Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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

REPLY TO OPPOSITIONS TO PETITION FOR RECONSIDERATION OF MOTOROLA SOLUTIONS, INC.

Motorola Solutions, Inc. ("Motorola Solutions") replies to oppositions filed in response to its Petition for Reconsideration ("*Petition*") of the Commission's *Second Memorandum Opinion and Order* in the above-captioned proceeding.[1] Motorola Solutions also responds to certain oppositions filed in response to reconsideration petitions filed by other parties.

In its *Petition*, Motorola Solutions urges the Commission to allow fixed TV band devices ("TVBD") to operate with less stringent adjacent channel out-of-band emissions ("OOBE") attenuation requirements when operated at specified distances beyond the protected contours of adjacent channel television stations. This rule modification was proposed to help foster the Commission's goal of extending broadband service without negatively impacting protected incumbent services. Nonetheless, certain entities have opposed Motorola's *Petition* based on faulty legal and policy arguments and, therefore, should be rejected.

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[1] Petition for Reconsideration of Motorola Solutions, Inc, ET Docket Nos. 04-186, 02-380 (filed Jan. 5, 2011) ("Petition"); *see also 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 and 02-380, FCC 10-174 (rel. Sept. 23, 2010) (*Second MO&O*).

Motorola Solutions also addresses comments responding to the petition for reconsideration seeking to eliminate the 76 meter limitation on the height above average terrain of fixed station locations.[2] As further discussed below, the record supports modifications to this rule, which will help TVBDs fulfill their promise to provide cost-effective broadband access across America.

I. The Commission Should Relax the OOBE Mask for Fixed Devices as Recommended by Motorola Solutions.

The *Petition* filed by Motorola Solutions is singular in focus – it urges the Commission to relax the OOBE requirement for fixed TVBDs. The stringent requirement precludes the use of existing, off-the-shelf technologies and would instead require the development of unique transmitter and variable frequency filtering solutions.[3] Meeting these standards will impose an estimated 65% surcharge on fixed TVBD customer premises equipment compared to comparable devices operating in other frequency bands and thus place TVBDs at a distinct disadvantage to unlicensed devices designed to operate in the 2.4 GHz and 5 GHz bands.[4] This will threaten the economic viability of the devices, especially for providing broadband service in rural areas.[5]

The *Petition* acknowledges that increasing OOBE necessitates some adjustments in the interference protection afforded to other users of the TV spectrum. The *Petition* therefore recommends the Commission provide equivalent protection to adjacent channel TV reception by

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[2] Joint Petition For Partial Reconsideration, filed by The 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 (filed Jan. 5, 2011) ("Joint Petitioners Reconsideration").

[3] Petition at 3.

[4] *Id.* at 3.

[5] *Id.* at 3.

increasing the required separation from the protected TV contours.[6] Geo-location database technology can be used to ensure that fixed devices subject to a relaxed adjacent channel OOBE mask are operated only in areas beyond the protected TV contours. The *Petition* concludes that it is not necessary to provide increased adjacent channel protection to other services or devices that use the TV band spectrum but, if necessary, these services could be similarly protected by slightly increasing the separation or keep-out zones around those services.[7]

Oppositions to the *Petition* were filed by the National Association of Broadcasters ("NAB") and the Maximum Service Television, Inc. ("MSTV"),[8] Shure Incorporated ("Shure"),[9] the National Cable & Telecommunications Association ("NCTA"),[10] and Cellular South, Inc.[11] In short, these parties argue that the *Petition*: 1) is procedurally defective;[12] 2) would increase interference risks to protected services;[13] and, 3) is unnecessary as other manufacturers have already produced equipment that meets the existing specification.[14]

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6 *Id.* at 3.

7 *Id.* at 3.

8 National Association of Broadcasters and Association for Maximum Service Television Opposition to Petitions for Reconsideration, ET Docket No. 04-186 (Feb. 24, 2011) ("NAB/MSTV Opposition").

9 Shure Incorporated Opposition to Petitions for Reconsideration, ET Docket No. 04-186 (Feb. 24, 2011) ("Shure Opposition").

10 Opposition to Petition for Reconsideration, National Cable and Telecommunications Association, ET Docket No. 04-186 (Feb. 24, 2011) ("NCTA Opposition").

11 Opposition to Petition for Reconsideration, Cellular South, Inc., ET Docket No. 04-186, at 2 (Feb. 25, 2011) ("Cellular South Opposition"). Motorola will respond to the late-filed Cellular South Opposition on the expectation that the Commission will at least consider the pleading as informal comments.

12 *See, e.g.,* NAB/MSTV Opposition at 3-4; Shure Opposition at 4; NCTA Opposition at 8.

13 *See, e.g.,* NAB/MSTV Opposition at 3; Shure Opposition at 2; NCTA Opposition at 7; Cellular South Opposition at 4.

14 *See, e.g.,* NAB/MSTV Opposition at 6; Shure Opposition at 10.

As an initial matter, Motorola Solutions notes that Section 1.429 of the Commission's Rules permits the filing of the *Petition* and authorizes the Commission to reconsider the stringency of adjacent OOBE attenuation requirements for fixed TV band devices.[15] Even if the *Petition* could be characterized as repetitive with Motorola Inc.'s previously filed petition,[16] the Commission is not legally required to dismiss it nor is the Commission barred from granting the requested relief contained in the *Petition*. Section 1.429(i) provides that petitions "*may be* dismissed by the staff as repetitious,"[17] but the Commission has consistently clarified that this language "is permissive and that [the FCC] may consider untimely or repetitious arguments where the public interest would be better served thereby."[18] Motorola Solutions urges the Commission to reject the requests of the opposition to summarily dismiss the *Petition*.

The more substantive claims raised by the opposition is that relaxed OOBE will substantially increase the potential for interference to protected devices.[19] The NAB/MSTV Opposition paints the *Petition* as "contrary to the public interest" and explains that it would "compromise protection for licensed services and consumers who rely on them."[20] The broadcast interests further argue that the Commission has adopted a three prong approach to protect services from interference from TVBDs: (1) OOBE mask, (2) distance separation

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[15] 47 C.F.R. § 1.429(a) ("Any interested party may petition for reconsideration of a final action…"). The *Second M&O* modified the OOBE measurement procedures. *Second M&O* at ¶ 87. This action implicates the adequacy of the overall OOBE requirements that are the focus of the *Petition* and renders it timely as filed.

[16] Petition For Reconsideration And Clarification, Motorola, Inc., ET Docket No. 04-186 (submitted March 19, 2009).

[17] 47 C.F.R. § 1.429(i) (emphasis added).

[18] *AM Expanded Band Allotment Plan*, Memorandum Opinion and Order, 13 FCC Rcd 21872, ¶ 7 (1998) (citing *MTS and WATS Market Structure*, 99 FCC 2d 708, 712 (1984)).

[19] *See, e.g.,* NAB/MSTV Opposition at 3; Shure Opposition at 2; NCTA Opposition at 7; Cellular South Opposition at 4.

[20] NAB/MSTV Opposition at ii.

requirements, and (3) a prohibition on operation in adjacent channels, and that Motorola Solutions' *Petition* undermines this approach.[21]

Motorola Solutions disagrees with these characterizations. The recommendation to relax the OOBE was developed with protection for licensed services as a key provision. Motorola Solutions did not recommend a blanket OOBE reduction that would apply to all TVBDs but, rather, limited the scope of its request to fixed devices that are already prohibited from operating within the protected contours of adjacent television stations – the primary user of these spectrum bands.[22] By proposing a corresponding increase in the distance that a fixed device operating with relaxed OOBE specification must operate beyond these protected TV contours, Motorola Solutions' proposal is fully consistent with the Commission's three pronged approach for controlling interference.

Motorola Solutions recognizes that it is imperative that the separation distances be appropriately adjusted to provide equivalent protection to that afforded under the Commission's previous decisions. Motorola Solutions believes that the recommendations contained in the *Petition* meet this goal but would be willing to discuss specific areas of concern including: 1) the VHF spectrum as discussed by NAB/MSTV;[23] 2) cable TV head ends as discussed by NCTA;[24] and, 3) protection of TV Channel 51 as discussed by Cellular South.[25]

With regard to the impact on wireless microphones, Shure argues that the "fundamental problem" with the approach of Motorola Solutions is that TV channels 7-20 are critically

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21 *Id.* at ii-iii.

22 Petition at 6.

23 NAB/MSTV Opposition at 4.

24 NCTA Opposition at 9.

25 Cellular South Opposition at 4.

important channels for wireless microphone operations because they are protected from TVBD interference in the Commission's Rules.[26] Shure continues to state that under Motorola Solutions' 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) and significantly rais[e] the risk of interference to wireless microphones operating on the first adjacent channel."[27]

Shure grossly overstates the concern for interference. Wireless microphones currently have no adjacent channel protection wherever they operate. In fact, as Shure's opposition makes clear, wireless microphones often operate on adjacent channels to TV transmitters, which are much higher powered and produce much higher absolute interference levels in the adjacent channels than would a TVBD, regardless of its OOBE levels. The absolute interference levels in fixed TVBD adjacent channels will be much lower. Motorola Solutions estimates that free space path losses will more than make up for any increased levels due to a relaxed mask – approximately 48 dB – when a fixed TVBD device is separated from a wireless microphone by only 10 meters.

NAB/MSTV are concerned that manufacturers could modify a device approved as a fixed device to operate as a personal/portable device in order to allow consumers to use the device without meeting the increased spacing requirements that would apply to fixed devices.[28] Motorola Solutions notes that this hypothetical concern is not triggered by the *Petition*; the

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[26] Shure Opposition at 8.

[27] *Id.* Cellular South similarly states that "relaxation of the OOBE mask would require consideration of the effects on 2nd and 3rd adjacent channel operations as well as 1st adjacent incumbents." Cellular South Opposition at 4. Motorola Solutions' proposals apply only to the first six megahertz beyond the occupied six megahertz channel. Petition at 3-5. Emissions beyond six megahertz would be attenuated at the same levels adopted by the Commission.

[28] NAB/MSTV Opposition at 7.

scenario could be contemplated under the rules already adopted and affirmed by the Commission. Nonetheless, Motorola Solutions believes that the Commission's existing equipment authorization rules are adequate to police such activity. Also, it is important to note that the *Petition* discussed the equipment validation issue and noted that the geo-location data base could readily enforce proper operation through the FCC ID (and/or unique serial number) assigned to each type of TVBD.[29] Telecordia, one of the parties tentatively designated by the Commission as a TV Bands Database administrator, has filed comments stating that its architected solution "can easily accommodate changes to the rules affecting adjacent channel separation distances and/or an additional class of fixed TVBD with a relaxed spectral mask with rules requiring an increased adjacent channel separation distance."[30] Telcordia confirms that it can implement the requested rules in its system should the FCC adopt this change.

Finally, the opponents of the *Petition* argue that the requested relaxation is not needed to produce practical and cost-effective devices. The NAB/MSTV, for example, state that "[h]igher power fixed operations have few physical restrictions regarding size and weight, simplifying compliance with the OOB emission limits."[31] In addition, several parties cite to Adaptrum's claims that it has a device ready for FCC equipment authorization that complies with the mask as adopted as evidence of there not being a need for relaxation.

To reiterate its previously filed comments,[32] Motorola Solutions does not doubt that circuitry can be designed to meet the Commission's requirements, the bigger issue is at what

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[29] Petition at 3. Also, the current rules allow the Commission to deactivate any mis-behaving device or group of devices by forcing a "no channels available" message to be sent to the device(s). *In the Matter of Unlicensed Operations in the TV Broadcast Bands*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, at ¶ 212 (2008).

[30] Comments of Telcordia Technologies, ET Docket No. 04-186, at 3 (Feb. 24, 2011).

[31] NAB/MSTV Opposition at 6.

[32] Petition at 4-5.

cost. Motorola Solutions has provided the Commission with analysis showing that meeting the OOBE requirements through a combined approach of reducing the occupied bandwidth and utilizing custom RF transmit circuitry results in a 65% increase in the cost of the customer premises equipment as well a 25% increase in the number of access point sites compared to a design approach that conforms to existing broadband technology transmit masks. As stated by the Public Interest Spectrum Coalition, allowing operators the flexibility to use a less restrictive spectral mask through a corresponding increase in the adjacent-channel distance separation criteria provides benefits that "are so clearly in the public interest that the Commission should give this change serious and favorable consideration."[33]

TV band devices will appeal to both the commercial and industrial/enterprise markets. The commercial market, which is supported by wireless broadband service providers, is very sensitive to the price of devices – particularly fixed customer premises equipment – and would therefore benefit immediately by rule changes that obviate the need for new technology to satisfy stringent performance requirements. Without the relief offered by a relaxed emissions mask, Motorola Solutions doubts that manufacturers will be able to achieve price points that sustain a thriving commercial market. The enterprise market would also benefit from manufacturing economies of scale through the utilization of existing electronic components developed for Wi-Fi and 4G wireless technologies. Therefore, by adopting Motorola Solutions' proposal for a relaxed emissions mask, the Commission would benefit both market segments and allow the TV white space spectrum to achieve its maximum potential.

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[33] The Public Interest Spectrum Coalition Opposition and Response to Petitions for Reconsideration, ET Docket No. 04-186, at 11 (Feb. 24, 2011).

II. The Commission Should Reconsider its Antenna Height Restrictions on Fixed TVBDs.

The Joint Petitioners Reconsideration provides compelling analysis of the consequences of the Commission's prohibition on TVBD tower sites with ground level elevations 76 meters or higher HAAT. The Joint Petitioners provide data showing that there are significant areas of the country where fixed devices cannot be deployed solely because the 76-meter HAAT limit is too low to allow fixed stations to be installed.[34] To address these problems, the Joint Petition recommends that the Commission eliminate interference protection based on both TVBD antenna height above ground level ("AGL") and the 76-meter antenna ground level HAAT restriction and, instead, make TVBD antenna HAAT the sole metric for determining the allowable height of fixed device antennas and should allow operation of fixed device antennas up to 250 meters HAAT.[35]

MSTV and NAB state that they do not oppose the Joint Petitioners' request to allow a maximum antenna HAAT of 250 meters provided that such a change is accompanied with corresponding amendments to the required co-channel and adjacent-channel distance separation values.[36] Motorola Solutions agrees with MSTV and NAB and urges the Commission to make these changes to its rules. As indicated by the broadcast interests, concerns about interference to distant receivers can be addressed through increased separation distances.

However, NAB/MSTV and others urge the Commission to retain the 30 meter AGL limit citing interference concerns and frequency reuse for TVBDs.[37] Motorola Solutions believes that

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[34] Joint Petitioners Reconsideration at 1-2.

[35] *Id.* at 1.

[36] NAB/MSTV Opposition at 9.

[37] *Id.* at 10. *See also* Cellular South Opposition at 7; Google, Inc., Response to Petitions for Reconsideration at 3.

this is a "belt and suspenders" regulatory approach and should be reconsidered. A 30 meter AGL limit would unnecessarily penalize flat rural areas – which defines much of the midwest and plains states – by forcing higher system deployment costs to cover a given area. In these more rural areas, frequency re-use for TVBDs is not an overarching factor as there is an abundance of available channels. Further, as discussed by the Joint Petitioners, HAAT is a more accurate metric for predicting potential interference.[38] Finally, eliminating, or even increasing, the 30 meter AGL height restriction will provide fixed broadband providers greater flexibility to cover all types of terrain (flat, hilly, and mountainous) at lower cost. As stated by the PISC, the Commission should accommodate this compelling public need.

III. Conclusion.

The Commission should provide greater flexibility for the fixed deployment of broadband TV band devices by relaxing the adjacent channel OOBE attenuation requirements when operated at specified distances beyond the protected contours of adjacent channel television stations and by allowing such devices to operate at higher antenna heights. The Commission should therefore reject the oppositions to Motorola Solutions' *Petition* and the Joint Petitioners Reconsideration.

Respectfully Submitted,

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[38] Joint Petitioners Reconsideration at 5.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing "REPLY TO OPPOSITIONS TO PETITION FOR RECONSIDERATION OF MOTOROLA SOLUTIONS, INC." was deposited in the United States mail, first class postage prepaid, on this 7th day of March, 2011, addressed to the following:

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