

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554**

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| In the Matter of |) | |
| |) | |
| Unlicensed Operation in the TV Broadcast Bands |) | ET Docket No. 04-186 |
| |) | |
| |) | |
| Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band |) | ET Docket No. 02-380 |
| |) | |

OPPOSITION TO PETITIONS FOR RECONSIDERATION

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SUMMARY

Shure Incorporated (“Shure”) respects the careful balance struck by the Commission in its Second Memorandum Opinion and Order (“Order”), released on September 23, 2010, and strongly opposes the effort by petitioners to undo this work. Specifically, Shure encourages the Commission to reject attempts to relax the out-of-band emissions limit for fixed unlicensed TV band devices (“TVBDs”), permit operation of fixed devices on adjacent channels, and more than triple the limit for fixed TVBD antenna height above average terrain (“HAAT”). The Commission fully considered a range of industry proposals with regard to the out-of-band emissions limit for fixed unlicensed TVBDs, and ultimately required attenuation of spurious emissions in channels adjacent to the occupied channel at a level necessary to protect incumbent operations. Petitioners fail to present any new facts for Commission consideration, and mistakenly rely on previously rejected arguments and a misapplication of industry standards to overcome the Commission’s determination. Petitioners are similarly misguided in requesting that the Commission permit “quasi-fixed” consumer devices to operate on adjacent channels. Commission rules currently provide abundant flexibility for portable devices, while preserving a small but important number of protected channels for wireless microphone operations. Finally, petitioners offer no practical rationale for altering the Commission’s 76 meter requirement for maximum TVBD antenna HAAT, and fail to consider adversely affected incumbent users other than TV stations. In establishing this requirement, the Commission carefully considered the balance between TVBD range and incumbent protection; petitioner’s introduction of a token number of potentially impacted areas lacks the persuasive force necessary to shift this balance.

For these reasons and the real adverse impact the suggested changes would have on wireless microphone operations, Shure opposes reconsideration of the Commission’s Order.

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OPPOSITION TO PETITIONS FOR RECONSIDERATION

Shure Incorporated (“Shure”), by its undersigned counsel and pursuant to Section 1.429(f) of the Commission’s Rules, hereby respectfully submits this consolidated Opposition to the Petitions for Reconsideration, identified herein,¹ of the Commission’s Second Memorandum Opinion and Order in the above-captioned docket, released on September 23, 2010 (“Reconsideration Order”).²

The 2008 White Spaces Order and the Reconsideration Order, issued after a complex and lengthy proceeding involving hundreds of parties and thousands of pages of record input, established rules that reflect a careful balancing of the multiple interests at stake in the UHF and VHF TV bands. The system adopted in the rules opened important opportunities for new unlicensed devices in the TV bands while establishing essential protections to prevent interference and disruption to the numerous diverse services -- broadcasting, public safety,

¹ See Petition for Reconsideration, Motorola Solutions, Inc., ET Docket Nos. 04-186, 02-380 (Jan. 5, 2011) (“Motorola Petition”); Joint Petition for Partial Reconsideration, Wireless Internet Service Providers Association, the Federation of Internet Solution Providers of the Americas, the Native American Broadband Association, Spectrum Bridge, Inc., Comsearch, Carlson Wireless Technologies Inc., and Wireless Strategies, Inc., ET Docket Nos. 04-186, 02-380 (Jan. 5, 2011) (“Joint Petition”); Petition for Reconsideration, Wi-Fi Alliance, ET Docket Nos. 04-186, 02-380 (Jan. 4, 2011) (“Wi-Fi Alliance Petition”).

² See *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Memorandum Opinion and Order, ET Docket Nos. 04-186, 02-380 (Released Sept. 23, 2010) (“Reconsideration Order”).

wireless microphones, to name a few -- and to the hundreds of millions of Americans who rely everyday on those services currently operating in this spectrum.

The Reconsideration Order responded to seventeen (17) petitions for reconsideration collectively requesting a variety of legal and technical changes to the Commission's white spaces rules originally set forth in the 2008 Second Report and Order.³ Shure herein opposes requests in the reconsideration petitions filed with respect to the Reconsideration Order that stand to disrupt that careful balance and pose significant risk of interference to wireless microphone operations. Specifically, Shure opposes proposals to 1) relax the out-of-band emission ("OOBE") limits for fixed unlicensed TV band devices ("TVBDs"),⁴ 2) permit quasi-fixed device operations on adjacent channels,⁵ and 3) dramatically increase the permissible height of fixed unlicensed TV band antennas.⁶ Each of these proposals suggest rule changes that, if adopted, individually or in the aggregate, could result in serious interference to wireless microphone operations.

I. Petitions Requesting Relaxation of the Out-of-Band Emission Limits for Fixed TVBDs or Alternative Requirements Should be Rejected

Motorola Solutions, Inc. ("Motorola), the Wireless Internet Service Provider's Association ("WISPA") and the Wi-Fi Alliance urge the Commission to relax significantly the adjacent channel OOBE limits for TVBDs. Motorola and WISPA specifically propose that fixed TVBDs be permitted to operate at significantly reduced limits when operating at certain

³ See *Unlicensed Operation in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807 at ¶ 258 (2008) ("Order").

⁴ See Motorola Petition at pp. 6-9; Joint Petition at pp. 7-9; Wi-Fi Alliance Petition at p. 4.

⁵ See Wi-Fi Alliance at p. 4.

⁶ See Joint Petition at pp. 3-7.

distances from protected contours of adjacent TV channels. Motorola argues that the limit in Section 15.709(c) of the Commission’s Rules “far exceeds industry standards for IEEE 802.11 or 802.16 compliant technologies.”⁷ The current requirements, Motorola argues, will “preclude use of existing off-the-shelf technology” and require the “development of unique transmitter and variable frequency filtering solutions” injecting costs that will put TVBDs at a “distinct disadvantage to unlicensed devices in the 2.4 GHz and 5 GHz bands.”⁸

The emission mask -- the requirement to suppress spurious emissions from the transmission in one channel from “bleeding” over into nearby channels -- is a critical defense against new TV band device interference to incumbent services such as broadcasting, wireless microphone operations and public safety operations. In the 2008 White Spaces Order, the Commission determined that spurious emissions in channels adjacent to the occupied channel should be attenuated at least 55 dB below the highest average power in the occupied channel.⁹ The Commission concluded that this requirement was necessary to minimize the risk of interference from TVBDs to devices operating in other TV channels. In the Reconsideration Order, the Commission strengthened the adjacent channel attenuation to -78.85 dB.¹⁰ Motorola and WISPA now argue the Commission should relax the limit even below the Commission’s original requirement to -47.8 dB/100 kHz, which represents a 25 dB relaxation from the limit adopted in the Reconsideration Order.

Shure opposes this reduction in adjacent channel attenuation because it will have a significant adverse impact on wireless microphone operations.

⁷ Motorola Petition at pp. 2-3.

⁸ *Id.* at p. 3.

⁹ *See* Order at ¶ 236; *see also* Reconsideration Order at ¶ 84.

A. The Commission has Already Fully Considered and Rejected Requests to Relax the OOB Requirement

This request has already been fully considered and should be dismissed as repetitious. In petitions for reconsideration filed on the 2008 White Spaces Order, Motorola and the Wi-Fi Alliance challenged the OOB requirement and pressed the Commission to weaken the required adjacent channel attenuation.¹¹ Motorola argued that a change should be made because the then-required attenuation level (-55 dB) in adjacent channels “is difficult to meet in consumer equipment operating on the power levels permitted by the Commission.”¹² The Commission considered and rejected the arguments made by Motorola and the Wi-Fi Alliance and declined to relax the required adjacent channel attenuation limit.¹³ The Commission rightfully recognized that “[a]djacent channel emissions from a TV bands device appear as co-channel emissions in an adjacent channel used by a TV station or other authorized service.”¹⁴ In fact, the Commission recognized the need to change the requirement to require an *increase* in the adjacent channel attenuation to -78.85 dB¹⁵ to address issues raised by IEEE 802. The requesting petitioners have failed to present any new or persuasive reasons -- or any data at all -- that would justify relaxation of this standard particularly in light of the significant adverse consequences to incumbent wireless users in the TV band.

¹⁰ The Commission agreed with IEEE and concluded that emissions should be measured relative to the total in-band power in a 6 megahertz bandwidth.

¹¹ See Petition for Reconsideration, Motorola Solutions, Inc., ET Docket Nos. 04-186, 02-380 (Mar. 19, 2009), at pp. 22-23; Petition for Reconsideration, Wi-Fi Alliance, ET Docket Nos. 04-186 (Mar. 17, 2009), at p. 5.

¹² Reconsideration Order at ¶ 85.

¹³ See *id.* at ¶ 88.

¹⁴ *Id.*

¹⁵ The Commission agreed with IEEE and concluded that emissions should be measured relative to the total in-band power in a 6 megahertz bandwidth. See *id.* at ¶ 87.

It is well-established that a petition for reconsideration will be granted only if it “relies on facts which have not previously been presented to the Commission.”¹⁶ The reconsideration process is not for the “purpose of allowing a petitioner to reargue matters already presented, considered, and disposed of by the Commission”¹⁷ in what could become essentially a “never-ending process of review that would frustrate the Commission’s ability to conduct its business in an orderly fashion.”¹⁸ The Commission recently reiterated the current importance of this policy in revising the reconsideration procedures to permit resolution by the relevant bureaus or offices of petitions that “plainly do not warrant consideration by the Commission”¹⁹ including, for example, petitions that “[r]ely on arguments that have been fully considered and rejected by the Commission within the same proceeding” or “[r]elate to an order for which reconsideration has been previously denied on similar grounds.”²⁰

B. The Motorola/WISPA Proposed Emission Limit is Not Justified by the IEEE 802 Limits Applicable to 2.4 GHz and 5 GHz Devices

Motorola and WISPA specifically urge the Commission to adopt an across-the-board 25 dB relaxation of the adjacent channel transmit spectral mask requirements for fixed TVBDs to -47.8 dBm/100 kHz. Motorola argues that a relaxation is warranted because the limit “greatly exceeds industry standards for wireless broadband technologies that are currently operating in

¹⁶ 47 C.F.R. § 1.429(b) (2011).

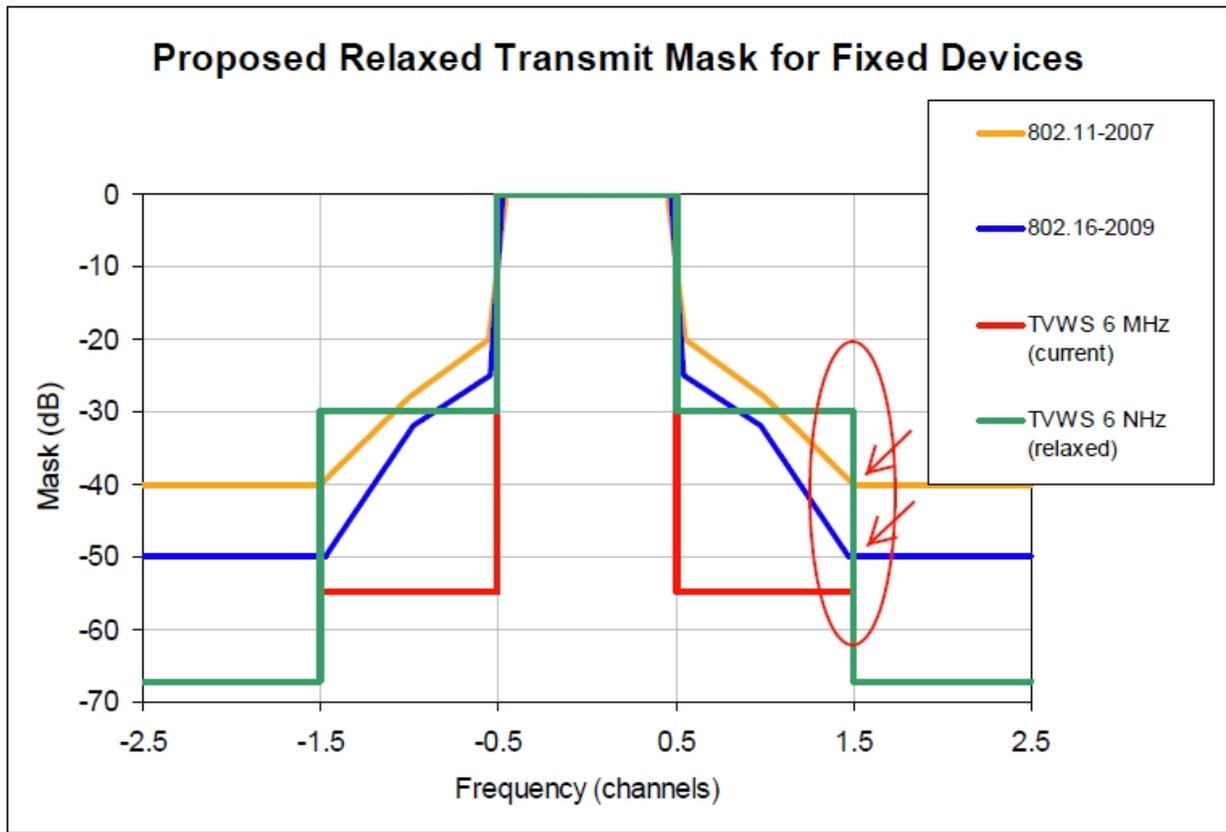
¹⁷ *In the Matter of Improving Public Safety Communications in the 800 MHz Band; Consolidating the 800 and 900 MHz Industrial/Land Transportation and Business Pool Channel*, Second Memorandum Opinion and Order, WT Docket No. 02-55 (Released May 30, 2007), at ¶ 54.

¹⁸ *Id.*

¹⁹ *In the Matter of Amendment of Certain of the Commission’s Part 1 Rules of Practice and Procedure and Part 0 Rules of Commission Organization*, Report and Order, GC Docket No. 10-44 (Released Feb. 4, 2011), at ¶ 28.

²⁰ *Id.*

other frequency bands.”²¹ At the outset, however, Shure observes that the Motorola/WISPA proposed relaxed OOB limit would actually *exceed* the IEEE 802.16 limits by up to 10 dB and the IEEE 802.11 limits by up to 20 dB in the first adjacent channels. The diagram below compares the transmit mask for IEEE 802.11, IEEE 802.16, and the existing TVBD mask within those limits, and the proposed Motorola/WISPA mask which significantly exceeds those limits.



Even if the IEEE 802.11 and 802.16 limits are treated as guidelines to be followed in the UHF and VHF TV spectrum, which they should not (see discussion at I.C), the Motorola/WISPA proposed new limit fails to match even the protections provided by the above IEEE 802.16 and 802.11 limits within the first adjacent channels. Motorola, supported by WISPA, addresses this

²¹ Motorola Petition at p. 4.

flaw in their approach by proposing to increase the required separation distance from the protected adjacent channel contour to prevent interference to TV broadcasting stations.²²

Neither Motorola nor WISPA make any mention of how their proposal prevents interference to any of the *other* services -- including wireless microphones -- operating in the TV channels. Under the Motorola/WISPA mask proposal, a wireless microphone operating at +/- 1 channel in the above chart would likely experience devastating co-channel interference and a complete disruption of the event relying on wireless microphone transmission. In its Petition, Motorola simply states that “it is not necessary to provide increased adjacent channel protection to other services or devices that use the TV band spectrum such as TV receive sites (*e.g.*, cable head-ends) and wireless microphones as a result of adopting the proposed relaxed OOB mask.”²³ Shure strongly disagrees with this statement and observes that Motorola provides absolutely no justification for this unacceptable position. To the extent that Motorola and WISPA are now arguing that the public interest no longer requires that incumbent services be protected from interference from new TVBDs, this extreme view is contrary to the Commission’s fundamental principal in this proceeding -- to create spectrum sharing opportunities without disrupting and harming existing services and users. Motorola states only that “[h]owever, if data is presented that demonstrates an increased potential for interference, these services and devices could be similarly protected by slightly increasing the separation or keep-out zones around those services for adjacent channel TVBD usage in the geo-location database. Again, such changes would be straightforward to implement in the database if necessary.”

²² With respect to interference to TV, WISPA provides a table of the revised separation distances that it proposes could be adopted to avoid interference if the Commission reduces the OOB limit.

²³ Motorola Petition at p. 9.

The fundamental problem with the approach of Motorola and WISPA is that TV channels 7-20 -- where fixed TVBDs are not permitted to operate on channels adjacent to local TV stations or Public Safety stations -- are critically important channels for wireless microphone operations because they are protected from TVBD interference in the Commission's Rules. Under the Motorola/WISPA proposal, inside a TV contour, emissions from a TVBD operating on a second adjacent channel would contaminate the first adjacent channel (as well as the third adjacent channel if there is one) significantly raising the risk of interference to wireless microphones operating on the first adjacent channel. Further, wireless microphones registered in the database or operating on the two locally designated reserve channels will not be protected from interference "pollution" emanating from a Motorola/WISPA TVBD operating on a channel next to the microphone channel. Outside of the TV contour, interference from TVBDs operating pursuant to the weakened Motorola/WISPA mask similarly undercuts the reserve channel and database registration interference protections established to safeguard wireless microphone operations.

In setting a careful balance between the interests of prospective new spectrum uses and incumbent users -- broadcasters, wireless microphone operations and PLMRS/CMRS, among others -- the Commission's Rules contemplate that adjacent channels where broadcasters are protected from unlicensed TVBD operations, two reserve channels, and channels registered in the database will be critical sources of spectrum unimpeded by TVBD transmissions to support wireless microphone operations.²⁴ Where wireless microphones do not have registered channels

²⁴ Under the Commission's white spaces rules, the many and varied applications of wireless microphone operations will need to resort to a "grab bag" of potential sources of spectrum that may or in some cases may not be available in any local area. Wireless microphones can look to two locally identified TV channels, adjacent channels, frequencies reserved in the database under a wireless microphone license or with approval and after exhaustion of all other sources of frequencies, reserved channels by non-licensed wireless microphone operations. Adjacent channels are a critical component to this scheme. See Reconsideration Order at ¶¶ 29-36,

in the database, the interference remedy proposed by Motorola (“slightly increasing the separation or keep-out zones” around other protected services) cannot remedy the adverse impact of interference caused by a reduction in the OOB limit and would be unworkable.²⁵

C. No Compelling Cost, Technical Design, or other Reason Has Been Presented that Justifies Relaxing the OOB Protections

In its Petition for Reconsideration, Motorola states that the OOB limits “will preclude the use of existing, off-the-shelf spectrally efficient technologies” referring to IEEE 802.11 and IEEE 802.13 technologies.²⁶ Motorola’s desire to have the rules conform to its own preferred design choices based on its desired commercial production and marketing costs is not a compelling rationale and does not justify a change in the Commission’s Rules.²⁷

It should be noted at the outset that IEEE 802.11 technologies were never designed or intended to operate in a complex spectrum environment where multiple and diverse licensed services share the spectrum and must be protected. Furthermore, the IEEE 802.11 standard was developed more than 14 years ago, and is no longer considered state-of-the-art with respect to spectral efficiency in comparison to more recently developed wireless transmission protocols. Shure does not believe that relaxing the TVBD emission standards solely to allow equipment that was designed to comply with standards for operation in other bands will result in the most efficient use of the TV White Spaces in the longer term.

131-133; *see also* Order at ¶ 1.

²⁵ WISPA argues in the alternative that at a minimum, the Commission should permit vendors to choose to produce equipment adhering to the existing higher mask to be used at existing separation distance requirements or another class of equipment meeting only the reduced mask standard but adhering to the larger distance separations to avoid interference. *See* Joint Petition at 9. For the interference reasons discussed above, Shure opposes the distribution of any TVBD equipment that only meets the greatly relaxed emission standard.

²⁶ Motorola Petition at pp. 2-3. The Wi-Fi Alliance similarly claims that the OOB mask requires that “expensive and complex filtering must be added to low-cost devices, significantly increasing the cost and thereby limiting market applications.” Wi-Fi Alliance Petition at p. 2.

Moreover, even if the Commission were inclined to consider technical design costs in this instance, the projected costs numbers put forth by Motorola are speculative and should not be given weight. Motorola depicts a parade of horrors that will unfold if the OOB limit is not dramatically reduced including a 65% surcharge on fixed TVBD costs,²⁸ an increase in monthly customer fees by 50%, and 33% increases in network costs which together, according to Motorola, shows that the current OOB requirement “threaten[s] their market viability.”²⁹ The parties advocating for a relaxed mask have done little to substantiate any of these claims.³⁰

It is worth noting in this context that Adaptrum recently filed an *ex parte* notice asserting that its device will meet the Commission’s OOB limits.³¹ In updating the Commission on its progress in developing TVBD technologies, Adaptrum stated “[w]e believe while the current mask requirement is stringent, it can be realized using innovative RF and baseband technologies. In fact, the demonstrated Adaptrum radio system meets and exceeds the mask requirement specified in the current rules while tuning over all UHF TV channels between 400-1000 MHz.” Adaptrum went on to state that “we believe clean out-of-band emission protects licensed operation in the TV band and *also reduces interference between whitespace radios.*”³² Retaining the OOB limit is not only important for incumbent operations but also is essential to the successful operations of white space radios. Adaptrum’s efforts to work with rules developed for a challenging spectrum environment appear consistent with the Commission’s interest in

²⁷ It is noteworthy that Motorola was an active participant in the development of the IEEE 802.22 standard for Wireless Regional Area Networks.

²⁸ See Motorola Petition at p. 5.

²⁹ *Id.*

³⁰ See generally *Ex Parte* Notice of Motorola Solutions, Inc., filed in ET Docket No. 04-186 on December 7, 2010, at p. 4.

³¹ See *Ex Parte* Notice of Adaptrum, filed in ET Docket No. 04-186 on January 6, 2011, at p. 1 (Adaptrum stated that it has implemented all requirements of the Commission’s white spaces rules and is ready to submit its radio for certification pending integration with an approved database).

³² *Id.* (emphasis supplied).

fostering innovations in radio techniques that will serve the growing need to make more use out of the Nation's spectrum.

D. The Wi-Fi Alliance Alternative Emission Limit for TVBDs Will Result in Interference to Wireless Microphones

The Wi-Fi Alliance proposes to apply a fixed limit of -25.8 dBm/100 kHz if a device operates at a power of 100 mW or less. This approach poses a serious threat to wireless microphones operating on adjacent channels (and TV receivers).

The proposed value of -25.8 dBm/100 kHz represents an increase of 27 dB over the current limit of -72.8 dBm/100 kHz relative to the highest average output power at 100 mW. This is equal to a limit of -8 dBm absolute in a 6 MHz channel, which is 2 dB higher than Motorola's proposal at the 100 mW level. (Note that this level would be the same for any transmit power level, so long as it is 100 mW EIRP or less.) This enormous increase would be detrimental not only to wireless microphones and other incumbent services, but also to the operation of new TV Band Devices.³³

Shure shares the Commission's goals of providing broadband connectivity to all U.S. citizens, but it need not be done at the expense of jeopardizing important existing services, including wireless microphone operations. We believe that the out-of-band emissions limits in Section 15.709(c) adopted by the Commission in this proceeding represent a reasonable

³³ The current emissions limits apply to all devices of any power level, whether fixed or portable. The FCC stipulates that spurious emissions must be at least 72.8 dB below the highest average power in the TV channel in which the device is operating. This is measured in a 100 kHz bandwidth. If power is aggregated across the entire TV channel, it is 60 times higher (there are sixty 100 kHz-wide slots in a 6 MHz TV channel), which is a ratio of 17.8 dB. Thus, the aggregate spurious emission level is therefore -55 dBr, as was depicted in the Motorola figure. If a device transmitted with 100 mW output (+20 dBm), this represents an adjacent channel spurious emission power of -35 dBm.

Motorola proposed to relax the adjacent channel emissions by 25 dB, from -72.8 to -47.8 dBr. Applying the 17.8 dB factor to capture the total power in the channel, this is equivalent to -30 dBr, as was also depicted in the figure. If a device transmitted with 100 mW output, this would represent an adjacent channel spurious emission

compromise between prospective TVBD manufacturers and incumbent users. Shure therefore urges the Commission to maintain the out-of-band emission limits it adopted in its rules for TV band devices.

II. Wi-Fi Alliance's Proposal to Permit Operation of Fixed Devices on Adjacent Channels Will Cause Interference to Wireless Microphone Operations

Shure strongly opposes the recommendation of the Wi-Fi Alliance that the Commission create a new class of TVBDs that encompass "quasi-fixed" consumer devices and permit them to operate on adjacent channels. The mass-marketed indoor consumer devices the Wi-Fi Alliance describes do not meet the Commission's definition of "fixed device" because they would be expected to be moved from one location to another at will by the user. As such, they should be classified as "portable devices" and should meet those requirements. The Commission's rules provide abundant flexibility for these devices to operate as Mode 1 or Mode 2 devices, depending on whether or not they have geolocation capability and Internet access capability. There is no justifiable reason to "muddy the waters" by creating yet another class of devices that is "somewhat mobile" but lacks these capabilities.

Furthermore, we oppose operation of fixed devices on adjacent channels and support the Commission's previous determination to prohibit such operation, for the reasons given in the ruling, including particularly the provision of a small but important number of protected channels for wireless microphones.

power of -10 dBm.

III. WISPA’s Proposal to More Than Triple the Limit for Fixed TVBD HAAT Creates a Dramatic Imbalance Between TVBD Transmission Range and Incumbent Protections

In its Reconsideration Order, the Commission rejected the fixed TVBD community’s plea for dramatically boosting permissible antenna heights, recognizing that permitting an antenna to exceed 30 meters in height would tilt the careful balance that needed to be struck between “unlicensed fixed TV bands device transmission range with the distance at which those operations could impact” higher priority incumbent services.³⁴ During the same balancing analysis regarding antenna height, the Commission recognized that “instances where a fixed [TVBD] antenna is located on a local geographic high such as a hill or mountain” also represent a threat to incumbents and established a 76 meter height above average terrain (“HAAT”) limit for fixed TVBD antenna sites.³⁵ In a transparent “second bite at the apple” regarding fixed TVBD antenna height, WISPA now argues that the 76 meter HAAT limit is overly restrictive and urges the Commission to boost HAAT to 250 meters, a level that would elevate most fixed TVBDs far above the 100 meter above ground level (“AGL”) limit previously proposed by WISPA, and rejected by the Commission for creating an imbalance between TVBD transmission range and incumbent protections.³⁶ WISPA’s arguments in support of a dramatic increase in HAAT are not persuasive.

WISPA argues that there are “significant areas of the country where fixed devices cannot be deployed solely because of the 76 meter HAAT,” but fails to persuasively support this assertion.³⁷ In fact, WISPA provides only a handful of real-world instances where the 76 meter

³⁴ Reconsideration Order at ¶ 63.

³⁵ *Id.* at ¶ 66.

³⁶ In its earlier petition for reconsideration WISPA had argued for increasing fixed TVBD antenna height to 100 meters above ground level. Petition for Reconsideration, Wireless Internet Service Providers Association, ET Docket Nos. 04-186, 02-380 (Mar. 19, 2009), at p. 13.

³⁷ Joint Petition at p. 3.

HAAT limit would make it impractical to provide service in rural, mountainous, and hilly areas. Specifically, WISPA identifies 28 affected TVBD sites in total, nationwide, several of which appear to be located on mountain peaks,³⁸ where the current HAAT rules would prohibit a fixed TVBD antenna site.

While WISPA fails to provide facts that support its assertion that the 76 meter HAAT presents a practical problem for fixed TVBD siting, it is beyond dispute that a 250 meter HAAT will dramatically increase the height of fixed TVBD antennas in the most heavily populated regions of the country where topographic features are relatively flat (*e.g.*, Eastern Coastal Plain, Midwest, Florida and East Texas), and create a dramatic imbalance between TVBD range and incumbent protection. Depending on the propagation model used, this increase could nearly double the range of a fixed TVBD transmitter.³⁹ WISPA offers no meaningful engineering or scientific analyses as to how incumbents will be protected from fixed TVBD emissions transmitting from the 800' towers permitted in flat areas with uniform HAAT.

Finally, WISPA proposes some limited additional protection to TV broadcasters by slightly increasing the separation distances between fixed TVBDs and incumbent TV stations, but offers no plan for mitigating interference to other protected services, including wireless microphones. For WISPA's proposal to be viable, increased separation distances would have to apply to all protected incumbent services.

³⁸ See, *e.g.*, site PA-6, which is located on Elliot Knob, the highest point for upwards of 20 miles in all directions from coordinates provided by WISPA.

³⁹ For example, using FCC F(50,90) estimated field strength in the UHF band at a receiving height of 9m.

Shure urges the Commission to reject WISPA's inappropriate request to elevate fixed TVBD HAAT for the reasons discussed above.

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