

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of	)	
	)	
Amendment of Parts 15, 73 and 74 of the	)	MB Docket No. 15-146
Commission’s Rules to Provide for the	)	
Preservation of One Vacant Channel in the UHF	)	
Television Band For Use By White Space Devices	)	
and Wireless Microphones	)	
	)	
Expanding the Economic and Innovation	)	GN Docket No. 12-268
Opportunities of Spectrum Through Incentive	)	
Auctions	)	

**COMMENTS OF WI-FI ALLIANCE**

Wi-Fi Alliance submits these comments in response to the Notice of Proposed Rulemaking (“NPRM”) and Public Notice in which the Commission proposes to preserve two vacant channels in the ultra high frequency (“UHF”) band in each area for use by white space devices (“WSDs”) and wireless microphones, following the upcoming incentive auction.<sup>1/</sup> Wi-Fi Alliance applauds the Commission’s continued efforts to make additional spectrum available for unlicensed operations and supports the Commission’s proposal to ensure that at least two TV band channels are available for unlicensed use.

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<sup>1/</sup> See Amendment of Parts 15, 73 and 74 of the Commission’s Rules to Provide for the Preservation of One Vacant Channel in the UHF Television Band For Use By White Space Devices and Wireless Microphones; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Notice of Proposed Rulemaking, 30 FCC Rcd. 6711 (2015) (“NPRM”); Broadcast Incentive Auction Scheduled to Begin on March 29, 2016; Procedures for Competitive Bidding in Auction 1000, Including Initial Clearing Target Determination, Qualifying to Bid, and Bidding in Auctions 1001 (Reverse) and 1002 (Forward), Public Notice, AU Docket No. 14-252 et al., FCC 15-78, ¶ 32 (rel. Aug. 11, 2015) (“Public Notice”).

## I. BACKGROUND AND INTRODUCTION

Wi-Fi Alliance is a global, non-profit industry association of more than 600 leading companies from dozens of countries, including 213 from the United States, who are devoted to a vision of “Connecting everyone and everything, everywhere.” With technology development, market building, and regulatory programs, Wi-Fi Alliance has enabled widespread adoption of Wi-Fi worldwide, certifying thousands of Wi-Fi products each year. The Wi-Fi Alliance mission is to provide a highly effective collaboration forum for stakeholders, deliver excellent connectivity experiences through interoperability, embrace technology innovation, promote the adoption of our technologies worldwide, advocate for fair worldwide spectrum rules, and to lead, develop, and embrace industry-agreed standards.

Wi-Fi Alliance applauds the Commission’s continued efforts to make additional spectrum available for unlicensed operations. Wi-Fi Alliance has participated in the Commission’s important, recent efforts the last two years to expand the spectrum resources available for unlicensed operations, including the opening up of portions of the 5 GHz band for unlicensed devices to operate on a shared basis,<sup>2/</sup> creating the Citizens Broadband Radio Service in the 3.5 GHz band,<sup>3/</sup> and expanding available spectrum for WSDs in the 600 MHz band.<sup>4/</sup> This

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<sup>2/</sup> See *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, First Report and Order, 29 FCC Rcd. 4127 (2014); *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, 28 FCC Rcd. 1769 (2013).

<sup>3/</sup> See *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959 (2015).

<sup>4/</sup> See *Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission’s Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, ET Docket No. 14-165 and GN Docket No. 12-268, FCC 15-99 (rel. Aug. 11, 2015) (“*Part 15 Order*”). See also *Amendment of Part 15*

proceeding offers a valuable opportunity to continue those efforts so that unlicensed spectrum can continue to be available to meet the ever-expanding demands for Internet access, carrier offload,<sup>5/</sup> and other current applications, as well as developing technologies such as the Internet of Things. Wi-Fi Alliance therefore strongly supports the Commission’s proposal to ensure that at least two TV band channels are available for unlicensed use.

## **II. TWO VACANT CHANNELS SHOULD BE DEDICATED EXCLUSIVELY FOR WSDs**

The Commission proposes to make two vacant TV band channels available for both WSDs and wireless microphones.<sup>6/</sup> The Commission should revisit this tentative conclusion and reserve the two vacant channels for WSDs only. The business model for WSDs requires the certainty that sufficient spectrum – at least two TV channels – be available on a nationwide basis. While Wi-Fi Alliance appreciates that even more spectrum will be available for WSD operations as a result of the rules adopted in the recent *Part 15 Order*,<sup>7/</sup> without certain access to at least two channels, manufacturers and service providers may not commit to the market. Use

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*of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission’s Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 29 FCC Rcd. 12248 (2014) (“*Part 15 NPRM*”).

<sup>5/</sup> Licensed providers have instituted “Wi-Fi offloading,” which allows them to deliver higher quality service to consumers. See Telecom Advisory Services, LLC, *Assessment of the Future Economic Value of Unlicensed Spectrum in the United States*, at 9 (Aug. 2014), available at <http://www.wififorward.org/wp-content/uploads/2014/01/Katz-Future-Value-Unlicensed-Spectrum-final-version-1.pdf>. Wi-Fi is a particularly attractive means of offloading large amounts of mobile data traffic since it is cost effective, widely available, and easily integrated into mobile core networks. Cisco, *Architecture for Mobile Data Offload Over Wi-Fi Access Networks* (2012), available at [http://www.cisco.com/c/en/us/solutions/collateral/service-provider/service-provider-wi-fi/white\\_paper\\_c11-701018.pdf](http://www.cisco.com/c/en/us/solutions/collateral/service-provider/service-provider-wi-fi/white_paper_c11-701018.pdf).

<sup>6/</sup> Public Notice ¶ 32; NPRM ¶¶ 9-11.

<sup>7/</sup> See generally *Part 15 Order*.

of the spectrum for wireless microphones will reduce the certainty that WSD spectrum will be available. Instead, the vacant channels in each market should be dedicated for WSD use.

While Wi-Fi Alliance acknowledges that “wireless microphones provide significant public benefits,” wireless microphones have other spectrum options.<sup>8/</sup> *First*, wireless microphones may already operate in portions of the VHF band, other parts of the UHF band, the ISM bands, unlicensed PCS bands, and in ultra-wideband spectrum.<sup>9/</sup> *Second*, wireless microphones will soon have access to additional spectrum in the 941-944 and 952-960 MHz bands, the 1435-1525 MHz band, and the 6875-7125 MHz band, and access to spectrum for wireless microphones will be expanded to cover other eligible entities.<sup>10/</sup> *Third*, wireless microphones will continue to have access to other TV spectrum, including use of spectrum in the guard bands and duplex gap.<sup>11/</sup> Unlike WSDs, wireless microphones do not require use of the same spectrum on a nationwide basis to ensure the success of the service. Instead, the market for wireless microphones will grow regardless of the spectrum bands in which they are allowed to operate in any particular area. With access to other bands, it is likely that wireless microphone use will proliferate throughout the spectrum; it will no longer be critical for wireless microphones to rely primarily on TV band spectrum. Permitting wireless microphone use of the two vacant channels is therefore unnecessary, and diversion of vacant spectrum to wireless microphones could threaten the viability of the nascent WSD marketplace.

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<sup>8/</sup> NPRM ¶ 10.

<sup>9/</sup> *See Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 29 FCC Rcd. 12343, ¶ 15 (2014), which provides a table of bands showing where wireless microphones may operate pursuant to different FCC rules.

<sup>10/</sup> *See Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, GN Docket No. 14-166 and GN Docket No. 12-268, FCC 15-100, ¶ 11 (rel. Aug. 11, 2015).

<sup>11/</sup> *See Part 15 Order* ¶¶ 7-8.

### III. THE VACANT CHANNEL DEMONSTRATION SHOULD BE BROADLY APPLIED

The Commission seeks comment “on which broadcast applicants proposing operations in the repacked UHF television band should be required to make a demonstration that their proposed new, displacement, or modified facility will not eliminate the last available vacant UHF channel in an area.”<sup>12/</sup> By applying the requirement for a vacant channel demonstration broadly, the Commission can best ensure the availability of spectrum for WSD use.

In particular, Wi-Fi Alliance agrees with the Commission that secondary broadcast users – LPTV and TV translators – should be required, immediately after the incentive auction, to demonstrate that vacant channels will be available when engineering replacement or modified facilities.<sup>13/</sup> As the Commission explains, LPTV and TV translators’ coverage areas are much smaller than a full power television station’s coverage area, so these stations utilize unused spectrum between full power stations – and are therefore more likely than full power stations to eliminate vacant channels.<sup>14/</sup> For the same reason, applicants for digital translator stations (“DRTs”) should also be required to demonstrate that vacant channels will be available, at any time after the auction is concluded.<sup>15/</sup> For displaced stations, a vacant channel demonstration must either assume the grant of a pending new or minor change application, or the Commission must require that the application be dismissed in order to protect the vacant channels.<sup>16/</sup>

Class A and full power station applicants that are displaced should not be required to make the vacant channel demonstration during the 39-month Post-Auction Transition Period, but

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<sup>12/</sup> NPRM ¶ 12.

<sup>13/</sup> *See id.* ¶¶ 13-14.

<sup>14/</sup> *Id.* ¶ 14.

<sup>15/</sup> *See id.* ¶ 15.

<sup>16/</sup> *See id.* ¶¶ 16-17.

other applications (that do not involve displacement) should include the demonstration. All Class A and full power stations should be required to make the demonstration after the Transition Period. Similarly, the demonstration should be required in allotment proceedings once the current freeze is lifted.<sup>17/</sup> The exemption from making the vacant channel demonstration should be limited to only those entities whose relocation or new operation is not their choice.

While displaced Class A and full power stations need not be required to make a vacant channel demonstration, the Commission should nonetheless consider the impact on vacant channels in evaluating proposed facilities and alternative channels for displaced stations. Wi-Fi Alliance appreciates that Class A and full power station displacement applications are less likely to result in the loss of the last two vacant channels because of co-channel and adjacent channel protection requirements. Nevertheless, when it considers displaced stations' proposed facilities and alternative channel assignments during the 39-month Transition Period, the Commission should evaluate vacant channel availability and promote the greatest number of channels potentially available for WSD use.

#### **IV. VACANT CHANNEL DEMONSTRATIONS SHOULD CONSIDER LOWER UHF CHANNELS**

The Commission observes that, in the *Part 15 NPRM*, it asked whether it should permit greater use of channels 14-20.<sup>18/</sup> Wi-Fi Alliance supported the Commission's proposal to permit such greater use of those channels,<sup>19/</sup> and applauds the Commission's decision to expand

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<sup>17/</sup> See *id.* ¶¶ 20-29.

<sup>18/</sup> See *id.* ¶ 34, citing *Part 15 NPRM* ¶¶ 29-31.

<sup>19/</sup> Comments of Wi-Fi Alliance, ET Docket No. 14-165 and GN Docket No. 12-268, at 9-11 (filed Feb. 4, 2015).

the potential pool of channels available for WSDs.<sup>20/</sup> Including lower UHF channels in the analysis – now permitted for WSD use as Wi-Fi Alliance has recommended – will help ensure that at least two channels remain available for WSDs. Wi-Fi Alliance therefore supports the Commission’s alternative plan to allow applicants to demonstrate that any channel above channel 14 will remain available for WSDs, so long as users of those channels are permitted the operational flexibility that they would have in other portions of the UHF spectrum.

**V. PROTECTION CRITERIA SHOULD PROTECT WHITE SPACE DEVICES OPERATING AT MAXIMUM POWER**

The Commission asks about the type of demonstration it should require of applicants for potential last vacant TV channels.<sup>21/</sup> Such a demonstration must assume operation of WSDs at maximum permitted operating parameters at the geographic edge of where they are permitted, taking into consideration the enhanced ability of WSDs to operate in TV band spectrum. Thus, the Commission should assume the potential use of 1000 milliwatt WSDs in vacant channel analyses. Wi-Fi Alliance disagrees with the Commission’s approach to exclude wireless microphone and temporary BAS stations from vacant channel analyses.<sup>22/</sup> Some of those stations operate regularly in areas defined by their authorizations. Not taking them into consideration will fail to provide a true picture regarding whether a channel is vacant.

**VI. GRID SIZE SHOULD CORRESPOND TO POPULATION DENSITY**

The Commission proposes that, to determine the availability of a vacant channel in a particular area, the white spaces database would “analyze a single point within each individual two-by-two kilometer cell of a grid that covers the entire proposed protected area of

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<sup>20/</sup> See Part 15 Order ¶¶ 87-90.

<sup>21/</sup> See NPRM ¶¶ 35-40.

<sup>22/</sup> See *id.* ¶ 39.

operations.<sup>23/</sup> Wi-Fi Alliance agrees that the determination of a vacant channel should be measured at the center of a cell; this approach will be easiest to implement. There may otherwise be too much variation of population and other factors within cells. However, instead of only using a two-by-two kilometer cell as the Commission suggests, the cell size should vary depending on population density. Where there is greater density of population, spectrum use is likewise denser – so too large a cell size will miss certain uses. The grid size should therefore be 2 kilometers x 2 kilometers where there are 250 or fewer people per square kilometer. Where there are between 250 and 25,000 people per square kilometer, the grid size should be 1 kilometer x 1 kilometer. Finally, in places like Manhattan, where there are greater than 25,000 people per square kilometer, the grid size should be 0.5 kilometers x 0.5 kilometers.

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<sup>23/</sup> See *id.* ¶ 43.

## VII. CONCLUSION

Wi-Fi Alliance supports the Commission's continued efforts to make additional spectrum available for unlicensed operations and, in particular, the Commission's proposal to ensure that at least two TV band channels are available for unlicensed use. As unlicensed spectrum increasingly becomes critical for Internet access and other important applications, preserving two vacant channels for unlicensed operations will energize innovation in white space device technologies.

Respectfully submitted,



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