

**Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions)	Docket No. 12-268
)	
)	
Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band)	WT Docket No. 08-166
)	
)	
Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television Transition)	WT Docket No. 08-167
)	
)	
Amendment of Parts 15, 74 and 90 of the Commission's Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones)	ET Docket No. 10-24
)	

To: The Commission

**REPLY COMMENTS OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

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SUMMARY

An important facet of this proceeding is the maximization and optimization of unlicensed spectrum for fixed wireless broadband. In its Reply Comments, the Wireless Internet Service Providers Association (“WISPA”) urges the Commission to adopt rules, policies and practices that will help bring this objective to fruition, without harming the interference protection rights of incumbents or disrupting the auction of the 600 MHz band.

Several parties noted the public interest benefits resulting from the continued availability of TV white space spectrum, especially in areas where other terrestrial broadband platforms are least likely to provide service. The superior propagation characteristics of the TV bands spectrum will reduce infrastructure costs and expedite service. Other unlicensed bands that are under consideration by the Commission do not offer the same benefits, and rules have not even been adopted to ensure cost efficient outdoor deployment. Recent events also demonstrate that wide-scale deployment of white space equipment is just around the corner.

WISPA and others urged the Commission to take several steps to optimize the white space spectrum that will remain following the auction and repacking processes. First, the Commission can and should allow opportunistic use of Channel 37 outside of geographic zones that protect radioastronomy (“RAS”) and wireless medical telemetry systems (“WMTS”). The record demonstrates that the TV bands databases can address the concerns of RAS and WMTS interests concerned about the potential for interference. The Commission also should continue to investigate whether Channel 37 incumbents can be relocated to other spectrum.

Second, as several parties recommended, the exclusive two-channel reservation for wireless microphones should be eliminated. Instead, wireless microphones should first use co-channel spectrum under new rules that will reduce the distance separation. As WISPA has long advocated, the two reserved channels should be *non-exclusive* so that in areas where the two

channels are not being used at a particular time or place, other unlicensed devices can, with the benefit of the databases, share the channels. Any additional spectrum that microphones may require can be reserved via the databases, but only on spectrum below Channel 21. In all cases, wireless microphones should reserve only the spectrum that they plan to use, not a full six megahertz. This hierarchy will preserve the same amount of spectrum for wireless microphones, but in a more spectrally efficient way that allows non-interfering opportunistic use by unlicensed devices.

Third, the Commission should encourage, if not require, channel sharing for secondary TV stations, a view that low power television interests support. As a number of parties suggest, the Commission should enforce its secondary television rules to ensure that non-operating stations do not remain in the TV bands databases.

Fourth, the Commission should allow unlicensed uses of licensed 600 MHz spectrum in areas where the licensee is not operating. The secondary market does not provide an adequate opportunity for wireless Internet service providers (“WISPs”) to acquire spectrum rights from licensees, and the ability to use auctioned but unused white space spectrum will not harm licensees’ rights. WISPA also supports allowing unlicensed access if a licensee fails to meet its build-out requirements.

Several parties agreed with WISPA that the Commission should auction 600 MHz spectrum by Cellular Market Areas. WISPA explained that the objections of large mobile wireless carriers could be addressed by auctioning a “geographic mix” of spectrum.

Finally, the Commission should consider ways to make more white space spectrum available for unlicensed uses. One example would be the reduction of the adjacent-channel restriction on fixed devices.

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**REPLY COMMENTS OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

The Wireless Internet Service Providers Association (“WISPA”), pursuant to Sections 1.415 and 1.419 of the Commission’s Rules, hereby provides its Reply Comments addressing certain of the Comments filed in response to the Notice of Proposed Rulemaking (“NPRM”)¹ and the Public Notice² in the above-captioned proceedings. As in its initial

¹ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, FCC 12-118, Docket No. 12-268 (rel. Oct. 2, 2012); *see also Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Order, DA 12-1916, Docket No. 12-268, *et al.* (rel. Nov. 29, 2012) (extending the deadline for filing Reply Comments to March 12, 2013).

² Public Notice, *The Wireless Telecommunications Bureau and the Office of Engineering and Technology Seek to Update and Refresh the Record in the Wireless Microphones Proceeding*, DA 12-1570, WT Docket Nos. 08-166, 08-167, ET Docket No. 10-24 (rel. Oct. 5, 2012); *see also Revisions to the Rules Authorizing the Operation of Low*

Comments,³ WISPA's focus is primarily on ensuring that the Commission optimizes the availability of unlicensed TV band spectrum above Channel 20 to stimulate the growth and expansion of fixed wireless broadband deployments. To this end, WISPA agrees with those commenters that support efficient spectrum planning and management in the re-packing process and policies that will stimulate innovation and enable responsible spectrum sharing with other users.

Introduction

I. THE RECORD DEMONSTRATES THE BENEFITS OF UNLICENSED SPECTRUM TO FIXED BROADBAND DEPLOYMENT.

The WISPA Comments documented the importance of unlicensed spectrum to the extension of affordable fixed broadband services to rural, unserved and underserved areas of the country. A large number of other commenters echoed these benefits in urging the Commission to preserve the TV white spaces and to re-pack the TV band spectrum in a spectrally efficient way in order to optimize the remaining white space for unlicensed fixed use.

The Public Interest Spectrum Coalition ("PISC") observed that rural wireless Internet service providers ("WISPs") need access to white space spectrum to expand coverage, stating that "[t]he ability of WISPs to access unlicensed spectrum without competitive bidding eliminates a significant barrier to entry, thereby benefitting consumers who would not otherwise have access to fixed broadband service."⁴ In their joint Comments, Google Inc. and Microsoft Corp. ("Google/Microsoft") stated that "[a]dditional unlicensed spectrum, particularly in the TV

Power Auxiliary Stations in the 698-806 MHz Band, Order, DA 12-1926, WT Docket Nos. 08-166, 08-167, ET Docket No. 10-24 (rel. Nov. 30, 2012) (extending the deadline for filing Reply Comments to March 12, 2013).

³ Comments of WISPA, Docket No. 12-268, *et al.* (Jan. 25, 2013) ("WISPA Comments").

⁴ Comments of the Public Interest Spectrum Coalition, Docket No. 12-268, *et al.* (Jan. 25, 2013) ("PISC Comments") at 17.

band, with its superior propagation characteristics for wide-range, non-line of sight operations, will facilitate further broadband expansion by WISPs into areas least likely to be served by traditional ISPs.”⁵ Even the Telecommunications Industry Association (“TIA”), which generally favors licensed spectrum, “supports the continued availability of TV white spaces for unlicensed use now and in the future. Although fewer TV white spaces will be available after the post-auction repacking, those that remain will offer significant opportunities for new unlicensed uses.”⁶

Since the filing of initial Comments, the Commission has taken additional steps in the process to facilitate use of unlicensed TV white space spectrum. First, the Commission authorized nationwide use of the Spectrum Bridge and Telcordia databases,⁷ which will enable certified equipment to be deployed on TV white space spectrum anywhere in the country. Second, the Commission gave the green light to Google⁸ and Key Bridge Global LLC⁹ to conduct public trials of their TV bands databases. Third, it is believed that a number of manufacturers have submitted devices to the Commission for equipment and database compatibility certification. As devices are certified, production lines can be ramped up and additional unlicensed white space equipment can be deployed in the field. These encouraging

⁵ Comments of Google Inc. and Microsoft Corp., Docket No. 12-268 (Jan. 25, 2013) (“Google/Microsoft Comments”) at 17.

⁶ Comments of the Telecommunications Industry Association, Docket No. 12-268 (Jan. 25, 2013) (“TIA Comments”) at 12; *see also* Comments of The Boeing Company, Docket No. 12-268 (Jan. 25, 2013) (“Boeing Comments”) at 3.

⁷ Public Notice, *Office of Engineering and Technology Authorizes TV White Space Database Administrators to Provide Service to Unlicensed Devices Operating on Unused TV Spectrum Nationwide*, DA 13-324 (rel. Mar. 1, 2013).

⁸ Public Notice, *Office of Engineering and Technology Announces the Opening of Public Testing for Google Inc.’s TV Band Database System*, DA 13-297 (rel. Feb. 27, 2013).

⁹ Public Notice, *Office of Engineering and Technology Announces the Opening of Public Testing for Key Bridge Global LLC’s TV Band Database System*, DA 13-328 (rel. Mar. 4, 2013).

developments – all of which have occurred in the last month and are continuing – demonstrate the Commission’s vested interest in promoting unlicensed white space deployment and the industry’s enthusiastic interest in fostering innovation and bringing new devices and services to market. Simply put, despite the uncertainties associated with the legislative and regulatory environment and the challenges of creating new technology, our nation is on the verge of wide-scale use of existing, unlicensed white space spectrum.

While not directly critical of unlicensed use of TV bands spectrum, a few commenters extolled the potential benefits of the 5 GHz bands that are currently being considered for unlicensed use.¹⁰ WISPA agrees that these bands as well as the 3550-3650 MHz band¹¹ offer much promise for additional unlicensed spectrum that WISPs need. Indeed, the proximity of these bands to existing bands that have been used for many years for outdoor fixed wireless broadband services suggests that WISPs will have strong interest in advocating for unlicensed use of this additional spectrum. That said, however, the possibility that spectrum above 3 GHz may, at some undetermined future point, be available for outdoor unlicensed use does not contravene the need for continued access to unlicensed TV bands spectrum below 1 GHz. TV white space spectrum propagation characteristics are unmatched in their ability to be used in areas where wireless paths are obstructed by trees, terrain and man-made obstructions, whereas

¹⁰ See, e.g., TIA Comments at 12 (opining that “other spectrum, such as the 5350-5470 MHz band, holds tremendous promise for unlicensed use”); Comments of Cisco Systems, Inc., Docket No. 12-268 (Jan. 25, 2013) (“Cisco Comments”) at 9-10 (noting importance of “opening more spectrum” in the 5 GHz band for unlicensed Wi-Fi). The Commission recently adopted a Notice of Proposed Rulemaking to consider rules for the 5350-5470 MHz and 5850-5925 MHz bands. See *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 13-49, FCC 13-22 (rel. Feb. 20, 2013).

¹¹ The Commission has initiated a proceeding to consider rules for the 3550-3650 MHz band. See *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, GN Docket No. 12-354, FCC 12-148 (rel. Dec. 12, 2012). WISPA filed extensive Comments in that proceeding favoring shared use with governmental and commercial users that would make available additional spectrum for fixed use and drive equipment innovation. See Comments of WISPA, GN Docket No. 12-354 (Feb. 20, 2013).

the Commission has only just begun to consider rules for the higher frequency bands with inferior propagation characteristics.¹²

II. THE RECORD REFLECTS A STRONG DESIRE TO RE-PACK THE TV BANDS TO PROMOTE ACCESS TO UNLICENSED SPECTRUM FOR FIXED USE.

As WISPA and other commenters observed, Section 15.712(a) of the Commission's Rules requires there to be three full channels (18 megahertz) of contiguous spectrum in order for one channel (6 megahertz) to be available for fixed use.¹³ This imposes significant limitations on the availability and use of white space spectrum, and mandates careful and spectrally efficient re-packing so that the maximum number of contiguous white space channels above Channel 20 remains available for unlicensed fixed use. WISPA and others recommended several steps that the Commission can and should take to ensure that re-packed spectrum is both maximized and optimized for fixed broadband use. The record supports adoption of these rules, policies and procedures.

A. To The Extent Possible, The Commission Should Allow Unlicensed Use Of Channel 37.

The Commission received much support for its proposal to allow unlicensed use of TV Channel 37 where radioastronomy ("RAS") and wireless medical telemetry systems ("WMTS") can be protected through the TV bands databases.¹⁴ When the TV white space rules were first conceived, the Commission had no experience in geolocation databases and made the safe choice

¹² In addition, as Google/Microsoft explain, the existing 5 GHz bands are subject to "a series of highly restrictive technical limitations." Google/Microsoft Comments at 27. Although it is too early to tell whether these or other restrictions will be imposed on the new commercial allocations in the 5 GHz band, the operating restrictions for additional U-NII operations demonstrate that not all unlicensed bands are fungible.

¹³ See Comments of WhiteSpace Alliance, Docket No. 12-268 (Jan. 25, 2013) ("WSA Comments") at 8; Google/Microsoft Comments at 50.

¹⁴ See *NPRM* ¶ 237.

to preclude unlicensed use of Channel 37 nationwide, even though existing RAS and WMTS operations are “fixed and static.”¹⁵ Now, however, database administrators have been selected and certified, and the ability of commercial databases to protect incumbents in identifiable geographic exclusion zones is not in question.

In addition to WISPA,¹⁶ several parties filed Comments supporting unlicensed use of Channel 37. For instance, PISC concluded that “[w]hile opportunistic unlicensed access to the unused portions of channel 37 appears to have no substantial downside for incumbents, there are important public interest benefits to putting this currently fallow spectrum to work.”¹⁷ Similarly, WSA urged the Commission to “allow for opportunistic use of the [Channel 37] spectrum by unlicensed devices in areas where the spectrum is not being used.”¹⁸ WSA suggested that the existing WMTS database could be imported into the TV white space database, which would be an expeditious way to permit unlicensed use outside of protected areas. Neul Limited (“Neul”), a developer of machine-to-machine technology in the unlicensed TV bands, noted the “problematic” emission notch required for Channel 37 and agreed that unlicensed access to Channel 37 spectrum “would be of enormous value to white space users.”¹⁹ Spectrum Bridge, Inc. (“Spectrum Bridge”), one of the two certified TV bands database administrators, agreed that “[t]he existing TV White Space database can handle the management of these facilities.”²⁰

¹⁵ PISC Comments at 28.

¹⁶ See WISPA Comments at 14-17.

¹⁷ *Id.* at 29.

¹⁸ WSA Comments at 27-28.

¹⁹ Comments of Neul Limited, Docket No. 12-268 (Jan. 25, 2013) (“Neul Comments”) at 2-3.

²⁰ Comments of Spectrum Bridge, Inc., Docket No. 12-268, *et al.* (Jan. 23, 2013) (“Spectrum Bridge Comments”) at 9.

Boeing stated its belief that “well-considered protection areas” would protect WMTS from interference.²¹ Spectrum Bridge and PISC also agreed with WISPA that, within the protected geographic zones, unlicensed users should be permitted to negotiate with RAS and WMTS incumbents for use, as the rules in the 3650-3700 MHz band allow.²²

A few commenters sought to preserve the *status quo*. Notably, and in contrast to the views taken by Spectrum Bridge, an experienced database administrator, the WMTS Coalition apparently lacks confidence in the ability of databases or other spectrum sharing techniques to adequately protect WMTS devices from interference. It seeks “absolute assurance” that protection zones would be large enough to ensure that WMTS devices are protected from interference, interference mitigation techniques will be 100 percent reliable and a proven frequency coordination process is highly accurate.²³ GE Healthcare argued against unlicensed use of Channel 37, claiming that “large exclusion distances would be necessary to prevent the fundamental emissions of unlicensed devices in Channel 37 from causing harmful interference to WMTS operations.”²⁴

WISPA believes that these conditions and concerns can be met by ensuring the accuracy of the location and operating parameters of WMTS devices and by establishing adequate protection zones that are registered in the TV bands databases and are designed to keep unlicensed devices from operating within those zones.²⁵ WISPA and other commenters agree

²¹ Boeing Comments at 3.

²² *See id.* at 10; *see also* PISC Comments at 30; WISPA Comments at 15-16.

²³ Initial Comments of the WMTS Coalition, Docket No. 12-268 (Jan. 25, 2013) (“WMTS Coalition Comments”) at 21.

²⁴ Comments of GE Healthcare, Docket No. 12-268 (Jan. 25, 2013) (“GE Healthcare Comments”) at 32.

²⁵ To the extent the Commission lacks sufficient data on the size of WMTS protection zones, it should issue a public notice seeking further comment.

that WMTS devices can and should be included in the white space databases. For instance, PISC stated that “it should be straightforward to define and enforce exclusion zones using the TV Bands Database.”²⁶ To the extent that a geolocation database would require all WMTS devices to “be known, registered, and/or capable of being identified,” this task is not as “daunting” as GE Healthcare might believe.²⁷ To address “deployment accuracy” issues associated with existing WMTS facilities (*e.g.*, differences between the actual location and the current “protection location” of the device), the Commission can afford WMTS registrants an opportunity to update and correct the database in connection with the transition of the existing WMTS database to the TV bands databases.²⁸ In addition, there is nothing about the databases that will prevent new devices from being added and protection zones from being established – indeed, changes in contours are an integral feature of geolocation databases and the provisions of Commission rules that require white space devices to query a database on a daily basis. The potential for shared use of Channel 37 should not fall victim to inaccurate data that WMTS users themselves inserted into the existing WMTS database, or that they failed to register in the first place. For the entire country to be foreclosed from using six megahertz of spectrum, including vast rural areas where no RAS and WMTS incumbents are nearby, would simply be irresponsible spectrum management.

In supporting the Commission’s proposal,²⁹ WISPA initially proposed that, over time, the Commission should attempt to relocate RAS and WMTS to other bands.³⁰ A few commenters

²⁶ PISC Comments at 28; *see also* Neul Comments at 5.

²⁷ GE Healthcare Comments at 32-33.

²⁸ *See* WMTS Coalition Comments at 22.

²⁹ *See NPRM ¶¶* 211-213.

³⁰ *See* WISPA Comments at 14.

claim that the relocation costs will far exceed the \$300 million allocated by Congress for relocation.³¹ To the extent the Commission is convinced that relocation costs will far exceed \$300 million, it should not abandon its plan to allow opportunistic use of Channel 37 outside of designated database-protected zones. To the extent the Commission determines that relocation costs would not be prohibitive or that more cost information is needed to complete the record, the Commission should continue to investigate relocation. In either event, the Commission should not delay allowing use of Channel 37 for unlicensed devices.

B. The Commission Should Take Steps To Ensure That Wireless Microphones Do Not Reserve Or Occupy More Spectrum Than They Require.

In addition to the WISPA Comments,³² the Commission received a number of Comments advocating elimination of the exclusive two-channel reservation for wireless microphones. Emerging from these Comments is a spectrally efficient hierarchy that would ensure adequate spectrum for wireless microphones while mitigating the potential disruption to unlicensed TV bands devices from intermittent microphone use. Significantly, this structure does not diminish the amount of spectrum available to wireless microphones, but rather ensures that unlicensed TV bands spectrum can be shared and used most efficiently.

First, wireless microphones should be encouraged to use spectrum that is co-channel with TV spectrum, and the Commission should reduce the co-channel distance separation criterion to allow more wireless microphones to be deployed in closer proximity to TV stations.³³

³¹ See, e.g., WMTS Coalition Comments at 17 (estimating over \$2 billion in out-of-pocket equipment costs for relocation); GE Healthcare Comments at 10 (estimating over \$2 billion in WMTS replacement costs); Comments of AT&T Inc., Docket No. 12-268 (Jan. 25, 2013) at 39 (stating that relocation would be “challenging” because of the costs).

³² See WISPA Comments at 17-20.

³³ See NPRM ¶ 223.

Unlicensed TV bands devices are prohibited from operating on these channels within the defined protection zones and, as PISC pointed out, this “appears to be one reason they are desirable to many professional microphone operators.”³⁴ Relying on the Spectrum Bridge and Telcordia TV bands databases and Shure’s own microphone channel search database, PISC offered a detailed analysis showing that “even in the single most congested urban market, there appears to be no need for wireless microphones to occupy unlicensed TV White Space channels – or even the two vacant microphone reserve channels – except as a last resort for special events.”³⁵ Spectrum Bridge noted that it “is already common practice” for wireless microphones to use co-channel TV spectrum.³⁶

Not only is co-channel spectrum the “cleanest” for wireless microphones, it also can be used more efficiently if the required 113 kilometer (70 mile) separation distance between wireless microphones and co-channel TV stations were reduced. To its credit, Sennheiser, a leading wireless microphone manufacturer, agreed with this objective, suggesting “a simpler rule” that would allow wireless microphones “to operate at locations where a co-channel TV signal is below a specified threshold.”³⁷ Sennheiser noted that by determining the signal level of the TV station at the microphone location, the benefits of wall attenuation can be taken into account, presumably reducing the actual distance that would be required to protect co-channel TV stations. Likewise, Shure stated that “there are special circumstances under which wireless

³⁴ PISC Comments at 35; *see also* Boeing Comments at 4 (recommending reduction of the distance separation criterion).

³⁵ *Id.* at 36.

³⁶ Spectrum Bridge Comments at 9; *see also* PISC Comments at 35 (“common practice” for microphones to use co-channel spectrum); Google/Microsoft Comments at 53 (“widespread” co-channel operations); WSA Comments at 34.

³⁷ Comments of Sennheiser Electronic Corporation, Docket No. 12-268 (Jan. 25, 2013) at 11; *see also* PISC Comments at 38 (proposing choice of either simple geographic separation or actual received signal strength at the microphone location)

microphones could operate on locally used co-channel TV frequencies within the TV Station's contour without causing interference, such as inside buildings or other structures where over-the-air TV signals are not receivable or where no over-the-air receivers are in operation.”³⁸ Given the prohibition on other unlicensed devices on co-channel spectrum inside protected areas and the likelihood that wireless microphones can use that spectrum more efficiently, co-channel spectrum should be the preferred location for wireless microphones.

Second, if there are no co-channel slots available for wireless microphones, the two reserved channels should remain available, but on a *non-exclusive* basis. WISPA has long supported non-exclusive use of reserved channels because it affords priority to wireless microphones but does not preclude shared use by TV bands devices when and where wireless microphones are not then occupying the spectrum.³⁹ Spectrum Bridge agreed with this position, stating that “[p]riority should be given to wireless microphones but when these channels are unoccupied they should be available for white space devices.”⁴⁰ PISC similarly stated that “the two microphone channels should be opened more generally for unlicensed TVBDs at any time and place wireless microphone operators have not made a qualified reservation.”⁴¹ Neul concurred: “Allowing whitespace devices to operate in the two channels designated for use by wireless microphone would improve the spectral usage of those bands.”⁴²

³⁸ Comments of Shure Incorporated, Docket No. 12-268, *et al.* (Jan. 25, 2013) (“Shure Comments”) at 25. Shure also observed that the database “presents the possibility of allowing co-channel operation of licensed microphones through database registration. In the event that any interference were to occur, the source could be identified through the database and turned off.” *Id.*

³⁹ See WISPA’s Consolidated Opposition to Petitions for Reconsideration, ET Docket No. 04-186 and 02-380 (May 8, 2009) at 6-8; *see also* WISPA Comments at 20.

⁴⁰ Spectrum Bridge Comments at 9.

⁴¹ PISC Comments at 41.

⁴² Neul Comments at 6-7.

Wireless microphone access to these channels would be through reservation in the TV white space databases, as several commenters, including NAB, recommend.⁴³ This approach would appear to accommodate NAB’s request that the Commission “preserve the two reserved channels *or develop some other mechanisms* to ensure that licensed wireless microphones and other Part 74 operations are protected and continue to provide ‘live’ coverage of news and weather and other important events.”⁴⁴ If wireless microphones in fact require co-channel spectrum and two TV bands channels, they will have priority use of that spectrum. The two reserve channels would only be shared if they are unoccupied at a given time and place, as determined by the databases. This will not disturb the *status quo* where, as Shure stated, wireless microphones are “guaranteed to be free from interference.”⁴⁵ As Google/Microsoft put it, “[t]his approach will ensure that Part 74 wireless microphone users will always have two channels where they can be assured of primary rights through a white spaces database, and both non-Part 74 wireless microphone users and users of white spaces devices will have access to these channels on an unlicensed basis.”⁴⁶

Third, in the unlikely event that co-channel and reserved channel spectrum is exhausted (as determined by database reservation) and licensed wireless microphones require more spectrum for a particular event, additional spectrum can be reserved through the database. This would appear to be extremely unlikely given The Broadway League’s assurance that it is able to use existing spectrum resources to enable coordinated and interference-free operations in the

⁴³ See, e.g., National Association of Broadcasters (“NAB Comments”) at 48; WISPA Comments at 19; Spectrum Bridge Comments 9; PISC Comments at 41; Neul Comments at 7; WSA Comments at 35.

⁴⁴ NAB Comments at 48 (emphasis added).

⁴⁵ Shure Comments at 15.

⁴⁶ Google/Microsoft Comments at 51-52.

heart of the Broadway theatre district.⁴⁷ Further, such reservations should be limited to TV channels below Channel 21. As WISPA stated in its Comments, personal/portable devices are prohibited below Channel 21, and fixed unlicensed operations likely will focus on operations on Channel 21 and above.⁴⁸ Through spectral separation, the potential for disruption for unlicensed devices would be reduced where intermittent wireless microphone use is necessary.

In addition to the foregoing wireless microphone spectrum access hierarchy, WISPA reiterates its strong view that wireless microphones register only the spectrum they actually will use. It is spectrally inefficient for a wireless microphone to preclude use of an entire six megahertz channel where the microphone is only using 200 kHz. Spectrum Bridge concurred, stating that “[w]ireless microphones are over protected when they are allocated a full 6 MHz TV channel. Wireless microphones should not be allocated more than 200 KHz and the industry should be encouraged to use available technologies to reduce this to 50KHz.”⁴⁹ Tellingly, Shure asked the Commission to reduce the occupied bandwidth, stating that:

Shure agrees that the Commission should reduce the permissible occupied bandwidth below 200 kHz for both analog and digital wireless microphones. This step will immediately increase spectrum efficiency in the market place. These tighter limits would help promote better use of scarce spectrum resources and improve compatibility between different wireless microphone systems.⁵⁰

If the “permissible occupied bandwidth” is reduced, it follows that spectrum reservation through the databases should provide only as much protection as wireless microphones need.

The proposals above do not reduce the amount of spectrum that would be available to wireless microphones on a priority basis, but do promote more efficient use of TV bands

⁴⁷ See Comments of The Broadway League, Inc., Docket No. 12-268 (Jan. 25, 2013) at 12.

⁴⁸ See WISPA Comments at 19.

⁴⁹ Spectrum Bridge Comments at 8.

⁵⁰ Shure Comments at 35-36.

spectrum. Accordingly, based on the record before it, the Commission should adopt these recommendations.

C. The Record Supports Channel Sharing Among Secondary TV Licensees And Strict Enforcement Of Operating Rules.

WISPA supported the Commission's proposal to allow low power television ("LPTV") and TV translator stations to share spectrum with each other and with full-power and Class A TV stations as a means to free up additional unlicensed spectrum and to reduce infrastructure and operational costs for LPTV licensees.⁵¹ PISC agreed that the Commission should promote sharing where it appears "technically feasible for as substantial number of stations and markets," noting that the Commission has already authorized channel sharing among full-power stations that are eligible to participate in the incentive auction.⁵² Likewise, Spectrum Bridge suggested that the Commission "encourage the sharing of channels that make financially marginal stations viable."⁵³ SpectrumEvolution, a company representing the interests of some LPTV stations, also supported channel-sharing.⁵⁴ WSA similarly urged TV broadcasters to multiplex their transmissions to improve spectral efficiency.⁵⁵ The record demonstrates little or no opposition to channel-sharing, and it therefore should be implemented.

⁵¹ See WISPA Comments at 22, *citing NPRM* ¶ 359.

⁵² PISC Comments at 55. PISC proposed to *require* secondary broadcasters to channel share, and recommended that the Commission conduct a feasibility study in the 30 largest DMAs. See *id.* WISPA does not object to this suggestion.

⁵³ Spectrum Bridge Comments at 7.

⁵⁴ See Comments of SpectrumEvolution, Inc., Docket No. 12-268 (Jan. 25, 2013) at 11-12.

⁵⁵ See WSA Comments at 30.

In addition, WISPA asked the Commission to enforce its LPTV operating rules to ensure that only legitimate, operating stations are protected in the TV bands database.⁵⁶ Spectrum Bridge⁵⁷ and PISC⁵⁸ both echoed these views. Based on the record, the Commission should authorize diligently enforce its operational rules for secondary TV stations.

D. The Public Interest Supports Unlicensed Use Of The 600 MHz Spectrum Band Until Licensees Commence Service In The Area Served By The Unlicensed Users.

WISPA endorsed an approach that would allow unlicensed devices to continue to operate in the TV bands following the auction process, until such time as the licensee commences service in the each geographic area where unlicensed operation is taking place.⁵⁹ Spectrum Bridge observed that “[i]t could take years for rural build out of auctioned spectrum to occur and it does not have to remain fallow during that period if white space rules are applied and managed by a database.”⁶⁰ In addition to database protection and rules that require white space devices to query the database on a daily basis, WISPA proposed a notification and public notice process that would facilitate a high degree of confidence that the licensee’s operations would be accurately reflected in the database.⁶¹ As WISPA stated, “continued operations of an existing service should be permissible where they will not disrupt the new licensee’s operations.”⁶² PISC advocated a similar approach, emphasizing database governance and confirming that “[l]icensees

⁵⁶ See WISPA Comments at 23-25.

⁵⁷ See Spectrum Bridge Comments at 7.

⁵⁸ See PISC Comments at 49-53.

⁵⁹ See WISPA Comments at 26-28.

⁶⁰ Spectrum Bridge Comments at 5.

⁶¹ See *id.*

⁶² *Id.* at 28.

lose no rights whatsoever and bear a *de minimus* burden to simply inform the Commission and one of the TV Bands Database administrators prior to commencing substantial service in a particular local area.”⁶³ The White Space Database Administrators likewise stated that:

If spectrum is not being used by a licensee, it is technologically feasible for the FCC to allow database administrators to include unused spectrum in their databases. Database administrators then have the capability to make that spectrum available for use by unlicensed devices. While temporary local use of fallow spectrum may not have been practical in the past, the Commission’s ongoing certification of databases to govern opportunistic and conditional access by frequency-hopping radios makes this approach entirely feasible and relatively inexpensive.⁶⁴

The Commission should adopt this approach to allow unlicensed use prior to licensed service commencement in a particular area.

CTIA opposed any such opportunistic use and instead asserted that the Commission’s secondary market framework can enable use by non-licensees.⁶⁵ While this may make theoretical sense, WISPs have found it exceedingly difficult to acquire, lease or sublease spectrum from entities that hold licenses, even in areas where the licensee is not using its spectrum and has no plans to deploy in the near term. Based on the experiences of its members, WISPA therefore disagrees with CTIA’s claim that the “Commission’s existing secondary market policies are performing quite well in allowing the marketplace to put spectrum in the hands of those who value it most.”⁶⁶ To the contrary, the Commission’s rules do not adequately prevent “legal warehousing” of spectrum. Moreover, under current rules, if a TV broadcaster

⁶³ PISC Comments at 57.

⁶⁴ Comments of the White Space Database Administrators, Docket No. 12-268 (Jan. 25, 32013) at 3 (footnote omitted).

⁶⁵ See Comments of CTIA – The Wireless Association, Docket No. 12-268 (Jan. 25, 2013) (“CTIA Comments”) at 40.

⁶⁶ *Id.* at 38.

goes dark, the spectrum becomes unlicensed white space; the rules should be no different if spectrum is unused by a 600 MHz licensee. If and when the Commission elects to re-assign the spectrum through a subsequent auction or some other process, the databases can again require the unlicensed user to cease operations in the particular locality.

Allowing opportunistic use in areas where a 600 MHz licensee is not serving would enable unlicensed opportunistic services to operate and provide additional incentive for licensees to build out and promote spectral efficiency. Short of creating the “chaotic environment” CTIA envisions,⁶⁷ this regime can be implemented and governed in an orderly way.

In addition to supporting pre-launch unlicensed use, Google/Microsoft advocates allowing continuing unlicensed access if the licensee fails to meet its build-out requirement.⁶⁸ Verizon disagrees, suggesting that the Commission should do what it has always done and reclaim unused spectrum for re-auction.⁶⁹ The problems with Verizon’s approach are that licensees often litigate for additional time to construct and the Commission often fails to re-auction the spectrum in a timely manner – all the while leaving the spectrum fallow. Allowing unlicensed use does not disturb these practices (should the Commission continue to follow them). It merely allows continued unlicensed use until a licensee, whether the initial licensee or a subsequent one, commences service in a particular area. Further, a licensee has ample opportunity to avoid this result by leasing its spectrum to help meet build-out requirements. The Commission should adopt the approach recommended by Google/Microsoft. To fail to authorize continued unlicensed use until a licensee eventually builds out only takes spectrum unused by the

⁶⁷ *Id.* at 41.

⁶⁸ *See* Google/Microsoft Comments at 45.

⁶⁹ *See* Comments of Verizon and Verizon Wireless, Docket No. 12-268 (Jan. 25, 2013) (“Verizon Comments”) at 67.

broadcast industry and transforms it into spectrum unused by the mobile broadband industry. This result flies in the face of the Commission's goal of promoting spectral efficiency.

III. THE COMMISSION SHOULD ADOPT RULES THAT PROMOTE PARTICIPATION BY SMALL ENTITIES IN THE FORWARD AUCTION.

In response to the *NPRM*,⁷⁰ WISPA urged the Commission to auction at least two contiguous blocks of paired 600 MHz licenses in each of the Cellular Market Areas ("CMAs").⁷¹ WISPA stated that these smaller areas would encourage auction participation by WISPs and other entities seeking spectrum in areas where they experience congestion and capacity constraints, without inhibiting participation by larger carriers. WISPA did not oppose auctioning some spectrum according to larger geographic areas, which would favor mobile carriers looking for larger footprints. WISPA submitted historical data showing that, in past auctions, small entities have successfully acquired rural CMA licenses and that a "geographic mix of licenses was consistent with statutory requirements of 'disseminating licenses among a wide variety of applicants.'" ⁷²

Smaller carriers generally agreed with WISPA. Citing the AWS rules, United States Cellular Corporation ("USCC") also asked the Commission to auction 600 MHz licenses by CMA, stating that "the use of CMAs would allow more targeted spectrum acquisition and result in greater efficiencies for both large and small applicants, while not discriminating in favor of any single business plan."⁷³ USCC added that "CMA-based licensing, as compared to using EA

⁷⁰ See *NPRM* ¶ 149.

⁷¹ See WISPA Comments at 30. WSA also advocated auctioning of small geographic areas. See WSA Comments at 29-30.

⁷² *Id.* at 32.

⁷³ Comments of United States Cellular Corporation, Docket No. 12-268 (Jan. 25, 2013) at 12.

license areas, would greatly increase the number of markets that would have 85 MHz of spectrum, or significantly more, available through repacking alone.”⁷⁴ The Rural Telecommunications Group (“RTG”) advocated an identical approach, asserting that “[l]icensing the 600 MHz band on the basis of smaller license areas would also result in greater auction and market efficiency because it would allow bidders to tailor their auction strategy and spectrum acquisitions to meet a wider variety of business plans.”⁷⁵ RTG also wrote extensively about the opportunities auctions would create for small companies seeking to serve rural communities.⁷⁶

Verizon disagreed and asked the Commission to not auction areas smaller than Economic Areas (“EAs”).⁷⁷ It cited the need for flexible deployment, avoidance of geographic “holes” and administrative challenges in administering the auction as reasons why the Commission should not auction 600 MHz spectrum for CMAs. These objections fade, however, if the Commission were to auction some licenses by CMA and others by EA. Verizon can simply decide to bid on larger regions and leave the CMA spectrum for bidders that have different business models – for instance, fixed service or regional mobile wireless. As for the complexity of the auction itself, the Commission has often conducted auctions with a geographic mix of licenses, and this would be no different. Auctioning smaller geographic areas also would make it easier for licensees to meet build-out conditions, reducing the potential for unlicensed use under a “use it or share it” approach.

⁷⁴ *Id.* at 13.

⁷⁵ Comments of the Rural Telecommunications Group, Inc., Docket No. 12-268 (Jan. 25, 2013) at 3.

⁷⁶ *See id.* at 3-5; *see also* Comments of the Competitive Carriers Association, Docket No. 12-268 (Jan. 25, 2013) at 14-15 (urging auctioning by small markets); Comments of Leap Wireless International, Inc. and Cricket Communications, Inc., Docket No. 12-26 (Jan. 25, 2013) at 4 (suggesting auctioning by CMA).

⁷⁷ *See* Verizon Comments at 60; *see also* AT&T Comments at 54 (discussing package bidding according to EAs as “the elemental geographic building block”).

IV. THE COMMISSION SHOULD CONSIDER AMENDING ITS RULES TO REDUCE THE ADJACENT-CHANNEL PROTECTION REQUIREMENTS FOR FIXED TV BANDS DEVICES.

In its Comments, WISPA suggested that the Commission may want to consider relaxing certain of its TV white space operating rules to make more usable spectrum available for fixed uses or to reduce infrastructure costs.⁷⁸ As two examples, WISPA mentioned that the Commission may be able to modify the adjacent-channel protection standards and the out-of-band emission requirements. In its Comments, WSA specifically requested the Commission to reduce from six megahertz to three megahertz the adjacent-channel protection afforded to TV stations.⁷⁹ As WSA explained, this would create additional spectrum for white space devices. It would also ease the Commission's re-packing efforts by preserving fixed white space deployment where only two contiguous vacant TV channels remained instead of the three channels that are required under current rules. WISPA appreciates that the Commission must be assured that a reduction in vacant adjacent-channel spectrum will not reduce protection to harmful levels. Accordingly, the Commission should seek further public input on this important issue as it considers other rule changes that will ensure spectrally efficient re-packing to encourage innovation and new service deployments in the TV bands.

Conclusion

The ability of wireless Internet service providers to enjoy continued access depends on an auction process and a repacking plan that promotes spectral efficiency and optimizes the unlicensed spectrum. By adopting the rules, policies and practices proposed in its initial

⁷⁸ See WISPA Comments at 33.

⁷⁹ See WSA Comments at 32.

Comments, the Comments of a number of other parties and the foregoing Reply Comments, the Commission can accomplish these important objectives.

Respectfully submitted,

**WIRELESS INTERNET SERVICE
PROVIDERS ASSOCIATION**

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