitted to the Commission.[372] The agreement specifies that DISH (through its subsidiaries, as appropriate) will operate each base station in the 2180-2200 MHz band such that the power spectral density (PSD) of the signal received at existing Federal earth stations and aeronautical mobile telemetry (AMT) stations shall not exceed agreed upon levels. The agreement also contains provisions for addressing the operation of 2180-2200 MHz base station relative to new federal stations to be deployed in the 2200-2290 MHz band.[373]

110. *Discussion*. We adopt the following approach for protecting Federal operations in the 2200-2290 MHz band from harmful interference from AWS-4 operations in the 2180-2200 MHz band. First, as discussed further below, we permit AWS-4 operators and Federal operators to enter into an operator-to-operator agreement that will specify terms of the permissible AWS-4 OOBE limits and/or maximum actual AWS-4 emissions to be received at the sites of Federal operations in the 2200-2290 MHz band. Second, we establish default OOBE limits for AWS-4 operations into the 2200-2290 MHz band in the event such private agreement were not in effect (*e.g.*, the agreement was terminated pursuant to its terms); AWS-4 licenses return to the Commission (*e.g.*, for a licensee's failure to meet the construction requirements).

111. We adopt this approach after careful analysis of the options before us. As explained above, the current ATC regime for protecting Federal operations in the 2200-2290 MHz band is a mix of Commission rules, waiver orders, and operator-to-operator agreements. As a result, the two MSS/ATC licensees have different interference protection requirements with respect to Federal operators in the 2200-2290 MHz band. Further, as noted above, during the course of this proceeding, the current 2 GHz MSS/ATC licensees (and prospective AWS-4 licensees) entered into an operator-to-operator agreement with Federal operators in the 2200-2290 MHz band.[374] It is against this backdrop that we promulgate OOBE rules for AWS-4 base station emissions into the 2200-2290 MHz band, which, like the ATC regime, will both set clear rules and allow licensees of AWS-4 operating authority to deviate from those rules by entering into operator-to-operator agreements, which will be transmitted to the Commission by NTIA.

112. First, we permit, but do not require, licensees of AWS-4 authority to enter into operator-to-operator agreements with Federal operators at 2200-2290 MHz to address the attenuation of emissions from AWS-4 base stations operating at 2180-2200 MHz into the adjacent Federal band, so long as such agreements do not otherwise run afoul of other Commission rules. We observe that the existing MSS/ATC licensees and federal users of the 2200-2290 MHz band have already effectuated such an agreement on what they, as actual operators, find to be the best environment to avoid actual harmful interference. We applaud the adjacent Federal and non-Federal operators for reaching this agreement and, with this Report and Order, provide a foundation for this agreement and other similar agreements that might be reached in the future without the need for a waiver or other special permission from the Commission. Therefore, we permit the DISH-Federal Agreement to govern AWS-4 base station

[372] Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, to Julius Knapp, Chief, Office of Engineering and Technology, Federal Communications Commission, WT Docket No. 12-70; ET Docket No. 10-142; WT Docket No. 04-356, Attachment ("Operator-to-Operator Agreement between New DBSD Satellite Services G.P. and Gamma Acquisition L.L.C. and United States Federal Government Agencies Operating Earth Stations and/or Aeronautical Mobile Telemetry (AMT) Stations in the 2200-2290 MHz Band") ("DISH-Federal Agreement") (Dec. 11, 2012).

[373] *See* DISH-Federal Agreement.

[374] *Id*.

emissions from 2180-2200 MHz into the 2200-2290 MHz band. Specifically, when, as discussed below, the licenses held by the current 2 GHz MSS licensees are modified to include AWS-4 service, we will include as conditions to such license modifications the requirement that the licensees of AWS-4 operating authority must comply with the DISH-Federal Agreement with regard to the permissible AWS-4 emissions into the 2200-2290 MHz band and/or the maximum actual AWS-4 emissions to be received at the specified sites of Federal operations in the 2200-2290 MHz band. To ensure that this agreement, and any subsequent agreements are consistent with other Commission rules and do not impede the operation of secondary markets, we require that the licensee of AWS-4 authority who is a party to an operator-to-operator agreement maintain a copy of the agreement(s) in its station files and disclose it, upon request, to prospective AWS-4 assignees, transferees, or spectrum lessees, to Federal operators in the 2200-2290 MHz band, and to the Commission.[375]

113. Second, to ensure that OOBE limits are established in the event such private agreements are not entered into or do not address all situations between AWS-4 operations in the 2180-2200 MHz band and Federal operations in the 2200-2290 MHz band, we establish default OOBE limits for AWS-4 emissions into the 2200-2290 MHz band. Because the record does not contain any technical justification to support any specific OOBE limit, and because the Commission did not propose a specific limit in the *AWS-4 NPRM*, we adopt the protection levels contained in the ATC rules relative to protection of Federal operations in the 2200-2290 MHz band.[376] Accordingly, AWS-4 base stations operating in 2180-2200 MHz shall not exceed an EIRP of -100.6 dBW/4 kHz for emissions into the 2200-2290 MHz band. Further AWS-4 base stations operating in 2180-2200 MHz may not be located less than 820 meters from a U.S. Earth Station facility operating in the 2200-2290 MHz band.

114. Finally, to avoid possible confusion between the operation of an operator-to-operator agreement and the default OOBE limit, we clarify the application of our rules in the event that (1) an operator-to-operator agreement ceases to operate (for whatever reason) or (2) is operative for less than the entire universe of AWS-4 licenses or Federal operations in the 2200-2290 MHz band. In either case where the agreement is not in effect, the licensee of AWS-4 operating authority must comply with the default rule. For example, should the DISH-Federal Agreement terminate for any reason, DISH (assuming it is the licensee of AWS-4 authority) would be required to operate pursuant to the default rule.

115. To ensure that AWS-4 base stations would be able to operate pursuant both to an operator-to-operator agreement and to the default rule, equipment manufacturers may seek equipment authorization for equipment designed against either the OOBE limit in the default rule, the OOBE limit in an executed operator-to-operator agreement between a licensee of AWS-4 authority and Federal operators in the 2200-2290 MHz band (which must provide at least $43 + 10 \log_{10}(P)$ dB of attenuation), or both, except as specified below. We shall approve or deny the equipment authorization, based on testing against whichever (or both) OOBE the manufacturer requests.

116. We recognize, however, that equipment designed to operate to the stricter default OOBE limits will also comply with any more relaxed OOBE limit contained in an operator-to-operator agreement. In the case where equipment is intended to be operated at either the default or the relaxed limits, we believe the equipment will be either modified or adjusted by the manufacturer or in the field. That is, we expect the equipment to have more than one mode of operation in this case. We require the application for equipment authorization for such equipment to clearly demonstrate compliance with both limits. If at the time of authorization the equipment is only approved for compliance with one limit, but is expected to be modified subsequently by the manufacturer to operate in another mode either in the factory

[375] *See* 47 C.F.R. § 27.53(a)(10).

[376] *See* 47 C.F.R. § 25.252(a)(1).

or in the field, the original equipment must be approved to permit such changes or meet such changes as allowed in the permissive change rules for equipment authorization.[377]

117. In addition, a licensee in the AWS-4 band may operate its base stations consistent with its operator-to-operator agreement only if such an agreement is in effect. In any other situation, including where such an agreement existed, but has been terminated (for whatever reason), the licensee must operate AWS-4 base stations that have obtained equipment authorization based on the default rule. To the extent that a licensee of AWS-4 authority that is a party to an operator-to-operator agreement installs and operates bases stations that are authorized against an OOBE limit that is less stringent than the default rule, that licensee is solely responsible for ensuring that its equipment would be authorized to operate in the event that the agreement terminates (for whatever reason).

(vii) Interference with Global Positioning Systems (GPS) operations

118. *Background*: In the *AWS-4 NPRM*, the Commission observed that the current Part 25 MSS/ATC rules require certain protection limits over the GPS band at 1559-1610 MHz.[378] Specifically, the current rules require 2 GHz MSS/ATC base stations and mobile terminals to provide an EIRP limit of -70 dBW/MHz or -80 dBW/700Hz, measured over any two millisecond active transmission interval, in the 1559-1610 MHz band.[379] The Commission also observed that different MSS/ATC bands have different frequency separations from the GPS band and sought comment on whether any special interference rules should apply to AWS-4 operations to protect GPS service.[380]

119. Some parties submitted comments asking for tighter emissions limits over the GPS band. USGIC argued that the current Part 25 OOBE limits for the protection of GPS operations at 1559-1610 MHz from terrestrial operations in the 2 GHz band are obsolete and proposed that the Commission adopt the EIRP emission limits agreed to by TerreStar and DBSD in their ATC authorization proceedings—EIRP emission limits for mobile transmitters of -95dBW/MHz for wideband signals and of -105dBW/kHz for narrowband signals, and EIRP emission limits for fixed or base station of -100dBW/MHz for wideband signals and of -110dBW/kHz for narrowband signals.[381] Deere similarly asserted that the OOBE limits in the Part 25 rules are not sufficient to protect GPS operations at 1559-1610 MHz, observed that TerreStar and DBSD had agreed to more stringent limits, and recommended that the Commission "further study this issue and consider an update to the OOBE limit" that should be applied to AWS-4 operations.[382] On September 27, 2012, DISH and USGIC submitted a letter agreement in which DISH agreed to limit its OOBE EIRP densities over the 1559-1610 MHz band to the limits contained in USGIC's comments.[383]

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[377] *See* 47 C.F.R. §§ 2.944, 2.1043.

[378] *AWS-4 NPRM*, 27 FCC Rcd at 3580 ¶ 55.

[379] *See* 47 C.F.R. § 25.252(a)(7), (b)(3).

[380] *AWS-4 NPRM*, 27 FCC Rcd at 3580 ¶ 55.

[381] USGIC Comments at 4-9, Exh. A; *see* Letter from F. Michael Swiek, Executive Director, U.S. GPS Industry Council, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1-4 (filed Nov. 8, 2012) (*USGIC Nov. 8, 2012 Letter*).

[382] Deere Comments at 4-7.

[383] Letter from Jeffrey H. Blum, Deputy General Counsel, DISH Network Corporation, and F. Michael Swiek, Executive Director, The U.S. GPS Industry Council, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1-2 (filed Sept. 27, 2012) (*DISH-USGIC Sept. 2012 Letter Agreement*)

120. Other parties opposed the addition of GPS specific protection limits for AWS-4 operations. CTIA stated that GPS protection limits are not necessary for AWS-4 operations because the AWS-4 band is located several hundred megahertz away from the GPS band.[384] CTIA further observed that operations in bands much closer to the GPS frequencies, such as the AWS-1 band (1710-1755 MHz; 2110-2155 MHz), operate with an OOBE limit of $43 + 10 \log_{10}(P)$ dB into the GPS band and these operations have not given rise to any complaints of interference to GPS. Instead of adopting OOBE limits, either by rule or by license condition, CTIA recommended that the Commission continue its recent efforts to examine receiver performance and noted that the Commission had recently held a workshop on receiver performance issues.[385] LightSquared also stated that the Commission should focus its efforts to protect GPS by examining GPS receiver reliability standards.[386] Greenwood claimed that the -105dBW/MHz EIRP limit would be reasonable if implemented over time, provided that receiver protection requirements for GPS/GNSS receivers increase to mitigate interference susceptibility.[387] Greenwood, like CTIA, also observed that there are many millions of devices transmitting between the GPS and AWS-4 bands that operate in bands that do not have specific OOBE protection levels for GPS and that are not causing OOBE interference to GPS.[388]

121. *Discussion*. The Commission has long recognized the importance of GPS and our responsibility to ensure that it receives appropriate interference protections from other radiocommunication services. The Commission generally supports the actions of licensees to resolve interference issues raised by other spectrum holders or users through private agreements, where, as is the case here, they are not otherwise inconsistent with Commission rules or policies. Because the prospective licensees of AWS-4 operating authority have reached a private agreement with the industry council representing GPS interests, the USGIC, we believe the most appropriate approach is to require that, as a license condition, the licensees comply with this agreement and the specific GPS protection limits contained therein.[389] This is consistent with the USGIC's request that we "condition AWS-4 licenses with the OOBE limits jointly agreed by DISH and the USGIC."[390] The licenses, moreover, shall remain

[384] CTIA Reply at 16-17; Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA—The Wireless Association®, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1-2 (filed Oct. 25, 2012) (*CTIA Oct. 25 Letter*)

[385] CTIA Reply at 16-17, *citing* Office of Engineering and Technology, Wireless Telecommunications Bureau, and Office of Strategic Planning Announce Workshop on "Spectrum Efficiency and Receiver Performance," *Public Notice*, 27 FCC Rcd 2084 (OET, WTB, OSP, rel. Feb. 24, 2012); *see* Letter from Scott K. Bergmann, CTIA—The Wireless Association™, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Nov. 30, 2012) ("CTIA reiterated that there is no need for Commission action or GPS-specific regulation in this instance. . . . CTIA encouraged the Commission to decline to adopt unnecessary and inappropriate regulation of, or license condition on, commercial mobile services.").

[386] LightSquared Reply at 3, *citing* Office of Engineering and Technology, Wireless Telecommunications Bureau, and Office of Strategic Planning Announce Workshop on "Spectrum Efficiency and Receiver Performance," *Public Notice*, 27 FCC Rcd 2754 (OET, WTB, OSP, rel. March 9, 2012).

[387] Greenwood Comments at 15-18; Greenwood Reply at 8-9.

[388] Greenwood Comments at 18.

[389] *See DISH-USGIC Sept. 2012 Letter Agreement*.

[390] Letter from F. Michael Swiek, Executive Director United States GPS Industry Council to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Oct. 9, 2012); *see id*. at 3 (stating that "the forthcoming AWS-4 report and order must include reference to the OOBE values agreed to by DISH and the USGIC, and that the resulting AWS-4 authorizations must reflect that AWS-4 operations will be subject to OOBE limits in the DISH/USGIC agreement for AWS-4").

subject to this license condition in the event that the licensees assign or otherwise transfer the licenses to successors-in-interest or assignees. To the extent that AWS-4 licenses return to the Commission (*e.g.*, for a licensee's failure to meet the construction requirements), the Commission will, prior to reassigning such licenses, consult with NTIA about the need for specific OOBE requirements on the new licenses to protect GPS operations in the 1559-1610 MHz band.[391]

122. In requiring the licensees comply with their voluntary agreement, we need not—and do not—reach the issue of determining whether the record contains sufficient information on whether and, if so, at what level, to establish an OOBE limit rule for protection of GPS from AWS-4 operations. We observe that the USGIC stated that both it and its member Deere believe that the emissions limits for the GPS band for services operating in other frequency bands should be considered on a "case-by-case basis."[392] We make no determination as to whether the limits in the private agreement are appropriate or viable for services operating in other spectrum.

(viii) Interference with Other Bands

123. DISH suggested that we should impose emission limits on the 1995-2000 MHz block and on the 1930-1995 MHz PCS blocks, as well as power limitations for 1995-2000 MHz operations.[393] Establishing such limits are outside the scope of this Report and Order, which sets service rules for AWS-4 spectrum, not the 1995-2000 MHz or 1930-1995 MHz bands. OOBE and power limits for the 1995-2000 MHz band will be addressed in the *H Block NPRM*.[394] To the extent that any party seeks a change in the existing PCS rules, that party is free to petition the Commission for a rule change.

124. Nevertheless, we observe that DISH proposed that the Commission limit 1995-2000 MHz block base station operations by an attenuation of $70 + 10 \log_{10}(P)$ dB at and above 2000 MHz, and later proposed instead that such operations should be attenuated by a factor of $79 + 10 \log_{10}(P)$ dB at and above 2005 MHz.[395] Similarly, DISH suggested that the in-band transmit power of operations in the 1995-2000 MHz band should be significantly reduced, i.e., that this should be a low power band.[396] These proposals could reduce the usability of the 1995-2000 MHz band. Such limits appear to be inconsistent with our general finding that the public interest, consistent with the Spectrum Act, is best served by preserving the usability of 1995-2000 MHz even if there is a possibility of reduced usability of the lower portion of the AWS-4 uplink band. Thus, we caution any licensee of AWS-4 operating authority against designing or deploying its network (except at its own risk) assuming either of these levels of OOBE protection for the 2000-2005 MHz band from the 1995-2000 MHz band or low power limits in the 1995-2000 MHz band. As noted below, the Commission will not take action to protect licensees of AWS-4 operating authority from interference that arises in such a scenario.[397] We expect that licensees and their equipment suppliers

[391] *See infra* Section III.F (Applications for Any AWS-4 Spectrum Returned to the Commission).

[392] Letter from Stephen D. Baruch, Counsel for the United States GPS Industry Council, to Marlene H. Dortch, Sec'y, Federal Communications Commission, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 1 (filed Oct. 9, 2012) ("The participants also discussed the USGIC's position that the potential interfering capability of other services should be considered on a case-by-case basis (particularly for bands operating closer in frequency to the RNSS bands)."); *DISH-USGIC Sep. 2012 Letter Agreement* at 2 n.2 ("Deere & Company, however, does support an evaluation of the appropriate OOBE limits on a case-by-case basis with respect to other bands.").

[393] DISH Comments at 28; *DISH Dec.3 Letter* at 3; *DISH Dec. 7 Letter* at 6-7.

[394] *See H Block NPRM*, at ¶¶ 34-37.

[395] *See e.g. DISH Dec.3 Letter* at 3.

[396] DISH Comments at 28.

[397] *See infra* Section III.B.5. (Acceptance of Interference into the AWS-4 Uplink Band).

will take this warning into account when establishing technical specifications, including industry standards, and procuring equipment for the band. To the extent that satellite receivers have already been deployed, which could suffer reductions in performance if full power services are deployed in 1995-2000 MHz,[398] we note that our proceeding proposing full power flexible use for 1995-2000 MHz has been open since 2004, before satellites operating in the 2000-2020 MHz band were launched, or even likely designed.[399] Therefore, we expect that the satellites were designed with this overload scenario in mind and there should, therefore, be no impact to MSS. To the extent this is not the case, we do not expect to limit use of 1995-2000 MHz due to any limitations of receivers deployed after our proceeding on use of 1995-2000 MHz was opened.

2. Co-Channel Interference Among AWS-4 Systems

125. Co-channel interference rules prevent harmful interference between geographically adjacent licenses operating in the same spectrum. Specifically, to avoid this interference, the Commission adopts field strength limits that apply at the geographic edge of the license area. In the *AWS-4 NPRM*, the Commission proposed that the current AWS-1 signal strength limit be applied to AWS-4 operations.[400] Because we are licensing AWS-4 spectrum in geographic service areas that are smaller than nationwide, we must adopt signal strength limits here.[401] With no commenters opposing this proposal, we conclude that the benefits of our proposal outweigh any potential costs. As we are basing our technical rules generally on AWS-1 rules where applicable, we continue to believe it appropriate to adopt the AWS-1 co-channel interference requirements for AWS-4. Thus we adopt the proposed co-channel interference levels and expand Section 27.55(a)(1) of the Commission's rules to include the 2180-2200 MHz band.[402] We observe, however, that the assignment approach we adopt below likely will result in an individual licensee obtaining assignments for geographically adjacent AWS-4 EA licenses. In such a scenario, that licensee may choose not to observe this signal strength limit between its geographically adjacent AWS-4 licenses, so long as it complies with other Commission rules and the adjacent affected service area licensee(s) agree(s) to a different field strength.[403]

3. Receiver Performance

126. *Background*: We invited comments on any potential overload interference that may be caused by AWS-4 transmitters or other transmitters that may cause overload interference to AWS-4 receivers. We also asked for characteristics of such receivers, potential mitigation solutions to overload interference and an assessment of the impact to deployment of AWS-4 service.[404] On March 12, 2012, the Commission hosted a two-day workshop on Spectrum Efficiency where various industry and federal participants discussed the role of receivers in enabling access to spectrum for new services.[405] The FCC's

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[398] DISH Comments at 28.

[399] *See AWS Sixth Report and Order*, 19 FCC Rcd at 20739 ¶ 39 ("We also find that due to similar characteristics and proximity to Broadband PCS, the 1915-1920 MHz and 1995-2000 MHz band pairing is comparable to the 1910-1915 MHz and 1990-1995 MHz band pairing"); *see also 2008 Further Notice* 23 FCC Rcd at 9860-61 ¶ 4 (proposing 1995-2000 MHz be used for base station use).

[400] *AWS-4 NPRM*, 27 FCC Rcd at 3582 ¶ 65.

[401] *See supra* Section III.A.3. (Geographic Area Licensing).

[402] 47 C.F.R. § 27.55(a)(1).

[403] *See* 47 C.F.R. § 27.55(a).

[404] *AWS-4 NPRM*, 27 FCC Rcd at 3581-82 ¶¶ 56.

[405] *See* http://www.fcc.gov/events/workshop-spectrum-efficiency-and-receivers-day-1 (last visited Dec. 4, 2012).

Technological Advisory Council (TAC) has also created a "Receiver and Spectrum Working Group" for 2012, which presented its interim recommendations at the September 24, 2012, TAC meeting.[406] The Spectrum Act also directed the U.S. Government Accountability Office to conduct a study on receiver performance and spectrum efficiency and issue a report by February 2013.[407]

127. *Discussion*: Various parties have commented on the receiver performance. LightSquared, Greenwood, CTIA, and NRTC suggested that the Commission continue its recent efforts on receiver performance.[408] Silicon Flatirons introduced the concept of "Interference Limit" as an alternative to receiver standard. It defined the "Interference Limit" as a profile of field strength density over frequency that a receiver should tolerate before claiming interference, and suggested that this concept, as opposed to a receiver standard, be applied to the AWS-4 band.[409]

128. We decline to address receiver performance issues at this time due to lack of details and discussions from commenters. As suggested by commenters, we will continue our efforts to collaborate with multiple stakeholders on receiver performance and establish a path forward based on the various inputs from interested parties, including the final recommendations of the TAC Working Group.

4. Power Limits

129. The Commission sought comment on appropriate power limits for terrestrial operations in the AWS-4 band.[410] Specifically, the Commission proposed to apply existing AWS-1 power limits for both base and mobile stations in the AWS-4 bands.[411] As discussed below, we adopt the Commission's proposed power limit for base stations. For mobile operations we adopt a power limit of 2 watts total equivalent isotropically radiated power (EIRP) with the additional constraint that total power between 2000-2005 MHz be limited to 5 milliwatts EIRP.

a. Base Stations

(i) Background

130. The Commission made three proposals in the *AWS-4 NPRM* relating to power limits for base stations operating in the AWS-4 bands. These proposals would generally apply the AWS-1 base station power limits for AWS-4 base stations, adjusting any coordination requirements to account for AWS-4 spectrum being adjacent to different spectrum bands than AWS-1 spectrum.[412] AWS-1 rules limit base station power in non-rural areas to 1640 watts EIRP for emission bandwidths less than 1 MHz and to 1640 watts per MHz EIRP for emission bandwidths greater than 1 MHz, and double these limits (3280 watts EIRP and 3280 watts/MHz EIRP) in rural areas.[413]

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[406] *See* http://transition.fcc.gov/bureaus/oet/tac/tacdocs/meeting92412/TAC-9-24-12-Presentations.pdf (last visited Dec. 4, 2012).

[407] *See* Spectrum Act § 6408(a).

[408] LightSquared Reply at 7; Greenwood Comments at 18; CTIA Reply at 17; NRTC Comments at 10.

[409] Silicon Flatirons Comments at 5-6, 8.

[410] *AWS-4 NPRM*, 27 FCC Rcd at 3581-82 ¶¶ 57-61.

[411] *Id*.

[412] *Id*.

[413] 47 C.F.R. § 27.50(d); *ICO Waiver Order*, 24 FCC Rcd at 188 ¶ 47; *TerreStar Waiver Order*, 25 FCC Rcd at 235-236 ¶¶ 23-24.

131. First, the Commission proposed power limits for base stations in non-rural areas. To best allow flexibility in the use of various bandwidths, the Commission proposed applying the limits of the existing AWS-1 rule of (1) 1640 watts EIRP for emissions less than 1 megahertz and (2) 1640 watts/MHz EIRP for emissions over 1 megahertz.[414] The Commission also discussed the MSS/ATC base station power limits set forth in the Commissions Part 25 rules and in the 2 GHz license authorizations, which vary somewhat from the AWS-1 rules.[415]

132. Second, the Commission proposed setting the AWS-4 power limits for base stations operating in rural areas to the limits set forth in sections 27.50(d)(1)-(2) for AWS-1 base station operations, which are double the limits for non-rural areas (i.e., 3 dB higher).[416] We noted in the AWS-4 NPRM that the Commission had not previously considered whether the higher power level of 3280 watts EIRP allowed for rural AWS-1 base stations is appropriate for 2180-2200 MHz.[417] In the *AWS-4 NPRM*, the Commission proposed to allow the increase of these power levels to 3280 watts EIRP for emissions less than 1 MHz and 3280 watts/MHz EIRP for emissions over 1 MHz in rural areas in an effort to further the goal of rural deployment of broadband services.[418]

133. Third, the Commission proposed that AWS-4 base stations with transmit power above 1640 watts EIRP and 1640 watts / MHz EIRP be required to coordinate with users in adjacent AWS blocks located within 120 kilometers.[419] The Commission made this proposal because it is equivalent to the AWS-1 coordination requirements as adjusted to account for differences in which bands are adjacent to AWS-1 and AWS-4 spectrum, respectively.[420]

(ii) Discussion

134. We adopt the three base station power limit proposals detailed in the *AWS-4 NPRM*. As we explain throughout this order, we base our technical rules on those in place for AWS-1 spectrum. The proposed rules are based on those for AWS-1, and we received no comments opposing the rules. Thus, we adopt the proposal to limit AWS-4 base stations to 1640 watts EIRP for emissions less than 1 MHz and 1640 watts/MHz EIRP for emissions over 1 MHz for non-rural areas; the proposal to set AWS-4 power limits for base stations operating in rural areas at the limits specified in 27.50(d)(1-2) of the Commission's rules;[421] and the proposal that AWS-4 base stations with transmit power above 1640 watts EIRP and 1640 watts/MHz EIRP be required to coordinate with users in adjacent AWS blocks located within 120 kilometers. These power limits will help ensure robust service in the AWS-4 bands, while also helping to minimize harmful interference into other bands. No commenters opposed these proposals.

[414] *AWS-4 NPRM*, 27 FCC Rcd 3581 ¶ 58.

[415] *See* 47 C.F.R. § 25.252 (a)(2).

[416] *AWS-4 NPRM*, 27 FCC Rcd 3581 ¶ 59.

[417] These higher power levels for rural areas were not considered because they were not requested in the waivers.

[418] *AWS-4 NPRM*, 27 FCC Rcd 3581 ¶ 59.

[419] *Id*. at 3581-3582 ¶ 60.

[420] *AWS-4 NPRM*, 27 FCC Rcd at 3581-3582 ¶ 60.

[421] 47 C.F.R. §§ 27.50(d)(1-2).

b. Mobile Stations

(i) Background

135. Commission rules governing ATC operations set a power limit of 1.0 dBW (1.25 watts) EIRP in a bandwidth of 1.23 MHz for mobiles operating in the 2000-2020 MHz band,[422] while AWS-1 rules set the power limit for mobile operations at 1 watt EIRP.[423] In the *AWS-4 NPRM*, the Commission suggested that the AWS-1 mobile power limit is somewhat more restrictive than the ATC rules and, because these two limits are similar, that the AWS-1 limit found in 27.50(d)(4) should be applied to mobile operations in AWS-4.[424] DISH argues for a 2 watt mobile power limit, asserting both that "the PCS power limit and its Part 27 counterpart, the 2 watt limit applicable to BRS/EBS, are more appropriate references for AWS-4" than is the AWS-1 power limit and that the ATC rule, because it specifies power spectral density (PSD) rather than a total power, allows more power, for example, 3 dBW in a 5 MHz bandwidth.[425] No other parties argued for or against a 1 watt or 2 watt limit for mobile stations.

(ii) Discussion

136. We adopt the following power limits for AWS-4 mobile operations. First, we adopt a limit of 2 watts equivalent isotropically radiated power (EIRP) for the total power of a device operating in the AWS-4 uplink. Then, to protect future operations in the adjacent 1995-2000 MHz band, we also limit the power of the portion of a device's transmission that falls into 2000-2005 MHz to 5 milliwatts. Our adoption of these requirements is based on the following technical analysis.

137. First, we consider the total mobile power for the AWS-4 uplink band. Although we generally are applying AWS-1 technical rules to AWS-4, here we adopt the 2 watt EIRP power limit proposed by DISH. No party opposed this proposal. We find that DISH is correct in its understanding of the ATC rule, and a 2 watt power limit is more restrictive than the existing ATC rules in the case of large bandwidths, which may be deployed in this band. Conversely, we note that keeping the PSD-based ATC rule would unnecessarily limit flexibility, and it could restrict the use of narrow transmission bandwidths, such as an LTE mobile transmitting on only a few resource blocks. We agree with DISH that a 2 watt EIRP for AWS-4 mobiles will provide adequate protection to PCS mobiles operating at 1990-1995 MHz.

138. Second, as discussed above,[426] to promote the best and highest use of spectrum, to fulfill our statutory obligations, and to maintain consistency with past Commission actions, we determine that it is in the public interest to ensure the efficient and robust use of both the 1995-2000 MHz band and the AWS-4 band, even if that results in adopting targeted rules that partially limit the usability of a portion of the AWS-4 uplink band. For these reasons, above we establish specific attenuation requirements to address interference from AWS-4 OOBE into the 1995-2000 MHz band.[427] OOBE limits do not, however, address overload issues. Overload interference can occur in a receiver when it receives signals *outside of the frequencies* of the desired signal, especially if they are of a much higher power than the desired signal. Overload interference can be managed by improving receiver performance through filtering or other techniques, or by placing transmit power limitations on the authorized frequencies of the potential interferer. We find below that a balance of expected improved performance for receivers in

[422] *See* 47 C.F.R. § 25.252(b)(1).

[423] *See* 47 C.F.R. § 27.50(d)(4).

[424] *AWS-4 NPRM*, 27 FCC Rcd at 3582 ¶ 61.

[425] DISH Comments at 30.

[426] *See supra* Section III.B.1.b.ii. (Interference with operations in 1995-2000 MHz).

[427] *Id*.

1995-2000 MHz (relative to typical specifications) and establishing power limitations on AWS-4 operations in the 2000-2005 MHz band best mitigates the possibility of mobile-to-mobile interference from the AWS-4 uplink band to the 1995-2000 MHz band.[428]

139. As detailed below, to establish the appropriate power limitations for AWS-4 operations in 2000-2005 MHz we make several calculations. First, we determine the signal level that future mobiles operating in the 1995-2000 MHz band can tolerate in an adjacent band, considering both the desired signal and the undesired signal levels, that is, the blocking performance. Next, we describe the user environment under which interference can reasonably be prevented. The environment defines the path losses between the interfering AWS-4 mobile and the 1995-2000 MHz receiver. Then, we establish power limits on the AWS-4 mobiles by applying the path losses to the maximum interfering signal level to work back to the allowable transmitter power.

140. *Blocking Performance*. As the Commission has not yet adopted rules for the 1995-2000 MHz band, and does not have receiver standards for comparable bands, to calculate the level of overload interference that we anticipate future mobile receivers operating in the 1995-2000 MHz band will tolerate we must turn to other sources. With the rapid adoption of 4G mobile broadband technologies, LTE is a technology commonly being deployed today. We use the 3GPP specifications for LTE user equipment (UE) operating in the nearby PCS band, band 25 (1930-1995 MHz).[429] Although these 3GPP LTE specifications are applicable to user equipment operating in 1930-1995 MHz, not 1995-2000 MHz, and are specific to LTE devices, we feel they are a reasonable indication of the likely performance of future 1995-2000 MHz band devices.

141. In the 3GPP specifications for LTE, blocking performance is specified with a desired signal 6 dB above the reference sensitivity.[430] For a device operating in the 1930-1995 MHz band (band 25) on a 5 megahertz channel, the reference sensitivity is -96.5 dBm.[431] Thus, the desired signal is -90.5 dBm. Next we determine the level of the undesired signal. For interferers on the adjacent channel, the 3GPP standard specifies the ratio of the undesired to desired signal level, termed the adjacent channel selectivity (ACS), rather than an absolute blocking level.[432] For band 25, assuming 5 MHz carriers, the ACS is 33 dB, resulting in -57.5 dBm as the level of undesired signal that the receiver must tolerate.[433]

142. *User Environment*. The interference scenario that has been discussed in the record is where a handheld AWS-4 mobile transmitter and a handheld PCS mobile receiver are in close proximity.[434] Based on the parameters provided in the comments of Motorola Mobility, which we find reasonable with the modification that the body loss applies to both devices as discussed above,[435] the characteristics of this environment are:

- Mobiles are separated by 2 meters

[428] As discussed above, we are not establishing receiver performance requirements at this time. *See supra* III.B.3. (Receiver Performance).

[429] *LTE RF Standard for UEs* at 20.

[430] *LTE RF Standard for UEs* at 86.

[431] *LTE RF Standard for UEs* at 78.

[432] *LTE RF Standard for UEs* at 83-85.

[433] *LTE RF Standard for UEs* at 83.

[434] Motorola Comments, Technical App. at A-1.

[435] *See supra* ¶ 85.

- The mobiles are in line of sight conditions, experiencing free space path loss (FSPL)
  FSPL (dB) = 20 log (d) + 20 log (f) – 27.55,
  where d = distance in meters and f = frequency in MHz.
  For a 2 meter separation and 2000 MHz transmit frequency, this translates to
  FSPL = 20 log(2) + 20 log (2000)- 27.55 = 44.5 dB,
- Each mobile (TxAntGain, RxAntGain) has a combined antenna gain and head/body loss of -10 dB
- Total path losses = TxAntGain + FSPL + RxAntGain = 10 + 44.5 + 10 = 64.5 dB

143. *Power Limitation*. The allowable transmitter power for AWS-4 is thus calculated by adding the path losses of 64.5 dB to the maximum level of the undesired signal level of -57.5 dBm. Hence, we arrive at a transmitter power level of 7 dBm, which is equivalent to 5 milliwatts. Accordingly, we find that the limit on the total EIRP of AWS-4 mobiles in 2000-2005 MHz must be at most 5 milliwatts. We recognize that carriers larger than 5 MHz may be deployed in the AWS-4 spectrum, and therefore, this power limit may in some cases apply to only a portion of the total power transmitted by the mobile. Therefore, we allow a device to transmit a total of 2 watts EIRP, as long as the portion of the device's transmission in 2000-2005 MHz is limited to an EIRP of 5 milliwatts.

144. *Comparison to OOBE limit*. To confirm the appropriateness of this limit, we compare the effect of overload interference to the 1995-2000 MHz band to OOBE interference to the 1995-2000 MHz band. As discussed above,[436] we establish an OOBE attenuation of 70 + 10 $\log_{10}$(P) below 2000 MHz for AWS-4 uplink transmissions. This corresponds to a level of -40 dBm/MHz. Applying the same isolation of 64.5 dB for 2 meters of separation, this means the level present at the 1995-2000 MHz receiver is -104.5 dBm/MHz. This is 3 dB below Motorola's suggested typical noise floor of -101.5 dBm/MHz, consisting of thermal noise of -114 dBm/MHz plus a 12.5 dB noise figure.[437] This is an approximately 2 dB noise rise or desensitization, close to the 3 dB desensitization Motorola recommends as a threshold of interference.[438] So the OOBE attenuation of 70 + 10 $\log_{10}$(P) and power limitation of 5 milliwatts are well balanced, with neither one allowing significantly higher probability of interference than the other.

145. *Receiver Improvements*. We note that using standard 3GPP blocking specifications, similar analysis would also imply the need for power reductions in 2005-2020 MHz. However, we believe that future equipment for the 1995-2000 MHz band should be able to exceed these specifications, if licensees find it necessary to do so. We impose power restrictions only in the first 5 megahertz because of the difficulty of improving filter performance in the first 5 megahertz adjacent to a band.

146. *Private Agreements*. We recognize that further improvement of the performance of receivers in 1995-2000 MHz band, as well as willingness on the part of licensees of the 1995-2000 MHz band to accept a higher probability of interference, could reduce or eliminate the need for power restrictions in 2000-2005 MHz. Therefore, we allow for licensees of AWS-4 authority to enter into private operator-to-operator agreements with all 1995-2000 MHz licensees to operate in 2000-2005 MHz at power levels above 5 milliwatts EIRP. In no case, however, may the total power of the AWS-4 mobile emissions exceed 2 watts EIRP.

147. *Alternate proposal*. As discussed above,[439] DISH also proposed a combination of rules and commitments that it says will allow full use of the 1995-2000 MHz band while preventing any 3GPP

[436] *See supra* Section III.B.1.b.ii. (Interference with operations in 1995-2000 MHz).

[437] Motorola Comments, Technical App. at A-1.

[438] *Id*.

[439] *See supra* ¶ 70.

delay.[440] In particular, part of this proposal is that DISH will designate 2000-2005 MHz as a terrestrial guard band, and DISH's devices will not transmit on those frequencies. DISH suggests that this will create more certainty for potential bidders on the1995-2000 MHz band than a power limitation such as we adopt here, and that its proposal will therefore increase the usability of that band.[441] However, we do not adopt any rules prohibiting transmission in 2000-2005 MHz, as establishing calibrated technical limits with the flexibility to be modified via private agreements allows technical and business solutions that increase the usability of this spectrum if needed, whereas a rule such as proposed by DISH would foreclose any productive use of the spectrum. We also do not believe that DISH's proposal will increase the usability of the 1995-2000 MHz band over the rules we adopt here, which adequately protect the 1995-2000 MHz band through a combination of OOBE limits and power limitations.

148. In sum, we decline to adopt the proposed power limit of 1 watt EIRP for mobiles. Rather, we set power limits for mobile operations in the 2000-2020 MHz band as follows: the total power of the mobile is limited to 2 watts EIRP for emissions in 2000-2020 MHz, and is limited to 5 milliwatts EIRP for the portion of any emission that falls into 2000-2005 MHz, except as provided for by private agreement between a licensee of AWS-4 operating authority and all 1995-2000 MHz licensees. No party presented data on the costs associated with different mobile power limits. Thus, given the record before us, we conclude that the potential benefits of our adopted mobile station power limit would outweigh any potential costs.

5. Acceptance of Interference into the AWS-4 Uplink Band.

149. As discussed earlier, the Commission looks to maximize the flexible use of both the AWS-4 and the 1995-2000 MHz bands to enable deployment of full, robust, commercial service for mobile broadband. And, as discussed above, to promote the best and highest use of spectrum, fulfill our statutory obligations, and to maintain consistency with past Commission actions, we determine that it is in the public interest to ensure the efficient and robust use of both the 1995-2000 MHz band and the AWS-4 band, even if that results in adopting targeted rules that partially limit the usability of a portion of the AWS-4 uplink band.[442] To this end, we have prescribed both power and emission limits on the AWS-4 mobile transmitters to prevent interference to the mobile receivers in the 1995-2000 MHz band. The Commission anticipates that the new technical rules to be provided in a forthcoming rulemaking for operation in the 1995-2000 MHz band will address interference to AWS-4 operations.[443] Even with appropriate technical rules and good engineering practice, where uplink and downlink operations are so closely located, there will remain a potential for base stations in the 1995-2000 MHz band to interfere with the AWS-4 base station receivers. Further, although we are not adopting rules limiting the operations of MSS mobile transmitters, the proximity of uplink and downlink operations also raises the potential for 1995-2000 MHz band base stations to interfere with MSS satellite receivers. Therefore, to the extent that future operations in the 1995-2000 MHz band, operating within the rules established for use of the 1995-2000 MHz band, cause harmful interference to AWS-4 operations or MSS operations due

[440] *See DISH Dec. 3 Letter*; *DISH Dec. 7 Letter*.

[441] *See DISH Dec. 7 Letter* at 3.

[442] Again, as stated above, we disagree with DISH's assertion that the Commission has a "first-in-time" policy that requires us to grant DISH "full rights" to use AWS-4 spectrum and, only thereafter, begin to examine the rules for the 1995-2000 MHz band. *See DISH Nov. 26 Ex Parte Letter* at 3. We are aware of no Commission rule requiring the application of a generic first-in-time priority between adjacent spectrum bands. *See supra* n.232.

[443] *See H Block NPRM*, at ¶¶ 35-37.

to either OOBE in the 2000-2005 MHz portion of the AWS-4 and 2 GHz MSS uplink band or in-band power in 1995-2000 MHz, AWS-4 and 2 GHz MSS licensees must accept this interference.[444]

150. We emphasize that we limit the acceptance of OOBE interference to the 2000-2005 MHz portion of the AWS-4 and 2 GHz MSS bands. However, should in band interference occur due to the power in 1995-2000 MHz overloading receivers above 2000 MHz, this overload can potentially affect the entire receive band. Overload interference can be prevented by improved receive filters. Therefore, if a licensee of AWS-4 operating authority determines such filters are necessary, the impact to the uplink band is limited to the transition band of the filter, not the entire band. Such a transition band would be less than 5 megahertz,[445] thus the impact would be limited to (at most) the 2000-2005 MHz portion of the AWS-4 bands, and there is no legacy equipment impact, as ATC service has not been deployed. Finally, we note that unlike the terrestrial service, MSS has been deployed in this band, with two satellites launched. Because both satellites were launched well after the Commission initiated the H block proceeding,[446] we expect that they were designed with this overload scenario in mind.[447] Therefore, there should be no impact to MSS. To the extent this is not the case, we do not expect to limit use of 1995-2000 MHz due to any limitations of receivers deployed after our proceeding on use of 1995-2000 MHz was opened.

151. Thus, for the public interest reasons discussed above and because Congress requires us to make available via a system of competitive bidding the 1995-2000 MHz band, we find that the costs of the tailored limitations on the use of the 2000-2005 MHz portion of the AWS-4 band as well as possibly some portion of the 2 GHz MSS band are outweighed by the benefits of enabling full use of the 1995-2000 MHz band and of the 2005-2020 MHz portion of the AWS-4 band.

6. Antenna Height Restrictions

152. In the *AWS-4 NPRM*, the Commission proposed that the flexible antenna height rules applicable to AWS-1 should be also applied to AWS-4 stations.[448] In response, only DISH commented on this issue. As explained below, we adopt the Commission's proposals with minor modifications.

a. Base Stations

(i) Background

153. Part 27 of the Commission's rules does not set out specific antenna height restrictions for AWS-1 base stations. However, pursuant to Section 27.56, all services operating under Part 27 are required to limit base station antenna heights to elevations that do not present a hazard to air navigation.[449] Additionally, the limitations of field strength at the geographical boundary of the license

[444] We set this rule for the 2000-2005 MHz portion of the band because the record indicates base station transmit filters need 1 to 5 megahertz to roll-off to a low level of emissions. *See* Nokia Reply at 4, Alcatel Comments at 12.

[445] For example, DISH argues for 5 megahertz of transition band to avoid overload. *See DISH Oct. 17 Letter* at 3.

[446] DBSD launched its satellite in April 2008 and TerreStar launched its satellite in July 2009. *AWS-4 NPRM*, 27 FCC Rcd at 3565-66 ¶ 8.

[447] *See AWS Sixth Report and Order*, 19 FCC Rcd at 20739 ¶ 39 ("We also find that due to similar characteristics and proximity to broadband PCS, the 1915-1920 MHz and 1995-2000 MHz band pairings is comparable to the 1910-1915 MHz and 1990-1995 MHz band pairing"); *see also 2008 Further Notice*, 23 FCC Rcd at 9860-61 ¶ 4 (proposing 1995-2000 MHz be used for base station use).

[448] *AWS-4 NPRM*, 27 FCC Rcd at 3582 ¶¶ 62-64.

[449] *See* 47 C.F.R. § 27.56.

discussed above also effectively limit antenna heights.[450] As a result, because of these inherent height limitations, the Commission proposed that unique antenna height limits were not needed for AWS-4 facilities, and that the general height restrictions of Part 27 would be sufficient.[451] We received one comment on this issue, which supported the proposal.[452]

(ii) Discussion

154. We find that, consistent with the Commission's proposal, specific antenna height restriction for AWS-4 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 AWS-4 base stations. Additionally, the sole commenter on this issue supports the Commission's position.[453] Thus, we find specific antenna height restrictions for AWS-4 base stations are not required.

b. Fixed Stations

(i) Background

155. Unlike base stations operating under Part 27, Commission rules specify a height restriction of 10 meters for fixed stations operating in AWS-1 uplink spectrum.[454] As the Commission discussed throughout the *AWS-4 NPRM*, because of the similarities between AWS-1 and AWS-4, we expect use of the AWS-4 bands to be similar to AWS-1 services. Hence, the Commission proposed applying the AWS-1 antenna height restriction of 10 meters to AWS-4.[455]

(ii) Discussion

156. DISH suggests that a height restriction is not necessary for AWS-4 fixed stations, because the uplink operations of AWS-4 will be more similar to BRS/EBS than AWS-1.[456] The 10 meter height limit was adopted in AWS-1 specifically to protect the Federal operations in the 1710-1755 MHz band and the adjacent Federal bands above and below.[457] Outside of this specific case, the Commission has not found a 10 meter height restriction necessary for other terrestrial mobile bands, such as BRS/EBS or PCS. No other comments were received on this issue. Because the AWS-4 uplink band at 2000-2020 MHz is not adjacent to Federal operations, and to promote flexibility in the use of AWS-4 spectrum, we decline to adopt a height limitation for fixed stations in the AWS-4 uplink band.

7. Canadian and Mexican Coordination

157. Because of our shared border with Canada and Mexico, the Commission routinely works in conjunction with the United States Department of State and Canadian and Mexican government officials to ensure efficient use of the spectrum as well as interference-free operations in the border areas. Until such time as any adjusted agreements, as needed, between the United States, Mexico and/or Canada can be agreed to, operations must not cause harmful interference across the border, consistent with the

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[450] *See supra* Section III.B.2. (Co-Channel Interference Among AWS-4 Systems).

[451] *AWS-4 NPRM*, 27 FCC Rcd at 3582 ¶ 63.

[452] DISH Comments at 30.

[453] DISH Comments at 30.

[454] *See* 47 C.F.R. § 27.50(d).

[455] *AWS-4 NPRM*, 27 FCC Rcd at 3582 ¶ 64.

[456] DISH Comments at 30-31.

[457] *AWS-1 Report and Order*, 18 FCC Rcd at 25204 n. 279.

terms of the agreements currently in force.[458] We note that further modifications of the rules might be necessary in order to comply with any future agreements with Canada and Mexico regarding the use of these bands.

8. Other Technical Issues

158. In addition to the specific technical issues addressed above, the Commission also proposed applying additional Part 27 rules to the AWS-4 band.[459] Specifically, the Commission proposed applying the following rule sections: 27.51 Equipment authorization, 27.52 RF safety, 27.54 Frequency stability, 27.56 Antennas structures; air navigation safety, and 27.63 Disturbance of AM broadcast station antenna patterns.[460] The Commission reasoned that because AWS-4 will be a Part 27 service, these rules should apply to all licensees of AWS-4 terrestrial authority, including those who acquire licenses through partitioning or disaggregation.[461] No commenters opposed this proposal. Accordingly, because these rules generally apply to all Part 27 services, and because, as we explain below, we find it appropriate to license the AWS-4 spectrum under our Part 27 regulatory framework,[462] we conclude that the potential benefits of our proposal would outweigh any potential costs and adopt the proposal to apply these additional Part 27 rules to licensees of AWS-4 authority.

C. Protection of MSS Operations

159. *Background*. As explained above, the Commission allocated 2 GHz spectrum for Mobile Satellite use in 1997 and issued MSS authorizations between 2001 and 2005.[463] Subsequently, in 2011, the Commission added co-primary Fixed and Mobile allocations to the band, but stated that MSS would remain co-primary in the 2 GHz MSS band.[464] In adding the terrestrial allocations, the Commission explained that the new allocation would "not result in harmful interference, and would not inevitably lead to uses that would result in harmful interference," as no terrestrial service rules yet existed for the band (other than the pre-existing MSS/ATC rules).[465] Most recently, with the *AWS-4 NPRM*, the Commission proposed to establish terrestrial service rules for the 2 GHz band. Consequently, to ensure that the addition of full terrestrial operations in the 2 GHz band does not result in harmful interference to 2 GHz MSS operations, the Commission proposed a rule requiring that any licensee of AWS-4 operating authority protect 2 GHz MSS operations from harmful interference.[466]

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[458] The list of agreements includes the "Protocol Concerning the Transmission and Reception of Signals from Satellites for the Provisions of Mobile-Satellite Services and Associated Feeder links in the United States of America and the United Mexican States."

[459] *AWS-4 NPRM*, 27 FCC Rcd at 3583 ¶ 67.

[460] *Id.*; 47 C.F.R. §§ 27.51, 27.52, 27.54, 27.56, 27.63.

[461] *AWS-4 NPRM*, 27 FCC Rcd at 3583 ¶ 67.

[462] *See infra* Section III.G.1.b. (Regulatory Framework).

[463] *See* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, *First Report and Order and Further Notice of Proposed Rule Making*, 12 FCC Rcd 7388 (1997) (allocating 2 GHz spectrum for Mobile Satellite use); *AWS-4 NPRM*, 27 FCC Rcd at 3564, 3565-66 ¶¶ 4, 7-8 (discussing history of MSS in the 2 GHz band).

[464] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5715 ¶ 10.

[465] *Id*. at 5715-16 ¶ 13.

[466] *AWS-4 NPRM*, 27 FCC Rcd at 3583 ¶ 68.

160. *Discussion*. We adopt a rule concerning protection of MSS operations in the 2 GHz band. The rule requires that AWS-4 operations not cause harmful interference to 2 GHz MSS operations and accept any interference received from duly authorized 2 GHz MSS operations. Further, with no commenters opposing the proposed MSS protection rules, we conclude that the benefits of these rules would outweigh any potential costs. As detailed more fully below,[467] the approach adopted also involves reliance upon rapid terrestrial build-out by the licensees, with potential loss of MSS interference protection in the event terrestrial services are not built out.[468] Finally, we observe that, should a licensee of AWS-4 operating authority who also possesses 2 GHz MSS operating authority fail to satisfy its AWS-4 Final Build-out Requirement in an EA, among other things, the MSS protection rule (discussed in this paragraph) shall not apply to that EA.[469]

D. Assignment of AWS-4 Operating Authority

161. License assignment refers to the process by which the Commission grants an entity the right to use specified channels or frequencies of radio transmission for a specified period of time; no ownership right is conveyed to the licensee.[470] Sections 307-309 of the Communications Act generally govern the initial assignment of licenses.[471] Section 316 governs the modification of Commission licenses.[472] As discussed below, we propose to modify, pursuant to our Section 316 authority, the incumbent 2 GHz MSS authorization holders' licenses to include AWS-4 terrestrial spectrum rights.

162. Specifically, we propose to modify the existing MSS licenses to add Part 27 rights and obligations for AWS-4 terrestrial spectrum use with all of the attendant rights, limitations, and obligations associated with the AWS-4 service rules we adopt herein. We find that a section 316 license modification approach is the best course of action because it is the most efficient and quickest path to enabling flexible terrestrial use of this band while ensuring compliance with the MSS protection rule described above.[473]

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[467] *See infra* Section III.E. (Performance Requirements)

[468] This approach is incompatible with deployment of additional MSS systems in the band, and therefore we do not anticipate accepting applications for new or modified MSS operations, except from an incumbent operator or its assignee or transferee. Accordingly, we delegate authority to the International Bureau to dismiss, upon acceptance by the incumbent MSS licensees of modified licenses authorizing AWS-4 operations, the "Consolidated Petition for Reconsideration of Inmarsat Ventures Limited and Inmarsat Global Limited," filed January 9, 2006, in IB Docket Nos. 05-220 and 05-221. That petition sought reconsideration premised on the deployment of an additional MSS system in the 2 GHz MSS bands.

[469] *See infra* Section III.E.2.b. (Penalties for Failure to Meet Construction Requirements).

[470] 47 C.F.R. § 2.1 ("Assignment (of a radio frequency or radio frequency channel). Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions. (RR)"); *see* 47 U.S.C. § 301, stating:

> It is the purpose of this chapter, among other things, to maintain the control of the United States over all the channels of radio transmission; and to provide for the use of such channels, but not the ownership thereof, by persons for limited periods of time, under licenses granted by Federal authority, and no such license shall be construed to create any right, beyond the terms, conditions, and periods of the license. No person shall use or operate any apparatus for the transmission of energy or communications or signals by radio . . . except under and in accordance with this chapter and with a license in that behalf granted under the provisions of this chapter.

[471] 47 U.S.C. §§ 307-309.

[472] 47 U.S.C. § 316.

[473] *See supra* Section III.C. (Protection of MSS Operations).

163. As explained below, we believe that technological difficulties continue to make it impractical today for same band, separate mobile satellite and terrestrial operator sharing of this spectrum, and therefore propose to modify the existing MSS licenses so that satellite and terrestrial services are managed by the same operator. We observe, however, that it may become possible for such same band, separate operator sharing to become technically feasible in the future. For this reason, and for other reasons discussed below, we find it appropriate to permit licensees of AWS-4 operating authority to utilize the Commission's wireless secondary market mechanisms with respect to their terrestrial operating authority.[474]

1. Background

164. In 2003, the Commission established the ATC rules, concluding that any grant of ATC authority would only be to MSS incumbents.[475] The Commission limited ATC authority to the existing MSS licensees because, in part, it determined that separately controlled MSS and terrestrial mobile operations (*i.e.*, two ubiquitous mobile services) in the same band would be "impractical and ill-advised" as the two distinct parties would be unable to overcome technical hurdles to reach a workable sharing arrangement.[476] Technical analyses at the time, moreover, demonstrated that granting a third party the right to use licensed MSS spectrum for terrestrial use could not occur without impacting the rights of the existing satellite licensees.[477]

165. In the *AWS-4 NPRM*, the Commission posited that the complexities of coordination between mobile satellite and terrestrial uses identified by the Commission in 2003 remain, and would continue to render grant of licenses for terrestrial operations to an entity other than the incumbent MSS licensee impractical.[478] The Commission expected that interference problems associated with two or more distinct mobile licensees in the band would continue to call for granting authority for AWS-4 operations to the 2 GHz MSS incumbents.[479] The Commission observed that granting authority for AWS-4 operations terrestrial use to the incumbent MSS licensees would provide them with at least as much ability to provide terrestrial service as their ATC authority does.[480] As a result of these factors, the Commission proposed to assign terrestrial use of AWS-4 spectrum to the incumbent 2 GHz MSS licensees as a means to make additional spectrum available for terrestrial broadband use.[481] The Commission sought comment on this proposal, including on whether technical advances had occurred since 2003 such that separately controlled mobile satellite and terrestrial mobile operations in the same band had become feasible.[482]

166. In response to this proposal, the Commission received numerous comments generally supporting the Commission's position that technical hurdles remain and that granting AWS-4 terrestrial operating authority to an entity other than the MSS incumbent remains impractical.[483] For example,

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[474] *See infra* Section III.G.3. (Secondary Markets).

[475] *See ATC Report and Order*, 18 FCC Rcd 1964 (2003).

[476] *ATC Report and Order*, 18 FCC Rcd at 1991-92 ¶ 49.

[477] *Id*. at 1972-73 ¶ 18.

[478] *AWS-4 NPRM*, 27 FCC Rcd at 3584 ¶ 71.

[479] *Id*.

[480] *Id*.

[481] *Id*. at 3584-85 ¶¶ 72.

[482] *Id*. at 3583-85 ¶¶ 69-73.

[483] *See, e.g.*, Alcatel Comments at 5; DISH Comments at 9-10; SIA Comments at 3; and USGIC Comments at 3-4.

Alcatel states that technical difficulties remain and that co-channel sharing between MSS and terrestrial operations is technically challenging.[484] According to Alcatel, a division of "the frequency block for use by separate MSS and terrestrial licensees would restrict the data rates and capacity of each, far below what a coordinated system would support, greatly impinging on both MSS and terrestrial service capabilities."[485] Similarly, DISH submitted a technical study showing that, to ensure efficient AWS-4 operations, the same operator must control both AWS-4 and MSS using an integrated system.[486] According to the study, an ideal system would operate under a single overall AWS-4/MSS network control facility.[487] A single control facility would diminish the impact of expected interference between AWS-4 operations and MSS operations under separate control.[488] For example, if AWS-4 terrestrial service is provided using Long Term Evolution (LTE) technology, because LTE can be dynamically reassigned, a single operator could dynamically assign channels, power levels, and signal coding to manage system interference.[489] However, if the AWS-4 and MSS systems were independently controlled, each operator would need to have control of the other's system to provide dynamic carrier management—an infeasible situation for two competing systems.[490] According to the study, the only solution in a separately controlled scenario would be to segregate spectral usage in a non-dynamic fashion, which would not enable stable, independent operation of satellite and terrestrial systems.[491] In sum, several commenters assert that adopting the Commission's proposal to assign the AWS-4 licenses to the MSS incumbents presents the most efficient means of putting the spectrum to use and minimizes technical complications related to interference issues, thereby resulting in faster licensing and deployment of AWS-4 spectrum.[492]

167. Additionally, some parties support the Commission's proposal to grant AWS-4 authority to the incumbent MSS operators provided the Commission imposes certain conditions upon the licenses. For example, a collection of public interest organizations supports that approach so long as additional "obligations and safeguards" are imposed.[493]

168. Although most parties support the Commission's proposal, two commenters, MetroPCS and NTCH, suggest that this proposal is not the correct path. MetroPCS argues the 2003 finding that the terrestrial services and satellite services cannot be separately licensed in the same geographic area may no longer be applicable.[494] MetroPCS suggests that technical hurdles can be overcome and, therefore, at least some of the spectrum should not be licensed to the incumbent MSS operators for full terrestrial use,

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[484] Alcatel Comments at 6-7.

[485] *Id*.

[486] *See* DISH Comments, Exh. 1 (DISH Technical Study).

[487] DISH Technical Study at Section 1.5.

[488] *Id*. at Section 1.3.

[489] *Id*. at Section 3.1.

[490] *Id*. at Section 3.2.

[491] *Id*. at Section 3.1.

[492] *E.g*., Sprint Comments at 14-15; Greenwood Comments at 10; Alcatel Comments at 6.

[493] PIO Comments at 2. We address these proposed conditions in the Regulatory Issues section, below. *See infra* Section III.G.7 (Other Matters—Proposed Party Conditions).

[494] MetroPCS Comments at 2-3.

but rather assigned via competitive bidding.[495] According to MetroPCS, interference concerns of sharing spectrum are illusory because there is no requirement that MSS be offered, and it is likely that only terrestrial services will be used in the 2 GHz spectrum bands.[496] Whereas MetroPCS argues technical hurdles can be overcome, NTCH argues that accepting competing applications for the AWS-4 licenses is in the public interest.[497] NTCH also argues the proposed modification of the MSS incumbents' licenses would result in an unjustified windfall and a loss to the public.[498]

2. Discussion—Section 316 License Modification

169. As discussed below, we reaffirm the Commission's earlier technical findings regarding same-band, separate operator sharing between mobile satellite and terrestrial operations in this band. We believe that such a sharing scenario generally remains impractical at this time and would inappropriately affect the rights of the existing MSS authorization holders.[499] Evidenced by the broad support among commenters for the proposed license modification approach, we conclude that the Commission's initial proposal to grant terrestrial authority to operate in the AWS-4 band to the current 2 GHz MSS licensees, through Section 316 license modifications, is appropriate and will serve the public interest, convenience, and necessity.

170. Of the numerous parties who commented on this issue, only NTCH opposes the license modification procedure outright.[500] We disagree with NTCH, and explain our reasoning below.

a. Legal Authority

171. In the *AWS-4 NPRM*, the Commission proposed modifying the 2 GHz MSS licensees' authority to operate in the AWS-4 bands by adding the authority to operate Part 27 terrestrial services.[501] This approach is consistent with the Commission's broad license modification authority, existing precedent, and the record. We therefore adopt the Commission's proposal to issue an *Order of Proposed Modification*, which accompanies this *Report and Order*, to modify the existing 2 GHz MSS licenses to include terrestrial operating authority in the AWS-4 spectrum upon the effective date of the service rules adopted herein.

172. Section 316 grants the Commission authority to modify a license if the modification promotes "the public interest, convenience, and necessity."[502] The D.C. Circuit has explained the authority granted by Section 316 to be a "broad power to modify licenses; the Commission need only find that the proposed modification serve the public interest, convenience and necessity."[503] This broad nature

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[495] *Id*. at 29-35. (MetroPCS proposes two alternatives for consideration: (1) the existing 2 GHz MSS licensee relinquish 20 megahertz of spectrum, which would then be auctioned; or (2) 2 GHz MSS licensee relinquish 30 megahertz of spectrum in the top 100 MSAs). *Id*.

[496] MetroPCS Comments at 35.

[497] NTCH Comments at 3-7.

[498] *Id*. at 1, 3-7; *see also* T-Mobile Comments at 18-20, U.S. Cellular Reply Comments at 5-6.

[499] *See infra* Section III.D.2.a.ii. (Public Interest Considerations); *ATC Report and Order*, 18 FCC Rcd at 1991-92 ¶ 49; *see also AWS-4 NPRM*, 27 FCC Rcd at 3583-84 ¶ 69.

[500] NTCH Comments at 3.

[501] *AWS-4 NPRM*, 27 FCC Rcd 3585 ¶ 75.

[502] 47 U.S.C. § 316(a)(1).

[503] *California Metro Mobile Communications v. FCC*, 365 F.3d 38, 45-46 (D.C. Cir 2004) (*CMMC*) (determining that the Commission had acted within its authority and that its license modification served the public interest, even though the analysis on which the Commission based its decision showed potential rather than actual interference).

includes eliminating harmful interference, or the potential for such interference, as an accepted basis for ordering wholesale license modifications.[504]

173. Numerous commenters support the Commission's proposal to exercise this authority here.[505] For example, PIO states that the Commission "has ample legal authority under Title III…to modify spectrum licenses at any time."[506] DISH comments that the license modification is consistent with both FCC precedent and the Communications Act, and that it is within the Commission's purview to modify the authorizations under Section 316.[507] Globalstar states that courts have confirmed the broad nature of Congress's grant of authority under Section 316 to modify licenses when doing so serves the public interest.[508] Moreover, even MetroPCS, who opposes, in part, the proposed approach, comments that the Commission is within its authority to modify licenses in order to improve spectrum utilization.[509]

174. Grant of AWS-4 terrestrial operating authority to the 2 GHz MSS licensees will expand the amount of spectrum available for stand-alone terrestrial mobile broadband by 40 megahertz, while also reducing the potential for interference between existing satellite and new terrestrial operations in the band.[510] Both reducing potential interference and increasing spectrum available for mobile broadband serve the public interest. To further ensure that modifying these licenses serves the public interest, we impose performance requirements and other license conditions, which will help to ensure the AWS-4 spectrum is used to provide consumers with mobile broadband service.[511] Therefore, as explained in greater detailed below, we conclude both that the Commission has the authority under Section 316 to modify the 2 GHz MSS licenses to add terrestrial rights and that so modifying these licenses will serve the public interest.

175. As discussed herein, the Commission is proposing to modify the 2 GHz MSS licenses to establish more uniform configuration and duplex spacing, one that will be consistent with the configuration of the spectrum for terrestrial use.[512] We undertake this modification pursuant to Section 316, which provides the Commission with the authority to modify licenses, including by rearranging licensees within a spectrum band.. As evidenced by the 800 MHz proceeding, for example, the Commission previously has exercised this authority to modify a license to include authority to operate on new frequencies—there the Commission modified Nextel's authorization to add the 1990-1995 MHz

[504] *See CMMC*, 365 F.3d at 41. Furthermore, courts have determined that the Commission is within its authority to make modifications even without an application from the licensee. *See Peoples Broadcasting Co. v. United States*, 209 F.3d 286, 288 (D.C. Cir. 1953) (upholding the Commission's authority to modify a television station license without an application by the licensee for such a modification and observing that "if modification of licenses were entirely dependent upon the wishes of existing licensees, a large part of the regulatory power of the Commission would be nullified.").

[505] *See, e.g.*, Globalstar Reply at 4-5; Sprint Reply at 15; USGIC Comments at 3-4; CCIA Comments at 2-5, CCIA Reply at 2.

[506] PIO Comments at 7-8.

[507] DISH Comments at 15-16, DISH Reply at 2.

[508] Globalstar Reply at 4-5 (*citing CMMC*, 365 F.3d at 44-45).

[509] MetroPCS Comments at 36-38; MetroPCS Reply Comments at 6-8.

[510] *See supra* Sections III.A. (Band Plan), III.B. (Technical Issues).

[511] *See* Section III.E. (Performance Requirements).

[512] *See supra* Section III.A. (Band Plan)

band.[513] Additionally, the Commission modified licenses to relocate operations of certain Digital Electronic Message Service licensees from the 18 GHz band to the 24 GHz band, in order to accommodate Department of Defense military systems.[514] In modifying licenses to rearrange the MSS duplex spacing, the Commission must meet the public interest, convenience, and necessity requirements of Section 316, which we do here for the reasons detailed below.[515] Here, our action to reconfigure an existing band among existing licensees is of a much more limited nature than in previous exercises of Section 316 authority, such as the 800 MHz re-banding for Nextel. Indeed, although the 2000-2020 MHz and 2180-2200 MHz bands are currently assigned to two different licensees, Gamma Acquisitions L.L.C. (Gamma) and New DBSD Satellite Services G.P. (New DBSD), both of these licensees are wholly owned subsidiaries of DISH.[516] As the satellites are under common control, the modification and resulting recalibration of the satellites should present a minimal burden to the existing licensees. We direct these licensees to determine how to effectuate the reconfiguration of the 2 GHz MSS band into an A-B/A-B arrangement. Providing the licensees with the ability to determine how to best effectuate the MSS band reconfiguration should further limit any burden the reconfiguration places on them. Thus, we will modify the respective licenses of Gamma and New DBSD to reflect the assignment of the paired spectrum as 2000-2010 MHz paired with 2180-2190 MHz and 2010-2020 MHz paired with 2190-2200 MHz, based on the licensees' responses to the Order of Proposed Modification herein.

b. Public Interest Considerations

176. In the *AWS-4 NPRM*, the Commission expected modification of the 2 GHz MSS licenses would yield certain public interest benefits, including the removal of regulatory barriers that impede the Commission's goal of terrestrial mobile broadband services in the 2 GHz band.[517] The Commission proposed that if current technology did not permit separate MSS and terrestrial mobile licensees, then license modifications pursuant to Section 316 would make more spectrum available for broadband use and avoid harmful electromagnetic interference.[518] As discussed below, to benefit the public interest, we adopt our proposal to modify the 2 GHz MSS licenses pursuant to Section 316.

177. *Making More Spectrum Available for Flexible Mobile Use*. As the Commission has observed, the availability and quality of wireless broadband services is likely to become constrained if additional spectrum is not made available to enable network expansion and technology upgrades.[519] The National Broadband Plan notes that, should additional mobile terrestrial spectrum not become available, the result could be higher prices, poor service quality, an inability for the U.S. to compete effectively on

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[513] Improving Public Safety Communications in the 800 MHz Band, WT Docket No. 02-55, ET Docket Nos. 00-258 and 95-18, RM-9498, RM-10024, *Memorandum Opinion and Order*, 20 FCC Rcd 16015, 16045 ¶ 69 (2005) (*800 MHz Order*); *see also* Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Services in the Upper and Lower L-Band, *Report and Order*, 17 FCC Rcd 2704 (2002) (*MSS Order*).

[514] *See* Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service from the 18 GHz Band to the 24 GHz Band and to Allocate the 24 GHz Band for Fixed Service, *Order*, 12 FCC Rcd 3471 (1997).

[515] *See supra* Section III.A.2. (Spectrum Block and Duplex Spacing); *see infra* Section III.D.2.b. (Public Interest Considerations).

[516] *See* DBSD North America, Inc. Debtor-in-Possession; New DSD Satellite Services G.P., Debtor-in-Possession; Pendrell Corporation, Transferor; and TerreStar License Inc., Debtor-in-Possession; Assignor, and DISH Network Corporation, Transferee; and Gamma Acquisition L.L.C.; Assignee, IB Docket No. 11-150, *Order*, 27 FCC Rcd 2250 (2012).

[517] *AWS-4 NPRM*, 27 FCC Rcd at 3586 ¶ 76; *National Broadband Plan* at 87-88.

[518] *AWS-4 NPRM*, 27 FCC Rcd at 3586 ¶ 76.

[519] *See supra* Section II.A. (The Growing Spectrum Demands of Mobile Broadband Services).

an international basis, depressed demand and, ultimately, a drag on innovation.[520] Although the Commission previously envisioned the 2 GHz MSS band being available to respond to the demand for spectrum, including through the development of the ATC regime,[521] to date commercial use of this spectrum remains virtually non-existent.[522] Therefore, to improve the public interest benefits of the 2 GHz spectrum, the Commission proposed authorizing terrestrial operations in this spectrum.[523] Granting the 2 GHz MSS operators the ability to provide more and better services to both existing and potentially new subscribers with the same amount of spectrum improves the efficiency with which they can use the spectrum. For example, DISH has commented that use of this spectrum for satellite service is most likely to be in conjunction with terrestrial service.[524]

178. We emphasize that, although our determination to grant AWS-4 authority to the incumbent 2 GHz MSS licensees will undoubtedly result in an increase in value of those licensees,[525] such increase in value is not a basis for our decision today; rather, it is a consequence of our decision, which is intended to enable AWS-4 spectrum to be meaningfully and timely put to use in a manner that promotes the public interest. (We believe that various aspects of the rules we are adopting will create additional public benefits in consideration of the increase in the spectrum value.) We deem the Section 316 license modification approach the best and fastest method for bringing this spectrum to market, a position underscored by commenters.[526] Thus, we conclude Section 316 license modifications are in the public interest.

179. Additionally, the technical requirements that we are adopting today for 2000-2005 MHz operations will help make the adjacent band, 1995-2000 MHz, available for terrestrial, flexible use, including for mobile broadband use. The Commission allocated 1995-2000 MHz for fixed and mobile use in 2003 and designated it for AWS use in 2004 as a downlink band paired with 1915-1920 MHz.[527] The existence of uplink operations adjacent to downlink operations, however, raises interference concerns; we resolve those through the establishment of technical and interference rules above.[528] Further, the Spectrum Act requires the Commission to license the 1995-2000 MHz band under flexible

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[520] *See National Broadband Plan* at 77.

[521] *See* Establishment of Policies and Service Rules for the Mobile Satellite service in the 2 GHz Band, IB Docket No. 99-81, *Report and Order*, 15 FCC Rcd 16127 (2000); *see also* ATC Order at ¶ 12 (adding ATC authority to the 2 GHz MSS band and concluding that "the public interest is best served by permitting MSS licensees flexibility to improve MSS by having the option of deploying MSS ATC to improve spectrum efficiency and achieve other public-interest goals, particularly given that our technical analyses demonstrate that we cannot grant to a third party the right to use licensed MSS spectrum for terrestrial use without impacting the rights of the existing satellite licensees.").

[522] *AWS-4 NPRM*, 27 FCC Rcd at 3565-66 ¶ 8.

[523] *Id*. at 3586 ¶ 78.

[524] *See* Letter from Jeffrey H. Blum, DISH, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70 and 04-356, ET Docket No. 10-142, at 2-3 (filed Aug. 28, 2012). Many commenters also emphasize the benefits that will follow the authorization, such as freeing up spectrum, benefitting consumers, and meeting goals established in the *National Broadband Plan*. *E.g.*, TIA Comments at 6; Alcatel Comments at 4-5; and CCIA Reply at 4-6 (arguing the grant of authority to the 2 GHz MSS licensee will help to fuel job growth and the economy).

[525] NTCH Comments at 1, 3-7; *see also* T-Mobile Comments at 18-20, U.S. Cellular Reply Comments at 5-6; PIO Comments at 7 (stating that AWS-4 licenses could be valued at $4 to $6 billion).

[526] *See, e.g.*, DISH Reply at 17-18; Alcatel Comments at 2, 5.

[527] *See* AWS *AWS Sixth Report and Order*, 19 FCC Rcd at 20740 ¶ 41 (pairing two bands).

[528] *See supra* Section III.B. (Technical Issues).

use service rules, unless doing so would cause interference to PCS licensees in the 1930-1995 MHz band.[529] Enabling this band to be used efficiently for flexible, commercial use is consistent with this statutory requirement. Moreover, as explained above, wireless broadband traffic is asymmetrical with more downlink than uplink; thus the public interest is best served by limiting uplink operations at 2000-2005 MHz to facilitate potential downlink operations at 1995-2000 MHz, particularly where such a downlink band could become part of the workhorse PCS band.[530] Accordingly, we conclude Section 316 license modifications are in the public interest.

180. Finally, we disagree with NTCH's assertion that the license modification approach we take is not in the public interest. NTCH argues the Commission's proposed actions are inappropriate and that we should accept competing applications for AWS-4 spectrum. NTCH, however, ignores the critical detail that same-band, separate operator sharing of the spectrum is not technically feasible at this time. Moreover, nothing we do today eliminates the existing mobile satellite allocation for the 2 GHz MSS band[531] or limits the licensees' continued satellite use rights for this spectrum (other than certain targeted technical restrictions applicable to 2000-2005 MHz). The Commission recognized these technical hurdles when it established co-primary fixed and mobile allocations in the 2 GHz band. Therefore, to make more spectrum in this band available for flexible terrestrial use, including for mobile broadband, and thereby serve the public interest, we will authorize AWS-4 operations by the incumbent 2 GHz MSS licensees through license modifications.[532]

181. *Eliminating Harmful Interference*. The Commission previously determined that separately controlled MSS and terrestrial operations (*i.e.*, two ubiquitous mobile services) in the same band would be impractical because the parties would not be able to overcome the technical hurdles to reach a workable sharing arrangement.[533] This determination suggested that the public interest would be best served by modifying the 2 GHz MSS license to allow the satellite licensee to operate terrestrial services, rather than make the band available for terrestrial licenses under a sharing regime with MSS.[534] As discussed below, the record demonstrates that the earlier Commission conclusion regarding the impracticality of allowing same spectrum, different operator use of the AWS-4 spectrum remains valid.[535] The majority of commenters discussing this issue concur with the Commission's assessment that harmful interference would occur if the 2 GHz MSS and AWS-4 terrestrial spectrum rights were controlled by different entities.[536] Thus, we conclude that the public interest is best served by modifying the 2 GHz MSS license rather than allowing shared use of the band. Accordingly, based on the record before us at this time, we decline to assign AWS-4 terrestrial rights through a system of competitive bidding.[537]

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[529] *See* Spectrum Act § 6401(b), codified at 47 U.S.C. § 1451(b).

[530] *See supra* Section III.B. (Technical Issues).

[531] *See 2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd 5710 (2011).

[532] To the extent NTCH suggests the Commission remove the MSS allocation in the 2 GHz band, we consider that request to be an untimely Petition for Reconsideration of the *2 GHz Band Co-Allocation Report and Order*. *See* 47 C.F.R. §1.429.

[533] *ATC Report and Order*, 18 FCC Rcd at 1991 ¶ 49.

[534] *AWS-4 NPRM*, 27 FCC Rcd 3586-87 ¶ 79.

[535] *See infra* Section III.D.2.b. (Public Interest Considerations).

[536] *See, e.g.*, DISH Comments at 4, 9-10; NRTC Comments at 4-5; USGIC Comments at 3.

[537] *See AWS-4 NPRM*, 27 FCC Rcd at 3587 ¶ 80.

182. One party opposes the Commission's proposal that shared use of the AWS-4 spectrum remains infeasible. MetroPCS argues that the current technology environment actually allows for sharing the AWS-4 spectrum between different operators.[538] MetroPCS suggests that use of known technologies, such as advance coding and interference cancellation and mitigation techniques, would allow for greater interference protection for satellite handsets from terrestrial broadcasts.[539] Additionally, MetroPCS asserts that because MSS satellites "are essentially 'bent pipes,' satellite and terrestrial operators will be able to coordinate their systems in a way that was not originally contemplated when the Commission decided that sharing was not feasible." Although MetroPCS is correct that DISH's satellites use a "bent pipe" architecture where the satellite is essentially repeating a signal generated on the ground, MetroPCS does not clarify how this would facilitate coordination. Contrary to MetroPCS's assertions, we find the record demonstrates continued technical hurdles exist. As DISH notes, although such technologies do allow for greater interference protection, they are "*only* feasible when operations are integrated . . . [and] the reverse link interference cancellation technique…is not a viable solution in the absence of integration, as it requires real-time knowledge of signals for this interference to be prevented."[540] Similarly, as NRTC notes, the technology necessary to share spectrum between two separate licensees, such as dynamic spectrum access and cognitive radios, is not market-proven for sharing mobile satellite and terrestrial operators or addressed in relevant technical standards.[541] Other parties, such as US GIC, comment that the Commission correctly concluded that multiple parties would not be able to overcome technical hurdles.[542]

183. Also, the record contains no evidence that dynamic frequency coordination can be achieved today between separately-controlled MSS and terrestrial networks. Indeed, as DISH notes, no commenter—including MetroPCS—provides technical support that disputes the continued validity of the Commission's 2003 finding.[543] Rather, as Sprint states, the record engineering analysis presented by DISH "credibly indicates that frequency sharing between separate operations could cause interference between AWS-4 and MSS equipment and transmissions."[544] Thus, we find that spectrum sharing between separately-licensed MSS and terrestrial operators, while perhaps possible in the future, is not viable today in this spectrum band.[545] Consequently, we conclude that substantial technical hurdles remain, justifying authorizing AWS-4 operations by the incumbent MSS licensees.[546]

184. We emphasize that this public interest determination is based in part on rules that will limit or potentially limit the licensees' terrestrial use of a five megahertz portion of AWS-4 spectrum to facilitate the use of 1995-2000 MHz.[547] In particular, as explained above, we are imposing increased OOBE limits at and below 2000 MHz, reduced power limits for mobile terrestrial operations in 2000-

[538] MetroPCS Comments at 2-3, 14, 19-22, 33-35.

[539] *Id*. at 20.

[540] DISH Reply Comments at 6-7, emphasis in original.

[541] NRTC Comments at 4.

[542] USGIC Comments at 4.

[543] DISH Reply at 6-7.

[544] Sprint Reply at 14.

[545] Globalstar Comments at 6; Globalstar Reply at 2.

[546] Having determined to modify the incumbent 2 GHz MSS licensee's authorization to permit it terrestrial use of the AWS-4 spectrum, we decline to pursue other assignment approaches, such as assigning the terrestrial use through competitive bidding. *See AWS-4 NPRM*, 27 FCC Rcd at 3587 ¶ 80.

[547] *See supra* Section III.B. (Technical Issues).

2005 MHz, and requiring an AWS-4 A block licensee to accept interference from duly authorized lawful operations in the 1995-2000 MHz band .[548] We do this to protect future operations in the 1995-2000 MHz band from harmful interference, to ensure the possibility of flexible commercial use of that band, consistent with Congressional direction, and to strike a balance in ensuring the efficient use of all relevant spectrum bands. The Communications Act established "that the Commission's powers are not limited to the engineering and technical aspects of radio communications."[549] Rather, the Communications Act directs the Commission to "'encourage the larger and more effective use of radio in the public interest'" and to adopt "'such rules and regulations and prescribe such restrictions and conditions . . . as may be necessary to carry out the provisions of this Act.'"[550] As explained above, we deem it necessary to set these technical limits to best maximize AWS-4 and 1995-2000 MHz spectrum for flexible terrestrial use by minimizing harmful interference between the bands. We believe the technical rules we adopt today to protect against harmful interference will promote more effective and efficient use of the 1995-2000 MHz band and the AWS-4 band and we believe that the benefits of these rules will outweigh any restrictions on the use of a portion of the AWS-4 uplink band. Moreover, any restrictions on the use of a portion of the AWS-4 band would be more than offset by the considerable increase in flexibility that the authorization holders will receive in obtaining overall terrestrial use rights under the Commission's Part 27 flexible use rules instead of under the existing ATC rules.[551]

185. Commenters did not offer specific data on the amount of benefits or costs associated with our proposed authorization of AWS-4 operations by the incumbent MSS licensees. However, because of the technical difficulties associated with coordinating between different AWS-4 licensees and the MSS licensee using the shared spectrum in the same service area, and the requirement discussed above for licensees of AWS-4 operating authority to protect 2 GHz MSS operations from harmful interference, and given the record before us and the benefits discussed above, we conclude that the potential benefits of assigning the AWS-4 spectrum rights to the existing 2 GHz MSS licensees would outweigh any potential costs.

3. Proposed Modification

186. For the reasons discussed throughout this Report and Order, we conclude that it is in the public interest, convenience, and necessity to propose modifying the existing 2 GHz MSS licenses as described in Section V below.[552] These modifications include adding Part 27 terrestrial spectrum rights to the 2 GHz MSS licenses, creating more uniform duplex spacing for the MSS rights, and eliminating ATC authority from the licenses. In the unexpected event that the license modification fails to become effectuated, we will take appropriate action at that time, potentially including full reconsideration of the assignment methods contemplated in this item and based on the revised factual scenario such an occurrence would represent.

E. Performance Requirements

187. The Commission establishes performance requirements to promote the productive use of spectrum, to encourage licensees to provide service to customers expeditiously, and to promote the

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[548] *Id*.

[549] *NBC*, 319 U.S. at 215.

[550] *Id*. at 217 (quoting 47 U.S.C. §§ 303(g) & (r)).

[551] NTCH Comments at 1, 3, 7; *see also* T-Mobile Comments at 18-20; U.S. Cellular Reply Comments at 5-6; PIO Comments at 7 (stating that AWS-4 licenses could be valued at $4 to $6 billion.).

[552] *See infra* Section V. (Order of Proposed Modification).

provision of innovative services throughout the license area(s), including in rural areas.[553] Historically, the Commission tailors performance and construction requirements to the unique characteristics of the spectrum band at issue.[554] For the AWS-4 band, we adopt performance requirements that will ensure that the spectrum is put to use expeditiously, while providing licensees with the flexibility needed to deploy services according to their business plans. Specifically, we require:

- *AWS-4 Interim Build-out Requirement*: Within four (4) years, a licensee shall provide reliable terrestrial signal coverage and offer terrestrial service to at least forty (40) percent of its total AWS-4 population. A licensee's total AWS-4 population shall be calculated by summing the population of each of its license areas in the AWS-4 band.
- *AWS-4 Final Build-out Requirement*: Within seven (7) years, a licensee shall provide reliable terrestrial signal coverage and offer terrestrial service to at least seventy (70) percent of the population in each of its license areas.

188. Additionally, we adopt the following penalties for failing to meet the build-out benchmarks:

- *Failure to Meet AWS-4 Interim Build-out Requirement*: Where a licensee fails to meet the aggregate AWS-4 Interim Build-out Requirement, the AWS-4 Final Build-out Requirement shall be accelerated by one year (from seven to six years).
- *Failure to Meet AWS-4 Final Build-out Requirement*: Where a licensee fails to meet the AWS-4 Final Build-out Requirement in any EA, its authorization for each EA in which it fails to meet the requirement shall terminate automatically without Commission action. To the extent that the licensee also holds the 2 GHz MSS rights for the affected license area, failure to meet the AWS-4 Final Build-out Requirement in an EA shall also result in the MSS protection rule in section 27.1136 of the Commission's rules no longer applying to that EA.

We explain the rationale for these performance requirements below.

1. Background

189. The AWS-4 band is allocated on a co-primary basis for both mobile satellite and terrestrial use and the Commission has previously granted MSS authorizations, including ATC authority, for 2 GHz MSS spectrum.[555] Given these unique circumstances, and the proposed Section 316 license modifications, the Commission proposed, as an interim terrestrial build-out requirement, to require that, within three years, a licensee must provide terrestrial signal coverage and offer terrestrial service to at least thirty percent of its total license-area population.[556] The Commission proposed to calculate a licensee's total AWS-4 population by summing the population of each EA license authorizations in the band.[557] As a final build-out requirement, the Commission proposed that, within seven years, the licensee must provide signal coverage and offer service to at least seventy percent of the population in each EA it holds.[558] The Commission proposed an aggregate license-area requirement for the interim milestone to

[553] *See* 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 at 15348 ¶ 154 (2007) (*700 MHz Second Report and Order*).

[554] *See e.g., 700 MHz Second Report and Order*, 22 FCC Rcd at 15348-15355 ¶¶ 153-77.

[555] *AWS-4 NPRM*, 27 FCC Rcd at 3563-3566 ¶¶ 3-9.

[556] *Id*. at 3590 ¶ 92.

[557] *Id*. at 3590 ¶ 92.

[558] *Id*. at 3590 ¶ 92.

provide a licensee with flexibility in the initial build of its network, and it proposed EA-based requirements for the final milestone in order to encourage widespread deployment throughout many areas of the country.[559]

190. In the *AWS-4 NPRM*, the Commission sought comment on specific penalties in the event a licensee fails to satisfy its terrestrial build-out requirements.[560] The Commission proposed and sought comment on whether all of a licensee's terrestrial spectrum rights should terminate automatically without Commission action if a licensee fails to meet the interim build-out requirement.[561] The Commission also sought comment on whether in the event a licensee fails to meet the final build-out requirement in any license area, its terrestrial spectrum rights for each license area in which it fails to meet the build-out requirement should terminate automatically without Commission action.[562] The Commission observed that, if it assigns AWS-4 terrestrial spectrum rights to the 2 GHz MSS licensee pursuant to a Section 316 license modification, the license would include both Part 27 terrestrial and Part 25 mobile satellite rights.[563] In such a situation, the Commission proposed that failure to meet the interim build-out requirement would result in the AWS-4 and 2 GHz MSS spectrum rights automatically terminating in all license areas (*i.e.*, nationwide, if a single licensee holds all of the authorizations), and failure to meet the final build-out requirement would result in the AWS-4 and 2 GHz MSS spectrum rights automatically terminating in those areas where the licensee fails to meet the requirement.[564]

191. Furthermore, in case a licensee's terrestrial authority to operate terminates, the Commission sought comment on the process for making terrestrial spectrum rights available for reassignment pursuant to the competitive bidding provisions of Section 309(j).[565] The Commission observed that its ability to reassign the spectrum rights could be impaired should the Commission continue to require coordination and protection of 2 GHz MSS operations by licensees of reassigned terrestrial spectrum rights.[566] The Commission sought comment on the appropriate remedy in such circumstances.[567]

192. Finally, the Commission proposed and sought comment on whether, consistent with Section 1.946(d) of the Commission's rules, licensees must demonstrate compliance with any new performance requirements by filing a construction notification within 15 days of the relevant milestone certifying that they have met the applicable performance benchmark.[568] The Commission also proposed to require additional detailed supporting documentation, including electronic coverage maps, for each construction notification.[569]

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[559] *Id*. at 3591 ¶ 93.

[560] *Id*. at 3591-92 ¶¶ 94-96.

[561] *Id*. at 3591 ¶ 94.

[562] *Id*. at 3591 ¶ 94.

[563] *Id*. at 3591 ¶ 95.

[564] *Id*. at 3591 ¶ 95.

[565] *Id*. at 3592 ¶ 96; *see* 47 U.S.C. § 309(j).

[566] *Id*. at 3592 ¶ 96*; see* 47 U.S.C. § 316.

[567] *Id*. at 3592 ¶ 96.

[568] *AWS-4 NPRM*, 27 FCC Rcd at 3592 ¶ 97*; see* 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").

[569] *AWS-4 NPRM*, 27 FCC Rcd at 3592 ¶¶ 97-98.

2. Discussion

193. We adopt specific performance requirements for the AWS-4 band in an effort to foster timely deployment of flexible terrestrial mobile service in the band, and to enable the Commission to take appropriate corrective action should the required deployment fail to occur. Although the record in response to the Commission's specific performance benchmark and penalty proposals is mixed, parties generally agree that performance requirements promote the timely, productive use of spectrum. For example, Alcatel-Lucent states that "reasonable deployment milestones ensure that the spectrum actually gets used in the near term."[570] Timely deployment of wireless networks in this band is vital given the failure of any terrestrial ATC service and failure of significant MSS to develop despite years of Commission effort to enable deployment of emerging and innovative technologies in the band.[571]

194. We disagree with commenters who argue that our build-out requirements "would be of limited value,"[572] because they either do not believe the licensee (post license modification) intends to build out using the spectrum or believe that additional conditions are needed to ensure the spectrum is utilized.[573] As an initial matter, we observe that the incumbent 2 GHz MSS licensees generally support our seven year end-of-term build-out benchmark and have committed to "aggressively build-out a broadband network" if they receives terrestrial authority to operate in the AWS-4 band.[574] We expect this commitment to be met and, to ensure that it is, adopt performance requirements and associated penalties for failure to build-out, specifically designed to result in the spectrum being put to use for the benefit of the public interest. We address requests for conditions in addition to performance requirements in section III.G.7., below.

a. Benchmarks

195. To ensure that a licensee provides service to consumers expeditiously, we adopt specific quantifiable performance requirements. Consistent with our approach to performance benchmarks in other bands—including the Upper 700 MHz C-block and the 2.3 GHz WCS band—we adopt objective interim and final build-out benchmarks.[575] As explained below, after taking into account the full range of comments, we adopt an interim requirement that differs somewhat from that proposed in the *AWS-4 NPRM* and adopt the final benchmark proposal in the *AWS-4 NPRM*.

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[570] Alcatel Comments at 16.

[571] *AWS-4 NPRM*, 27 FCC Rcd at 3563-3566, ¶¶ 3-9. Although TerreStar, a predecessor 2 GHz MSS licensee to DISH, previously offered MSS service to a limited number of customers in an arrangement with AT&T, there is no indication from the current licensee's web site that any service is presently offered to consumers in the 2 GHz MSS band. *See* URL: http://www.dish.com (last visited Nov. 30, 2012).

[572] MetroPCS Comments at 27.

[573] *Id*. at 27-29; PIO Comments at 17-19; RCA Comments at 4-5, 11-12.

[574] DISH Comments at 18; *but see*, MetroPCS Comments at 28 (arguing that DISH "lacked detail regarding its plans to obtain the necessary technical, operational and business expertise to construct and operate a terrestrial network, as well as how it planned to compete against the nationwide carriers."); MetroPCS Reply Comments at 8-9.

[575] *See 700 MHz Second Report and Order*, 22 FCC Rcd at 15351 ¶¶ 163-64. Although the C Block was licensed by REAG, the rules require C Block licensees to meet these benchmarks in each EA. 47 C.F.R. § 27.6(b)(2). We decline to use the AWS-1 band as a basis for the performance requirements we adopt here. Build-out requirements for AWS-1 spectrum took into account the uncertainty associated with the timing of clearing Federal operations from the band, which does not need to occur here. *See AWS-1 Report and Order*, 18 FCC Rcd at 25191-93 ¶¶ 73-79.

196. *Interim Benchmark.* We modify the proposed interim build-out requirement in response to the record. Recognizing concerns raised by commenters that the proposal may not afford a new entrant in a new flexible use terrestrial band sufficient time to deploy its network and offer service, we extend the interim build-out requirement timeframe from three to four years.[576] Extending the interim benchmark to four years will enable service providers and equipment vendors to deploy network infrastructure and devices based on the most advanced technologies, including the LTE-Advanced standard.[577] This is analogous to the Commission's decision in the *2012 WCS Order* in which the Commission extended the proposed build-out requirements by six months to accommodate new technological developments.[578] Extending the interim benchmark from three to four years also accommodates possible timing effects that may result from our technical findings, above, to enable use of the adjacent 1995-2000 MHz band.[579] We also increase the population benchmark from 30% to 40%, to more closely align the benchmark with interim benchmarks in other bands.[580] Finally, we determine that a licensee's total AWS-4 population shall be calculated by summing the population, based on the most recent decennial U.S. Census Data at the time of measurement, of each of its license areas in the AWS-4 band.[581]

197. *Final Benchmark.* We find, consistent with the record, that a final seven-year construction milestone provides a reasonable timeframe for a licensee to deploy its network and offer widespread service.[582] No party suggested that a longer time frame would be necessary and, indeed, DISH stated that seven years is a reasonable period for a final build-out milestone.[583] We are not

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[576] DISH Comments at 5, 19-20 (arguing that a "four-year interim buildout period is necessary to allow sufficient time to build a new facilities-based network."); *see also*, CCIA Reply Comments at 2, 9-11; AT&T Comments at 11-12; Globalstar Comments at 6 n.13; CCIA Comments at 6-8; Letter from Alison A. Minea, Corporate Counsel, DISH, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-70 at 2 (filed August 21, 2012) (arguing in favor of modifying the interim milestone from three to four years); *but see*, T-Mobile Comments at 9 (arguing for more rigorous interim build-out requirements and requiring the licensee to provide coverage to at least 100 million people within 21 months and at least 145 million people within 33 months).

[577] DISH Comments at 19-23.

[578] In the 2.3 WCS band, the Commission implemented an interim build-out requirement of 4 years / 40% of population (per license) and a final build-out requirement of 6 ½ years / 75% of population (per license), finding that additional time was warranted to allow for the development and deployment of new equipment and technologies in the band. 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 at 13702-06 ¶¶ 127-135 (2012) (*2012 WCS Order*).

[579] *See supra* Section III.B (Technical Issues). Although, as stated above, we do not base our technical rules on the potential of those rules effect the development of private party technical standards, we consider it as one reason of many here to adjust the interim build-out benchmark. *See supra* ¶¶ 94-95.

[580] *See 700 MHz Second Report and Order*, 22 FCC Rcd at 15351 ¶ 162; *2012 WCS Order*, 27 FCC Rcd at 13702-06 ¶¶ 127-135.

[581] For example, if Wireless Operator A has 20 AWS-4 EA licenses, its total AWS-4 population would be the sum of the populations in each of those twenty EAs. To meet the AWS-4 Interim Build-out requirement, Wireless Operator A would need to provide reliable terrestrial signal coverage and offer terrestrial service to at least forty (40) percent of this total AWS-4 population. The benchmark is thus measured against a single aggregate population total and is not calculated on an individual EA basis.

[582] *See e.g.*, DISH Reply Comments at 13; DISH Comments at 18 (stating that a seven year build-out schedule is achievable); RCA Comments at 6; NTCA Comments at 4. DISH Reply Comments at 16.

[583] DISH Comments at 18.

persuaded by T-Mobile's proposal that we require an expedited build-out schedule.[584] Although we expect it is possible for a licensee to meet a faster schedule, we believe such a benchmark could unnecessarily restrict the business plans of licensees, particularly new entrants. Therefore, after assessing the record and Commission precedent, we find that requiring 70% build-out at the seven-year milestone would serve the public interest.[585]

198. As discussed above,[586] we are adopting an EA-based AWS-4 band plan requirement and not a nationwide band plan. Setting build-out benchmarks on an EA basis is consistent with our general approach of assigning AWS-4 terrestrial spectrum rights under the Commission's Part 27 rules, including permitting any licensee to avail itself of the Commission's secondary market mechanisms.[587] Consistent with our practice in other bands, we will measure interim and final build-out benchmarks using percentages of license area population. We reject DISH's proposal to measure these benchmarks using static measures of population.[588] This allows for more flexibility and certainty in licensing. For example, should a licensee partition some of its AWS-4 spectrum, a percentage-based approach would apply to each partition, while a single population count would not.

199. *Rural Specific Benchmarks*. We conclude that no additional rural-specific construction benchmarks are warranted beyond the performance requirements described above. We recognize that some commenters seek stricter performance requirements to promote service to rural areas.[589] However, the performance requirements we adopt today will provide licensees with an ability to scale networks in a cost efficient manner while also ensuring that the vast majority of the population will have access to these wireless broadband services by the final benchmark.[590] Because of the substantial capital investment and logistical challenges associated with a licensee building-out its terrestrial network to a significant percentage of the Nation's population within four and seven years, we conclude that the performance requirements we adopt are an appropriate balance.

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[584] *See*, T-Mobile Comments at 10 (arguing that "seven years to deploy a terrestrial wireless network in this spectrum band is excessive in this case."); *see also* T-Mobile Comments at 3, 6, 8-11; PIO Comments at 5-7 (arguing that the build-out requirements proposed in the *AWS-4 NPRM* "are not substantially more stringent than conditions attached to auctioned spectrum.").

[585] *See*, DISH Comments at 23 ("The final milestone should be set at 200 million POPs, which is approximately 65 percent of the current U.S. population based on the 2010 U.S. Census."); AT&T Comments at 12 (proposing performance requirements modeled after the Upper 700 C-Block requirements, in particular, proposing to require licensees "to cover 75% of the total population of each MEA by the end of the license term.").

[586] *See supra* Section III.A.3. (Geographic Licensing Area).

[587] *See infra* Section III.G.3. (Secondary Markets).

[588] *See* DISH Comments at 23 ("[T]he Commission should adopt a four-year milestone that requires coverage and service to 60 million POPs, which is approximately 20 percent of the current U.S. population based on the 2010 U.S. Census….The final milestone should be set at 200 million POPs, which is approximately 65 percent of the current U.S. population based on the 2010 U.S. Census.").

[589] NRTC Comments at 6-7; NRTC Reply Comments at 4-5; *see also* PIO Comments at 7; PIO Reply Comments at 8.

[590] *See 700 MHz Second Report and Order*, 22 FCC Rcd at 15351 ¶ 164. *See also* DISH Comments at 19-22; AT&T Reply Comments at 9.

b. Penalties for Failure to Meet Construction Requirements

200. We adopt meaningful and enforceable consequences, or penalties, for failing to meet both the interim and the final benchmarks.[591] The penalties we adopt represent modification of the Commission's main proposal in the *AWS-4 NPRM* for the penalty for failure to meet in the interim build-out requirement; they reflect the record generated in this proceeding.

201. *Penalties for Failure to Meet the Interim Benchmark.* We modify the Commission's proposal and find that failure to meet the aggregate AWS-4 Interim Build-out Requirement will result in the AWS-4 Final Build-out Requirement being accelerated (shortened) by one year.[592] We agree with commenters who suggest that penalties of this nature are appropriate for failure to meet the AWS-4 interim benchmark.[593] In modifying the Commission's proposal from the *AWS-4 NPRM*,[594] we note the concerns raised by commenters who argued that the proposal to terminate all of a licensee's terrestrial authority for not meeting the Interim Build-out Requirement could impact investment and impact customers.[595]

202. *Penalties for Failure to Meet the Final Benchmark:* In the event a licensee fails to meet the AWS-4 Final Build-out Requirement in any EA, we adopt the proposal in the AWS-4 NPRM that the licensee's terrestrial authority for each such area shall terminate automatically without Commission action. Automatic termination is a common remedy for failure to build Part 27 flexible use licenses.[596] We also adopt the Commission proposal that any licensee who forfeits its AWS-4 operating authority for failure to meet the AWS-4 Final Build-out Requirement in an EA shall be precluded from regaining that authorization.[597] To the extent that a licensee is also the 2 GHz MSS licensee, failure to meet the AWS-4 Final Build-out Requirement in a license area shall also result in the MSS protection rule in section 27.1136 of the Commission's rules no longer applying to that AWS-4 license area.[598] We believe that our approach strikes an appropriate balance between promoting prompt build-out and penalizing a licensee

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[591] *See* Alcatel-Lucent Comments at 16.

[592] If a licensee of AWS-4 authority fails to meet the interim benchmark, its final build-out benchmark would be reduced to 6 years instead of 7 years. We recognize that in the 700 MHz proceeding, we reduced a licensee's final build-out requirement and license term by two years for failing to meet the interim benchmark. *See 700 MHz Second Report and Order*, 22 FCC Rcd at 15351 ¶ 163. However, we find that it would be unreasonable to set the interim benchmark for the licensees of AWS-4 authority at 4 years and the final benchmark at 5 years.

[593] DISH Reply Comments at 15 (proposing alternative sanctions including "reducing the length of the license term, implementing a remediation plan, or limiting the ability to obtain additional AWS licenses in other bands until buildout is completed."); DISH Comments at 24-25; AT&T Comments at 12-13; U.S. Cellular Reply Comments at 9-10.

[594] *See AWS-4 NPRM*, 27 FCC Rcd at 3591 ¶ 94.

[595] Alcatel-Lucent Comments at 16; CCIA Comments at 6; CCIA Reply Comments at 9-11; AT&T Comments at 13; CTIA Comments at 17; CTIA Reply Comments at 12-14; Nokia Comments at 5; USCC at 9-10; Globalstar Reply Comments at 7; Globalstar Comments at 7; Sprint Reply Comments at 16; MSUA Comments at 3; SIA Comments at 4-5; *but see* MetroPCS Reply Comments (stating that "[t]he Commission's proposed penalties are fair and in-line with conditions imposed on other licensees."); T-Mobile Comments at 12-13.

[596] *See generally* 47 C.F.R. § 27.14.

[597] *See AWS-4 NPRM*, 27 FCC Rcd at 3592 ¶ 96; *see, e.g.*, 47 C.F.R. §§ 27.14(a), (j), (o).

[598] *See* RCA Comments at 6; PIO Reply Comments at 8 (arguing that "it seems reasonable and consistent with efficient spectrum use to reclaim the AWS-4 licenses that correspond to particular service areas where the licensee fails to meet final build-out requirements.); *see also* 47 C.F.R. § 27.1136.

for not meeting its terrestrial performance obligations in a particular EA.[599] In addition, by only terminating specific licenses where a licensee fails to meet the final benchmark in a particular license area, a licensee's customers in other license areas would not be impacted.[600]

203. Moreover, we reject suggestions that MSS interference protections should not be affected by a failure to construct terrestrial services.[601] If we do not remove the protection rule for satellite operations for those geographic areas where the terrestrial operating authority terminates, it will be challenging to relicense the spectrum in a way that will encourage productive terrestrial use. This could create incentives for the current licensees not to comply with the construction benchmarks and could potentially cause the spectrum to continue to lay fallow of terrestrial use contrary to the public interest.[602]

204. We believe these penalties are necessary to ensure that licensees utilize the spectrum in the public interest. As explained above, the Nation needs additional spectrum supply.[603] Failure by licensees to meet the build-out requirements would not address this need. Commenters did not offer specific data on the amount of benefits or costs associated with our proposed penalties or any alternative penalties for failure to meet performance requirements. We disagree that the penalties could potentially discourage network investment[604] for the licensee or lower the service quality for terrestrial wireless service customers.[605] While a customer might lose service if a licensee loses its terrestrial spectrum rights for failure to build-out,[606] we expect that a future licensee of AWS-4 authority for that EA would ultimately serve more customers. We expect the probability of not meeting the performance requirements due to the costs of meeting the rules to be small and that the performance penalties are unlikely to deter network investment. Moreover, the Commission has consistently dismissed the contention that an automatic termination policy is unfair; rather, it is the same approach that the Commission applies to nearly all geographically-licensed wireless services.[607] The Commission has specifically rejected the argument that the automatic termination penalty would deter capital investment, noting that the wireless industry has invested billions of dollars and has flourished under this paradigm.[608]

205. "*Use it or Share it.*" We decline to impose any "use it or share it" requirements for the AWS-4 spectrum band.[609] PIO argues that the Commission's build-out requirements should be "augmented by a 'use it or share it' license condition that would permit other parties to make use of

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[599] *See* RCA Comments at 6; PIO Reply Comments at 8.

[600] RCA Comments at 6; *see* PIO Reply Comments at 8; *see generally*, AT&T Comments at 13-14; U.S. Cellular Reply Comments at 9-10.

[601] MSUA Comments at 3; SIA Comments at 4-5.

[602] SIA acknowledges that "it is not practical for MSS licenses and AWS licenses for the same frequency bands to be held by different entities" SIA Comments at 4.

[603] *See supra* Section II.A (The Growing Spectrum Demands of Mobile Broadband Services).

[604] *See* Globalstar Comments at 7, CTIA Reply at 12-14, U.S. Cellular Reply Comments at 9-10.

[605] *See* Alcatel Comments at 16, CTIA Reply at 12-14.

[606] *See* Alcatel Comments at 16, DISH Comments at 25, U.S. Cellular Reply Comments at 9-10.

[607] *2010 WCS Order*, 25 FCC Rcd at 11796 ¶ 214; *2012 WCS Order*, 27 FCC Rcd at 13704 ¶ 131 (rel. Oct. 17, 2012).

[608] *2010 WCS Order*, 25 FCC Rcd at 11796 ¶ 214; *2012 WCS Order*, 27 FCC Rcd at 13704 ¶ 131 (rel. Oct. 17, 2012).

[609] CTIA Reply Comments at 2, 14-16; AT&T Reply Comments at 10-11.

unused" AWS-4 spectrum on a localized basis until the licensee actually begins providing service.[610] While we reserve the right to implement "use it or share it" obligations in the future, "use it or share it" is a complex concept that is not sufficiently developed in this record.[611] Even though we do not adopt a requirement, we encourage providers to enter into leasing agreements for unused spectrum.[612] While we discuss spectrum leasing in greater detail below,[613] we note that engaging in spectrum leasing may assist a licensee in meeting its performance milestones.[614] We also note that we asked a number of questions about "use or lease" in the *Incentive Auctions NPRM* and hope to build a more robust record in that proceeding about how such a process could work effectively.[615]

206. *Compliance Procedures*. After assessing the record, we find that licensees must demonstrate compliance with the new performance requirements by filing a construction notification within 15 days of the relevant milestone certifying that they have met the applicable performance benchmark, consistent with Section 1.946(d) of the Commission's rules.[616] Further, we find that each construction notification must 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.[617] Finally, we decline to require, as suggested by T-Mobile,[618] that any licensee file certifications every six months regarding its

[610] PIO Comments at 13; *see also*, Letter from Michael Calabrese, Director, Wireless Future Project, Open Technology Institute, New America Foundation, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-70 at 3 (filed August 20, 2012) (arguing that "any build-out requirements should be augmented by a 'use it or share it' license condition"); Letter from Michael Calabrese, Director, Wireless Future Project, Open Technology Institute, New America Foundation, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-70 at 2 (filed July 19, 2012); Letter from James Carlson, President, Carlson Wireless Technologies, Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 12-70 at 1 (filed June 22, 2012) (applauding the "use it or share it" approach).

[611] *See* CTIA Reply Comments at 2, 14-16.

[612] NRTC Reply at 5 (arguing that the Commission should encourage licensees to partner with rural organizations by, for example, leasing spectrum to a rural entities and counting the population and geography associated with the lease toward meeting performance requirements); *see also*, RTG Reply Comments at 3 (supporting "NTCA's recommendation that DISH be permitted to meet its deployment benchmarks by meaningfully partnering with rural wireless carriers").

[613] *See infra* Section III.G.3.b. (Spectrum Leasing).

[614] *See* NTCA Comments at 4-5 ("[I]f the Licensee offers reciprocal roaming, marketing, leasing, or in any other meaningful way integrates a rural carrier's spectrum seamlessly into its network or operation, the population served by the rural provider should count toward the Licensee's build-out benchmarks."); NRTC Comments at 7 (arguing that "the population and/or geography associated with that lease could be applied toward satisfying the performance requirement.").

[615] *See* Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Docket No. 12-268, *Notice of Proposed Rulemaking*, FCC 12-118 (rel. Oct. 2, 2012).

[616] *See* 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").

[617] *See, e.g.*, 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.").

[618] *See* T-Mobile Comments at 15.

construction progress; such frequent reporting is unnecessary to ensure intensive spectrum use given the performance measures we adopt today. [619]

207. Electronic coverage maps must accurately depict the boundaries of each license area in the licensee's service territory.[620] If a licensee does not provide reliable signal coverage to an entire EA, its map must accurately depict the boundaries of the area or areas within each EA not being served. Each licensee also must file supporting documentation certifying the type of service it is providing for each EA 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.

208. Further, 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.[621] Specifically, the licensee must base its claims of population served on areas no larger than the Census Tract level.[622] 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.[623]

F. Applications for Any AWS-4 Spectrum Returned to the Commission

209. Certain requirements adopted in this *Report and Order* create the potential for AWS-4 spectrum rights to be terminated automatically or otherwise returned to the Commission's spectrum inventory for reassignment.[624] For example, this *Report and Order* adopts consequences, including the loss of terrestrial use of, and satellite protection for, the spectrum, if a licensee fails to meet certain build-out requirements.[625] Such returned AWS-4 terrestrial spectrum rights would be reassigned using a geographic-area approach with licenses to be made available on an EA basis. In such a situation, consistent with the proposal set forth in the *AWS-4 NPRM*, we adopt a licensing process that provides for the acceptance of mutually exclusive applications, which would be resolved by means of competitive bidding pursuant to the statutory directive.[626] The Commission has long recognized that where mutually exclusive applications are submitted this type of framework best serves the public interest because the competitive bidding mechanism is most likely to select licensees that value the spectrum the most and

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[619] *See* DISH Reply Comments at 30-31; *see also* PIO Reply Comments at 8.

[620] 47 C.F.R. § 27.14(p)(7).

[621] 47 C.F.R. § 27.14(h).

[622] 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… [T]he entire United States is covered by census tracts." U.S. Census Bureau, http://www.census.gov/geo/www/geo_defn.html#CensusTract (last visited Dec. 3, 2012).

[623] *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 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 23 FCC Rcd at 6995-99 ¶¶ 10-16.

[624] *AWS-4 NPRM*, 27 FCC Rcd at 3587 ¶ 81.

[625] *See supra* Section III.E. (Performance Requirements).

[626] *AWS-4 NPRM*, 27 FCC Rcd at 3587 ¶ 81.

will put it to its highest and most efficient use.[627] In the event that AWS-4 spectrum rights are returned to the Commission, we conclude that any such rights will be made available for reassignment for terrestrial use only.[628] Accordingly, the returned spectrum rights will be subject to the competitive bidding procedures we adopt below and will not be subject to any MSS protection rule.

1. Procedures for Any AWS-4 Licenses Subject to Assignment by Competitive Bidding

210. We will conduct any auction for AWS-4 licenses resulting from terrestrial spectrum rights being returned to the Commission pursuant to our standard competitive bidding rules found in Part 1, Subpart Q of the Commission's rules and will provide bidding credits for qualifying small businesses, as proposed in the *AWS-4 NPRM*. Below we discuss our reasons for adopting the relevant proposals.

a. Application of Part 1 Competitive Bidding Rules

211. The Commission proposed to conduct any auction for AWS-4 licenses in conformity with the general competitive bidding rules set forth in Part 1, Subpart Q, of the Commission's rules, and substantially consistent with the competitive bidding procedures that have been employed in previous auctions.[629] Additionally, the Commission proposed to employ the Part 1 rules governing competitive bidding design, designated entity preference, unjust enrichment, application and payment procedures, reporting requirements, and the prohibition on certain communications between auction applicants.[630] Under this proposal, such rules would be subject to any modifications that the Commission may adopt for its Part 1 general competitive bidding rules in the future. The *AWS-4 NPRM* also sought comment on

[627] *See, e.g.*, Amendment of the Commission's Rules Regarding Multiple Address Systems, WT Docket No. 97-81, *Report and Order*, 15 FCC Rcd 11956, 11974 ¶ 47 (2000) (concluding that geographic-area licensing of the 928.85-929 MHz and 959.85-960 MHz bands would encourage efficient spectrum use, expeditious licensing, and the rapid delivery of new technologies to the public); Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands, ET Docket No. 95-183, *Report and Order and Second Notice of Further Rule Making*, 12 FCC Rcd 18600, 18647 ¶ 101 (1997) (predetermined service areas provide a more orderly structure for the licensing process and foster efficient utilization of the spectrum in an expeditious manner); *see also* Revision of part 22 and Part 90 of the Commission's Rules to Facilitates Future Development of Paging Systems, WT Docket No. 96-18, *Second Report and Order and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 2732, 2744 ¶ 15 (1997); Implementation of Section 309(j) of the Communications Act – Competitive Bidding, PP Docket No. 93-253, *Third Report and Order*, 9 FCC Rcd 2941, 2944 ¶ 6 (1994) (Narrowband Personal Communications Services); *see generally* Implementation of Section 309(j) of the Communications Act – Competitive Bidding, PP Docket No. 93-253, *Second Report and Order*, 9 FCC Rcd 2348, 2350 ¶ 4-5 (1994) (competitive bidding should place licenses in the hands of the parties able to use them most efficiently).

[628] As noted above, while we conclude that technological difficulties make it impractical today for same-band sharing of this spectrum between separate mobile satellite and terrestrial operators, we observed that it may become possible for such sharing to become technically feasible in the future. For this reason, and for other reasons discussed herein, including our determination that returned spectrum will not be subject to any MSS protection rule, we find it appropriate to put a framework in place now that would govern the reassignment of AWS-4 spectrum rights. To the extent that the MSS licensee relinquishes its terrestrial spectrum rights either voluntarily or involuntary the MSS licensee bears the consequences of any interference that occurs as an attendant result of its opening the door to satellite/terrestrial use in the same band by two different licensees. That is, the MSS licensee would be responsible for its own considered choices or for its failure to fulfill the responsibilities that attends the expansion of its licensed rights into the terrestrial realm.

[629] *AWS-4 NPRM*, 27 FCC Rcd at 3587-88 ¶ 83.

[630] *Id*.

whether any Part 1 rules would be inappropriate or should be modified for an auction of licenses in the AWS-4 bands.[631]

212. We received no comments on the proposed use of our standard competitive bidding rules for any auction of terrestrial AWS-4 licenses.

213. One commenter, TIA, makes several proposals addressing auction design, such as the use of two-sided auctions and auction vouchers, the use of combinatorial, or package, bidding, and avoiding the use of minimum bids.[632] Consistent with our long-standing approach, auction-specific matters such as the competitive bidding design and specific mechanisms relating to day-to-day auction conduct, including minimum opening bids and/or reserve prices, would be determined by the Wireless Telecommunications Bureau prior to the start of the auction pursuant to its delegated authority, after providing interested parties an opportunity to comment.[633] Such delegated authority has proven effective over the years in providing flexibility to develop auction procedures in response to auction-specific issues and to respond rapidly to potential bidder concerns that are sometimes of a time-sensitive nature. Consequently, we determine that the Commission's Part 1 bidding rules should govern the conduct of any such auction.[634] Given the record before us and the benefits discussed above, we conclude that the potential benefits of our proposal would likely outweigh any potential costs.

b. Small Business Provisions for Terrestrial Geographic Area Licenses

214. As the *AWS-4 NPRM* discussed, in authorizing the Commission to use competitive bidding, Congress mandated that the Commission "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."[635] In addition, Section 309(j)(3)(B) of the Communications Act 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."[636] One of the principal means by which the Commission fulfills this mandate is through the award of bidding credits to small businesses.

215. In the *Competitive Bidding Second Memorandum Opinion and Order*, the Commission stated that it would define 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.[637] Further, in the *Part 1 Third Report and Order*, the Commission, while

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[631] *Id*.

[632] TIA Comments at 19-20. TIA characterizes minimum bids as "artificial floors to bidding" and claims they limit the ability of commercial entities to bid. *Id*. at 20.

[633] *See* 47 C.F.R. §§ 0.131(c), 0.331; *see also* Amendment of Part 1 of the Commission's Rules – Competitive Bidding Procedures, *Third Report and Order and Second Further Notice of Proposed Rule Making*, WT Docket No. 97-82, 13 FCC Rcd 374, 448-49, 454-55 (1997) (directing the Bureau to seek comment on specific mechanisms relating to auction conduct pursuant to the BBA) (*Part 1 Third Report and Order*).

[634] *AWS-4 NPRM*, 27 FCC Rcd at 3587-88 ¶ 83.

[635] *Id*. at 3588 ¶ 84 (quoting 47 U.S.C. § 309(j)(4)(D)).

[636] 47 U.S.C. § 309(j)(3)(B).

[637] 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 ¶ 145 (1994) (*Competitive Bidding Second Memorandum Opinion and Order*); 47 C.F.R. § 1.2110(c)(1).

standardizing many auction rules, determined that it would continue a service-by-service approach to defining the eligibility requirements for small businesses.[638]

216. The Commission proposed in the *AWS-4 NPRM* to define a small business as an entity with average gross revenues for the preceding three years not exceeding $40 million, and a very small business as an entity with average gross revenues for the preceding three years not exceeding $15 million.[639] Under this proposal, small businesses would 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.[640]

217. This proposal was modeled on the small business size standards and associated bidding credits as the Commission adopted for the AWS-1 band.[641] The Commission premised this proposal on the belief that the AWS-4 spectrum, assigned in geographic area licenses, would be employed for purposes similar to those for which the AWS-1 band is used.[642] In response to the *AWS-4 NPRM's* request for comment on these proposals, including the costs or benefits of these standards and associated bidding credits, especially as they relate to the proposed geographic areas, the Commission received no comment. Based on our prior experience with the use of bidding credits in spectrum auctions, we believe that the use of bidding credits is an effective tool in achieving the statutory objective of promoting participation by designated entities in the provision of spectrum-based services.[643] In the absence of small business size standards and bidding credits, designated entities might have less opportunity to obtain spectrum in this band. The Commission believes that continuing to extend such benefits to AWS-4 would be consistent with our statutory mandate. In light of the similarities with the AWS-1 service, we adopt these size standards and associated bidding credits for small businesses in the event that AWS-4 licenses are awarded through competitive bidding.[644]

218. We received two comments in response to the *AWS-4 NPRM's* request for comment on whether to use a different approach to bidding credits.[645] Commenters addressed eligibility in differing ways. NTCH proposes adopting eligibility rules that would preserve a 20 megahertz license for entities with less than $100 million in assets, with the remaining 20 megahertz block available for all bidders.[646] Council Tree proposes that in the absence of "set aside blocks" of AWS-4 spectrum for bidding only by designated entities, that the Commission adopt significantly higher bidding credits, with discounts up to 45 percent.[647] The Commission has previously rejected suggestions for spectrum "set-asides" in

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[638] *Part 1 Third Report and Order*, 13 FCC Rcd at 388 ¶ 18; 47 C.F.R. § 1.2110 (c)(1).

[639] *AWS-4 NPRM*, 27 FCC Rcd at 3588-89 ¶ 86.

[640] *Id*. at 3589 ¶ 87

[641] *Id*. at 3588-89 ¶ 86.

[642] *Id*. at 3588-89 ¶ 86.

[643] *See e.g., AWS-1 Report and Order*, 18 FCC Rcd at 25219-20 ¶ 148.

[644] On December 5, 2012, we requested the U.S. Small Business Administration's approval of our final rule adopting these small business size standards. Letter from Gary D. Michaels, Deputy Chief, Auctions and Spectrum Access Division, Wireless Telecommunications Bureau, Federal Communications Commission, to Khem R. Sharma, Division Chief, Office of Size Standards, U.S. Small Business Administration, dated Dec. 5, 2012.

[645] *AWS-4 NPRM*, 27 FCC Rcd at 3589 ¶ 89.

[646] NTCH Comments at 10.

[647] *See, e.g.*, Council Tree Comments at 11-12; *see also* MetroPCS Reply Comments at 15-16. Council Tree proposes bidding credits of 25% to businesses with average annual gross revenues not exceeding $40 million; 35% (continued….)

rulemaking proceedings, concluding that it was unnecessary to supplement the incentives provided for small business participation by foreclosing licenses to other bidders.[648] In the *AWS-4 NPRM*, the Commission acknowledged the difficulty in accurately predicting the market forces that might exist at the time that these frequencies are licensed, but the Commission is not persuaded that it is necessary to either set aside a portion of the spectrum at issue now, or adopt significantly larger bidding credits, in order to encourage the full participation of designated entities.[649] We therefore adopt our proposals relating to small businesses. Given the record before us and the benefits discussed above, we conclude that the potential benefits of our proposals would likely outweigh any potential costs.

G. Regulatory Issues; Licensing and Operating Rules

219. The regulatory framework we adopt below establishes the license term, criteria for renewal, and other licensing and operating rules pertaining to the AWS-4 bands. In the *AWS-4 NPRM*, the Commission proposed to grant licensees of AWS-4 operating authority the flexibility to provide any fixed or mobile service consistent with the allocations for this spectrum.[650] The Commission also proposed to license this spectrum under the Commission's market-oriented Part 27 rules, and generally to apply the provisions of the Commission's Part 27 rules applicable to AWS and the Commission's wireless rules generally applicable across multiple commercial bands to AWS-4 spectrum.[651]

1. Flexible Use, Regulatory Framework, and Regulatory Status

220. Below, we adopt regulations to provide licensees of AWS-4 operating authority with the flexibility to provide any terrestrial fixed or mobile service that is consistent with the allocation and service rules for AWS-4 spectrum. We also determine to license the AWS-4 spectrum under the Commission's market-oriented Part 27 rules and apply the regulatory status provisions of Section 27.10

a. Flexible Use

221. *Background.* In the *AWS-4 NPRM*, the Commission proposed service rules that would permit licensees to employ the AWS-4 band for any terrestrial use permitted by the United States Table of Frequency Allocations contained in Part 2 of the Commission's rules (*i.e.*, fixed or mobile services).[652] In proposing this approach, the Commission observed that Congress recognized the potential benefits of flexible allocations of the electromagnetic spectrum and amended the Communications Act in 1999 to add Section 303(y), which gives the Commission authority to provide for flexibility of use if:

> (1) such use is consistent with international agreements to which the United States is a party; and (2) the Commission finds, after notice and an opportunity for public comment, that (A) such an allocation would be in the public interest; (B) such use would not deter

(Continued from previous page)
for businesses with revenues not exceeding $15 million; and 45% to businesses with revenues not exceeding $3 million. Council Tree Comments at 11-12. This proposal is premised on Council Tree's own assessment of the Commission's designated entity program. The Commission has made clear that it is unpersuaded by Council Tree's claims with respect to the performance of designated entities in recent auctions. *See, e.g.*, Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Report and Order and Further Notice of Proposed Rulemaking*, WT Docket No. 06-150, 22 FCC Rcd 8064, 8090 ¶ 65 (2007). Therefore, although we address Council Tree's proposals for the AWS-4 band, we decline to address again such claims, which are not the subject of this proceeding.

[648] *See AWS-1 Report and Order*, 18 FCC Rcd at 25189-90 ¶ 68.

[649] *AWS-4 NPRM*, 27 FCC Rcd at 3589 ¶ 88.

[650] *Id*. at 3592 ¶ 99.

[651] *Id*. at 3592-604 ¶¶ 99-129.

[652] *Id*. at 3593 ¶ 100.

> investment in communications services and systems, or technology development; and (C) such use would not result in harmful interference among users.[653]

The Commission also stated that it had previously laid the foundation for more flexible use of the AWS-4 band in the *2 GHz Band Co-Allocation Order*, in which the Commission added co-primary Fixed and Mobile allocations to the pre-existing MSS allocation in the 2 GHz band.[654] The Commission sought comment on its proposal for flexible use of the AWS-4 band.[655] The Commission asked whether any restrictions on the band are warranted and, if so, requested that commenters state what they should be and why they are needed.[656] In addition, the Commission asked commenters to quantify the costs and benefits of any such restrictions and to discuss any trade-offs between flexibility and investment in technology and new services.[657]

222. *Discussion.* In order to promote innovative broadband services and encourage the flexible and efficient use of the AWS-4 band, we will allow a licensee of AWS-4 authority to utilize the spectrum for any terrestrial use permitted by the United States Table of Frequency Allocations contained in Part 2 of the Commission's rules, provided that the licensee complies with the applicable service rules. We find that this determination fully meets the criteria of Section 303(y) and that the record unanimously supports our permitting flexible use of the AWS-4 spectrum.[658]

223. First, as required by Section 303(y)(1), flexible use of this band is consistent with applicable international agreements. Such use would remain subject to bilateral discussions commonly undertaken whenever spectrum is put to use in border areas.

224. Second, as required by Section 303(y)(2), flexible use is in the public interest because it would not deter—and, indeed, we expect it will stimulate—investment in broadband, and it would not result in harmful interference.[659] We agree with commenters who state, for example, that flexibility will promote broadband deployment,[660] ensure the spectrum is put to its most beneficial use,[661] and maximize the probability of success for new services to be provided in the AWS-4 band.[662] Similarly, we expect that flexibility will allow any licensee of AWS-4 authority to respond to consumer demand in a manner that, as AT&T states, would "maximize the value of the spectrum resource both to the licensee and to the public."[663]

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[653] *Id.* at 3593 ¶ 100 (citing Balanced Budget Act, Pub. L. No. 105-33, 111 Stat. 251, 268-69; 47 U.S.C. § 303(y)).

[654] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5714-16 ¶¶ 8-13.

[655] *AWS-4 NPRM*, 27 FCC Rcd at 3594 ¶ 102.

[656] *Id.*

[657] *Id.*

[658] *See e.g.*, Alcatel Comments at 14; AT&T Comments at 10; CEA Comments at 3; COMPTEL Comments at 2; DISH Comments at 25; Nokia Comments at 4-5; NRTC Comments at 2; T-Mobile Comments at 6; Verizon Wireless Comments at 4.

[659] 47 U.S.C. § 303(y)(2).

[660] *See, e.g.*, Alcatel Comments at 6; T-Mobile Comments at 6; Verizon Wireless Comments at 4.

[661] CEA Comments at 3.

[662] NRTC Comments at 7.

[663] AT&T at i, 9; *see also* Alcatel Comments at 7; DISH Comments at 31; Nokia Comments at 5.

225. Similarly, we believe flexibility will spur investment in communications services and systems and technology development. We find that permitting licensees to use this spectrum for any use permitted by the spectrum's allocation will not deter investment in communications services and systems, or technology development.[664] The record in this proceeding unambiguously supports this determination. For example, T-Mobile states that "[f]lexible use could 'encourage innovation and investment in mobile broadband.'"[665] DISH asserts that flexibility will allow the licensee "to tailor its services to consumer demand and technological innovation."[666] Nokia explains that being able to adapt as necessary will allow operators to "address the rapid changes generated by new and innovative concepts in the marketplace."[667] Similarly, NRTC states that "flexibility will be critical in adapting to changing technology."[668]

226. We also find that permitting licensees' flexible use of the AWS-4 spectrum will not result in harmful interference among spectrum users. The technical rules we adopt today reflect careful consideration of potential interference scenarios and the overall public interest.[669] Further, the flexibility we are permitting will itself provide licensees with the ability to adjust their operations to minimize any interference that might occur.[670] Our technical rules for the AWS-4 band will permit licensees to provide a wide variety of services in these bands with a minimum of interference, and will permit both in-band (if any) and adjacent-band licensees to operate with sufficient certainty and clarity regarding their rights and responsibilities. Because we are adopting technical restrictions to protect other spectrum users, this proposal will not result in harmful interference.[671] Accordingly, the standards of Section 303(y)(2) are satisfied here. Commenters did not offer specific data on the amount of benefits or costs associated with our proposal for flexible use of the AWS-4 band. Given unanimous supports in the record and the potential benefits discussed above, we conclude that the potential benefits of our proposal would outweigh any potential costs.

b. Regulatory Framework

227. *Background*. In the *AWS-4 NPRM*, because the Commission proposed to permit flexible use of these bands, the Commission also proposed to license the spectrum under the flexible regulatory framework of Part 27 of our rules.[672] The Commission stated that Part 27 does not prescribe a comprehensive set of licensing and operating rules for the spectrum, but instead defines the permissible uses and any limitations thereon, and specifies basic licensing requirements.[673] The Commission sought comment on its proposal to apply the Part 27 rules to the AWS-4 band and the associated costs and benefits.[674]

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[664] *See* 47 U.S.C. § 303(y)(2)(B).

[665] T-Mobile Comments at 6 (citing *AWS-4 NPRM*, 27 FCC Rcd at 3561 ¶ 1).

[666] DISH Comments at 31.

[667] Nokia Comments at 5

[668] NRTC Comments at 7.

[669] *See supra* Section III.B. (Technical Issues).

[670] *See* Alcatel Comments at 7 ("flexibility will also assist the AWS-4 licensee to best address any adjacent interference").

[671] *See supra* Section III.B. (Technical Issues).

[672] *AWS-4 NPRM*, 27 FCC Rcd at 3594 ¶ 103.

[673] *Id*. at 3594 ¶ 103.

[674] *Id*. at 3594 ¶ 103.

228. *Discussion.* We determine to license the AWS-4 spectrum under Part 27 because these rules provide a broad and flexible regulatory framework for licensing spectrum, thereby enabling the spectrum to be used to provide a wide variety of broadband services. This light-handed regulatory approach permits licensees to use the spectrum for a multitude of purposes across the country and provides licensees with the ability to change technologies in response to changes in market conditions.

229. The record unanimously supports this approach.[675] For example, NRTC states that licensees should be able to take advantage of the flexibility provided by the Part 27 rules.[676] Similarly, the Consumer Electronics Association ("CEA") states that this Part 27 flexibility will allow market forces to determine what services are offered in the AWS-4 band.[677] We agree. This flexibility should allow licensees to design their systems to respond readily to consumer demand, thus allowing the marketplace to dictate the best uses of the licensed spectrum. Commenters did not offer specific data on the amount of benefits or costs associated with our proposal to apply the Part 27 rules to the AWS-4 band. Given unanimous support in the record and the potential benefits discussed above, we conclude that the potential benefits of our proposal would outweigh any potential costs.

c. Regulatory Status

230. *Background.* In the *AWS-4 NPRM*, the Commission proposed to apply the regulatory status provisions of Section 27.10 of the Commission's rules to licensees in the AWS-4 band.[678] Under this approach, the Commission permits applicants to request common carrier status as well as non-common carrier status for authorization in a single license, rather than to require the applicant to choose between common carrier and non-common carrier services.[679] In addition, the Commission proposed that an AWS-4 band licensee would be required to indicate its regulatory status based upon the type of service(s) it chooses to provide.[680] A licensee would be able to provide all allowable services anywhere within its licensed area, consistent with its regulatory status.[681] Apart from this designation of regulatory status, the Commission did not propose to require applicants to describe the services they seek to provide.[682] If a licensee changes the service or services it offers such that its regulatory status would change, the Commission proposed that the licensee be required to notify the Commission.[683] A change in a licensee's regulatory status would 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.[684] Consistent with our Part 27 rules, the Commission proposed to require the notification within 30 days of a change made without the need for prior Commission approval, except that a different time period may apply where the change results in the discontinuance,

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[675] *See, e.g.*, CEA Comments at 3-4; NRTC Comments at 7; NRTC Reply Comments at 5.

[676] *See* NRTC Comments at 7.

[677] *See* CEA Comments at 3.

[678] *AWS-4 NPRM*, 27 FCC Rcd at 3594 ¶ 104.

[679] *See* 47 C.F.R. § 27.10.

[680] *AWS-4 NPRM*, 27 FCC Rcd at 3595 ¶ 105.

[681] *AWS-4 NPRM*, 27 FCC Rcd at 3594-95 ¶ 104. For instance, we note that, to the extent a licensee provides a Commercial Mobile Radio Service, such service would be subject to the provisions of Part 20 of the Commission's rules, 47 C.F.R. §§ 20.1 *et seq*.

[682] *AWS-4 NPRM*, 27 FCC Rcd at 3595 ¶ 105.

[683] *Id*. at 3595 ¶ 106.

[684] *Id*. at 3595 ¶ 106; s*ee also*, 47 U.S.C. § 310(b); *see infra* Section III.G.2.a. (Foreign Ownership).

reduction, or impairment of the existing service.[685] The Commission sought comment on these proposals and the associated costs and benefits of the proposals.[686]

231. *Discussion.* No commenters directly addressed the application of Section 27.10 of the Commission's rules to the AWS-4 band. Commenters, however, overwhelmingly support increased regulatory flexibility and applying the Part 27 rules to the AWS-4 band.[687] We believe that by applying Section 27.10 of the Commission's rules to the AWS-4 band we will achieve efficiencies in the licensing and administrative process, and provide licensees with additional flexibility.[688] Therefore, we adopt the proposal from the *AWS-4 NPRM* to apply Section 27.10 of our rules to the AWS-4 band.[689]

232. Under this flexible regulatory approach, licensees in the AWS-4 band 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.[690] This broad licensing framework will encourage licensees to develop new and innovative services with minimal regulatory restraint.

233. To fulfill our enforcement obligations and to ensure compliance with Titles II and III of the Communications Act, we require the licensee to identify the regulatory status of the service(s) it intends to provide. Consistent with Section 27.10 of the Commission's Rules, the licensee will not be required to describe its particular services, but only to designate the regulatory status of the service(s). We remind potential licensees that an election to provide service on a common carrier basis requires that the elements of common carriage be present;[691] otherwise the applicant must choose non-common carrier status.[692] 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 applications, or at any time, requesting clarification and including service descriptions for that purpose.[693]

234. We also determine that if the 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.[694] A change in the licensee's regulatory status will not require prior

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[685] *AWS-4 NPRM,* 27 FCC Rcd at 3595 ¶ 106; s*ee also* 47 C.F.R. § 27.66.

[686] *AWS-4 NPRM,* 27 FCC Rcd at 3595 ¶¶ 104-06.

[687] *See supra* Sections III.G.1.a.. (Flexible Use), III.G.1.b. (Regulatory Framework).

[688] *See AWS-4 NPRM,* 27 FCC Rcd at 3594-95 ¶ 104.

[689] *Id*. at 3594-95 ¶¶ 104-06.

[690] *See* FCC Form 601.

[691] *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").

[692] *See Part 27 Report and Order,* 12 FCC Rcd at 10848 ¶¶ 121-22. The Commission examined services in the *LMDS Second Report and Order* and explained that any video programming service would be treated as a non-common carrier service. Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, CC Docket No. 92-297, *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking,* 12 FCC Rcd 12545, 12639-41 ¶¶ 213-15 (1997) (*LMDS Second Report and Order*); *aff'd, Melcher v. FCC,* 134 F.3d 1143 (D.C. Cir. 1998).

[693] *Part 27 Report and* Order, 12 FCC Rcd at 10848 ¶ 121.

[694] *See* 47 C.F.R. § 27.10(d). *See also* 47 C.F.R. § 27.66.

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.[695] 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.[696]

2. Ownership Restrictions

a. Foreign Ownership

235. *Background*: In the *AWS-4 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.[697] The Commission stated that Section 27.12 of its rules implements these restrictions and proposed to apply Section 27.12 to applicants applying for licenses in the AWS-4 band.[698] 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. The Commission sought comment on this proposal, including any associated costs or benefits.

236. *Discussion*: Based on our statutory responsibilities, we determine that all licensees of AWS-4 authority shall be subject to the provisions of Section 27.12 of the Commission's rules.[699] All such entities are subject to Section 310(a) of the Communications Act, which prohibits licenses from being "granted to or held by any foreign government or the representative therefore."[700] In addition, as

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[695] 47 U.S.C. § 310(b); *see infra* Section III.G.2.a. (Foreign Ownership).

[696] *See* 47 C.F.R. § 27.66.

[697] *AWS-4 NPRM*, 27 FCC Rcd at 3596 ¶ 107 (citing 47 U.S.C. §§ 310(a), (b)). The relevant provisions of section 310 are as follows:

> Sec. 310. Limitation on Holding and Transfer of Licenses.
>
> (a) The station license required under this Act shall not be granted to or held by any foreign government or representative thereof.
>
> (b) No broadcast or common carrier or aeronautical en route or aeronautical fixed radio station license shall be granted to or held by—
>
> (1) any alien or the representative of any alien;
>
> (2) any corporation organized under the laws of any foreign government;
>
> (3) any corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country;
>
> (4) any corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof, or by any corporation organized under the laws of a foreign country, if the Commission finds that the public interest will be served by the refusal or revocation of such license.

[698] *AWS-4 NPRM*, 27 FCC Rcd at 3596 ¶ 107 (citing 47 C.F.R. § 27.12, which provides that: "Except as provided in §§ 27.604, 27.1201, and 27.1202, any entity other than those precluded by section 310 of the Communications Act . . . is eligible to hold a license under this part.").

[699] 47 C.F.R. § 27.12.

[700] 47 U.S.C. § 310(a).

applicable here, a licensee that would provide a common carrier, aeronautical en route, or aeronautical fixed service in this band would also be subject to the foreign ownership and citizenship requirements in Section 310(b) of the Communications Act.[701]

237. We did not receive any comments opposing our proposal that applicants for this band be required to provide the same foreign ownership information in their filings, regardless of the type of service the licensee would provide using its authorization. Since we are adopting a flexible approach to licensing the AWS-4 band, we determine that all licensees will be subject to the same requirements for filing foreign ownership information in their applications. Therefore, we will require all licensees to provide the same foreign ownership information, which covers both Sections 310(a) and 310(b) of the Communications Act, regardless of whether the licensee will provide common carrier or non-common carrier service. We note, however, that we would be unlikely to deny a license to an applicant requesting to provide exclusively services 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 such services.

b. Eligibility and Mobile Spectrum Holding Policies

238. *Background*. Section 6404 of the Spectrum Act recognizes the Commission's authority "to adopt and enforce rules of general applicability, including rules concerning spectrum aggregation that promote competition."[702] In the *AWS-4 NPRM* the Commission proposed not to apply any eligibility restrictions to AWS-4 licenses.[703] The Commission stated that it believed that open eligibility in the AWS-4 band would not pose a significant likelihood of substantial harm to competition in any specific markets and that open eligibility in these bands is consistent with the FCC's 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.[704] The Commission sought comment on this approach and asked commenters to discuss the costs and benefits of the open eligibility proposal on competition, innovation, and investment.[705] No commenters specifically addressed this issue.

239. Access to spectrum is a precondition to the provision of mobile wireless services. Ensuring the availability of sufficient spectrum is critical for promoting the competition that drives innovation and investment. Currently, the Commission generally addresses mobile spectrum holdings issues using a case-by-case analysis. In the *AWS-4 NPRM*, the Commission sought comment on whether and, if so, how to address any such concerns involving AWS-4 spectrum, including on the costs and benefits of any proposals.[706]

240. Several parties addressed mobile spectrum holdings issues in their comments. For example, NRTC stated that AWS-4 spectrum should be subject to the same spectrum aggregation policies that apply to other CMRS spectrum bands.[707] AT&T argued that the AWS-4 spectrum should be included

[701] 47 U.S.C. § 310(b).

[702] *See* Spectrum Act at § 6404.

[703] *AWS-4 NPRM*, 27 FCC Rcd at 3596 ¶ 109.

[704] *Id*. at 3596 ¶ 109 (citing 47 U.S.C. §§ 309(j)(3)(A), (B) & (D)).

[705] *AWS-4 NPRM*, 27 FCC Rcd at 3596 ¶ 109.

[706] *Id*. at 3596-97 ¶¶ 110-11.

[707] NRTC Comments at 8; NRTC Reply Comments at 5-6.

in the Commission's spectrum screen.[708] And Council Tree asserted that the Commission should establish generally applicable spectrum aggregation limits, beyond the current screen, to all mobile telephony/broadband services.[709] Finally, subsequent to the comment dates for the *AWS-4 NPRM*, the Commission opened a proceeding to examine its mobile spectrum holding policies.[710]

241. *Discussion*. The Commission has previously determined in a number of services that eligibility restrictions on licenses may be imposed 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. This approach relies on market forces absent a compelling showing that regulatory intervention to exclude potential participants is necessary.[711]

242. There is nothing in the record indicating that open eligibility in the AWS-4 band would pose a significant likelihood of substantial competitive harm in the broadband services market. Therefore, consistent with our findings on this issue for other spectrum bands, we find that open eligibility in this 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.[712] The open eligibility is also consistent with Section 6404 of the Spectrum Act.[713] Given the record before us, we conclude that the potential benefits of open eligibility would outweigh any potential costs.[714]

243. The Commission recently opened a general rulemaking proceeding to broadly examine its policies and rules regarding mobile spectrum holdings.[715] Given that recently-initiated proceeding, we decline to address here the narrower issue of how to assess AWS-4 spectrum holdings for purposes of spectrum concentration analysis. During the pendency of the *Mobile Spectrum Holdings Policies* proceeding, we will continue to apply our case-by-case approach to secondary market transactions and initial license applications as necessary.[716]

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[708] AT&T Comments at 11.

[709] Council Tree Comments at 14-16.

[710] Policies Regarding Mobile Spectrum Holdings, WT Docket No. 12-269, *Notice of Proposed Rulemaking*, 27 FCC Rcd 11710 (2012) (*Mobile Spectrum Holdings Policies NPRM*).

[711] *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, 15381, 15383-84 ¶¶ 253, 256 (2007); Allocations and Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands, *Report and Order*, 18 FCC Rcd 23318 at 23346-47 ¶ 70 (2003); *see also AWS-4 NPRM*, 27 FCC Rcd at 3596 ¶ 108.

[712] *See* 47 U.S.C. § 309(j)(3)(A), (B), & (D).

[713] *See* Spectrum Act at § 6404.

[714] We note that, although there will be no band specific eligibility restrictions on holding a AWS-4 operating authority, as discussed earlier the terrestrial operating authority will be granted to the incumbent 2 GHz MSS authorization holders through license modifications pursuant to Section 316 of the Act. *See infra* Section III.D. (Assignment of AWS-4 Operating Authority).

[715] *See Mobile Spectrum Holdings Policies NPRM*, 27 FCC Rcd 11710.

[716] *Id*. at 11718 ¶ 16 n.59.

3. Secondary Markets

a. Partitioning and Disaggregation

244. *Background*. The Commission's Part 27 rules generally allow for geographic partitioning and spectrum disaggregation.[717] 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. As the Commission noted when first establishing partitioning and disaggregation rules, allowing such flexibility could facilitate the efficient use of spectrum by providing licensees with the flexibility to make offerings directly responsive to market demands for particular types of services, increase competition by allowing market entry by new entrants, and expedite provision of services that might not otherwise receive service in the near term.[718]

245. In the *AWS-4 NPRM*, the Commission sought comment on allowing licensees in the AWS-4 band to partition their service areas or to disaggregate their spectrum into new licenses.[719] The Commission's Part 27 rules for terrestrial wireless service provide that licensees may apply to partition their licensed geographic service areas or disaggregate their licensed spectrum at any time following the grant of their licenses.[720] The Commission's rules also set forth the general requirements that apply with regard to approving applications for partitioning or disaggregation, as well as other specific requirements (*e.g.*, performance requirements) that would apply to licensees that hold licenses created through partitioning or disaggregation. The Commission sought comment on applying these general procedures and requirements to any permissible partitioning or disaggregation of AWS-4 licenses. In particular, the Commission sought comment on the performance requirements that would apply to any license created through partitioning or disaggregation.[721] The Commission proposed requiring each licensee of AWS-4 authority who is a party to a partitioning, disaggregation or combination of both to independently meet the applicable performance and renewal requirements.[722] The Commission sought comment on these proposals and asked that commenters discuss and quantify the costs and benefits of these proposals on competition, innovation, and investment.[723]

246. The Commission acknowledged, however, that there may be technical impediments to partitioning or disaggregating satellite spectrum and service.[724] The Commission, therefore, sought

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[717] *See* 47 CFR § 27.15.

[718] 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 ¶ 1 (1996).

[719] *AWS-4 NPRM*, 27 FCC Rcd at 3598 ¶ 113.

[720] *See Part 27 Report and Order*, 12 FCC Rcd at 10836-39 ¶¶ 96-103.

[721] *AWS-4 NPRM*, 27 FCC Rcd at 3598 ¶ 113.

[722] *Id*. at 3598 ¶ 113.

[723] *Id*. at 3598 ¶ 113.

[724] *Id*. at 3598-99 ¶ 114 (noting that the Commission was seeking comment on the Commission's earlier conclusion that the complexities of coordination between MSS and terrestrial operations render impractical assignment of terrestrial licenses to an entrant other than the incumbent MSS licensee(s)).

comment on whether the actual capabilities of existing or future satellites make partitioning or disaggregation of spectrum difficult or problematic.[725]

247. The Commission also acknowledged that Part 25 of its rules does not contain provisions governing the partition or disaggregation of MSS.[726] The Commission thus sought comment on whether, in the event the Commission permits partitioning or disaggregation for licensees of AWS-4 authority, the Part 25 rules also should be amended to address partitioning and disaggregation of 2 GHz MSS spectrum by its licensees. The Commission also asked if any permitted partitioning or disaggregation should apply to AWS-4 use individually or only to the entire terrestrial and mobile satellite authorization. Commenters were asked to discuss and quantify the costs and benefits of allowing partitioning and disaggregation of AWS-4 spectrum.[727]

248. *Discussion.* Partitioning and disaggregation promote the efficient use of spectrum and increase competition. These secondary market tools also should expedite the provision of service to rural and other underserved areas of America as well as to niche markets.[728]

249. We conclude that a licensee of AWS-4 authority should have the same ability to partition its service territories and disaggregate its spectrum as other wireless licensees and, therefore will allow any such licensee to partition its service areas or to disaggregate its spectrum to the extent permitted by section 27.15 of the Commission's rules.[729] We acknowledge that, as the record indicates, there may be technical complexities associated with partitioning and disaggregation specific to the satellite overlay that exists in the band. For example, CEA contends that partitioning and disaggregation should be permitted in the AWS-4 band to the extent technically feasible and NRTC states that partitioning and disaggregation will be technically complex.[730] Further, SIA and US GPSIC argue that partitioning and disaggregation should be prohibited in the AWS-4 band due to coordination and technical difficulties.[731] Although these coordination and technical issues are real—indeed, they are central to our assignment determinations, above—the fact that we will assign AWS-4 operating authority to the 2 GHz MSS licensees mitigates against the need to prohibit partitioning or disaggregation. Additionally, the MSS interference protection rule we adopt above will "run with the license", obligating any partitionee or disaggregatee to avoid interference with MSS operations.[732]

250. To the extent that a licensee of AWS-4 authority develops the ability (through technical advances or coordination measures) to ensure that an AWS-4 partitionee or disagregatee would not cause

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[725] *AWS-4 NPRM*, 27 FCC Rcd at 3598-99 ¶ 114.

[726] *Id*. at 3598 ¶ 114; *see* 47 C.F.R. Part 25.

[727] *AWS-4 NPRM*, 27 FCC Rcd at 3598-99 ¶ 114.

[728] *See* Amendment of Parts 1, 22, 24, 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 at 7024-25 ¶ 75 (*WRS Renewals NPRM and Order*), citing *CMRS Partitioning and Disaggregation* Order, 11 FCC Rcd at 21843 ¶ 14 ("increasing the number of parties that may obtain partitioned PCS licenses will lead to more efficient use of PCS spectrum and will speed service to underserved or rural areas").

[729] 47 C.F.R. § 27.15.

[730] CEA Comments at 3; NRTC Comments at 8.

[731] SIA Comments at 5; US GPIC Comments at 4.

[732] *See infra* Section III.C. (Protection of MSS Operations).

harmful interference to MSS operations, we find no basis to restrict it from entering into partitioning or disaggregation arrangements in the same manner as other Part 27 licensees.

251. As explained above and in the *AWS-4 NPRM*, the Commission determined that, based on the facts in this band, a grant of AWS-4 operating authority to a third party would potentially compromise the existing rights of existing satellite licensees.[733] A private party licensee, however, is free to choose voluntarily to enter into a business relationship that includes its agreeing to not pursue all of its rights or even to encumber some of its rights. This is particularly so, if the licensee's forgoing of its rights furthers larger Commission goals. Stated otherwise, while we decline to grant AWS-4 authority to parties in a manner that would undermine the existing MSS licensees,[734] we find it would be consistent with the Commission's goal of widespread mobile broadband availability to permit an MSS licensee to limit voluntarily its ability to offer satellite service as part of a secondary market arrangement enabling another party to better provide flexible use terrestrial service, including mobile broadband using AWS-4 spectrum. For example, a licensee may determine that it would be best for it to give up its rights to interference protection for its satellite operations for a certain geographic area or a specific portion of its spectrum and permit another licensee to have a license for terrestrial use for the corresponding geographic area or spectrum.

252. Thus, we believe that any licensee of AWS-4 authority should have the same freedom as other wireless licensees to use its licensed spectrum in the way that the licensee determines would make the best business sense through the use of partitioning or disaggregation. A licensee of AWS-4 authority should be permitted the discretion to determine the amount of spectrum it will occupy and the area it will serve consistent with its business plan.[735] Accordingly, we find it in the public interest to permit any licensee of AWS-4 authority to partition any geographic portion of its license area, at any time following the grant of its license, and to also permit any such licensee to disaggregate spectrum in any amount, at any time following the grant of its license.[736]

253. We further conclude that the public interest would be served by requiring each party to a partitioning, disaggregation, or combination of both in the AWS-4 band to individually meet the applicable AWS-4 performance requirements. As the Commission observed in the *WRS NPRM*, this approach should lead to more efficient spectrum usage and prevent the avoidance of timely construction through secondary market fiat, while still providing operators with the flexibility to design their networks according to their operational and business needs.[737] In addition, commenters did not offer specific costs associated with the geographic partitioning and spectrum disaggregation rules for the AWS-4 band. Given the benefits discussed above, we conclude that the potential benefits of the partitioning and disaggregation rules would likely outweigh any potential costs.

b. Spectrum Leasing

254. *Background*. In order to promote more efficient use of terrestrial wireless spectrum through secondary market transactions, while also eliminating regulatory uncertainty, the Commission, in

[733] There are mechanisms whereby the Commission can limit or even revoke the right to use spectrum of a particular licensee (*e.g.*, revocation under Section 312 of the Communications Act). Because the 2 GHz MSS licensees have met their satellite milestones and committed to offer MSS to the public, we do not pursue such options here. *See* DISH Comments at 2; DISH Reply at 9-12, 20.

[734] *See supra* Section III.D. (Assignment of AWS-4 Operating Authority).

[735] *See WRS Renewals NPRM and Order*, 25 FCC Rcd at 7025 ¶ 76.

[736] 47 C.F.R. § 27.15(a)(2); s*ee also Part 27 Report and Order*, 12 FCC Rcd at 10836-39 ¶¶ 96-103.

[737] **S***ee WRS Renewals NPRM and Order*, 25 FCC Rcd at 7023, 7029 ¶¶ 73, 91.

2003, adopted a comprehensive set of policies and rules to govern spectrum leasing arrangements between terrestrial licensees and spectrum lessees.[738] These policies and rules enabled terrestrially-based Wireless Radio Service licensees holding "exclusive use" spectrum rights to lease some or all of the spectrum usage rights associated with their licenses to third party spectrum lessees, which then would be permitted to provide wireless services consistent with the underlying license authorization.[739] Through these actions, the Commission sought to promote more efficient, innovative, and dynamic use of the terrestrial spectrum, expand the scope of available wireless services and devices, enhance economic opportunities for accessing spectrum, and promote competition among terrestrial wireless service providers.[740] In 2004, the Commission built upon this spectrum leasing framework by establishing immediate approval procedures for certain categories of terrestrial spectrum leasing arrangements and extending the spectrum leasing policies to additional Wireless Radio Services.[741] Most recently, in 2011 in the *2 GHz Band Co-Allocation Order*, the Commission extended its secondary market spectrum leasing policies, procedures, and rules to MSS/ATC spectrum and licenses for spectrum manager lease arrangements.[742]

255. In the *AWS-4 NPRM*, the Commission sought comment on the extent to which the Commission's secondary markets spectrum leasing policies and rules should be extended to AWS-4 spectrum.[743] The Commission proposed to extend spectrum manager lease arrangements to AWS-4 spectrum.[744] With regard to *de facto* transfer lease arrangements, the Commission proposed to permit them only to the extent that the disaggregation and partitioning of AWS-4 spectrum and licenses is

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[738] 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 (2003) (*Secondary Markets First Report and Order*), *Erratum*, 18 FCC Rcd 24817 (2003).

[739] *Secondary Markets First Report and Order*, 18 FCC Rcd at 20609-13, 20648-49 ¶¶ 8-9, 12-13, 91-92. Wireless Radio Services do not include satellite services. 47 C.F.R. § 1.907. 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 Report and Order*, 18 FCC Rcd at 20648-49 ¶¶ 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*.

[740] *See Secondary Markets First Report and Order*, 18 FCC Rcd at 20607 ¶ 2.

[741] 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) (*Secondary Markets Second Report and Order*). The Commission has added more terrestrial services to this spectrum leasing framework, including the AWS-1 in 2003 (*AWS-1 Report and Order)* and 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 ¶¶ 177-181 (2004).

[742] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5716-19 ¶¶ 14-19. The Commission did not extend the secondary market regime to MSS/ATC *de facto* transfer lease arrangements because that would have been inconsistent with the need to have the same entity control both the terrestrial and satellite operations. Additionally, as explained in the *MSS NPRM*, the application of the secondary market rules to MSS/ATC spectrum does not apply to the BAS and FSS operations currently in the 2 GHz band or to MSS leasing arrangements (*e.g.*, transponder leases) that do not involve spectrum associated with terrestrial operations. *MSS Fixed and Mobile Allocation NPRM*, 25 FCC Rcd at 9488-92 ¶¶ 17-25.

[743] *AWS-4 NPRM*, 27 FCC Rcd at 3600 ¶ 117.

[744] *Id*. at 3600 ¶ 117.

permitted.[745] The Commission also proposed, however, not to allow *de facto* transfer lease arrangements for AWS-4 spectrum or licenses, to the extent that the Commission finds that the complexities of coordination between MSS and terrestrial operations renders impractical assignment of terrestrial licenses to an entrant other than the incumbent MSS licensee(s).[746] The Commission sought comment on these proposals, and asked commenters to discuss the costs and benefits for competition, innovation, and investment of extending the Commission's secondary spectrum leasing policies and rules to AWS-4 spectrum.[747]

256. The record unanimously supports permitting spectrum manager lease arrangements for AWS-4 spectrum,[748] but is mixed with regard to *de facto* transfer lease arrangements.[749] Several parties urge the Commission to extend our existing secondary markets leasing rules and policies to the AWS-4 spectrum.[750] Others, however, urge the Commission not to permit *de facto* leasing arrangements, arguing that it would be difficult for parties to such licenses to overcome the technical difficulties to reach workable sharing arrangements.[751]

257. *Discussion*. We find it in the public interest to apply the same comprehensive set of rules, policies, and procedures governing spectrum leasing arrangements between terrestrial licensees and spectrum lessees that we have adopted for other wireless spectrum bands to the AWS-4 band.[752] This decision will encourage innovative arrangements and investment in the AWS-4 band.

258. We extend our secondary leasing policies to both spectrum manager lease arrangements and *de facto* transfer lease arrangements.[753] For a particular spectrum band, spectrum leasing policies generally follow the same approach as the partitioning and disaggregation policies for the band. In the *AWS-4 NPRM*, we observed this relationship between partitioning/disaggregation and spectrum leasing, but did not make a specific proposal with respect to whether to permit partitioning and disaggregation of AWS-4 spectrum. Consistent with our determination, above, to permit partitioning and disaggregation of AWS-4 spectrum,[754] we permit spectrum leasing of AWS-4 spectrum, including both categories of spectrum lease arrangements.[755]

259. We acknowledge that in the *2 GHz Band Co-Allocation Order* the Commission did not extend the secondary market regime to permit MSS/ATC *de facto* transfer lease arrangements.[756] The facts underlying that decision, however, differ from those here. In the case of MSS/ATC spectrum, terrestrial operations were explicitly ancillary to satellite operations and terrestrial operations were

[745] *Id*. at 3600 ¶ 117.

[746] *Id*. at 3600 ¶ 117.

[747] *Id*. at 3600 ¶ 117.

[748] *See, e.g.*, CEA Comments at 4; NRTC Reply Comments at 5-6; TIA Comments at 21.

[749] *See, e.g.*, SIA Comments at 5; USGIC at 4.

[750] *See, e.g.*, CEA Comments at 4; NRTC Reply Comments at 5-6; TIA Comments at 21.

[751] *See, e.g.*, USGIC at 4; *see also* SIA Comments at 5.

[752] *See generally Secondary Markets First Report and Order*, 18 FCC Rcd 20604; *Secondary Markets Second Report and Order*, 19 FCC Rcd 17503.

[753] *See, e.g.*, CEA Comments at 4; TIA Comments at 20.

[754] *See supra* Section III.G.3.a. (Partitioning and Disaggregation).

[755] *See AWS-4 NPRM*, 27 FCC Rcd at 3600 ¶ 117.

[756] *2 GHz Band Co-Allocation Report and Order*, 26 FCC Rcd at 5716-19 ¶¶ 14-19.

premised on the operator satisfying the ATC gating criteria, some of which require at least a certain amount of control over satellite operations, control an ATC lessee would not be able to exercise.[757] That is not the situation here. The AWS-4 terrestrial spectrum use will not be ancillary to satellite 2 GHz MSS use. Rather, subject to the technical rules established herein, terrestrial and satellite uses will exist under co-primary allocations and will have equal status. Further, an AWS-4 terrestrial lessee will not be responsible for meeting satellite obligations, including the ATC gating criteria, which we are eliminating (along with the entire ATC regime) for the 2 GHz MSS band. Accordingly, we decline to adopt the Commission's proposal to not permit *de facto* lease arrangements of AWS-4 spectrum and reject the similar position of a handful of commenters. Instead, for the aforementioned reasons, we permit these lease arrangements, as well as spectrum manager lease arrangements for AWS-4 spectrum. Additionally, the MSS interference protection rule we adopt above will "run" with either type of leasing arrangement, obligating any lessee to avoid interference with MSS operations.[758] Given the record before us, we conclude that the potential benefits of extending these rules, policies, and procedures are likely to outweigh the potential costs.

4. License Term, Renewal Criteria, and Permanent Discontinuance of Operations

a. License Term

260. *Background*. In the *AWS-4 NPRM*, the Commission proposed to establish a 10-year term for AWS-4 licenses.[759] Although the Communications Act does not require a specific term for spectrum licenses,[760] the Commission has adopted 10-year terms for many wireless radio services.[761] The Commission sought comment on its proposal to establish a 10-year term for AWS-4 spectrum rights, including on its costs and benefits.[762] The Commission also sought comment on whether the spectrum rights should match the 15-year term of the satellite licenses and, if so, inquired how this could be accomplished given that the term of the two 2 GHz MSS licenses have different expiration dates.[763]

261. The Commission proposed, in addition, that, if the terrestrial authority under a license is partitioned or disaggregated, any partitionee or disaggregatee would be authorized to hold its license for the remainder of the partitioner's or disaggregator's original license term.[764] The Commission emphasized that nothing in this proposal was intended to enable a licensee, by partitioning or disaggregation, to be able to confer greater rights than it was awarded under the terms of its license grant; nor would any partitionee or disaggregatee obtain rights in excess of those previously possessed by the underlying Commission licensee.[765] The Commission sought comment on these proposals, including on their costs and benefits.

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[757] *Id.* at 5717 ¶ 16.

[758] *See infra* Section III.C. (Protection of MSS Operations).

[759] *AWS-4 NPRM*, 27 FCC Rcd at 3600 ¶ 118.

[760] 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). The Table of Frequency Allocations does not permit broadcast use of the 2155-2175 MHz band. 47 C.F.R. § 2.106.

[761] *AWS-4 NPRM*, 27 FCC Rcd at 3600 ¶ 118; *see, e.g.*, 47 C.F.R. §§ 24.15, 27.13(a).

[762] *Id*. at 3600 ¶ 118.

[763] *Id*. at 3600-01 ¶ 119.

[764] *Id*. at 3601 ¶ 120.

[765] *Id*. at 3601 ¶ 120.

262. *Discussion.* We adopt a license term for AWS-4 spectrum rights of ten years and subsequent renewal terms of ten years and we modify Section 27.13 of the Commission's rules to reflect these determinations.[766] We find our decision consistent with the Commission's adoption of ten-year license terms in most other Part 27 services[767] and in services using similar spectrum, such as that used for PCS.[768] Thus, in adopting a 10-year license term, we treat holders of AWS-4 spectrum rights similarly to licensees providing like services. Further, no party opposed (or commented on) the Commission's license term proposal.

263. In addition, we adopt the Commission's proposal that, in the event that the terrestrial portion of a license is partitioned or disaggregated, any partitionee or disaggregatee will be authorized to hold its license for the remainder of the partitioner's or disaggregator's license term. Although the parties to such an arrangement may agree that the arrangement will terminate prior to the end of the license term, the arrangement may not remain in effect longer than the license term (or any subsequent renewal term). Thus, we ensure that a licensee, by partitioning or disaggregation, will not be able to confer greater rights on another party than it was awarded by the Commission under the terms of its license grant. This approach is similar to the partitioning and disaggregation provisions the Commission adopted for licensees in other spectrum bands, including for the BRS (formerly MDS),[769] broadband PCS,[770] 700 MHz band,[771] and AWS-1 bands.[772] Accordingly, we conclude that the potential benefits of the proposed license terms would outweigh any potential costs.

b. Renewal Criteria

264. *Background.* In the *AWS-4 NPRM*, the Commission proposed to adopt AWS-4 renewal requirements consistent with those adopted in the *700 MHz First Report and Order*, which form the basis of the renewal paradigm proposed in the *Wireless Radio Services Renewal NPRM.*[773] The Commission emphasized that, as was set forth in both of these items, a performance showing and a renewal showing

[766] 47 C.F.R. § 27.13.

[767] *See* 47 C.F.R. § 27.13, describing initial license terms for licensees in the 2305-2320 MHz and 2345-2360 MHz Bands (ten years), 698-764 MHz and 776-794 MHz Bands (ten years, except for initial authorizations for (1) broadcast service providers and (2) licensees in the 746-747 MHz, 776-777 MHz, 762-764 MHz and 792-794 MHz Bands), 1390-1392 MHz Band (ten years), 1392-1395 MHz and 1432-1435 MHz Bands (ten years), 1670-1675 MHz Band (ten years); *but see AWS-1 Report and Order*, 18 FCC Rcd at 25190 ¶ 70 (fifteen years).

[768] *See* 47 C.F.R. § 24.15.

[769] *See* 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, MM Docket No. 94-131, *Report and Order*, 10 FCC Rcd 9589, 9614 ¶ 46 (1995).

[770] *See* Geographic Partitioning and Spectrum Disaggregation by Commercial Mobile Radio Services Licensees and Implementation of Section 257 of the Communications Act—Elimination of Market Barriers, WT Docket No. 96-1148, *Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 21831, 21870 ¶¶ 76-77 (1996).

[771] *See* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket No. 99-168, *First Report and Order*, 15 FCC Rcd 476, 506-08 ¶ 73-78 (2000) (*Upper 700 MHz First Report and Order)*; Reallocation and Service Rules for 698-746 MHz Spectrum Band, *Report and Order*, 17 FCC Rcd 1022, 1079-81 (2002).

[772] *See AWS-1 Service Rules Report and Order*, 18 FCC Rcd at 25193-95 ¶¶ 80-83.

[773] *AWS-4 NPRM*, 27 FCC Rcd at 3601 ¶ 121; *see* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket Nos. 06-150, 01-309, 03-264, 06-169, 96-86, CC Docket No. 94-102, PS Docket No. 06-229, *Report and Order and Further Notice of Proposed Rulemaking* 22 FCC Rcd 8064 at 8093-94 ¶ 75-77 (2007) (*700 MHz First Report and Order*); *WRS Renewals NPRM and Order*, 25 FCC Rcd at 6997-98, 7002-09 ¶¶ 2, 16-32.

are two distinct showings. A performance showing provides a snapshot in time of the level of a licensee's service, while a renewal showing provides information regarding the level and types of service provided over the entire license term."[774]

265. The Commission proposed that applicants for renewal of AWS-4 spectrum rights 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 Commission's rules and policies and with the Communications Act.[775] The Commission proposed that the same factors that were discussed in the *700 MHz First Report and Order* and in the *WRS Renewals NPRM and Order*, such as the level and quality of service, whether service was ever interrupted or discontinued, and whether service has been provided to rural areas and to qualifying tribal lands, should be considered when evaluating renewal showings for the AWS-4 band, and sought comment on this approach.[776] The Commission also requested that commenters discuss and quantify the costs and benefits of this approach, including on competition, innovation, and investment.[777]

266. In the *AWS-4 NPRM*, the Commission also proposed that AWS-4 spectrum holders meet three and seven-year performance obligations and sought comment on whether licensees should obtain a renewal expectancy for subsequent license terms, if they continue to provide at least the level of service demonstrated at the seven-year performance benchmark through the end of any subsequent license terms.[778] The Commission asked commenters to discuss and quantify the costs and benefits of this approach, including on competition, innovation, and investment.[779]

267. The Commission further proposed prohibiting the filing of mutually exclusive renewal applications[780] and proposed that if a license is not renewed, the associated spectrum would be returned to the Commission for reassignment.[781] The Commission sought comment on these proposals, including the costs and benefits of these proposals.[782]

268. No comments were filed in this proceeding on the issue of renewal criteria.

269. *Discussion*. Pursuant to Section 308(b) of the Communications Act, the Commission may 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."[783] We find that all licensees of spectrum in the AWS-4 band seeking renewal of their authorizations at the end of their license term must

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[774] *AWS-4 NPRM*, 27 FCC Rcd at 3601 ¶ 121.

[775] *Id*. at 3602 ¶ 122; *see WRS Renewals NPRM and Order*, 25 FCC Rcd at 6997-98, 7002-09 ¶¶ 2, 16-32.

[776] *AWS-4 NPRM*, 27 FCC Rcd at 3601-02 ¶ 121-22; *see 700 MHz First Report and Order*, 22 FCC Rcd at 8093 ¶ 75; s*ee WRS Renewals NPRM and Order*, 25 FCC Rcd at 6997-98, 7002-09 ¶¶ 2, 16-32; *see also WRS Renewals NPRM and Order*, 25 FCC Rcd at 7043 App. A (proposed rule 1.949(c)(4)).

[777] *AWS-4 NPRM*, 27 FCC Rcd at 3602 ¶ 122.

[778] *Id*. at 3602 ¶ 123.

[779] *Id*. at 3602 ¶ 123.

[780] *AWS-4 NPRM*, 27 FCC Rcd at 3602 ¶ 124 (citing *WRS Renewals NPRM and Order*, 25 FCC Rcd at 6998, 7012-13 ¶¶ 3, 40-42; *700 MHz First Report and Order*, 22 FCC Rcd at 8093-8094 ¶¶ 76-77).

[781] *AWS-4 NPRM*, 27 FCC Rcd at 3602 ¶ 124 (citing *WRS Renewals NPRM and Order*, 25 FCC Rcd at 6998, 7013-14 ¶¶ 3, 43-44; *700 MHz First Report and Order*, 22 FCC Rcd at 8093 ¶ 76).

[782] *AWS-4 NPRM*, 27 FCC Rcd at 3602 ¶ 124.

[783] 47 U.S.C. § 308(b).

file a renewal application, independent of their performance requirements, pursuant to Section 1.949 of the Commission's rules.[784] Commenters did not comment on or address any potential costs associated with the proposed license renewal criteria in the AWS-4 band. Accordingly, we conclude that the potential benefits of the proposed license renewal requirements would outweigh any potential costs.

270. A licensee's renewal showing is distinct from its performance showing. In the renewal context, the Commission will consider the level and types of a licensee's service provided over the entire license term, as opposed to measuring services offered at a specific point in time for performance requirements. Thus, a licensee that meets the applicable performance requirements might nevertheless fail to meet the renewal requirements.

271. We require the renewal showing to include a detailed description of the renewal applicant's provision of service during the entire license period and discuss: (1) the level and quality of service provided by the applicant (*e.g.*, the population served, the area served, the number of subscribers, 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 § 1.2110(e)(3)(i) of this chapter; and (5) any other factors associated with the level of service to the public.[785] A licensee must also demonstrate at renewal that it has substantially complied with all applicable Commission rules and policies, and the Communications Act of 1934, as amended, including any applicable performance requirements. The licensee must also maintain the level of service provided at its final performance benchmark to the end of the license term.

272. As we did in the *700 MHz First Report and Order*, we will prohibit the filing of mutually exclusive renewal applications. If a license is not renewed, the associated spectrum will be returned to the Commission for reassignment.[786]

c. Permanent Discontinuance of Operations

273. *Background*. In the *AWS-4 NPRM*, the Commission requested comment on the application to AWS-4 operators of our rules governing the permanent discontinuance of operations.[787] Under Section 1.955(a)(3) of our rules, an authorization will automatically terminate, without specific Commission action, if service is "permanently discontinued."[788] The Commission proposed to define, "permanently discontinued," for the AWS-4 spectrum, 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 to, the provider. The Commission proposed that licensees would not be subject to this requirement until the date of the first performance requirement benchmark. The Commission also proposed that, consistent 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. The Commission also noted that an authorization will automatically terminate without specific Commission action if service is permanently

[784] 47 C.F.R. § 1.949.

[785] In the *700 MHz First Report and Order* the Commission noted that "As we have had the authority to do in the past on a case-by-case basis, we could nevertheless condition the renewal of any 700 MHz license on a specific level of compliance with one or more of these or any other relevant factors." *Id.* at 22 FCC Rcd at 8064¶ 75 n.174.

[786] *See 700 MHz First Report and Order*, 22 FCC Rcd at 8094 ¶ 76.

[787] *See WRS Renewals NPRM and Order*, 25 FCC Rcd at 7017 ¶ 49-50; *AWS-4 NPRM*, 27 FCC Rcd at 3602 ¶ 125.

[788] 47 C.F.R. § 1.955(a)(3).

discontinued even if a licensee fails to file the required form. The Commission sought comment on these proposals.[789] We received no comments on these issues.

274. *Discussion.* We adopt the Commission's proposal to apply Section 1.955(a)(3) of the Commission's rules to any licensee, such that an AWS-4 operator's terrestrial spectrum rights, will automatically terminate, without specific Commission action, if service is "permanently discontinued."[790] For AWS-4 spectrum, we define "permanently discontinued" 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 to, the provider in an EA. We believe this approach strikes the appropriate balance between a licensee's need for operational flexibility and the need to ensure efficient utilization of licensed spectrum. In addition, our determination will ensure that AWS-4 spectrum does not remain idle for extended periods. Rather, it will facilitate business and network planning by providing certainty to licensees and their investors. The discontinuance rule will apply commencing on the date a licensee must meet its final performance requirement benchmark,[791] thereby providing a licensee with adequate time to construct its terrestrial network.

275. 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.[792] We emphasize, however, that an authorization will automatically terminate without specific Commission action if service is permanently discontinued even if a licensee fails to file the required form requesting license cancellation.

276. Finally, in applying section 1.955(a)(3) to licensees of AWS-4 authority, we clarify that operation of so-called channel keepers, *e.g.*, devices that transmit test signals, tones and/or color bars, do not constitute operation for purposes of the permanent discontinuance rules.[793]

5. Other Operating Requirements

277. *Background.* In the *AWS-4 NPRM*, the Commission stated that even though licenses for this band may be issued pursuant to one rule part, licensees in these bands may be required to comply with rules contained in other parts of the Commission's rules by virtue of the particular services that they offer.[794] The Commission sought comment on any provisions in existing, service-specific rules that may require specific recognition or adjustment to comport with the supervening application of another rule part, as well as any provisions that may be necessary in the other rule part to fully describe the scope of covered services and technologies.[795] In addition, the Commission sought comment generally on

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[789] *AWS-4 NPRM*, 27 FCC Rcd at 3602-03 ¶ 125.

[790] 47 C.F.R. § 1.955(a)(3).

[791] *See supra* Section III.E. (Performance Requirements).

[792] 47 C.F.R. § 1.955(a)(3).

[793] *See* Application of San Diego MDS Company, *Memorandum Opinion and Order*, 19 FCC Rcd 23120, 23124 ¶ 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*); *BRS/EBS 3rd MO&O*, 21 FCC Rcd at 5731 ¶ 297 (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 service"); *see WRS Renewals NPRM and Order*, 25 FCC Rcd at 7019 ¶ 59.

[794] *AWS-4 NPRM*, 27 FCC Rcd at 3603 ¶ 126.

[795] *Id*. at 3603 ¶ 127.

whether any conditions should govern the operation of a provider's network if it is granted a license to operate in these bands.[796]

278. *Discussion.* Although we are generally adopting Part 27 rules for the AWS-4 band, in order to maintain general consistency among various wireless communication services, we also require any licensee of AWS-4 operating authority to comply with other rule parts that pertain generally to wireless communication services. For example, Section 27.3 of the Commission's rules lists some of the other rule parts applicable to wireless communications service licensees generally;[797] we thus find it appropriate to apply this and similar rules to the AWS-4 band. Some of these other rule parts will be applicable by virtue of the fact that they apply to all licensees, and others will apply depending on the type of service a licensee provides. For example:

- Applicants and licensees will be subject to the application filing procedures for the Universal Licensing System, set forth in Part 1 of our rules.[798]
- Licensees will be required to comply with the practices and procedures listed in Part 1 of our rules for license applications, adjudicatory proceedings, etc.
- Licensees will be required to comply with the Commission's environmental provisions, including section 1.1307.[799]
- Licensees will be required to comply with the antenna structure provisions of Part 17 of our rules.
- To the extent a licensee provides a Commercial Mobile Radio Service, such service is subject to the provisions of Part 20 of the Commission's rules, including 911/E911 and hearing-aid compatibility requirements, along with the provisions in the rule part under which the license was issued.[800] Part 20 applies to all CMRS providers, even though the stations may be licensed under other parts of our rules.[801]
- The application of general provisions of Parts 22, 24, or 27 will include rules related to equal employment opportunity, etc.

No commenter opposes this approach.

6. Facilitating Access to Spectrum and the Provision of Service to Tribal Lands

279. *Background.* In the *AWS-4 NPRM*, the Commission observed that it has under consideration in the *Tribal Lands NPRM* various provisions and policies intended to promote greater use

[796] *Id*. at 3603-04 ¶ 128.

[797] 47 C.F.R. § 27.3.

[798] *See* 47 C.F.R. Part 1, Subpart F.

[799] 47 C.F.R. § 1.1307.

[800] 47 C.F.R. Part 20; *see also* 47 C.F.R. § 27.3(g).

[801] *See, e.g.*, *700 MHz Second Report and Order*, 22 FCC Rcd at 15478-79 ¶¶ 550-53.

of spectrum over Tribal Lands.[802] The Commission proposed to extend any rules and policies adopted in that proceeding to any licenses that may be issued through competitive bidding in this proceeding. The Commission sought comment on this approach, including its associated costs and benefits.[803] We received no comments on this issue.

280. *Discussion.* We adopt our proposed approach and 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.[804] The *Tribal Lands* proceeding, being specifically focused on that issue, is better suited than the instant proceeding to reach conclusions on that issue.

7. Other Matters—Proposed Party Conditions

281. *Mandatory Wholesale and Roaming Requirements.* Several commenters requested that the Commission impose mandatory wholesale and roaming requirements on licensees of AWS-4 operating authority.[805] For example, RCA contends that the Commission should require any licensee to "make a minimum portion of its network available to competitive carriers at cost-based wholesale rates, and to provide roaming at cost-based rates to any competitive carrier whose network is technologically compatible."[806] Similarly, PIO asserts that the Commission should require a licensee "to make up to 50 percent of its capacity available in each Economic Area for open wholesale leasing by any qualified entity, or for roaming by other carriers, on a non-discriminatory basis."[807] Commenters supporting these additional requirements argue they will increase competition and benefit consumers by increasing broadband deployment.[808] Other parties, however, argue against these restrictions, asserting they are unwarranted, economically inefficient and beyond the scope of the proceeding.[809]

282. We decline to impose any mandatory wholesale and roaming requirements in this *Report and Order*. We find these requests beyond the scope of the service rules proceeding before us and would be better addressed in other, non-band specific, proceedings on those topics. For example, roaming requirements for wireless spectrum licensees are the subject of other Commission proceedings.[810] We also note that we have recently initiated a proceeding to broadly examine our policies and rules regarding mobile spectrum holdings, including possible remedies to address potential harms or to help ensure the realization of potential benefits.[811]

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[802] *AWS-4 NPRM*, 27 FCC Rcd at 3604 ¶ 129 (*citing*, Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands, WT Docket 11-40, *Notice of Proposed Rulemaking*, 26 FCC Rcd 2623 (2011) (*Tribal Lands NPRM*)).

[803] *AWS-4 NPRM*, 27 FCC Rcd at 3604 ¶ 129.

[804] *Tribal Lands NPRM*, 26 FCC Rcd at 2630-31 ¶¶ 19-20 (2011).

[805] *See, e.g.*, NTCA Comments at 3; PIO Comments at 8-11; RCA Comments at 4, 6-7; U.S. Cellular Reply Comments at 4-5.

[806] RCA Comments at 4, 6-7; *see also* PIO Comments at 2, 9; PIO Reply Comments at 2-5.

[807] PIO Comments at 9.

[808] *See, e.g.*, PIO Comments at 16.

[809] *See, e.g.*, AT&T Reply Comments at 10-11; Verizon Wireless Reply Comments at 2-4.

[810] *See, e.g.*, Reexamination of Roaming Obligations of Commercial Radio Service Providers and Other Providers of Mobile Data Services, WT Docket No. 05-265, *Second Report & Order*, 26 FCC Rcd 5411 (2011), *recon. pending*.

[811] *Mobile Spectrum Holdings Policies NPRM*, 27 FCC Rcd at 11730-32 ¶¶ 43-48.

283. *Wholesale Restrictions*. A number of commenters proposed that, in order to promote competition and prevent the entrenchment of duopoly power, the Commission should impose restrictions on the amount of AWS-4 spectrum that a licensee may make available for access to a particular wireless service provider.[812] For example, T-Mobile suggests that any licensee be required "to obtain the Commission's prior approval before entering into any wholesale agreement that would result in another wireless carrier's traffic accounting for more than a certain substantial percentage (i.e., 25 percent) of the total traffic carried on the AWS-4 licensee's terrestrial network."[813] T-Mobile states that this limitation should apply to any wholesale arrangements, regardless of the other party, for an amount of AWS-4 network capacity above the specified threshold.[814] Other commenters argue for a specific percentage limitation on the amount of wireless traffic that a licensee may make available to a particular wireless carrier[815] or for restrictions focused on the two largest wireless carriers.[816] In contrast, other commenters argue that such restrictions are unwarranted, unworkable and that no technical or economic justifications have been provided that support traffic restrictions generally or that support applying any such restrictions only to Verizon Wireless and AT&T.[817]

284. We decline to impose restrictions on the ability of a licensee of AWS-4 authority to provide access to its AWS-4 traffic capacity to other wireless carriers in this proceeding. We believe that this issue is beyond the scope of this proceeding. We also note that we have recently initiated a proceeding to broadly examine our policies and rules regarding mobile spectrum holdings.[818]

285. *Penalties for Early License Transfers*. Some commenters seek the imposition of unjust enrichment penalties if a licensee of AWS-4 authority sells or otherwise transfers control of its license to one of the two largest mobile data carriers within a specified time period.[819] These commenters argue that such a penalty would partially compensate the public for the value of the spectrum and prevent an AWS-4 licensee from unjustly realizing a windfall.[820] For example, PIO argues that if a licensee does not use the AWS-4 spectrum but instead sells the spectrum to an incumbent mobile carrier, the licensee "would be enriching itself financially at the expense of the public who would suffer from a much more heavily consolidated mobile broadband environment."[821]

286. PIO and RCA state that there are already current models for mitigating unjust enrichment and the Commission should look to them for guidance here.[822] Specifically, these commenters point to the designated entity rules, which contain penalty provisions in the event a designated entity receives a

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[812] *See, e.g.*, PIO Comments at 11-13; RCA Comments at 11-12; T-Mobile Comments at 15-17; USCC Reply Comments at 8-9.

[813] T-Mobile Comments at 6-7.

[814] *Id*.

[815] *See, e.g.*, PIO Comments at 11-13.

[816] *See, e.g.*, RCA Comments at 11-12.

[817] *See, e.g.*, AT&T Reply Comments at 10-11; DISH Reply Comments at 30; Verizon Wireless Reply Comments at 2-4.

[818] *Mobile Spectrum Holdings Policies NPRM*, 27 FCC Rcd 11710.

[819] *See, e.g.*, PIO Comments at 3, 17-19; RCA Comments at 5, 11-12.

[820] PIO Comments at 3, 17-19; RCA Comments at 11-12.

[821] PIO Comments at 18.

[822] *Id*. at 3, 18-19; RCA Comments at 11-12.

benefit in the competitive bidding process and subsequently transfers its license(s).[823] These commenters assert that such a condition would make it more likely that the AWS-4 spectrum will be deployed in a manner consistent with the public interest.[824]

287. In response, other parties oppose such an approach. For example, DISH asserts that the commenters did not offer "a statutory basis or Commission precedent to support such a departure from the Commission's secondary market policies."[825] Verizon Wireless argues that the proposed unjust enrichment rules are superfluous and overly broad because the Commission will review any application to assign or transfer spectrum licenses.[826] Verizon Wireless further contends that, because the proposals are only intended to apply to two companies, the proposals are less about the unjust enrichment of a licensee of AWS-4 authority and more about preventing AT&T and Verizon Wireless from acquiring new spectrum.[827] For similar reasons, AT&T also opposes unjust enrichment conditions.[828]

288. We will not, in this proceeding, adopt a system for imposing unjust enrichment penalties in the event that a licensee of AWS-4 operating authority seeks to transfer its license to one of the two largest mobile data providers. Nor will we impose additional restrictions on the licensee's ability to transfer or otherwise assign its terrestrial spectrum rights. Rather, the Commission will continue to review any proposed transfers of control or assignments of AWS-4 authority under its requirements then in place. Finally, we note that we have recently initiated a proceeding to examine spectrum concentration issues and that, during the pendency of this proceeding, we will continue to apply our case-by-case approach to secondary markets transactions and initial license applications as necessary.[829]

H. Relocation and Cost Sharing

1. Emerging Technologies Policies

289. As the Commission explained in the *AWS-4 NPRM*, the Emerging Technologies (ET) procedures represent a broad set of tools that the Commission uses to aid the process of making spectrum available for new uses.[830] Generally, the Commission applies the ET procedures when it is necessary to relocate incumbent licensees to introduce new services into a frequency band. The Commission sets a "sunset date"—a date by which incumbent licensees may not cause interference to new band entrants. Prior to the sunset date, the new entrants may negotiate with incumbents to gain early entry into the band and, if necessary, may relocate the incumbents to comparable facilities. Because new entrants may have to relocate incumbents from a larger frequency range or greater geographic area than where the new

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[823] *Id*.

[824] PIO Comments at 19; RCA Comments at 11-12.

[825] DISH Reply Comments at 30.

[826] Verizon Wireless Reply Comments at 5.

[827] *Id*. at 4-5.

[828] AT&T Reply at 10-11.

[829] *Mobile Spectrum Holdings Policies NPRM*, 27 FCC Rcd 11710.

[830] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, ET Docket No. 92-9, *First Report and Order and Third Notice of Proposed Rule Making*, 7 FCC Rcd 6886 (1992) ("*Emerging Technologies First R&O*"); *Second Report and Order*, 8 FCC Rcd 6495 (1993); *Third Report and Order and Memorandum Opinion and Order*, 8 FCC Rcd 6589 (1993) ("*Emerging Technologies Third R&O and MO&O*"); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum Opinion and Order*, 9 FCC Rcd 7797 (1994); *aff'd Association of Public Safety Communications Officials-International, Inc. v. FCC*, 76 F.3d 395 (D.C. Cir. 1996) (collectively, "*Emerging Technologies* proceeding").

entrants will operate, the Commission also typically establishes a companion set of cost-sharing procedures. These procedures allow the operators that have relocated incumbents to be reimbursed a portion of their relocation expenses from new entrants that benefit from the spectrum clearance. The application of specific relocation and cost sharing processes under the ET framework generally varies for each frequency band, and is based on the types of incumbent licensees and particular band characteristics.[831] We discuss, below, the particular relocation and cost sharing procedures that we adopt for the 2000-2020 MHz and 2180-2200 MHz bands.

2. Relocation and Cost-Sharing for 2000-2020 MHz

290. *Background*. The lower portion of the AWS-4 band (2000-2020 MHz) is part of the 1990-2025 MHz band that the Commission reallocated from the Broadcast Auxiliary Service (BAS) to emerging technologies such as PCS, AWS, and MSS.[832] Consistent with the relocation principles first established in the Commission's *Emerging Technologies* proceeding, each new entrant had an independent responsibility to relocate incumbent BAS licensees.[833] Sprint Nextel (Sprint), which is the PCS licensee at 1990-1995 MHz, completed the BAS transition for the entire 35 megahertz in 2010.[834] In 2011, Sprint notified the Commission that it entered in a private settlement with DISH to resolve its dispute with MSS licensees with respect to MSS licensees' obligation to reimburse Sprint for their share of the BAS relocation costs.[835] In the *AWS-4 NPRM*, we asked whether any relocation and cost-sharing issues for the 2000-2020 MHz band remained if the Commission were to assign terrestrial licenses under Part 27.[836]

291. *Discussion.* We find that no additional relocation or cost-sharing procedures are necessary for the 2000-2020 MHz AWS-4 band. In addition, although we do not adopt cost-sharing rules in this *Report and Order*, we clarify that AWS-2 licensees will continue to be responsible for reimbursing Sprint for 2/7th of the BAS relocation costs (*i.e.*, the proportional share of the costs associated with Sprint relocating 10 megahertz of BAS spectrum that may be used by AWS-2 entrants) and that such cost-sharing issues will be addressed in a separate proceeding.

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[831] *See* Amendment of Part 2 of the Commission's Rules to Allocated Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, WT Docket No. 02-353, *Ninth Report and Order and Order*, 21 FCC Rcd 4473, 4479 ¶ 11 n.35 (2006) (*AWS Ninth R&O*).

[832] *See* 47 C.F.R. § 74.690. Of the total 35 megahertz of spectrum, five megahertz was authorized for PCS and held by Sprint Nextel; 10 megahertz is authorized for, and to be auctioned and licensed as, AWS; and 20 megahertz was authorized for MSS.

[833] Improving Public Safety Communications in the 800 MHz Band, WT Docket No. 02-55, ET Docket No. 00-258, ET Docket No. 95-18, *Fifth Report and Order, Eleventh Report and Order, Sixth Report and Order, and Declaratory Ruling*, 25 FCC Rcd 13874 at 13876 ¶ 5 (2010) (*2010 BAS Ruling*). Each new entrant also had a responsibility to reimburse an earlier entrant for its share of the costs for the relocation of BAS from the 1990-2025 MHz band. *See, e.g.*, *id.*, 25 FCC Rcd at 13876 ¶ 6.

[834] Letter from Brett S. Haan, 800 MHz Transition Administrator, LLC, to David L. Furth, Deputy Chief, Public Safety and Homeland Security Bureau, Federal Communications Commission at 2 (May 13, 2011), *citing* Letter from Robert H. McNamara, Sprint Nextel Corporation, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 02-55 (dated July 15, 2010).

[835] *See* Applications of New DBSD Satellite Services G.P., Debtor-in-Possession, and TerreStar Licensee Inc., Debtor-in-Possession, *Withdrawal of Petition to Condition Approval of Sprint Nextel Corporation*, IB Docket No. 11-149 (Nov. 3, 2011) (informing the Commission that Sprint had reached an agreement with DISH to settle its outstanding disputes).

[836] *AWS-4 NPRM*, 27 FCC Rcd at 3605 ¶ 131.

292. *Relocation.* As explained in the *AWS-4 NPRM*, Sprint undertook the relocation of BAS from the entire 35 megahertz at 1990-2025 MHz and notified the Commission that this transition was completed in 2010.[837] No party raised outstanding relocation issues, unrelated to cost-sharing (which is discussed below), for the 1990-2025 MHz band in response to the *AWS-4 NPRM*. Therefore, we find no need to adopt additional relocation procedures for the 1990-2025 MHz band.

293. *Cost Sharing*. Even though Sprint only benefits from the use of five megahertz of spectrum (1990-1995 MHz), Sprint incurred significant costs in clearing the remaining thirty megahertz of spectrum (1995-2025 MHz) to the benefit of other entrants. The Commission has consistently affirmed its general cost-sharing policy that an entrant who has relocated incumbents from reallocated spectrum is entitled to reimbursement for a portion of the band clearing costs from other entrants benefitting from that relocation.[838] The Commission has emphasized that all entrants to the 1990-2025 MHz band may be required to bear a proportional share of the costs incurred in the BAS clearance, on a *pro rata* basis according to the amount of spectrum each entrant is assigned.[839] Of the total 35 megahertz of spectrum, five megahertz was authorized for PCS and held by Sprint; 10 megahertz is authorized for (but yet to be auctioned and licensed as) AWS-2; and 20 megahertz was authorized for MSS. Sprint clarified in the record that DISH satisfied the cost-sharing obligations associated with 20 megahertz of spectrum in the 1990-2025 MHz band and that the only remaining cost-sharing obligations in this band are attributable to the 10 megahertz of spectrum authorized for AWS-2.[840]

294. We conclude that, consistent with the Commission's policy that all entrants to the 1990-2025 MHz band bear a proportional share of the costs incurred in the BAS clearance on a *pro rata* basis according to the amount of spectrum each entrant is assigned, future AWS-2 licensees who enter the band prior to the sunset date will be responsible for reimbursing Sprint for 2/7^{ths} of the BAS relocation costs (*i.e.*, the proportional share of the costs associate with Sprint relocating 10 megahertz of BAS spectrum that will be used by AWS-2 entrants).[841] We believe that this determination represents the most fair and balanced approach for all parties. The Commission will address the application on these cost-sharing obligations on AWS-2 licensees, including Sprint's proposal to set the sunset date for reimbursement at ten years after the issuance of the first AWS licenses in these bands separately in the *H Block NPRM*.

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[837] *AWS-4 NPRM*, 27 FCC Rcd at 3605 ¶ 131.

[838] *See, e.g., 2010 BAS Ruling*); *AWS Ninth R&O*, 21 FCC Rcd at 4513-4516 ¶¶ 74-79; *See Microwave Cost Sharing First Report and Order and Further Notice of Proposed Rule Making*, 11 FCC Rcd 8825, 8861 ¶ 71 (2000) ("*Microwave Cost Sharing First R&O and FNPRM*"); Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, WT Docket No. 95-157, *Notice of Proposed Rulemaking*, 11 FCC Rcd 1923, 1931, ¶ 16 (1995).

[839] Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket Nos. 00-258 and 95-18, *Sixth Report and Order, Third Memorandum Opinion and Order, and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720, 20750 ¶ 63 (2004) ("*AWS Sixth R&O*"); Improving Public Safety Communications in the 800 MHz Band, WT Docket 02-55, *Report and Order, Fourth Report and Order, Fourth Memorandum Opinion and Order, and Order*, 19 FCC Rcd 14969, 15099 ¶¶ 261-262 (2004) ("*800 MHz R&O*").

[840] Sprint Comments at 15. Sprint was the only party to comment specifically on cost-sharing issues for the 2020-2025 MHz band.

[841] Each five megahertz block of spectrum in the 1990-2025 MHz band represents one-seventh of the relocated BAS spectrum. Sprint has stated that the *pro rata* share of the overall BAS relocation costs attributable to each five megahertz of relocated BAS spectrum amounts to $94,875,516. Letter from Marc S. Martin, Counsel for Sprint Nextel Corporation, K&L Gates, to Marlene H. Dortch, Sec'y, FCC, WT Docket Nos. 12-70, 04-356, ET Docket No. 10-142, at 2 (filed Jul. 9, 2012).

3. Relocation and Cost Sharing for 1915-1920 MHz.

295. Although relocation and cost sharing for the 1915-1920 MHz band were not raised in the *AWS-4 NPRM*, UTAM, Inc. filed comments seeking reimbursement in this proceeding for its costs in clearing the 1915-1920 MHz block, i.e., the AWS-2 Lower H block.[842] UTAM is the frequency coordinator for the unlicensed personal communications service (UPCS) and was designated by the Commission to relocate incumbent licensees in the 1910-1930 MHz band to support the introduction and deployment of UPCS devices.[843] Because the Commission has not yet auctioned the H Block, UTAM has yet to be compensated for its relocation efforts. UTAM expressed concern that "converting the 2000-2020 MHz band from an MSS uplink to a terrestrial uplink" band would result in harmful interference to the 1995-2000 MHz block.[844] This could make the Upper H block unusable, resulting in both the Upper and Lower H blocks remaining unlicensed and, consequently, UTAM not being reimbursed for clearing the Lower H block. UTAM argues, therefore, that we should require the licensee of AWS-4 operating authority to reimburse UTAM while affording the licensee a reimbursement right to collect the amount from AWS-2 licensees once the 1915-1920 MHz band is auctioned.[845] We disagree that the licensees of AWS-4 authority should be held responsible for this outstanding cost-sharing obligation. As noted above, cost-sharing procedures under the ET framework allow the operators that have relocated incumbents to be reimbursed a portion of their relocation expenses from new entrants that benefit from the spectrum clearance. In this case, we find no benefit to the licensees of AWS-4 operating authority for UTAM's clearing of 1915-1920 MHz. To be clear, we recognize UTAM's outstanding claim for full reimbursement of its expenses for clearing fixed microwave incumbents from the 1915-1920 MHz band. Additionally, as discussed above, we expect that the technical rules we are adopting will have a positive effect on the utility of the 1995-2000 MHz band relative to the existing MSS and MSS/ATC rules.[846] Consistent with precedent, we defer cost-sharing issues for the 1915-1920 MHz band until we establish service rules for that band, which we expect to do in the near future.[847]

4. Relocation and Cost-Sharing for 2180-2200 MHz

a. Relocation

296. *Background*. The upper portion of AWS-4 (2180-2200 MHz) is part of the 2160-2200 MHz band that the Commission previously reallocated from the Fixed Microwave Services (FS) to emerging technologies.[848] In the *AWS-4 NPRM*, the Commission observed that our licensing records show approximately 700 active FS licenses in the 2180-2200 MHz band and that most of these incumbents appear to be state or local governmental entities, utilities, railroads, and other businesses with FS links licensed in the Microwave Public Safety Pool (MW) or the Microwave Industrial/Business Pool

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[842] UTAM Comments at 2-6; UTAM Reply Comments at 1-4; *see AWS Sixth Report & Order*, 19 FCC Rcd at 20726-20740 ¶¶ 8-41; *AWS-2 NPRM*, 19 FCC Rcd at 19264 ¶ 2.

[843] *See* 47 C.F.R. § 15.307 (applications for certification of UPCS equipment must include an affidavit from UTAM, Inc. certifying that the applicant is a participating member of UTAM, Inc.); *see generally* biannual reports filed by UTAM in GEN Docket No. 90-314.

[844] UTAM Comments at 4.

[845] *Id*. at 4-6.

[846] *See supra* Section III.B. (Technical Issues).

[847] *See 2010 BAS Ruling*, 25 FCC Rcd at 13903-13904 ¶ 72.

[848] *See* 47 C.F.R. § 101.69.

(MG) for private, internal communication.[849] FS links in the 2180-2200 MHz band typically are paired, for two-way operation, with FS links in the 2130-2150 MHz band. The Commission previously adopted relocation and cost-sharing rules for AWS-1 licensees in the 2110-2155 MHz band, and we proposed in the *AWS-4 NPRM* to adopt similar rules for licensees of AWS-4 operating authority to govern relocation and cost-sharing in the 2180-2200 MHz band.[850]

297. In the *AWS-4 NPRM*, the Commission proposed to apply the rules that govern the relocation of FS incumbents from the 2110-2155 MHz band by AWS-1 licensees to the relocation of FS incumbents from the 2180-2200 MHz band by an AWS-4 entrant.[851] Under the existing rules, AWS-1 licensees must coordinate their frequency usage with all potentially affected co-channel and adjacent channel incumbents prior to initiating operations from any base or fixed station.[852] If interference would occur,[853] the AWS-1 licensee can initiate a mandatory negotiation period.[854] If no agreement is reached during the mandatory negotiation period, the AWS-1 licensee can initiate involuntary relocation procedures.[855] Under the Commission's proposal, these processes would also apply to AWS-4 entrants, too.

298. In the *AWS-4 NPRM*, the Commission also proposed to sunset AWS-4 relocation obligations ten years after the first AWS-4 license is issued in the band.[856] Under the ET policies, the Commission sunsets the relocation obligation owed by new licensees to incumbents. For example, MSS/ATC relocation obligations to FS in the 2180-2200 MHz band will sunset in December 2013.[857] Similarly, for the 2110–2150 MHz, 2160–2175 MHz, and 2175–2180 MHz bands, the sunsets occur "ten years after the first ET license is issued in the respective band."[858] Thus, because AWS-1 licenses were first-issued in 2006, the sunset for relocation obligations for FS incumbents in the 2130-2150 MHz band will occur in 2016. The Commission recognized in the *AWS-4 NPRM* that the 2013 sunset date applies to 2180-2200 MHz for MSS/ATC.[859] However, the Commission stated that, under its proposal to permit full terrestrial use under Part 27, it would be appropriate to treat the AWS-4 band the same as other AWS bands by setting the sunset ten-years after the band is licensed for AWS.[860] The Commission therefore

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[849] *AWS-4 NPRM*, 27 FCC Rcd at 3605 ¶ 132.

[850] *Id*. at 3605-3607 ¶¶ 132-135.

[851] *Id*. at 3605-3606 ¶¶ 132-134.

[852] 47 C.F.R. § 27.1131 ("Coordination shall be conducted in accordance with the provisions of [47 C.F.R.] § 24.237.").

[853] 47 C.F.R. §§ 27.1131, 27.1160, 101.82.

[854] 47 C.F.R. §§ 101.69, 101.73.

[855] *See* 47 C.F.R. § 101.75.

[856] *AWS-4 NPRM*, 27 FCC Rcd at 3606 ¶ 134; *see* 47 C.F.R. § 101.75.

[857] 47 C.F.R. § 101.79(a)(2); *see* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, ET Docket No. 95-18, ET Docket No. 00-258, IB Docket No. 01-185, *Third Report and Order and Third Memorandum Opinion and Order*, 18 FCC Rcd 23638, 23675 ¶ 77 (2003) ("*MSS Third R&O*").

[858] 47 C.F.R. § 101.79(a)(1).

[859] *AWS-4 NPRM*, 27 FCC Rcd at 3606 ¶ 134.

[860] *Id*.

proposed to revise Section 101.79(a)(2) of the Commission's rules[861] to include Part 27 sunset rules in the 2180-2200 MHz band, setting a 10-year sunset date.[862] The Commission also proposed removing footnote NG168 from the U.S. Table of Frequency Allocations.[863] The Commission explained that this would clarify, that after the applicable sunset date, grandfathered fixed microwave systems will be governed by the procedures in Section 101.79.[864]

299. *Discussion.* We adopt the proposed approach to apply rules for the relocation of FS incumbents from the 2180-2200 MHz band by an AWS-4 entrant based on similar rules that apply to the relocation of FS incumbents from the 2110-2155 MHz band by AWS-1 licensees. We also establish a 10-year sunset date from the grant of the first license or issuance of a modification of a license to authorize the use of the 2180-2200 MHz band for AWS-4 under Part 27.

300. We received minimal comment on this issue. DISH opposed this approach, arguing that the Commission should allow FS operations to terminate in 2013 because current MSS/ATC obligations to relocate FS incumbents in the 2180-2200 MHz band will sunset in December 2013 and FS incumbents have been on notice for more than 20 years that they would likely need to relocate their services.[865] Conversely, the Utilities Telecom Council (UTC) supports the Commission's proposal to establish a ten-year sunset for AWS-4 relocation obligations in the 2180-2200 MHz band, claiming that this will provide FS incumbents with an equal opportunity to negotiate relocation with AWS-4 entrants as was provided for negotiation with other entrants.[866]

301. Under the AWS-4 service rules that we are adopting, the MSS/AWS-4 licensee will be required to build a terrestrial network to serve a large portion of the country. Thus, the deployment of a ubiquitous AWS-4 network creates a much greater certainty that incumbents would need to relocate from the band than might have been anticipated under the existing MSS/ATC regime.[867] Because of the large number of FS incumbents still present in the band, we find that it serves the public interest to impose an obligation on an AWS-4 entrant to relocate FS incumbents from the 2180-2200 MHz band, and that this obligation should be independent and distinct from the existing MSS/ATC relocation obligation. Consequently, this relocation obligation shall not sunset at the December 2013 date applicable under the MSS/ATC rules but instead shall be determined by the AWS-4 relocation rules which we are now adopting.

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[861] *See AWS-4 NPRM*, 27 FCC Rcd at 3632-33, App. A (proposed 47 C.F.R. § 101.79).

[862] *AWS-4 NPRM*, 27 FCC Rcd at 3606 ¶ 134.

[863] NG168, which has subsequently been renumbered as NG43, limits the use of the 2180-2200 MHz band to MSS and ancillary terrestrial components, establishes a cut-off date for new primary fixed and mobile services, and sets December 9, 2013 as the date by which all fixed and mobile service licensees shall operate on a secondary basis.

[864] *AWS-4 NPRM*, 27 FCC Rcd at 3606 ¶ 134.

[865] DISH Comments at 33.

[866] UTC Comments at 1-2; *see also* Motorola Comments at 1-2 (noting that the Commission is correct to look to the AWS-1 rules as a model for AWS-4 for technical matters as well as other regulatory issues).

[867] Unless otherwise specified, our ET policies do not require an incumbent licensee to cease operating after the relocation obligation period ends for new entrants. Instead, incumbent primary licensees may continue to operate on a primary basis but must vacate the spectrum within six months of receiving written notice from a new entrant intending to turn on a system within the interference range of the incumbent. *See, e.g.* 47 C.F.R. § 101.79(a). Incumbent secondary licensees must vacate the spectrum within 30 days of receiving a written notification from a new entrant. *See, e.g.*, 47 C.F.R. § 101.103(d) (30-day notification period for frequency coordination).

302. Although DISH is correct that FS incumbents in the 2180-2200 MHz band were subject to relocation by MSS licensees,[868] we find it appropriate to impose relocation obligations on licensees of AWS-4 authority at this time because we now adopt service rules for a new wireless terrestrial service under Part 27. The Commission generally adopts relocation procedures at the time that it adopts rules for the provision of new services in bands that are used by incumbent licensees. The MSS/ATC relocation rules are based on unique circumstances that were only applicable to MSS. The Commission departed from its traditional relocation rules in adopting a mandatory negotiation period for relocation of FS incumbents by MSS licensees in the 2180-2200 MHz band as well as providing a specific date for the start of the ten-year sunset period instead of the issuance of the first license or start of the first relocation negotiations.[869] The Commission believed that the modifications to the traditional relocation/negotiation procedures was warranted due to the presence of special circumstances specific to MSS and hoped that it would expedite the relocation of FS incumbents from the 2180-2200 MHz band.[870] The Commission also has stated that those special circumstances are not applicable to relocations by AWS licensees and declined to depart from the traditional trigger for determining the mandatory negotiation period and the sunset dates for the relocation of FS incumbents by AWS licensees.[871]

303. Although we agree with DISH that FS incumbents had considerable notice that they would likely need to relocate their services, we are not persuaded that this should be the predominant factor in our decision. We note that, under the ET procedures, the date at which the incumbents first received notice that they would be relocated has not determined the starting date for the relocation sunset period. For example, when the Commission allocated spectrum for AWS, including at 2130-2150 MHz in 2002, and thereafter adopted service rules, modified relocation rules, and adopted cost-sharing rules, it continued to impose an obligation on AWS-1 licensees to relocate FS incumbents at 2130-2150 MHz for ten years from the date on which the first AWS-1 license was granted, even though those FS incumbents were already on notice that they would be subject to relocation. Similarly, the Commission decided to relocate BAS incumbents in the 1990-2025 MHz band to make way for MSS in 1997, but did not begin the ten-year relocation period until 2000 and later extended the sunset date to 2013.[872]

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[868] DISH Comments at 33.

[869] *See* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, ET Docket No. 95-18, ET Docket No. 00-258, IB Docket No. 01-185, *Third Report and Order and Third Memorandum Opinion and Order*, 18 FCC Rcd 23638, 23675 ¶ 77 (2003) ("*MSS Third R&O*"). The mandatory negotiation period for non-public safety incumbents ended on December 8, 2004, and the mandatory negotiation period for public safety incumbents ended December 8, 2005. 47 C.F.R. § 101.69(e)(1), (2). MSS relocation obligations to FS in the 2180-2200 MHz band will sunset in December 2013 (ten years after the mandatory negotiation period began for MSS licensees). 47 C.F.R. § 101.79(a)(2).

[870] *See MSS Third R&O*, 18 FCC Rcd at 23675 ¶ 77. Rather than the mandatory negotiations commencing when the MSS licensee informs the FS incumbent in writing of its desire to negotiate, the Commission modified its rules and specified the starting date of the mandatory negotiation period between MSS licensees and FS incumbents, as well as the starting date of the related ten-year sunset period for relocation of FS incumbents by MSS licensees in the 2180-2200 MHz band. *See MSS Third R&O*, 18 FCC Rcd at 23675 ¶ 77; *see also id.* (noting that "MSS proponents have argued that the ATC component recently authorized for MSS licensees would be instrumental in accelerating their ability to move forward with the relocation process.").

[871] *AWS Sixth R&O*, 19 FCC Rcd at 20763 ¶ 102.

[872] *See* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, ET Docket No. 95-18, ET Docket No. 00-258, IB Docket No. 01-185, *First Report and Order and Further Notice of Proposed Rulemaking*,, 12 FCC Rcd 7388, 7401 ¶ 30 (1997); *MSS Third R&O*, 18 FCC Rcd at 23649-50, 23661-62 ¶¶ 19, 47.

304. For all of the reasons discussed above, we conclude that it is in the public interest to adopt relocation rules for licensees of AWS-4 authority, including the trigger for determining the mandatory negotiation period and the sunset date for relocation obligations, that are based on our traditional *Emerging Technologies* proceedings and similar to rules that have governed the relocation of incumbent licensees by AWS-1 licensees and other terrestrial wireless licensees. We believe that our action will promote a harmonized approach under Part 27 to the relocation of FS incumbents by terrestrial wireless licensees across the AWS bands and will provide FS incumbents in the 2180-2200 MHz band with a meaningful opportunity to negotiate relocation agreements with a licensee of AWS-4 authority.

305. The specific rules that we adopt are set-forth in the attached Appendix A and, as explained above, are based on similar rules that apply to the relocation of FS incumbents from the 2110-2155 MHz band by AWS-1 licensees.[873] No parties commented on modifying the proposed rules themselves. In general, licensees of AWS-4 authority will be required to coordinate their frequency usage with all potentially affected co-channel and adjacent channel FS incumbents operating in the 2180-2200 MHz band prior to initiating operations from any base or fixed station. If interference would occur,[874] the licensee of AWS-4 authority can initiate a mandatory negotiation period (two-years for non-public safety, three-years for public safety) during which each party must negotiate in good faith for the purpose of agreeing to terms under which the FS licensees would: (1) relocate their operations to other fixed microwave bands or other media; or alternatively (2) accept a sharing arrangement with the licensee of AWS-4 authority that may result in an otherwise impermissible level of interference to the FS operations.[875] If no agreement is reached during the mandatory negotiation period, the licensee of AWS-4 authority can initiate involuntary relocation procedures.[876]

306. We also establish a 10-year sunset date from the grant of the first license or issuance of a modification of a license to authorize the use of the 2180-2200 MHz band for AWS-4 under Part 27.[877] We addressed arguments raised by DISH with respect to the sunset above. In addition, we adopt our proposal to delete the reference in footnote NG168 in the U.S. Table of Frequency Allocations to all Fixed and Mobile facilities operating on a secondary basis not later than December 9, 2013.[878] No parties commented on our proposal to modify this footnote. As we explained in the *AWS-4 NPRM*, grandfathered fixed microwave systems will be governed by the procedures in Section 101.79 after the applicable sunset date.[879]

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[873] *See supra* Section III.H.4.a. (Relocation and Cost-Sharing for 2180-2200 MHz - Relocation)

[874] 47 C.F.R. §§ 27.1131, 27.1160, 101.82.

[875] 47 C.F.R. §§ 101.69, 101.73.

[876] *See* 47 C.F.R. § 101.75.

[877] *Id*.

[878] NG168 stated that "Except as permitted below, the use of the 2180-2200 MHz band is limited to the MSS and ancillary terrestrial component offered in conjunction with an MSS network, subject to the Commission's rules for ancillary terrestrial components and subject to all applicable conditions and provisions of an MSS authorization. In the 2180-2200 MHz band, where the receipt date of the initial application for facilities in the fixed and mobile services was prior to January 16, 1992, said facilities shall operate on a primary basis and all later-applied-for facilities shall operate on a secondary basis to the mobile-satellite service (MSS); and not later than December 9, 2013, all such facilities shall operate on a secondary basis." This footnote has since been renumbered as NG43.

[879] *AWS-4 NPRM*, 27 FCC Rcd at 3606 ¶ 134; *see also infra* Section IV (Ancillary Terrestrial Component in the 2 GHz MSS Band) (deleting footnote 168, as well, because ATC is eliminated in the 2180-2200 MHz band).

b. Cost-Sharing

307. *Background.* In the *AWS-4 NPRM*, the Commission proposed to extend to the AWS-4 band the cost-sharing rules adopted for AWS-1 licensees. As noted above, FS links in the 2180-2200 MHz band typically are paired, for two-way operation, with FS links in the 2130-2150 MHz band. The Commission previously established a cost-sharing plan for MSS, MSS/ATC, and AWS-1 licensees in these paired bands.[880] Pursuant to the proposal, the cost-sharing plan would sunset for licensees of AWS-4 operating authority on the same date on which the relocation obligation sunsets.[881] The Commission also proposed conforming amendments to Parts 27 and 101 to include AWS-4 under the relocation and cost-sharing rules generally and to delete references to MSS/ATC.[882]

308. *Discussion.* We adopt the proposals set forth in the *AWS-4 NPRM* to extend the cost-sharing rules adopted for AWS-1 licensees to the AWS-4 band. This will result in the cost-sharing requirements sunsetting on the same date as the relocation obligations. UTC supports the Commission's proposal to apply cost-sharing rules similar to those adopted for AWS-1 licensees and contends that our failure to do so would provide a windfall to AWS-4 entrants.[883] The Commission has emphasized that it is desirable to harmonize the FS relocation procedures among the various AWS designated bands to the greatest extent feasible.[884] The Commission specifically noted that relocation procedures that are consistent throughout the band can be expected to foster a more efficient rollout of AWS and minimize confusion among the parties, and thereby serve the public interest.[885] We believe that adopting rules based on the Part 27 cost-sharing rules that apply to AWS-1 licensees will accelerate the relocation process and promote rapid deployment of new advanced wireless services in the band. The Part 27 cost-sharing rules were designed to accommodate the deployment of new wireless terrestrial services and have a proven record of success. We also observe that the Commission refined the Part 27 cost-sharing plan based on the experience and record of the cost-sharing plan that applied to PCS under Part 24. We therefore believe that our adoption of similar rules in this instance will expedite the relocation of FS incumbents and the introduction of new services. We further find that this approach will serve the public interest because it will distribute relocation costs more equitably among the beneficiaries of the relocation, encourage the simultaneous relocation of multi-link communications systems, and accelerate the relocation process, thereby promoting more rapid deployment of new services. We reach this conclusion for the reasons stated in this paragraph and irrespective of UTC's windfall argument. Accordingly, we adopt rules in Appendix A based on the formal cost-sharing procedures codified in Part

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[880] 47 C.F.R. § 101.82. The cost-sharing plan is administered by clearinghouses selected by the Commission's Wireless Telecommunications Bureau under delegated authority. *See* 47 C.F.R. § 27.1162; *see also id.* ("This clearinghouse(s) will administer the cost-sharing plan by, *inter alia*, determining the cost-sharing obligation of AWS and other ET entities for the relocation of FMS incumbents from the 2110-2150 MHz and 2160-2200 MHz bands.").

[881] *See* 47 C.F.R. § 27.1174.

[882] *See AWS-4 NPRM*, 27 FCC Rcd at 3628-33, App. A (proposed rules).

[883] UTC Comments at 1-2. Although DISH did not directly comment on issues relating to cost-sharing with respect to the relocation of FS incumbents from the 2180-2200 MHz band, DISH stated that FS operations to terminate in 2013. DISH Comments at 33.

[884] *AWS Ninth R&O*, 21 FCC Rcd at 4506 ¶ 60; Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, *Eighth Report and Order, Fifth Notice of Proposed Rule Making, and Order*, 20 FCC Rcd 15866, 15883 ¶ 34 (2005) ("*AWS Eighth R&O and Fifth Notice*").

[885] *AWS Ninth R&O*, 21 FCC Rcd at 4506 ¶ 60; *AWS Eighth R&O and Fifth Notice*, 20 FCC Rcd at 15883 ¶ 34.

27 of our rules to apportion relocation costs among those entrants that benefit from the relocation of FS incumbents in the 2180-2200 MHz band.

309. Consistent with our proposal to extend the cost-sharing rules adopted for AWS-1 licensees to the AWS-4 band, we also adopt rules to permit for voluntary self-relocating FS incumbents to obtain reimbursement from those licensees of AWS-4 authority benefiting from the self-relocation. Incumbent participation will provide FS incumbents with the flexibility to relocate themselves and the right to obtain reimbursement of their relocation costs, adjusted by depreciation, up to the reimbursement cap, from new AWS-4 entrants in the band. Incumbent participation also will accelerate the relocation process by promoting system wide relocations and result in faster clearing of the band, thereby expediting the deployment of new advanced wireless services to the public. Therefore, we require licensees of AWS-4 authority to reimburse FS incumbents that voluntarily self-relocate from the 2110-2150 MHz and 2160-2200 MHz bands and AWS licensees will be entitled to *pro rata* cost sharing from other AWS licensees that also benefited from the self-relocation.

310. With respect to cost-sharing obligations on MSS operators for FS incumbent self-relocation in the 2180-2200 MHz band, we recognize that the Commission previously declined to impose cost sharing on MSS operators for voluntary self-relocation by FS incumbents in that band.[886] Accordingly, for FS incumbents that elect to self-relocate their paired channels in the 2130-2150 MHz and 2180-2200 MHz bands, we will impose cost-sharing obligations on AWS licensees but not on MSS operators.[887] Where a voluntarily relocating microwave incumbent relocates a paired microwave link with paths in the 2130–2150 MHz and 2180–2200 MHz, it may not seek reimbursement from MSS operators but is entitled to reimbursement from the first AWS beneficiary for its actual costs for relocating the paired link, subject to the reimbursement cap in Section 27.1164(b).[888] This amount is subject to depreciation as specified in § 27.1164(b). An AWS licensee who is obligated to reimburse relocation costs under this rule is entitled to obtain reimbursement from other AWS beneficiaries in accordance with Sections 27.1164 and 27.1168.[889] For purposes of applying the cost-sharing formula relative to other AWS licensees that benefit from the self-relocation, depreciation shall run from the date

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[886] *See MSS Third R&O*, 18 FCC Rcd at 23673 ¶ 73 (a reimbursement scheme for voluntary self-relocation was not envisioned by the MSS/FS relocation plan and thus a cost sharing plan for MSS reimbursing FS incumbents who voluntarily relocate was not warranted).

[887] To the extent that a party is both an AWS licensee and a 2 GHz MSS operator, its AWS obligations shall govern its relocation and cost sharing obligations should the two sets of obligations conflict.

[888] 47 C.F.R. § 27.1166(f). Because MSS licensees were not obligated to reimburse a voluntarily relocating FS incumbent with a paired microwave link with paths in the 2130–2150 MHz and 2180–2200 MHz bands, a voluntary relocating FS incumbent was only entitled to partial reimbursement from the first AWS beneficiary, equal to fifty percent of its actual costs for relocating the paired link, or half of the reimbursement cap in Section 27.1164(b), whichever was less. With the adoption of rules in this *Report and Order* to permit for voluntary self-relocating FS incumbents to obtain reimbursement from licensees of AWS-4 authority benefiting from the self-relocation, a reimbursement obligation for self-relocations will exist for AWS licensees that benefit from the relocation of the paths in the 2130–2150 MHz and 2180–2200 MHz bands as of the effective date of this *Report and Order*. To the extent that an FS incumbent with paths in the 2130–2150 MHz and 2180–2200 MHz bands undertook self-relocation prior to the effective date of this *Report and Order*, the voluntary relocating FS incumbent is entitled to only partial reimbursement, as discussed above. We will rely on the notice requirement set-forth in Section 27.1166(a)(2) for determining the date of self-relocation. *See* 47 C.F.R. § 27.1166(a)(2) (requiring a voluntarily relocating microwave incumbent to submit documentation of the relocation of the link to the clearinghouse within 30 calendar days of the date that the incumbent notifies the Commission that it intends to discontinue, or has discontinued, the use of the link, pursuant to 47 C.F.R. § 101.305 of the Commission's rules).

[889] 47 C.F.R. § 27.1166(f).

on which the clearinghouse issues the notice of an obligation to reimburse the voluntarily relocating microwave incumbent.[890]

311. We require AWS-4 relocators to file their reimbursement requests with the clearinghouse[891] within 30 calendar days of the date the relocator signs a relocation agreement with an incumbent. Terrestrial operations trigger incumbent microwave relocations on a link-by-link basis,[892] and the Commission imposed a mandatory requirement that all terrestrial operators——AWS and MSS ATC—that relocate FS incumbents from the 2110-2150 MHz and 2160-2200 MHz bands use a clearinghouse.[893] No party proposed that we modify the rules requiring the use of a clearinghouse by terrestrial wireless licenses for cost-sharing. The clearinghouses have considerable experience in determining the cost-sharing obligation of AWS and other ET entities for the relocation of FS incumbents from the 2110-2150 MHz and 2160-2200 MHz bands, and the Commission selected clearinghouses to serve as neutral third-parties in the cost-sharing process.[894] We continue to believe that a mandatory requirement will allow the clearinghouses to accurately track cost-sharing obligations as they relate to all terrestrial operations[895] and expedite the relocation of FS incumbents from the 2180-2200 MHz band by minimizing disputes over the reimbursement of those costs. For similar reasons and consistent with precedent, we will also require self-relocating microwave incumbents in the 2180-2200 MHz band to file their reimbursement requests with the clearinghouse within 30 calendar days of the date that they submit their notice of service discontinuance with the Commission.[896]

312. We further require all licensees of AWS-4 authority that are constructing a new site or modifying an existing site to file site-specific data with the clearinghouse prior to initiating operations for a new or modified site. The site data must provide a detailed description of the proposed site's spectral frequency use and geographic location.[897] We will also impose a continuing duty on those entities to maintain the accuracy of the data on file with the clearinghouse. We find that such an approach will ensure fairness in the process and preclude new AWS-4 entrants from conducting independent

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[890] *Id.*

[891] On October 4, 2006, the Wireless Telecommunications Bureau found PCIA--The Wireless Infrastructure Association (PCIA) and the CTIA Spectrum Clearinghouse, LLC qualified to serve as clearinghouses that will administer the Commission's cost-sharing plan and determining the cost-sharing obligation of AWS and other ET entities for the relocation of FS incumbents from the 2110-2150 MHz and 2160-2200 MHz bands. *See* Wireless Telecommunications Bureau Finds CTIA and PCIA Qualified to Administer the Relocation Cost-Sharing Plan For Licensees in the 2.1 GHz Bands, *Public Notice*, 21 FCC Rcd 11265 (2006).

[892] *See AWS Ninth R&O,* 21 FCC Rcd at 4522 ¶ 94.

[893] *See AWS Ninth R&O,* 21 FCC Rcd at 4522-4523 ¶¶ 94-96. Pursuant to 47 C.F.R. § 25.149(a)(1), ATC base stations transmit in the MSS downlink band (2180–2200 MHz).

[894] 47 C.F.R. § 27.1162. Because of the considerable experience of the clearinghouses and their role as neutral, third parties in the cost-sharing process, most cost-sharing disputes are resolved between the parties or through the clearinghouses. *See, e.g.*, 47 C.F.R. § 27.1172(a) (requiring parties to submit cost-sharing disputes, in the first instance, to the clearinghouse for resolution).

[895] *See AWS Ninth R&O,* 21 FCC Rcd at 4523 ¶ 96.

[896] 47 C.F.R. § 27.1166(a)(2).

[897] The site-specific data must at least include the applicant's name and address, the name of the transmitting base station, the geographic coordinates corresponding to that base station, the frequencies and polarizations to be added, changed, or deleted, and the emission designator. Because this information is included in the prior coordination notice (PCN) required by 47 C.F.R. § 101.103(d), entities can satisfy the site data filing requirement by submitting their PCN to the clearinghouse instead.

interference studies for the purpose or effect of evading the requirement to file site-specific data with the clearinghouse prior to initiating operations.[898]

313. Utilizing the site-specific data submitted by licensees of AWS-4 authority, the clearinghouse determines the cost-sharing obligations of each entrant by applying the Proximity Threshold Test. We find that the presence of an entrant's site within the Proximity Threshold Box, regardless of whether it predates or postdates relocation of the incumbent, and regardless of the potential for actual interference, will trigger a cost-sharing obligation.[899] Accordingly, any entrant that engineers around the FS incumbent will trigger a cost-sharing obligation once relocation of the FS incumbent occurs.[900]

314. Consistent with precedent, we establish a specific date on which the cost-sharing plans that we adopt here will sunset. We find that the sunset date for cost sharing purposes is the date on which the relocation obligation for the subject band terminates.[901] Although we realize that we are adopting a sunset date that differs from the sunset date for cost-sharing obligations of AWS-1 licensees, we find that establishing sunset dates for cost sharing purposes that are commensurate with the sunset date for AWS relocation obligations in each band appropriately balances the interests of all affected parties and ensures the equitable distribution of costs among those entrants benefiting from the relocations. We reiterate, however, that AWS entrants that trigger a cost-sharing obligation prior to the sunset date must satisfy their payment obligation in full. [902]

315. We continue to require participants in the cost-sharing plan to submit their disputes to the clearinghouse for resolution in the first instance.[903] Where parties are unable to resolve their issues before the clearinghouse, parties are encouraged to use expedited ADR procedures, such as binding arbitration, mediation, or other ADR techniques.[904] Except for the independent third party appraisal of the compensable relocation costs for a voluntarily relocating microwave incumbent and documentation of the relocation agreement or discontinuance of service required for a relocator or self-relocator's reimbursement claim, both of which must be submitted in their entirety, we require participants in the

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[898] 47 C.F.R. § 27.1131 (all AWS licensees, prior to initiating operations, must coordinate their frequency usage with co-channel and adjacent channel incumbent, Part 101 fixed point-to-point microwave licensees in the 2110-2155 MHz band, in accordance with 47 C.F.R. § 24.237); 47 C.F.R. § 101.103(d) (proposed frequency usage must be prior coordinated with existing licensees).

[899] *See, e.g., Microwave Cost Sharing First R&O and FNPRM*, 11 FCC Rcd at 8892-3, Appendix A ¶¶ 32-33 (The Proximity Threshold Test is less expensive and easier to administer than the interference criteria of TIA TSB 10-F because under the test, a PCS base station will either fall inside the reimbursement "box" or out of it.)

[900] Our rules also preclude entrants that have triggered a cost-sharing obligation from avoiding that obligation by deconstructing or modifying their facilities. Once an entrant submits its site-specific data with the clearinghouse and triggers a cost sharing obligation because it is within the Proximity Threshold "box," it is required to pay its cost sharing obligations in full. The "post-trigger" deconstruction or modification of the entrant's facilities will neither eliminate nor mitigate such payment obligations. 47 C.F.R. § 27.1168(b).

[901] In accordance with the rules adopted herein, the relocation sunset date is ten years after the grant of the first license or modification of a license authorizing the use of the 2180-2200 MHz band for AWS-4 under Part 27.

[902] We clarify that a clearinghouse determines when an entrant triggered a cost sharing obligation pursuant to the Proximity Threshold Test. Regardless of the reason, entrants that somehow evade notifying the clearinghouse of the fact that they triggered a cost sharing obligation will nevertheless be responsible for the full payment of their obligation. *See, e.g.*, 47 C.F.R. §§ 27.1168, 27.1170; *see also AWS Ninth R&O*, 21 FCC Rcd at 4517 ¶ 82 n. 295.

[903] *See* 47 C.F.R. § 27.1188(a).

[904] *Id*.

cost-sharing plan to provide only the uniform cost data requested by the clearinghouse subject to the continuing requirements that relocators and self-relocators maintain documentation of cost-related issues until the sunset date and provide such documentation, upon request, to the clearinghouse, the Commission, or entrants that trigger a cost-sharing obligation. In addition, we also require that parties of interest contesting the clearinghouse's determination of specific cost-sharing obligations must provide evidentiary support to demonstrate that their calculation is reasonable and made in good faith.[905] Specifically, these parties are expected to exercise due diligence to obtain the information necessary to prepare an independent estimate of the relocation costs in question and to file the independent estimate and supporting documentation with the clearinghouse.[906]

316. We expect new entrants and incumbent licensees to act in good faith in all matters relating to the cost-sharing process herein established. Although the Commission has generally required "good faith" in the context of parties' participation in negotiations,[907] self-relocating incumbents benefit through their participation in the cost-sharing regime and therefore we expect them to act in good faith in seeking reimbursement for recoverable costs in accordance with the Commission's rules. We find that the question of whether a particular party was acting in good faith is best addressed on a case-by-case basis. By retaining sufficient flexibility to craft an appropriate remedy for a given violation in light of the particular circumstances at hand, we can ensure that any party who violates our good faith requirements, either by acting in bad faith or by filing frivolous or harassing claims of violations, will suffer sufficient penalties to outweigh any advantage it hoped to gain by its violation.[908]

IV. ANCILLARY TERRESTRIAL COMPONENT IN THE 2 GHZ MSS BAND

317. *Background*. In the *AWS-4 NPRM*, the Commission proposed eliminating the ATC rules for the 2 GHz band.[909] The Commission recognized that an authorization of terrestrial operations under Part 27 of the Commission's rules for the AWS-4 band, while also maintaining ATC operations would be redundant and potentially confusing to operators.[910] Additionally, the Commission observed that the ATC regulations no longer represented the best framework for terrestrial mobile broadband to develop in the 2 GHz band. Thus, the Commission proposed eliminating ATC rules for this band.[911] As part of effectuating the replacement of ATC with Part 27 rules, the Commission also proposed deleting footnote NG168 from the U.S. Table of Allocations.[912]

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[905] *See* 47 C.F.R. § 27.1188(b).

[906] *Id*.

[907] *See, e.g.*, *AWS Ninth R&O*, 21 FCC Rcd at 4519 ¶ 85; *Emerging Technologies Third R&O and MO&O*, 8 FCC Rcd at 6595, ¶¶ 15-16; *Microwave Cost Sharing First R&O and FNPRM*, 11 FCC Rcd at 8838, ¶¶ 20-22; Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, *Second Report and Order and Second Memorandum Opinion and Order*, 15 FCC Rcd 12315, 12331 ¶ 47 (2000) ("*MSS Second R&O and Second MO&O*").

[908] *See, e.g.*, *AWS Ninth R&O*, 21 FCC Rcd at 4519 ¶ 85; *Emerging Technologies Third R&O and MO&O*, 8 FCC Rcd at 6595 ¶¶ 15-16; *Microwave Cost Sharing First R&O and FNPRM*, 11 FCC Rcd at 8838 ¶¶ 20-22; *MSS Second R&O and Second MO&O*, 15 FCC Rcd at 12331 ¶ 47.

[909] *AWS-4 NPRM*, 27 FCC Rcd at 3607 ¶ 136.

[910] *Id*.

[911] *Id*.

[912] *Id*.

318. *Discussion*. We adopt the proposal to eliminate the ATC rules for the 2 GHz band and delete footnote NG168 (now numbered NG43) from the U.S. Table of Allocations. We conclude that authorizing two, distinct terrestrial mobile operations in the band would result in confusion and redundancy. Furthermore, as the Commission observed in the *AWS-4 NPRM*, the changing circumstances in the 2 GHz MSS band demonstrate that ATC regulations are no longer the best framework for developing and deploying terrestrial broadband operations in the band.[913] Finally, the record reflects no opposition to our adopting the proposals. We therefore conclude that the potential benefits of our proposals would outweigh any potential costs. In eliminating the ATC rules for the 2 GHz MSS band, we emphasize that our action does not result in changes to the ATC rules for either the L-band or the Big LEO band; rather, we intend to address issues pertaining to the ATC rules for those bands in one or more separate proceedings at a later date.[914]

V. ORDER OF PROPOSED MODIFICATION

319. As noted above, although the 2000-2020 MHz and 2180-2200 MHz bands are currently assigned to two different licensees, Gamma Acquisitions L.L.C. (Gamma) and New DBSD Satellite Services G.P. (New DBSD), both licenses are wholly owned subsidiaries of DISH.[915] In paragraph 175 above, we direct these 2 GHz MSS licensees to determine how to effectuate the reconfiguration of the 2 GHz MSS band into an A-B/A-B arrangement by each licensee selecting a duplex pair in response to this Order of Proposed Modification. For the reasons discussed throughout this *Report and Order*, we conclude that it is in the public interest, convenience, and necessity to propose modifying the existing 2 GHz MSS licenses as follows:

- To modify the 2 GHz MSS licenses of Gamma Acquisition L.L.C. (call sign E060430) and New DBSD Satellite Services G.P. (call sign E070272) to reflect the duplex pairing that each licensee selects in its response to this Order of Proposed Modification, consistent with paragraph 175, above;
- To add AWS-4 terrestrial operating authority, as detailed in this *Report and Order and Order of Proposed Modification*, to the 2 GHz MSS licenses of both Gamma Acquisition L.L.C. (call sign E060430) and New DBSD Satellite Services G.P. (call sign E070272) consistent with the 2 GHz MSS licensees' duplex pairing selections;
- To require Gamma Acquisition L.L.C. and New DBSD Satellite Services G.P. to accept any OOBE interference to MSS or terrestrial operations in 2000-2005 MHz from lawful operations from future 1995-2000 MHz licensees;
- To require Gamma Acquisitions L.L.C. and New DBSD Satellite Services G.P. to accept any in band interference in some or all of 2000-2020 MHz from lawful operations from 1995-2000 MHz licensees; and
- To eliminate the ATC authority in the 2000-2020 MHz and 2180-2200 MHz spectrum bands of both Gamma Acquisition L.L.C. and New DBSD Satellite Services G.P.[916]

320. In this connection, we believe that the proposed license modifications would serve the public interest by allowing for additional terrestrial broadband spectrum, while minimizing harmful interference. In accordance with Section 316(a) of the Communications Act, as amended, and Section

[913] *Id*.

[914] *Id*.

[915] *See supra* ¶ 14.

[916] *See infra* Section IV. (Ancillary Terrestrial Component in the 2 GHz MSS Band).

1.87(a) of the Commission's rules, we will not issue a modification order(s) until Gamma Acquisition L.L.C. and New DBSD Satellite Services G.P. have received notice of our proposed action and have had an opportunity to protest.[917] We direct the staff to send this Report and Order and Order of Proposed Modification by certified mail, return receipt requested to Gamma Acquisition L.L.C., and to New DBSD Satellite Services G.P. Pursuant to Section 316(a)(1) of the Act and Section 1.87(a) of the Commission's rules, receipt of this *Report and Order and Order of Proposed Modification* by certified mail, return receipt requested, shall constitute notification in writing of our *Order of Proposed Modification* proposing to modify the 2 GHz MSS licenses of Gamma Acquisition L.L.C. and New DBSD Satellite Services G.P. and of the grounds and reasons therefore.[918] Gamma Acquisition L.L.C. and New DBSD Satellite Services G.P. shall have thirty days from the date of such receipt to protest such Order of Proposed Modification. To protest the proposed modifications, Gamma Acquisition L.L.C. or New DBSD Satellite Services G.P. must, within thirty days of receiving notice of this *Report and Order and Order of Proposed Modification*, submit a written statement with sufficient evidence to show that the modification would not be in the public interest. The protest must be filed in the Electronic Comment Filing System (ECFS) under WT Docket No. 12-70[919] or with the Office of the Secretary, Federal Communications Commission, 445 Twelfth Street, S.W., Room TW-A235, Washington, D.C. 20554; the protesting party must, within 30 days of receiving notice of this *Report and Order and Order of Proposed Modification*, send a copy of the protest via electronic mail to Kevin Holmes of the Broadband Division of the Wireless Telecommunications Bureau at Kevin.Holmes@fcc.gov.[920] Once the 30 day protest period has lapsed, Gamma Acquisition L.L.C.'s and New DBSD Satellite Services G.P.'s right to file a protest expires, and the Commission may modify the licenses as noticed.[921] Finally, in the event that Gamma Acquisition L.L.C. or New DBSD Satellite Services G.P. rejects any aspect of the proposed license modification, it will be deemed to have rejected the entire license modification.

321. We delegate to the Wireless Telecommunications Bureau and the International Bureau the authority to issue a license modification order for Gamma Acquisition L.L.C. (call sign E060430) and for New DBSD Satellite Services G.P. (call sign E070272), but only to the extent consistent with paragraphs 319-320 above.

322. *Ex Parte Status.* Unless otherwise provided by the Commission or its staff pursuant to Section 1.1200(a),[922] a license modification proceeding under Title III of the Communications Act is treated as a restricted proceeding for *ex parte* purposes under Section 1.1208 of the Commission's

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[917] 18 U.S.C. § 316(a); 47 C.F.R. § 1.87(a).

[918] *Id.*

[919] As discussed in paragraph 322 below, we are using WT Docket No. 12-70 for any filings related to the instant Order of Proposed Mofication for administrative convenience only.

[920] This address is proper only for protests submitted by U.S. mail. For hand-delivered or messenger-delivered paper filings, the proper address is 236 Massachusetts Ave., N.E., Suite 110, Washington, D.C. 2002. For documents sent by overnight delivery service other than United States Postal Service Express Mail and Priority Mail, the proper address is 9300 East Hampton Dr., Capitol Heights, MD 20743. For further information, contact the Office of the Secretary at (202) 418-0300 or mdortch@fcc.gov.

[921] We also note, as set forth in Section 316(a)(2), that "[a]ny other licensee or permittee who believes its license or permit would be modified by the proposed action may also protest the proposed action before its effective date." 47 U.S.C. § 316(a)(2); *see also* 47 C.F.R. § 1.87(c).

[922] 47 CFR §§ 1.1200(a) ("[w]here the public interest so requires in a particular proceeding, the Commission and its staff retain the discretion to modify the applicable ex parte rules by order, letter, or public notice.").

rules.[923] In this case, the license modification proceedings are related to the above-captioned rulemaking proceeding, WT Docket No. 12-70, which is designated as a permit but disclose proceeding under the *ex parte* rules.[924] Due to the interrelated nature of these proceedings, we find that it is in the public interest to treat the license modification proceedings as permit but disclose proceedings under Section 1.1206 of the Commission's rules.[925] Therefore, any *ex parte* presentations that are made with respect to the issues involved in the subject license modification proceedings subsequent to the release of the this Order of Proposed Modification will be permissible but must be disclosed in accordance with the requirements of Section 1.1206(b) of the Commission's Rules.[926] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). For administrative convenience only, any filings related to this Order of Proposed Modification must be filed in WT Docket No. 12-70 and may be filed using the Electronic Comment Filing System (ECFS), http://apps.fcc.gov/ecfs/2d.[927] In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

VI. NOTICE OF INQUIRY: 2 GHZ EXTENSION BAND CONCEPT

323. In the *AWS-4 Notice of Inquiry*, the Commission sought comment on a variation on the AWS-4 band plan proposed in the *AWS-4 NPRM*. That band plan, termed the "2 GHz Extension Band Concept," would have incorporated the NTIA proposal to reallocate the 1695-1710 MHz band from Federal to non-Federal use and would have resulted in a 35 megahertz band that paired 2180-2200 MHz (downlink) with 1695-1710 MHz (uplink) and a 30 megahertz downlink expansion band of 1995-2025 MHz.[928] Because we adopt a specific AWS-4 band plan above that includes much of this spectrum, we decline at this time to pursue the 2 GHz Extension Band Concept.

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[923] 47 C.F.R. § 1.1208 (Restricted proceedings).

[924] *See AWS-4 NPRM* at ¶ 148.

[925] 47 C.F.R. § 1.1206 (Permit-but-disclose proceedintgs).

[926] 47 C.F.R. § 1.1206(b).

[927] For additional information on filings in FCC proceedings, *see AWS-4 NPRM* at section V (Procedural Matters).

[928] *AWS-4 Notice of Inquiry*, 27 FCC Rcd at 3607-3611 ¶¶ 137-147.

VII. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Analysis

324. The Regulatory Flexibility Act (RFA)[929] requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."[930] Accordingly, we have prepared a Final Regulatory Flexibility Analysis concerning the possible impact of the rule changes contained in the *Report and Order* on small entities. The Final Regulatory Flexibility Analysis is set forth in Appendix B.

B. Paperwork Reduction Act Analysis

325. This document contains 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.

326. In this present document, we have assessed the effects of the policies adopted in this Report and Order and Order of Proposed Modification with regard to information collection burdens on small business concerns, and find that these policies will benefit many companies with fewer than 25 employees because the revisions we adopt should provide small entities with more information, more flexibility, and more options for gaining access to valuable wireless spectrum. In addition, we have described impacts that might affect small businesses, which includes most businesses with fewer than 25 employees, in the FRFA in Appendix B, *infra*.

C. Further Information

327. For additional information on this proceeding, contact Kevin Holmes of the Broadband Division, Wireless Telecommunications Bureau, at (202) 418-BITS or Kevin.Holmes@fcc.gov.

VIII. ORDERING CLAUSES

328. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332 and 333 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 152, 154(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, and 333 that this Report and Order and Order of Proposed Modification IS HEREBY ADOPTED.

329. IT IS FURTHER ORDERED that Parts 1, 2, 25, 27, and 101 of the Commission's Rules, 47 C.F.R. Sections 1, 2, 25, 27, and 101, ARE AMENDED as specified in Appendix A, effective 30 days after publication in the *Federal Register* except as otherwise provided herein.

330. IT IS FURTHER ORDERED that the amendments, adopted above and specified in Appendix A, to sections 1.949, 27.14, 27.17, 27.1131, 27.1134, 27.1136, 27.1166, 27.1168, 21.1170, 101.69, and 101.73(d) of the Commission's rules, 47 C.F.R. §§ 1.949, 27.14, 27.17, 27.1131, 27.1134, 27.1136, 27.1166, 27.1168, 21.1170, 101.69, and 101.73(d), which contain new or modified information

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[929] *See* 5 U.S.C. § 601–612. The RFA 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).

[930] 5 U.S.C. § 605(b).

collection requirements that require approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act (PRA), WILL BECOME EFFECTIVE after the Commission publishes a notice in the *Federal Register* announcing such approval and the relevant effective date.

331. IT IS FURTHER PROPOSED, pursuant to Sections 4(i) and 316(a) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 316, and Section 1.87 of the Commission's Rules, 47 C.F.R. § 1.87, that the license for Call Sign E060430 held by Gamma Acquisition L.L.C. BE MODIFIED consistent with Section IV (Order of Proposed Modification) of this Report and Order and Order of Proposed Modification. Pursuant to Section 316(a)(1) of the Communications Act of 1934, as amended, 47 U.S.C. § 316(a)(1), and Section 1.87(a) of the Commission's rules, 47 C.F.R. § 1.87(a), receipt of this Report and Order and Order of Proposed Modification by certified mail, return receipt requested, shall constitute notification in writing of our Order of Proposed Modification that proposes to modify Call Sign E060430 held by Gamma Acquisition L.L.C., and of the grounds and reasons therefore, and Gamma Acquisition L.L.C. shall have thirty (30) days from the date of receipt to protest such Order of Proposed Modification. The Wireless Telecommunications Bureau and the International Bureau are delegated authority to issue an order of modification if no protests are filed.

332. IT IS FURTHER PROPOSED, pursuant to Sections 4(i) and 316(a) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 316, and Section 1.87 of the Commission's Rules, 47 C.F.R. § 1.87, that the license for Call Sign E070272 held by New DBSD Satellite Services G.P. BE MODIFIED consistent with Section IV (Order of Proposed Modification) of this Report and Order and Order of Proposed Modification. Pursuant to Section 316(a)(1) of the Communications Act of 1934, as amended, 47 U.S.C. § 316(a)(1), and Section 1.87(a) of the Commission's rules, 47 C.F.R. § 1.87(a), receipt of this Report and Order and Order of Proposed Modification by certified mail, return receipt requested, shall constitute notification in writing of our Order of Proposed Modification that proposes to modify Call Sign E070272 held by New DBSD Satellite Services G.P., and of the grounds and reasons therefore, and New DBSD Satellite Services G.P. shall have thirty (30) days from the date of receipt to protest such Order of Proposed Modification. The Wireless Telecommunications Bureau and the International Bureau are delegated authority to issue an order of modification if no protests are filed.

333. IT IS FURTHER ORDERED that this Report and Order and Order of Proposed Modification SHALL BE SENT by certified mail, return receipt request, to Gamma Acquisition L.L.C., 9601 South Meridian Blvd., Englewood, CO 80112 and Pantelis Michalopoulos, Steptoe & Johnson LLP, 1330 Connecticut Avenue, NW, Washington, DC 20036-1795, and to New DBSD Satellite Services G.P., 11700 Plaza America Drive, Suite 1010, Reston VA 20190 and Pantelis Michalopoulos, Steptoe & Johnson LLP, 1330 Connecticut Avenue, NW, Washington, DC 20036-1795.

334. IT IS FURTHER ORDERED that the license modification proceedings commenced by the Order of Proposed Modification shall be treated as permit-but-disclose proceedings under the Commission's *ex parte* rules, 47 C.F.R. § 1.1200 *et seq.*

335. IT IS FURTHER ORDERED that the Wireless Telecommunications Bureau IS DELEGATED authority to make all necessary changes to its electronic database systems and forms to implement the policies and rules adopted in this Report and Order.

336. IT IS FURTHER ORDERED that the International Bureau IS DELEGATED AUTHORITY to act on the petition for reconsideration filed by Inmarsat in IB Docket Nos. 05-220 and 05-221, consistent with this Order as set forth above.

337. IT IS FURTHER ORDERED that the Final Regulatory Flexibility Analysis in Appendix B hereto IS ADOPTED.

338. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this *Report and Order* to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. 801(a)(1)(A).

339. 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*, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

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 1, 2, 25, 27, and 101 as follows:

PART 1— PRACTICE AND PROCEDURE

1. The authority citation for part 1 continues 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), and 309.

2. Amend § 1.949 by adding paragraph (c) as follows:

§ 1.949 Application for renewal of license.

*****

(c) Renewal Showing. An applicant for renewal of a geographic-area authorization in the 2000-2020 MHz and 2180-2200 MHz service bands must make a renewal showing, independent of its performance requirements, as a condition of renewal. The showing must include a detailed description of the applicant's provision of service during the entire license period and address:

(1) The level and quality of service provided by the applicant (e.g., the population served, the area served, the number of subscribers, 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 § 1.2110(f)(3)(i); and

(5) Any other factors associated with the level of service to the public.

PART 2— FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

3. The authority citation for part 2 continues to read as follows:

   Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

4. § 2.106 in the Table of Frequency Allocations, is amended as follows:

a. Page 36 is revised

b. In the list of non-Federal Government (NG) Footnotes, footnote NG43 is removed.

§ 2.106 Table of Frequency Allocations.

The revision reads as follows:

*****

1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F			1980-2025	NG177	
				2000-2020 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25) Wireless Communications (27)
2010-2025 FIXED MOBILE 5.388A 5.388B 5.388	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	2010-2025 FIXED MOBILE 5.388A 5.388B 5.388		2020-2025 FIXED MOBILE NG177	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) SPACE RESEARCH (Earth-to-space) (space-to-space) 5.391 5.392 US90 US222 US346 US347 US393	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US222 US346 US347 US393	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)
2110-2120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388			2110-2120 US252	2110-2120 FIXED MOBILE US252	Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388	2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2200	2120-2180 FIXED MOBILE NG153 NG178	
	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E				
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F				2180-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25) Wireless Communications (27)

****

PART 25— SATELLITE COMMUNICATIONS

5. The authority citation for part 25 continues to read as follows:

   Authority: 47 U.S.C. 701-744. Interprets or applies sections 4, 301, 302, 303, 307, 309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

6. Amend § 25.143 by revising paragraphs (i) and (k) to read as follows:

§ 25.143 Licensing provisions for the 1.6/2.4 GHz mobile-satellite service and 2 GHz mobile-satellite service.

****

(i) Incorporation of ancillary terrestrial component base stations into a 1.6/2.4 GHz mobile-satellite service network. Any licensee authorized to construct and launch a 1.6/2.4 GHz system may construct ancillary terrestrial component (ATC) base stations as defined in § 25.201 at its own risk and subject to the conditions specified in this subpart any time after commencing construction of the mobile-satellite service system.

*****

(k) Aircraft. ATC mobile terminals must be operated in accordance with 25.136(a). All portable or hand-held transceiver units (including transceiver units installed in other devices that are themselves portable or hand-held) having operating capabilities in the 1610–1626.5 MHz/2483.5–2500 MHz bands shall bear the following statement in a conspicuous location on the device: "This device may not be operated while on board aircraft. It must be turned off at all times while on board aircraft."

7. Amend § 25.149 by revising the section heading, and paragraph (a)(1) introductory text, removing and reserving paragraphs (a)(2)(i), (b)(1)(i), and (b)(5)(i), and revising paragraphs (d) and (e), to read as follows:

§ 25.149 Application requirements for ancillary terrestrial components in the mobile-satellites service networks operating in the 1.5/1.6 GHz and 1.6/2.4 GHz mobile-satellite service.

(a) ***

(1) ATC shall be deployed in the forward-band mode of operation whereby the ATC mobile terminals transmit in the MSS uplink bands and the ATC base stations transmit in the MSS downlink bands in portions of the 1626.5–1660.5 MHz/1525–1559 MHz bands (L-band) and the 1610–1626.5 MHz/2483.5–2500 MHz bands (Big LEO band).

*****

(d) Applicants for an ancillary terrestrial component authority shall demonstrate that the applicant does or will comply with the provisions of § 1.924 of this chapter and §§ 25.203(e) through 25.203(g) and with §§ 25.253 or 25.254, as appropriate, through certification or explanatory technical exhibit.

(e) Except as provided for in paragraph (f) of this section, no application for an ancillary terrestrial component shall be granted until the applicant has demonstrated actual compliance with the provisions of paragraph (b) of this section. Upon receipt of ATC authority, all ATC licensees must ensure continued compliance with this section and §§ 25.253 or 25.254, as appropriate.

*****

§25.252 [Removed and Reserved].

8. Remove and reserve § 25.252

9. Amend § 25.255 by revising the section heading as follows:

§ 25.255 Procedures for resolving harmful interference related to operation of ancillary terrestrial components operating in the 1.5/1.6 GHz and 1.6/2.4 GHz bands.

10. Add § 25.265 as follows:

§ 25.265 Acceptance of Interference in 2000-2020 MHz.

(a) MSS receivers operating in the 2000-2020 MHz band must accept interference from lawful operations in the 1995-2000 MHz band, where such interference is due to:

(1) The in-band power of any operations in 1995-2000 MHz (i.e., the portion of transmit power contained in the 1995-2000 MHz band); or

(2) The portion of out-of-band emissions contained in 2000-2005 MHz.

(b) Reserved.

PART 27—MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

11. The authority citation for part 27 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302, 303, 307, 309, 332, 336, and 337 unless otherwise noted.

12. Amend § 27.1 by adding paragraph (b)(10) to read as follows:

§ 27.1 Basis and purpose.

*****

(b) ***

(10) 2000-2020 MHz and 2180-2200 MHz.

*****

13. Amend § 27.2 by revising paragraph (a) and adding paragraph (d) to read as follows:

§ 27.2 Permissible communications.

(a) Miscellaneous wireless communications services. Except as provided in paragraph (b) or (d) of this section and subject to technical and other rules contained in this part, a licensee in the frequency bands specified in § 27.5 may provide any services for which its frequency bands are allocated, as set forth in the non-Federal Government column of the Table of Allocations in § 2.106 of this chapter (column 5).

*****

(d) 2000-2020 MHz and 2180-2200 MHz bands. Operators in the 2000-2020 MHz and 2180-2200 MHz bands may not provide the mobile-satellite service under the provisions of this part; rather, mobile-satellite service shall be provided in a manner consistent with part 25 of this chapter.

14. Amend § 27.4 by revising the definition in “Advanced wireless service (AWS)” to read as follows:

§ 27.4 Terms and definitions.

*****

Advanced Wireless Service (AWS). A radiocommunication service licensed pursuant to this part for the frequency bands specified in § 27.5(h) or § 27.5(j).

*****

15. Amend § 27.5 by adding paragraph (j) to read as follows:

§ 27.5 Frequencies.

*****

(j) 2000-2020 MHz and 2180-2200 MHz bands. The following frequencies are available for licensing pursuant to this part in the 2000-2020 MHz and 2180-2200 MHz (AWS-4) bands:

(1) Two paired channel blocks of 10 megahertz each are available for assignment as follows:

Block A: 2000-2010 MHz and 2180-2190 MHz; and

Block B: 2010-2020 MHz and 2190-2200 MHz.

(2) Reserved.

16. Amend § 27.6 by adding paragraph (i) to read as follows:

§ 27.6 Service areas.

*****

(i) 2000-2020 MHz and 2180-2200 MHz bands. AWS service areas for the 2000-2020 MHz and 2180-2200 MHz bands are based on Economic Areas (EAs) as defined in paragraph (a) of this section.

17. Amend § 27.13 by adding paragraph (i) to read as follows:

§ 27.13 License period.

*****

(i) 2000-2020 MHz and 2180-2200 MHz bands. Authorizations for the 2000-2020 MHz and 2180-2200 MHz bands will have a term not to exceed ten years from the date of issuance or renewal.

18. Amend § 27.14 by revising the first sentence of paragraphs (a), (f), and (k), and adding paragraph (q) 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 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 D in the 758–763 MHz and 788–793 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 2000-2020 MHz and 2180-2200 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 698–746 MHz, 747–762 MHz, and 777–792 MHz bands and licensees holding AWS authorizations for the 2000-2020 MHz and 2180-2200 MHz bands. ***

* * * * *

(k) Licensees holding WCS or AWS authorizations in the spectrum blocks enumerated in paragraphs (g), (h), (i), or (q) 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. ***

* * * * *

(q) The following provisions apply to any licensee holding an AWS authorization in the 2000-2020 MHz and 2180-2200 MHz bands (an "AWS-4 licensee"):

(1) An AWS-4 licensee shall provide terrestrial signal coverage and offer terrestrial service within four (4) years from the date of the license to at least forty (40) percent of the total population in the aggregate service areas that it has licensed in the 2000-2020 MHz and 2180-2200 MHz bands ("AWS-4 Interim Buildout Requirement"). For purposes of this subpart, a licensee's total population shall be calculated by summing the population of each license area that a licensee holds in the 2000-2020 MHz and 2180-2200

MHz bands; and

(2) An AWS-4 licensee shall provide terrestrial signal coverage and offer terrestrial service within seven (7) years from the date of the license to at least to at least seventy (70) percent of the population in each of its license areas in the 2000-2020 MHz and 2180-2200 MHz bands ("AWS-4 Final Buildout Requirement").

(3) If any AWS-4 licensee fails to establish that it meets the AWS-4 Interim Buildout Requirement, the AWS-4 Final Buildout requirement shall be accelerated by one year from (seven to six years).

(4) If any AWS-4 licensee fails to establish that it meets the AWS-4 Final Buildout Requirement in any of its license areas in the 2000-2020 MHz and 2180-2200 MHz bands, its authorization for each license area in which it fails to meet the requirement shall terminate automatically without Commission action. To the extent that the AWS-4 licensee also holds the 2 GHz MSS rights for the affected license area, failure to meet the AWS-4 Final Buildout Requirement in an EA shall also result in the MSS protection rule in section 27.1136 no longer applying in that license area.

(5) To demonstrate compliance with these performance requirements, licensees shall use the most recently available 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 only be deemed served by the licensee if it provides 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 only include the population within the Census Tract (or other acceptable identifier) towards meeting the performance requirement of a single, individual license.

(6) Failure by any AWS-4 licensee to meet the AWS-4 Final Buildout Requirement in paragraph (q)(4) of this section will result in forfeiture of the license and the licensee will be ineligible to regain it.

19. Amend § 27.15 by revising paragraph (d)(1)(i); adding paragraph (d)(1)(iii); revising paragraph (d)(2)(i); and adding 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 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, Blocks C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, or Block D in the 758–763 MHz and 788–793 MHz bands; and for licensees holding AWS authorizations in the 2000-2020 MHz and 2180-2200 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. Parties to partitioning agreements have two options for satisfying the construction requirements set forth in § 27.14. Under the first option, the partitioner and partitionee each certifies that it will independently satisfy the substantial service requirement for its respective partitioned area. If a licensee subsequently fails to meet its substantial service requirement, its license will be subject to automatic cancellation without further Commission action. Under the second option, the partitioner certifies that it has met or will meet the substantial service requirement for the entire, pre-partitioned geographic service area. If the partitioner subsequently fails to meet its substantial service requirement, only its license will be subject to automatic cancellation without further Commission action.

*****

(iii) For licensees holding AWS authorizations in the 2000-2020 MHz and 2180-2200 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)

(2) ***

(i) Except for WCS licensees holding authorizations for 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, Blocks C, C1, or C2 in the 746–757 MHz and 776–787 MHz bands, or Block D in the 758–763 MHz and 788–793 MHz bands; and for licensees holding AWS authorizations in the 2000-2020 MHz and 2180-2200 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. Parties to disaggregation agreements have two options for satisfying the construction requirements set forth in § 27.14. Under the first option, the disaggregator and disaggregatee each certifies that it will share responsibility for meeting the substantial service requirement for the geographic service area. If the parties choose this option and either party subsequently fails to satisfy its substantial service responsibility, both parties' licenses will be subject to forfeiture without further Commission action. Under the second option, both parties certify either that the disaggregator or the disaggregatee will meet the substantial service requirement for the geographic service area. If the parties choose this option, and the party responsible subsequently fails to meet the substantial service requirement, only that party's license will be subject to forfeiture without further Commission action.

*****

(iii) For licensees holding AWS authorizations in the 2000-2020 MHz and 2180-2200 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 disagregatee 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).

20. Add § 27.17 to read as follows:

§ 27.17 Discontinuance of Service in the 2000-2020 MHz and 2180-2200 MHz bands.

(a) Termination of Authorization. A licensee's AWS authorization in the 2000-2020 MHz and 2180-2200 MHz bands will automatically terminate, without specific Commission action, if it permanently

discontinues service after meeting the AWS-4 Final Buildout Requirement as specified in § 27.14.

(b) Permanent discontinuance of service is defined as 180 consecutive days during which a licensee holding AWS authority in the 2000-2020 MHz and 2180-2200 MHz bands does not operate or, in the case of a commercial mobile radio service provider, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the providing carrier.

(c) Filing Requirements. A licensee of the 2000-2020 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.

21. Amend § 27.50 by revising paragraphs (d) introductory text, (d)(1), and (d)(2) and adding paragraph (d)(7) and (d)(8) to read as follows:

§ 27.50 Power limits and duty cycle.

*****

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz, 2110–2155 MHz, 2000-2020 MHz, and 2180-2200 MHz bands:

(1) The power of each fixed or base station transmitting in the 2110–2155 MHz or 2180-2200 MHz bands and located in any 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, is limited to:

*****

(2) The power of each fixed or base station transmitting in the 2110–2155 MHz or 2180-2200 MHz bands and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

*****

(7) Fixed, mobile, and portable (hand-held) stations operating in the 2000-2020 MHz band are limited to 2 watts EIRP, except that the total power of any portion of an emission that falls within the 2000-2005

MHz band may not exceed 5 milliwatts. A licensee of AWS-4 authority may enter into private operator-to-operator agreements with all 1995-2000 MHz licensees to operate in 2000-2005 MHz at power levels above 5 milliwatts EIRP; except the total power of the AWS-4 mobile emissions may not exceed 2 watts EIRP.

(8) A licensee operating a base or fixed station in the 2180–2200 MHz band utilizing a power greater than 1640 watts EIRP and greater than 1640 watts/MHz EIRP must be coordinated in advance with all AWS licensees authorized to operate on adjacent frequency blocks in the 2180–2200 MHz band.

*****

22. Amend § 27.53 by revising paragraph (h) introductory text and adding paragraph (h)(4) to read as follows:

§ 27.53 Emission limits.

*****

(h) AWS Emission Limits.

(1) General Protection Levels. Except as otherwise specified below, for operations in the 1710–1755 MHz, 2110–2155 MHz, 2000-2020 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$(P) dB.

(2) Additional Protection Levels. Notwithstanding the foregoing paragraph (h)(1) of this section:

(i) Operations in the 2180-2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200-2290 MHz band.

(ii) For operations in the 2000-2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 $\log_{10}$(P) dB.

(3) Measurement Procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the

transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(ii) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(iii) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

(4) Private Agreements.

(i) For AWS operations in the 2000-2020 MHz and 2180-2200 MHz bands, to the extent a licensee establishes unified operations across the AWS blocks, that licensee may choose not to observe the emission limit specified in paragraph (h)(1), above, strictly between its adjacent block licenses in a geographic area, so long as it complies with other Commission rules and is not adversely affecting the operations of other parties by virtue of exceeding the emission limit.

(ii) For AWS operations in the 2000-2020 MHz band, a licensee may enter into private agreements with all licensees operating between 1995 and 2000 MHz to allow the $70 + 10 \log_{10}(P)$ dB limit to be exceeded within the 1995-2000 MHz band.

(iii) An AWS licensee who is a party to a private agreement described in this section (4) must maintain a copy of the agreement in its station files and disclose it, upon request, to prospective AWS assignees, transferees, or spectrum lessees and to the Commission.

*****

23. Amend § 27.55 by revising paragraph (a)(1) to read as follows:

§ 27.55 Power strength limits.

(a)***

(1) 2110–2155, 2180-2200, 2305–2320 and 2345–2360 MHz bands: 47 dBμV/m.

*****

24. Amend § 27.57 by revising paragraph (c) to read as follows:

§ 27.57 International coordination.

*****

(c) Operation in the 1710-1755 MHz, 2110-2155 MHz, 2000-2020 MHz, and 2180-2200 MHz bands is subject to international agreements with Mexico and Canada.

25. Add § 27.65 to read as follows:

§ 27.65 Acceptance of Interference in 2000-2020 MHz.

(a) Receivers operating in the 2000-2020 MHz band must accept interference from lawful operations in the 1995-2000 MHz band, where such interference is due to:

(1) the in-band power of any operations in 1995-2000 MHz (i.e., the portion transmit power contained in the 1995-2000 MHz band); or

(2) the portion of out-of-band emissions contained in 2000-2005 MHz.

(b) Reserved.

26. Amend part 27 by revising the heading of subpart L to read as follows:

Subpart L—1710-1755 MHz, 2110-2155 MHz, 2000-2020 MHz, and 2180-2200 MHz bands

27. Add § 27.1103 to read as follows:

§ 27.1103 2000-2020 MHz and 2180-2200 MHz bands subject to competitive bidding.

Mutually exclusive initial applications for 2000-2020 MHz and 2180-2200 MHz band 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.

28. Add § 27.1104 to read as follows:

§ 27.1104 Designated Entities in the 2000-2020 MHz and 2180-2200 MHz bands.

Eligibility for small business provisions:

(a)(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 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 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.

29. Revise § 27.1131 to read as follows:

§ 27.1131 Protection of Part 101 operations.

All AWS licensees, prior to initiating operations from any base or fixed station, must coordinate their frequency usage with co-channel and adjacent channel incumbent, Part 101 fixed-point-to-point microwave licensees operating in the 2110–2155 MHz and 2180-2200 MHz bands. Coordination shall be conducted in accordance with the provisions of § 24.237 of this chapter.

30. Amend § 27.1134 by adding paragraph (e) to read as follows:

§ 27.1134 Protection of Federal Government operations.

*****

(e) Protection of Federal operations in the 2200-2290 MHz band.

(1) Default Emission Limits. Except as provided in paragraph (e)(2) of this section, the following default out-of-band emissions limits shall apply for AWS-4 operations in the 2180-2200 MHz band.

(i) For these AWS-4 operations, the power of any emissions on all frequencies between 2200 and 2290 MHz shall not exceed an EIRP of -100.6 dBW/4 kHz.

(ii) No AWS-4 base station operating in the 2180-2200 MHz band shall be located less than 820 meters from a U.S. Earth Station facility operating in the 2200-2290 MHz band.

(2) Agreements between AWS-4 operators and Federal government entities. The out-of-band emissions limits in paragraph (e)(1) of this section may be modified by the private contractual agreement of licensees of AWS-4 operating authority and Federal government entities operating in the 2200-2290 MHz band. Such agreement shall be transmitted to the Commission by the National Telecommunications and

Information Administration (NTIA) of the U.S. Department of Commerce. A licensee of AWS-4 operating authority who is a party to such an agreement must maintain a copy of the agreement in its station files and disclose it, upon request, to prospective AWS-4 assignees, transferees, or spectrum lessees, to Federal operators, and to the Commission.

31. Add § 27.1136 to read as follows:

§ 27.1136 Protection of mobile satellite services in the 2000-2020 MHz and 2180-2200 MHz bands. An AWS licensee of the 2000-2020 MHz and 2180-2200 MHz bands must accept any interference received from duly authorized mobile satellite service operations in these bands. Any such AWS licensees must protect mobile satellite service operations in these bands from harmful interference.

32. Amend § 27.1160 by revising the first sentence to read as follows:

§ 27.1160 Cost-sharing requirements for AWS.

Frequencies in the 2110–2150 MHz and 2160–2200 MHz bands listed in §101.147 of this chapter have been reallocated from Fixed Microwave Services (FMS) to use by AWS (as reflected in §2.106) of this chapter. ***

33. Amend § 27.1166 by revising paragraphs (a)(1), (b) introductory text, (b)(2), and (f) to read as follows:

§ 27.1166 Reimbursement under the cost-sharing plan.

(a) ***

(1) To obtain reimbursement, an AWS relocator must submit documentation of the relocation agreement to the clearinghouse within 30 calendar days of the date a relocation agreement is signed with an incumbent. In the case of involuntary relocation, an AWS relocator must submit documentation of the relocated system within 30 calendar days after the end of the relocation.

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(b) Documentation of expenses. Once relocation occurs, the AWS relocator, or the voluntarily relocating microwave incumbent, must submit documentation itemizing the amount spent for items specifically listed in §27.1164(b), as well as any reimbursable items not specifically listed in §27.1164(b) that are

directly attributable to actual relocation costs. Specifically, the AWS relocator, or the voluntarily relocating microwave incumbent must submit, in the first instance, only the uniform cost data requested by the clearinghouse along with a copy, without redaction, of either the relocation agreement, if any, or the third party appraisal described in (b)(1) of this section, if relocation was undertaken by the microwave incumbent. AWS relocators and voluntarily relocating microwave incumbents must maintain documentation of cost-related issues until the applicable sunset date and provide such documentation upon request, to the clearinghouse, the Commission, or entrants that trigger a cost-sharing obligation. If an AWS relocator pays a microwave incumbent a monetary sum to relocate its own facilities, the AWS relocator must estimate the costs associated with relocating the incumbent by itemizing the anticipated cost for items listed in §27.1164(b). If the sum paid to the incumbent cannot be accounted for, the remaining amount is not eligible for reimbursement.

*****

(2) Identification of links. The AWS relocator or the voluntarily relocating microwave incumbent must identify the particular link associated with appropriate expenses (i.e., costs may not be averaged over numerous links). Where the AWS relocator or voluntarily relocating microwave incumbent relocates both paths of a paired channel microwave link (e.g., 2110–2130 MHz with 2160–2180 MHz and 2130–2150 MHz with 2180–2200 MHz), the AWS relocator or voluntarily relocating microwave incumbent must identify the expenses associated with each paired microwave link.

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(f) Reimbursement for Self-relocating FMS links in the 2130–2150 MHz and 2180–2200 MHz bands. Where a voluntarily relocating microwave incumbent relocates a paired microwave link with paths in the 2130–2150 MHz and 2180–2200 MHz bands, it may not seek reimbursement from MSS operators, but is entitled to reimbursement from the first AWS beneficiary for its actual costs for relocating the paired link, subject to the reimbursement cap in § 27.1164(b). This amount is subject to depreciation as specified in § 27.1164(b). An AWS licensee who is obligated to reimburse relocation costs under this rule is entitled to obtain reimbursement from other AWS beneficiaries in accordance with §§27.1164 and

27.1168. For purposes of applying the cost-sharing formula relative to other AWS licensees that benefit from the self-relocation, depreciation shall run from the date on which the clearinghouse issues the notice of an obligation to reimburse the voluntarily relocating microwave incumbent.

34. Amend § 27.1168 by revising paragraphs (a) introductory text, (a)(2), (a)(3), (a)(3)(ii), and (b) to read as follows:

§ 27.1168 Triggering a reimbursement obligation.

*****

(a) The clearinghouse will apply the following test to determine when an AWS entity has triggered a cost-sharing obligation and therefore must pay an AWS relocator, MSS relocator, or a voluntarily relocating microwave incumbent in accordance with the formula detailed in §27.1164:

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(2) An AWS relocator, MSS relocator or a voluntarily relocating microwave incumbent has paid the relocation costs of the microwave incumbent; and

(3) The AWS or MSS entity is operating or preparing to turn on a fixed base station at commercial power and the fixed base station is located within a rectangle (Proximity Threshold) described as follows:

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(ii) If the application of the Proximity Threshold Test indicates that a reimbursement obligation exists, the clearinghouse will calculate the reimbursement amount in accordance with the cost-sharing formula and notify the AWS entity of the total amount of its reimbursement obligation.

(b) Once a reimbursement obligation is triggered, the AWS entity may not avoid paying its cost-sharing obligation by deconstructing or modifying its facilities.

35. Revise § 27.1170 to read as follows:

§ 27.1170 Payment issues.

Prior to initiating operations for a newly constructed site or modified existing site, an AWS entity is required to file a notice containing site-specific data with the clearinghouse. The notice regarding the new or modified site must provide a detailed description of the proposed site's spectral frequency use and

geographic location, including but not limited to the applicant's name and address, the name of the transmitting base station, the geographic coordinates corresponding to that base station, the frequencies and polarizations to be added, changed or deleted, and the emission designator. If a prior coordination notice (PCN) under §101.103(d) of this chapter is prepared, AWS entities can satisfy the site-data filing requirement by submitting a copy of their PCN to the clearinghouse. AWS entities that file either a notice or a PCN have a continuing duty to maintain the accuracy of the site-specific data on file with the clearinghouse. Utilizing the site-specific data, the clearinghouse will determine if any reimbursement obligation exists and notify the AWS entity in writing of its repayment obligation, if any. When the AWS entity receives a written copy of such obligation, it must pay directly to the relocator the amount owed within 30 calendar days.

36. Revise § 27.1174 to read as follows:

§ 27.1174 Termination of cost-sharing obligations.

The cost-sharing plan will sunset for all AWS and MSS entities on the same date on which the relocation obligation for the subject AWS band (i.e., 2110–2150 MHz, 2160–2175 MHz, 2175–2180 MHz, 2180-2200 MHz) in which the relocated FMS link was located terminates. AWS or MSS entrants that trigger a cost-sharing obligation prior to the sunset date must satisfy their payment obligation in full.

PART 101— FIXED MICROWAVE SERVICES

37. The authority citation for part 101 continues to read as follows:

Authority: 47 U.S.C. 154, and 303 unless otherwise noted.

38. Amend § 101.69 by revising paragraph (e) introductory text to read as follows:

§ 101.69 Transition of the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands from the fixed microwave services to personal communications services and emerging technologies.

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(e) Relocation of FMS licensees by Mobile-Satellite Service (MSS) licensees will be subject to mandatory negotiations only.

*****

39. Amend § 101.73 by revising paragraphs (a) and (d) introductory text to read as follows:

§ 101.73 Mandatory negotiations.

(a) A mandatory negotiation period may be initiated at the option of the ET licensee. Relocation of FMS licensees by Mobile Satellite Service (MSS) operators and AWS licensees in the 2110–2150 MHz and 2160–2200 MHz bands will be subject to mandatory negotiations only.

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(d) Provisions for Relocation of Fixed Microwave Licensees in the 2110–2150 and 2160–2200 MHz bands. A separate mandatory negotiation period will commence for each FMS licensee when an ET licensee informs that FMS licensee in writing of its desire to negotiate. Mandatory negotiations will be conducted with the goal of providing the FMS licensee with comparable facilities defined as facilities possessing the following characteristics:

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40. Amend § 101.79 by revising paragraphs (a) introductory text and (a)(2) to read as follows:

§ 101.79 Sunset provisions for licensees in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands.

(a) FMS licensees will maintain primary status in the 1850–1990 MHz, 2110–2150 MHz, and 2160–2200 MHz bands unless and until an ET licensee requires use of the spectrum. ET licensees are not required to pay relocation costs after the relocation rules sunset. Once the relocation rules sunset, an ET licensee may require the incumbent to cease operations, provided that the ET licensee intends to turn on a system within interference range of the incumbent, as determined by TIA TSB 10–F (for terrestrial-to-terrestrial situations) or TIA TSB 86 (for MSS satellite-to-terrestrial situations) or any standard successor. ET licensee notification to the affected FMS licensee must be in writing and must provide the incumbent with no less than six months to vacate the spectrum. After the six-month notice period has expired, the FMS licensee must turn its license back into the Commission, unless the parties have entered into an agreement

which allows the FMS licensee to continue to operate on a mutually agreed upon basis. The date that the relocation rules sunset is determined as follows:

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(2) For the 2180–2200 MHz band, for MSS/ATC December 8, 2013 (i.e., ten years after the mandatory negotiation period begins for MSS/ATC operators in the service), and for ET licensees authorized under part 27 ten years after the first part 27 license is issued in the band. To the extent that an MSS operator is also an ET licensee authorized under part 27, the part 27 sunset applies to its relocation and cost sharing obligations should the two sets of obligations conflict.

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41. Amend § 101.82 by revising paragraphs (a) and (d) to read as follows:

§ 101.82 Reimbursement and relocation expenses in the 2110–2150 MHz and 2160–2200 MHz bands.

(a) Reimbursement and relocation expenses for the 2110–2130 MHz and 2160–2200 MHz bands are addressed in §§ 27.1160–27.1174.

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(d) Cost-sharing obligations among terrestrial stations. For terrestrial stations (AWS), cost-sharing obligations are governed by §§ 27.1160 through 27.1174 of this chapter; provided, however, that MSS operators are not obligated to reimburse voluntarily relocating FMS incumbents in the 2180–2200 MHz band. (AWS reimbursement and cost-sharing obligations relative to voluntarily relocating FMS incumbents are governed by § 27.1166 of this chapter).

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APPENDIX B

Final Regulatory Flexibility Act Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] the Commission incorporated an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the *Notice of Proposed Rulemaking (NPRM)*. No comments were filed addressing the IRFA. Because we amend the rules in this *Report and Order*, we have included this Final Regulatory Flexibility Analysis (FRFA). This present FRFA conforms to the RFA.[2]

A. Need for, and Objectives of, the Report and Order

2. Demand for wireless broadband services and the network capacity associated with those services is surging, resulting in a growing demand for spectrum to support these services. Adoption of smartphones increased at a 50 percent annual growth rate in 2011, from 27 percent of U.S. mobile subscribers in December 2010 to nearly 42 percent in December 2011.[3] Further, consumers have rapidly adopted the use of tablets, which were first introduced in January of 2010.[4] By the end of 2012, it is estimated that one in five Americans—almost 70 million people—will use a tablet.[5] Between 2011 and 2017, mobile data traffic generated by tablets is expected to grow at a compound annual growth rate of 100 percent.[6] New mobile applications and services, such as high resolution video communications, are also using more bandwidth. For example, a single smartphone can generate as much traffic as thirty-five basic-feature mobile phones,[7] while tablets connected to 3G and 4G networks use three times more data

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[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] comScore 2012 Mobile Future in Focus (2012) at 16 http://www.comscore.com/Press_Events/Presentations_Whitepapers/2012/2012_Mobile_Future_in_Focus (last visited Dec. 6, 2012).

[4] Implementation of Section 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, 9754 ¶ 145 (*Fifteenth Mobile Wireless Competition Report*).

[5] Press Release, eMarketer, *Tablet Shopping Growing, but Retailers Must Keep Up* (June 15, 2012), *available at* http://www.emarketer.com/Article.aspx?R=1009120&ecid=a6506033675d47f881651943c21c5ed4 (last visited Dec. 6, 2012).

[6] Ericsson, Traffic and Market Report: On the Pulse of the Networked Society (June 2012), available at http://www.ericsson.com/res/docs/2012/traffic_and_market_report_june_2012.pdf (last visited Dec. 6, 2012).

[7] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016 (February 2012), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html (last visited Dec. 6, 2012).

than smartphones over the cellular network.[8] All of these trends, in combination, are creating an urgent need for more network capacity and, in turn, for suitable spectrum.

3. The 2010 *National Broadband Plan* recommended the Commission undertake to make 500 megahertz of spectrum available for broadband use within ten years, including 300 megahertz within five years.[9] The Commission has taken numerous steps to achieve these goals, including recently adopting a notice of proposed rulemaking on conducting the world's first incentive auction to repurpose broadcast spectrum for wireless broadband use,[10] and updating the Commission's rules for the 2.3 GHz Wireless Communications Service (WCS) band to permit the use of the most advanced wireless technologies in that band.[11]

4. In February 2012, Congress enacted Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (the "Spectrum Act").[12] The Spectrum Act includes several provisions to make more spectrum available for commercial use, including through auctions, and to improve public safety communications.[13] Among other things, the Spectrum Act requires the Commission, by February 23, 2015, to allocate the 1915-1920 MHz band and the 1995-2000 MHz band (collectively, the H Block) for commercial use, and to auction and grant new initial licenses for the use of each spectrum band, subject to flexible-use service rules.[14] Congress provided, however, that if the Commission determined that either of the bands could not be used without causing harmful interference to commercial licensees in 1930-1995 MHz (PCS downlink), then the Commission was prohibited from allocating that specific band for commercial use or licensing it.[15] Additionally, Sections 6401(f) and 6413 of the Spectrum Act specify that the proceeds from an auction of licenses in the 1995-2000 MHz band and in the 1915-1920 MHz band shall be deposited in the Public Safety Trust Fund and then used to fund the Nationwide Public Safety Broadband Network ("FirstNet").[16] The H block spectrum could be the first spectrum specified by

[8] Kevin Fitchard, 3G/4G tablets suck up 3x more data than smartphones, GIGAOM, May 15, 2012, available at http://gigaom.com/mobile/study-3g4g-tablets-suck-up-3x-more-data-than-smartphones/ (last visited Dec. 6, 2012).

[9] *National Broadband Plan*, Recommendation 5.8 at 84-85.

[10] *See* Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Docket No. 12-268, *Notice of Proposed Rulemaking*, FCC 12-118, at 3 (rel. Oct. 2, 2012); *National Broadband Plan* at 81-82.

[11] *See* Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, *Order on Reconsideration*, WT Docket No. 07-293, IB Docket No. 95-91, (rel. Oct. 17, 2012) (*2012 WCS Order*)**;** *see also, 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, GEN Docket No. 90-357, RM-8610, *Report and Order and Second Report and Order*, 25 FCC Rcd 11710 (2010) (*2010 WCS Order*).

[12] *See generally* Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) (Spectrum Act)

[13] Spectrum Act §§ 6001-6703.

[14] *See* Spectrum Act § 6401(b), codified at 47 U.S.C. § 1451(b).

[15] *See* Spectrum Act § 6401(b)(4), codified at 47 USC § 1451(b)(4).

[16] Spectrum Act §§ 6401(f), 6413, codified at 47 U.S.C. §§ 309(j)(8)(D)(ii), 1457. Amounts remaining in the Public Safety Trust Fund after fiscal year 2022 are required to be deposited into the Treasury's general fund for the purpose of deficit reduction.

the Spectrum Act to be licensed by auction, and thus could represent the first inflow of revenues toward this statutory goal.[17]

5. In this Report and Order, we increase the Nation's supply of spectrum for mobile broadband by adopting flexible use rules for 40 megahertz of spectrum in the 2 GHz band (2000-2020 MHz and 2180-2200 MHz), which we term the AWS-4 band. In so doing, we carry out a recommendation in the *National Broadband Plan* that the Commission enable the provision of stand-alone terrestrial services in the 2 GHz Mobile Satellite Service (MSS) spectrum band, thus dramatically increasing the value of this spectrum to the public. Specifically, we remove regulatory barriers to mobile broadband use of this spectrum, and adopt service, technical, and licensing rules that will encourage innovation and investment in mobile broadband and provide certainty and a stable regulatory regime in which broadband deployment can rapidly occur.

B. Legal Basis

6. The actions are authorized pursuant to sections 1, 2, 4(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, and 333 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 201, 301, 302, 303, 307, 308, 309, 310, 316, 319, 324, 332, and 333, and Section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302.

C. Description and Estimate of the Number of Small Entities To Which the Rules Will Apply

7. The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the rules adopted, herein.[18] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[19] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[20] 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.[21] Below, we describe and estimate the number of small entity licensees that may be affected by the adopted rules.

8. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards that encompass

[17] Concurrently with the issuance of this Report and Order, the Commission is issuing a Notice of Proposed Rulemaking that proposes service, technical, and licensing rules for the H block. *See generally*, Service Rules for the 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, WT Docket No. 12-357, *Notice of Proposed Rulemaking*, FCC 12-152 (adopted Dec. 11, 2012).

[18] 5 U.S.C. § 603(b)(3).

[19] 5 U.S.C. § 601(6).

[20] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 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."

[21] 15 U.S.C. § 632.

entities that could be directly affected by the proposals under consideration.[22] As of 2009, small businesses represented 99.9% of the 27.5 million businesses in the United States, according to the SBA.[23] Additionally, a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[24] Nationwide, as of 2007, there were approximately 1,621,315 small organizations.[25] Finally, the term "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[26] Census Bureau data for 2007 indicate that there were 89,527 governmental jurisdictions in the United States.[27] We estimate that, of this total, as many as 88,761 entities may qualify as "small governmental jurisdictions."[28] Thus, we estimate that most governmental jurisdictions are small.

9. *Satellite Telecommunications and All Other Telecommunications.* The rules adopted in this Order would affect some providers of satellite telecommunications services. Satellite telecommunications service providers include satellite and earth station operators. Since 2007, the SBA has recognized two census categories for satellite telecommunications firms: "Satellite Telecommunications" and "Other Telecommunications." Under the "Satellite Telecommunications" category, a business is considered small if it had $15 million or less in average annual receipts.[29] Under the "Other Telecommunications" category, a business is considered small if it had $25 million or less in average annual receipts.[30]

10. The first category of Satellite Telecommunications "comprises establishments primarily engaged in providing point-to-point telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via

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[22] *See* 5 U.S.C. § 601(3)–(6).

[23] *See* SBA, Office of Advocacy, "Frequently Asked Questions," available at http://web.sba.gov/faqs/faqindex.cfm?areaID=24 (last visited Dec. 11, 2012).

[24] 5 U.S.C. § 601(4).

[25] INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2010).

[26] 5 U.S.C. § 601(5).

[27] U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, Table 427 (2007).

[28] The 2007 U.S Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 local governmental organizations in 2007. If we assume that county, municipal, township, and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,095. If we make the same population assumption about special districts, specifically that they are likely to have a population of 50,000 or less, and also assume that special districts are different from county, municipal, township, and school districts, in 2007 there were 37,381 such special districts. Therefore, there are a total of 89,476 local government organizations. As a basis of estimating how many of these 89,476 local government organizations were small, in 2011, we note that there were a total of 715 cities and towns (incorporated places and minor civil divisions) with populations over 50,000. CITY AND TOWNS TOTALS: VINTAGE 2011 – U.S. Census Bureau, *available at* http://www.census.gov/popest/data/cities/totals/2011/index.html. If we subtract the 715 cities and towns that meet or exceed the 50,000 population threshold, we conclude that approximately 88,761 are small. U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES 2011, Tables 427, 426 (Data cited therein are from 2007).

[29] *See* 13 C.F.R. § 121.201, NAICS code 517410.

[30] *See* 13 C.F.R. § 121.201, NAICS code 517919.

a system of satellites or reselling satellite telecommunications."[31] For this category, Census Bureau data for 2007 show that there were a total of 512 satellite communications firms that operated for the entire year.[32] Of this total, 464 firms had annual receipts of under $10 million, and 18 firms had receipts of $10 million to $24,999,999.[33]

11. The second category of Other Telecommunications is comprised of entities "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."[34] For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.[35] Of this total, 2,346 firms had annual receipts of under $25 million.[36] Consequently, the Commission estimates that the majority of All Other Telecommunications firms are small entities that might be affected by our actions.

12. *Satellite Telecommunications/Mobile Satellite Service Licensees*. Neither the Commission nor the U.S. Small Business Administration has developed a small business size standard specifically for mobile satellite service licensees. The appropriate size standard is therefore the SBA standard for Satellite Telecommunications, which provides that such entities are small if they have $15 million or less in annual revenues.[37] This industry comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.[38] Currently, the Commission's records show that there are 31 entities authorized to provide voice and data MSS in the United States. The Commission does not have sufficient information to determine which, if any, of these parties are small entities. The Commission notes that small businesses are not likely to have the financial ability to become MSS system operators because of high implementation costs, including construction of satellite space stations and rocket launch, associated with satellite systems and services.

13. However, the U.S. Census publishes data about Satellite Telecommunications generally, and this data may well be relevant to the estimate of the number of voice and data MSS. Census data for 2007 indicate that 512 satellite telecommunications firms operated during that year. Of that 512, 290 received annual receipts of $10.0 million or less. 18 firms received annual receipts of between $10.0

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[31] U.S. Census Bureau, 2007 NAICS Definitions, "517410 Satellite Telecommunications."

[32] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=900&-ds_name=EC0751SSSZ4&-_lang=en .

[33] *Id*.

[34] U.S. Census Bureau, 2007 NAICS Definitions, "517919 Other Telecommunications", http://www.census.gov/naics/2007/def/ND517919.HTM.

[35] *See* 13 C.F.R. § 121.201, NAICS code 517919.

[36] U.S. Census Bureau, 2007 Economic Census, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517919" (issued Nov. 2010).

[37] 13 C.F.R. § 121.201, NAICS code 517410.

[38] http://www.census.gov/cgi-bin/sssd/naics/naicsrch.

million and $24, 999.999 and 30 received annual receipts of $25.0 million or more. Since the Census data does not distinguish between MSS and other types of satellite communications companies, it cannot be known precisely, based on Census data, how many of the 31 authorized MSS firms are small.[39] However, since the majority of all satellite telecommunications companies were small under the applicable standard, a limited inference is possible that some of the 31 MSS firms are small. Since it is possible that some MSS companies are small entities affected by this Order, we therefore include them in this section of the FRFA.

14. *Wireless Telecommunications Carriers (except satellite)*. The *Report and Order* applies various Commission policies and rules to terrestrial service in the MSS bands. We cannot predict who may in the future become a licensee or lease spectrum for terrestrial use in these bands. In general, any wireless telecommunications provider would be eligible to become an Advanced Wireless Service licensee or lease spectrum from the MSS or AWS licensees. 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, paging services, wireless Internet access, and wireless video services.[40]

15. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees.[41] Census Bureau data for 2007, which now supersede data from the 2002 Census, show that there were 3,188 firms in this category that operated for the entire year. Of this total, 3,144 had employment of 999 or fewer, and 44 firms had employment of 1,000 employees or more. Thus under this category and the associated small business size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities that may be affected by our actions.[42]

D. Description of Projected Reporting, Recordkeeping, and other Compliance Requirements

16. The projected reporting, recordkeeping, and other compliance requirements resulting from the *Report and 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.

17. Any applicants for licenses of AWS-4 operating authority will be required to file license applications using the Commission's automated Universal Licensing System (ULS). ULS is an online electronic filing system that also serves as a powerful information tool that enables potential licensees to research applications, licenses, and antennae structures. It also keeps the public informed with weekly public notices, FCC rulemakings, processing utilities, and a telecommunications glossary. Licensees of

[39] http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodType=table

[40] http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517210&search=2007%20NAICS%20Search

[41] 13 C.F.R. § 121.201, NAICS code 517110.

[42] *See* http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-_skip=600&-ds_name=EC0751SSSZ5&-_lang=en

AWS-4 operating authority that must submit long-form license applications must do so through ULS using Form 601,[43] FCC Ownership Disclosure Information for the Wireless Telecommunications Services using FCC Form 602, and other appropriate forms.[44]

E. Steps taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

18. The RFA requires an agency to describe any significant alternatives that it has considered in reaching 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 or reporting requirements under the rule for 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 small entities.[45]

19. As we provide in this *Report and* Order, licensing the AWS-4 bands under Economic Areas (EA) geographic size licenses will provide regulatory parity with other AWS bands that are licensed on an EA basis, such as AWS-1 B and C block licenses. Additionally, assigning AWS-4 in EA geographic areas will allow AWS-4 licensees to make adjustments to suit their individual needs. EA license areas are small enough to provide spectrum access opportunities for smaller carriers. EA license areas also nest within and may be aggregated up to larger license areas that have been used by the Commission for other services, such as Major Economic Areas (MEAs) and Regional Economic Area Groupings (REAGs) for those seeking to create larger service areas. Licensees may also adjust their geographic coverage through secondary markets. These rules should enable licensees of AWS-4 operating authority, or any entities, whether large or small, providing service in other AWS bands to more easily adjust their spectrum to build their networks pursuant to individual business plans.

20. This *Report and Order* adopts rules to protect entities operating in nearby spectrum bands from harmful interference, which may include small entities. The technical rules adopted in the *Report and Order* are designed, among other things, to protect broadband PCS services operating in the 1930-1995 MHz band, future services operating in the 1995-2000 MHz band, and Federal operations in the 2200-2290 MHz band from harmful interference from AWS-4 operations.

21. The *Report and Order* provides licensees of AWS-4 authority with the flexibility to provide any fixed or mobile service that is consistent with the allocations for this spectrum, which is consistent with other spectrum allocated or designated for licensed fixed and mobile services, *e.g.*, AWS-1. The *Report and Order* further provides for licensing of this spectrum under the Commission's market-oriented Part 27 rules. This includes applying the Commission's secondary market policies and rules to all transactions involving the use of AWS-4 bands for terrestrial services, which will provide greater predictability and regulatory parity with bands licensed for terrestrial mobile broadband service. These rules should make it easier for AWS-4 providers to enter secondary market arrangements involving terrestrial use of their spectrum. The secondary market rules apply equally to all entities, whether small or large. As a result, we believe that this will provide an economic benefit to small entities by making it easier for entities, whether large or small, to enter into secondary market arrangements for AWS-4 spectrum.

[43] 47 C.F.R. § 1.913(a)(1).

[44] 47 C.F.R. § 1.2107

[45] 5 U.S.C. § 604(a)(6).

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Rules

22. None.

G. Report to Congress

23. The Commission will send a copy of the *Report and Order*, including the FRFA, in a report to Congress pursuant to the Congressional Review Act.[46] In addition, the Commission will send a copy the *Report and Order*, including FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *Report and Order* and FRFA (or summaries thereof) will be published in the Federal Register.[47]

[46] *See* 5 U.S.C. § 801(a)(1)(A). The Congressional Review Act is contained in Title II, § 251, of the CWAAA, *see* Pub. L. No. 104-121, Title II, § 251, 110 Stat. 868.

[47] *See* 5 U.S.C. § 604(b).

APPENDIX C

List of Commenters to *AWS-4 NPRM and NOI*

Comments
Alcatel-Lucent (Alcatel)
AT&T Services, Inc. (AT&T)
Computer & Communications Industry Association (CCIA)
Consumer Electronics Association (CEA)
COMPTEL
Council Tree Investors, Inc. (Council Tree)
CTIA—The Wireless Association (CTIA)
DECT Forum (DECT)
Deere & Company (Deere)
DISH Network Corporation (DISH)
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS)
Globalstar, Inc.
Greenwood Telecommunications Consultants, LLC (Greenwood)
Iridium Satellite LLC (Iridium)
Information Technology Industry Council (ITI)
LightSquared Inc.
MetroPCS Communications, Inc. (MetroPCS)
Mobile Satellite Users Association (MSUA)
Motorola Mobility, Inc. (Motorola)
Nokia Siemens Network (Nokia)
National Rural Telecommunications Cooperative (NRTC)
National Telecommunications Cooperative Association (NTCA)
New America, Public Knowledge, and Consumers Union (Public Interest Organizations/PIO)
NTCH, Inc.
RCA- The Competitive Carriers Association (RCA)
Satellite Industry Association (SIA)
Silicon Flatirons Center, University of Colorado (Silicon Flatirons)
Sprint Nextel Corporation (Sprint)
Telecommunications Industry Association (TIA)
T-Mobile USA, Inc. (T-Mobile)
United States Cellular Corporation (US Cellular/USCC)
US GPS Industry Council (USGIC)
UTAM, Inc.
Verizon Wireless

Reply Commenters
AMS Corporation (AMS)
AT&T
CCIA
CTIA
DECT
DISH
Globalstar
Greenwood
Iridium
LightSquared

MetroPCS
NRTC
Nokia
PIO
Rural Telecommunications Group, Inc. (RTG)
Sprint
USCC
US GIC
UTAM
Utilities Telecom Council
Verizon Wireless