

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

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

REPLY TO OPPOSITIONS

Shure Incorporated (“Shure”), by its undersigned counsel and pursuant to Section 1.429 of the Commission’s Rules, 47 C.F.R. § 1.429, hereby respectfully submits this consolidated Reply to Oppositions to Shure’s Petition for Reconsideration (“Petition”) of the Commission’s Second Report and Order in the above-captioned docket released on November 14, 2008 (“Order”).¹

Several oppositions to Shure’s Petition were filed, although they did not all have the same focus.² Neither time nor space permits a comprehensive response to every issue raised in the Oppositions; therefore this reply will focus below on seven key issues relevant to wireless

¹ 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”).

² See *Opposition and Comments of Google Inc.*, ET Docket No. 04-186 (May 8, 2009) (“Google Opposition”); *Consolidated Opposition to Petitions for Reconsideration of Dell Inc. and Microsoft Corp.*, ET Docket No. 04-186 (May 8, 2009) (“Dell/Microsoft Opposition”); *Opposition to Petitions for Reconsideration of the Public Interest Spectrum Coalition (“PISC”)*, ET Docket No. 04-186 (May 8, 2009) (“PISC Opposition”); *Consolidated Opposition to Petitions for Reconsideration of the Wireless Internet Service Providers Association (“WISPA”)*, ET Docket No. 04-186 (May 8, 2009) (“WISPA Opposition”); *Comments on Petitions for Reconsideration of Carlson Wireless Technologies, Inc.*, ET Docket No. 04-186 (May 8, 2009) (“Carlson Opposition”); *Motorola, Inc., Opposition to Petitions for Reconsideration*, ET Docket No. 04-186 (May 8, 2009) (“Motorola Opposition”); *Comments of the Federation of Internet Solution Providers of the Americas*, ET Docket No. 04-186 (May 8, 2009); *Comments of the Wi-Fi Alliance to Deny the Shure Petition for Reconsideration*, ET Docket No. 04-186 (May 8, 2009).

microphone operations.

I. Sensing Must Be Retained

Several TVBD proponents used their oppositions as nothing more than another attempt to persuade the Commission to dilute protections for incumbent services by attacking the requirement for a spectrum sensing function in database-enabled TVBDs.³ Shure urges the Commission to stay the course it carefully charted and retain spectrum sensing. Spectrum sensing remains an irreplaceable interference protection mechanism that the Commission properly determined should be embedded in every database-enabled TVBD.⁴ Uncontested record evidence demonstrates that there are planned and itinerant wireless microphone uses -- higher priority uses with which Part 15 operations must not interfere -- that the database cannot protect. For example, when a broadcast network covering a music production or major sports game decides just before the broadcast to incorporate additional microphones on an unreserved channel, or to relocate microphones to an unreserved channel with less ambient radiofrequency (“RF”) noise, those microphones will rely exclusively on spectrum sensing for protection.⁵ Alternatively, when a news crew deploys to the scene of an emergency, the microphones they bring will rely solely on spectrum sensing for interference protection. Successful production of all live music, broadcast, news, business gatherings, major sporting and similar events depends on the ability of the producers, engineers, crews, and talent associated with TV networks, movie studios, the event location, leagues and others to account for the “on the ground” reality of the

³ See, e.g., *Google Opposition* at 6.

⁴ *Order* at ¶ 71 (“We find that the geo-location/database and spectrum sensing methods offer the most practical solutions for identifying unused TV channels and are therefore incorporating both these methods”).

⁵ For instance, frequency coordinators at major football stadiums are routinely compelled by changing microphone needs and RF environment to reassign UHF/VHF channels on game day until 1-2 hours before kickoff.

RF environment. It is critical that database-enabled devices retain a sensing feature to assure the continued success of these productions.

Moreover, despite what Google and a handful of other TVBD proponents that lack experience manufacturing RF equipment wrongly assert, incorporating sensing will not delay or otherwise hinder the broader development of fixed TVBDs. Subsequent to the release of the Order numerous manufacturers have heaped praise upon the rules,⁶ and Shure is aware of manufacturers actively developing fixed TVBDs.⁷

II. Database Updates/Registration Must Be Strengthened To Make Wireless Microphone Protection Effective

Certain changes to improve the dynamic performance of the database are absolutely necessary to ensure that registered wireless microphones receive effective protection. Specifically, the database must update in real-time or near real-time, synchronize at least once per hour, and require TVBDs to recheck available frequencies every hour. As Commission tests demonstrated, and which no TVBD proponent challenged, the RF environment at any given

⁶ See, e.g., Ex Parte Presentation of Adaptrum, Inc., ET Docket No. 04-186 (filed Dec. 11, 2008) (“We congratulate[] OET on its completion of this significant milestone and on their ability to balance the concerns of all interests involved”); see also Craig Mundie, Chief Research and Strategy Officer, Microsoft, Statement on the FCC Vote in Favor of White Spaces Use (Nov. 4, 2008), <http://www.microsoft.com/Presspass/press/2008/nov08/11-04FCC.msp> (“Today’s vote makes possible new ways to connect people and devices to each other... [w]e look forward to playing our part in helping to realize the wireless broadband potential of the white spaces”).

⁷ For example, Motorola recently stated that it would be “adding [spectrum sensing and geolocation database] capabilities to the field proven Canopy system... for use in fixed applications in the United States.” See Motorola, *Fixed TV White Space Solutions for Wireless ISP Network Operators*, 9 (Nov. 2008), available at http://www.motorola.com/staticfiles/Business/Product%20Lines/Motowi4/wi4%20Fixed/Point-to-Point%20Mulitpoint/Canopy/_ChannelDetails/_Documents/_Static%20files/WB_TV%20White%20Space%20Position%20Paper_V2_11.08.pdf?localeId=33.

location can change dramatically on a hour-by-hour basis.⁸ The database needs to accommodate these changes to ensure that Commission Rules and Part 15 principles are enforced.

Efforts to weaken database protocols will critically undermine this safeguard and must be rejected. Certain TVBD proponents argue that more frequent database updates, more rapid synchronization between databases, and shorter intervals between TVBD rechecks of the database will be problematic.⁹ These baseless assertions, however, are flatly contradicted by potential database administrators who support enhanced protocols and share the view that they are critical to the successful implementation and ongoing management of the database.¹⁰ Given that even potential administrators support real-time updates and other enhanced protocols proposed by Shure, we urge the Commission to tighten the standard.

Finally, some TVBD proponents are exploiting the reconsideration process as an opportunity to debate Part 74 license eligibility in a transparent attempt to clear the targeted frequency band of existing uses by eliminating database protections for certain microphone users.¹¹ This proceeding is not the appropriate forum to address this issue, which is already before the Commission.¹² Shure urges the Commission to ignore inappropriate requests to examine this issue during the late stages of this proceeding, which are wrong on principle and process.

⁸ See, e.g., Evaluation of the Performance of Prototype TV-Band White Space Devices Phase II, Technical Research Branch Laboratory Division Office of Engineering and Technology, Federal Communications Commission, OET Report FCC/OET 08-TR-1005, E1-37 (Oct. 15, 2008) (“*Phase II Report*”).

⁹ See, e.g., *Google Opposition* at 18.

¹⁰ See, e.g., Petition for Reconsideration of Key Bridge Global LLC, ET Docket No. 04-186, 6 (Mar. 19, 2009) (“*Key Bridge Petition*”).

¹¹ See, e.g., *Dell/Microsoft Opposition* at 7-8; see *PISC Opposition* at 8-9.

¹² The Commission should resist pressure to rule on issues for which the public has not had appropriate notice. Pursuant to the Administrative Procedure Act and the Commission’s Rules, the Commission is required to publish the “terms or substance of [a] proposed rule” for comment. 5 U.S.C. § 553(b)(3); 47 C.F.R. § 1.413(c). Comment has not been sought on Part 74 license eligibility in this proceeding.

III. Behavioral Obligations Must Be Strengthened To Make Wireless Microphone Protections Effective

Several TVBD proponents oppose even modest enhanced behavioral performance obligations for TVBDs necessary to ensure the effectiveness of the database as an important means of interference protection. Some oppose rule modifications that would require a non-occupancy period after detecting an incumbent signal on a channel and more frequent scans of a channel in use by a TVBD.¹³ These behavioral obligations, however, are largely based on dynamic frequency sharing (“DFS”) parameters developed by IEEE, which the TVBD proponents hail as a neutral standards setting body in their Oppositions.¹⁴ Several TVBD proponents are members of IEEE and worked on these very parameters.¹⁵ TVBD proponents failed to submit any technical analysis demonstrating why these parameters cannot be readily integrated at no material cost into fixed and personal/portable TVBDs. Given the compelling need for these enhanced behavioral obligations reflected throughout the record, Shure urges the Commission to strengthen the spectrum sensing parameters specified in Section 15.711(c) to accommodate these modest changes in TVBD behavioral performance.¹⁶

IV. Personal/Portable TVBD Operations Must Not Be Expanded Below Channel 21

The County of Los Angeles, LMCC and other critical users all agree that personal/portable TVBD operations would threaten public safety operations on channels 14-20. Even Motorola agrees that it made a mistake in asking the Commission to allow operation of

¹³ See, e.g., *PISC Opposition* at 11-13.

¹⁴ See *WISPA Opposition* at 3; *Dell/Microsoft Opposition* at 2; *Google Opposition* at 2.

¹⁵ For example, Motorola, Inc., Adaptrum, Inc. and Philips Electronics North America Corp. participate in 802.22.

¹⁶ See *Petition for Reconsideration of Shure Incorporated*, ET Docket No. 04-186, 9-14 (Mar. 19, 2009) (“*Shure Petition*”).

these devices on these channels.¹⁷ The Commission should reject, however, Motorola's attempt to reclassify its recently proposed in-motion vehicle mounted devices as a third category of TVBD, and not allow it or any other personal/portable TVBD to operate in channels 5-13. Motorola and the other proponents of this expanded operation fail to address the unfriendly characteristics of VHF and low-UHF spectrum for personal/portable TVBD use, and the limitations of relying on the database to overcome the frequency propagation issues previously raised.¹⁸ Therefore, the Commission should uphold its decision to permit personal/portable devices to operate only on channels above Channel 21 (subject to specified limitations) and not on frequencies below Channel 21.

V. The Protective Zone For Wireless Microphones Should Be Expanded, Not Reduced

Despite the strong record evidence in support of expanding the protective zone around registered wireless microphones, Dell and Microsoft assert that the zone should be reduced.¹⁹ Dell and Microsoft arbitrarily suggest that the protective zone could be decreased to a scant 160 meters for personal/portable TVBDs and still provide adequate protection for registered wireless microphones.²⁰

Shure urges the Commission to reject this recommendation, which is not based on scientific analysis and is readily contradicted by the Commission's own analysis and abundant record evidence. Shure has repeatedly demonstrated that a TVBD with 100 mW of EIRP has sufficient signal strength to interfere with a wireless microphone signal from a distance

¹⁷ See *Motorola Opposition* at 15.

¹⁸ See, e.g., *Shure Opposition* at 18-19.

¹⁹ See *Dell/Microsoft Opposition* at 2-3.

²⁰ *Id.*

exceeding two kilometers.²¹ Moreover, the Commission's own analysis also confirms that a 100 mW TVBD signal will propagate with enough strength to create harmful interference far beyond the protective zone Dell and Microsoft wrongly suggest offers adequate protection.²²

Shure also urges the Commission to disregard the colorful exhibits Dell and Microsoft submitted with their Opposition that suggest registered microphones with a two kilometer protective zone will largely prohibit TVBD operations throughout New York City and San Francisco.²³ These exhibits appear to be nothing more than randomly imposed circles over satellite images of the aforementioned cities. The circles do not appear to reflect operational wireless microphones, and Dell and Microsoft offer no evidence that any research has been conducted to measure the actual use of wireless microphones in these cities. If the Commission extends the protective zone around wireless microphones to two kilometers, which the record and scientific objective analysis support, there will still be spectrum for TVBDs in every major metropolitan market.

VI. Commission Should Reject Efforts To Limit Safe Harbor Channels

Several parties recommended setting aside two channels for wireless microphone use, but then negate whatever protective benefits could be had of this by arguing that these channels should support all wireless microphones that may not have a license and/or be shared with TVBDs on a non-exclusive basis.²⁴ Carlson even goes so far as to urge the Commission to

²¹ See, e.g., *Shure Ex Parte Presentation*, ET Docket No. 04-186, 11-17 (filed Jun. 13, 2007) (demonstrating that interference radius of 100 mW transmitter extends 2.4 km, yet under ideal conditions a TVBD's -114 dBm effective sensing radius extends only 1.2 km).

²² See *Phase II Report* at 31. Signal strength from Adaptrum's 100 mW prototype was measured at -77.4 dBm at 360 meters spread over 4.5 MHz. This is far more signal strength than needed to disrupt a microphone receiver, which can typically receive microphone signals at ≥ -95 dBm and requires a D/U ratio at the receiver of approximately 20 dB.

²³ See *Dell/Microsoft Opposition* at 9-10, Exhibits 1-3.

²⁴ See, e.g., *Carlson Opposition* at 5-7; *WISPA Opposition* at 7-8.

eliminate the requirement for sensing and mandate that all wireless microphones that may not have a license operate in two channels to be designated in each market on a non-exclusive use basis.²⁵ First, this proposal is entirely inadequate to support existing wireless microphone operations. For example, this proposal would require that all wireless microphones in use in the Broadway theater district be relegated to operation on two channels -- a situation that would materially impair current operations. Second, having wireless microphones share such spectrum would critically reduce and perhaps eliminate the utility of any such safe harbor channels. Even if unlicensed wireless microphones registered in the database, as proposed by Carlson and WISPA, the opportunities for interference will be just about as great as operating in any other channel where they share spectrum with TVBDs. Shure and others elsewhere in the record have clearly demonstrated that even the two “safe harbor” channels designated in thirteen (effectively 11 market) markets will not be sufficient spectrum to support wireless microphone operations in many localities nationwide. Adoption of this or similar proposals would further exacerbate the situation, and eliminate whatever advantages there might have been in exempting these channels from TVBD use.

VII. Open And Transparent Procedures Are Needed For A Meaningful Certification Process

Several of the TVBDs proponents have asked the Commission to eliminate the public comment process during the certification phase for TVBDs, arguing that the Commission does not need to invite “frivolous objections intended solely to delay the process.”²⁶ The entire testing process up to now has, if nothing else, demonstrated that for the process to work right there needs to be rigorous testing, with the Commission receiving as much input as possible. This is

²⁵ See *Carlson Opposition* at 6.

²⁶ See, e.g., *Carlson Opposition* at 8.

not a matter of whether one side or the other “trusts” the Commission’s processes to get it right -- it is a matter of right and sound engineering and public policy. The TVBD proponents’ efforts to construct a closed door process that will enable a spectrum takeover is essentially asking the Commission to go backwards on transparency and public input by stakeholders in critical decisions. It is critical that those most affected by the Commission’s decisions have a role in the process. Wireless microphone stakeholders, including manufacturers and users, have the knowledge, experience and technical expertise to evaluate claims of interference protection. The public interest in maintaining an open and transparent process where technical rules and technology choices are grounded in the results of sound, fully analyzed data requires that the Commission reject these calls to close and rush the process. These are the same proponents who already have argued that the Commission should not test TVBDs in simulated real-world environments.²⁷ Without a transparent certification process, it is impossible to know what potentially harmful interference will be caused by new TVBDs until after they have been certified and are operating in the marketplace. At that point, it will be too late.

²⁷ For instance, PISC opposes Shure’s request to require TVBDs to detect wireless microphones in the presence of a -20 dBm interfering signal, yet this is the exact type of real world occurrence wireless microphones face on a daily basis. *See PISC Opposition* at 22.

Respectfully submitted,

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CERTIFICATE OF SERVICE

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