

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

In the Matter of	)	
	)	
Unlicensed Operation in the	)	ET Docket No. 04-186
TV Broadcast Bands	)	
	)	
Additional Spectrum for Unlicensed	)	ET Docket No. 02-380
Devices Below 900 MHz and in the	)	
3 GHz Band	)	
	)	
Second Report and Order and	)	FCC 08-260
Memorandum Opinion and Order	)	

**OPPOSITION TO PETITIONS FOR RECONSIDERATION  
OF  
THE PUBLIC INTEREST SPECTRUM COALITION**

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**TABLE OF CONTENTS**

SUMMARY.....iii

ARGUMENT.....1

I. THE COMMISSION SHOULD NOT RESERVE CHANNELS EXCLUSIVELY FOR PARTICULAR USES

A. The Commission Should Not Sacrifice the Intended Unlicensed Use in Rural Areas to Reserve Six Channels Exclusively for Fixed Licensed Use.....1

B. Excluding TVBDs from the 50 Markets is Unjustified .....4

C. Allocating Two Additional Channels Between 21 – 51 for Wireless Microphones Nationwide is Wasteful and Inefficient.....5

D. Given the Existing Database Protections for Wireless Microphones, the Commission Should Allow Personal/Portable TVBDs to Operate Below Channel 21.....7

II. THE COMMISSION SHOULD NOT EXPAND INTERFERENCE PROTECTIONS FOR WIRELESS MICROPHONES

A. The Commission Has Not Addressed the Issue of Expanding Interference Protections to Currently Unauthorized Microphone Users.....8

B. The Current Sensing Requirements for TVBDs Relying on the Geolocation Database is Overly Burdensome.....9

C. Requiring Real-Time Database Look-up to Protect Registered Microphone Users is Excessive and Unnecessary.....11

D. Given the Specificity of the Database it is Unnecessary to Require a Non-Occupancy Periods for Channels Being Utilized by Wireless Microphones.....13

E. Extending Interference Protection Zones for Registered Wireless Microphone Venues to 2 km is Excessive and an Inefficient Use of Spectrum.....14

III. THE COMMISSION SHOULD NOT EXPAND INTERFERENCE PROTECTIONS FOR CABLE HEADENDS.....15

IV. THE COMMISSION SHOULD NOT PLACE FURTHER RESTRICTIONS ON THE OPERATION OF PERSONAL/PORTABLE TVBDS

A. Prohibiting personal/portable TVBDs from Adjacent Channel Operation is Excessive and Would Eliminate White Space in Crowded Urban Markets.....19

B. The Power Limits on Personal/Portable TVBDs are Already Overly Restrictive and Should Not be Further Reduced.....20

V. THE COMMISSION SHOULD NOT MAKE THE CERTIFICATION PROCESS FOR TVBDS MORE BURDENSOME.....22

VI. THE COMMISSION SHOULD RE-EXAMINE THE BORDER EXCLUSION ZONE.....23

VII. CONCLUSION.....23

## SUMMARY

On behalf of the Public Interest Spectrum Coalition (PISC) and the Champaign Urbana Wireless Network (“Petitioners”), the New America Foundation and Public Knowledge respectfully submit the following *Opposition to Petitions for Reconsideration* of the Commission’s TV band white space rules.<sup>1</sup> We oppose the Petitions by incumbent spectrum users, both authorized and unauthorized, to revisit the Order’s central balance between protecting licensed incumbent services and opening this “vast wasteland” of underutilized spectrum on a shared, unlicensed basis to serve the public’s interest in new, innovative and competitive broadband devices and services. The Commission has already taken an overly cautious approach to authorizing TVBDs. The additional restrictions in the Petitions opposed herein would eliminate the utility of TVBDs and the potential for national markets, undermining the very success of this rulemaking as well destroying the potential of this band to promote much needed wireless broadband connectivity in areas across the country.

First, several Petitioners request the Commission to reserve channels exclusively for their use, either through exclusive licensing or by effectively prohibiting the operation of TVBDs. *Fiber Tower, et. al* presents no new argument to justify their proposal to exclusively license six channels in rural areas nationwide, that has already been considered and rejected by the Commission in this proceeding. Considering the propagation characteristics of the band and the alternatives available to Petitioners for wireless backhaul, there is no reason to carve out a special license regime for such a small number of backhaul providers. Further, it is unnecessary and wasteful to reserve additional channels for wireless microphone users, given that the Order already designates an abundance of safe harbors for microphone users and provides even greater protection to Part 74 licensees through registration in the geolocation database.

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<sup>1</sup> Unlicensed Operations in the TV Broadcast Bands; Additional Spectrum for Unlicensed Devices Below 900 MHz and the 3 GHz Band, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd. 16807 (2008) (¶¶ 1-3) (“Second R&O”).

Second, requests by Shure and other Petitioners to further expand protections for all wireless microphone users are unwarranted and potentially threaten any channel availability for TVBDs in metropolitan areas across the country. Considering the substantial protections afforded by the geolocation database, it is unnecessary and unduly burdensome to require TVBDs with database access to sense, particularly at -114 dBm, or to prohibit the operation of personal/portable TVBDs below channel 21.

Third, the Commission has already gone too far by extending the interference protection to an unknown number of cable headends without even a showing of interference. Because headends were under no prior obligation even to register their location, the Commission has no idea how many headends there are, or where they are located, and thus no means to assess the impact of further protections. Given this uncertainty, the Commission should first collect this information through an additional notice and provide for adequate public input and discussion.

Fourth, requests to further limit the operation and power levels of personal/portable TVBDs on first adjacent channels are unsubstantiated, excessive and would in practice undermine national markets for TVBDs and services. Proposals to limit TVBDs to 10 or 20 mW power are simply efforts to re-argue the already well-settled question of whether the white space spectrum should be opened for new broadband services and innovation.

Fifth, the Commission should not make the certification process for TVBDs more burdensome. Shure's request to open test procedures of geolocation TVBDs to public comments would hamper innovation and rehash issues the Commission has already aired exhaustively.

Finally, the Commission should reexamine the border exclusion zone, given that there is nothing in the *Order* to explain how it is possible for unlicensed devices to qualify as broadcast devices subject to the treaty when they do not even meet the threshold requirement of requiring licenses under Section 301.

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**OPPOSITION TO PETITIONS FOR RECONSIDERATION  
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On behalf of the Public Interest Spectrum Coalition (PISC)<sup>1</sup> and the Champaign Urbana Wireless Network (“Petitioners”), the New America Foundation and Public Knowledge submit the following *Opposition to Petitions for Reconsideration* to the *Second Report and Order and Memorandum Opinion and Order* in the above captioned proceeding.<sup>2</sup>

**ARGUMENT**

**I. THE COMMISSION SHOULD NOT RESERVE CHANNELS EXCLUSIVELY FOR PARTICULAR USES**

**A. The Commission Should Not Sacrifice the Intended Unlicensed Use in Rural Areas to Reserve Six Channels Exclusively for Fixed Licensed Use**

FiberTower, *et al.* request the Commission “designate the White Spaces in six UHF TV

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<sup>1</sup> PISC is an unincorporated *ad hoc* coalition of non-profit organizations with a membership consisting of the following, in alphabetical order: The CUWiN Foundation (CUWIN), Common Cause, Consumer Federation of America (CFA), Consumers Union (CU), EDUCAUSE, Free Press (FP), Media Access Project (MAP), the New America Foundation (NAF), the Open Source Wireless Coalition (OSWC), Public Knowledge (PK), and U.S. PIRG.

<sup>2</sup> *Second Report and Order and Memorandum Opinion and Order*, FCC 08-260, adopted Nov. 4, 2008 (hereinafter *Second R&O/MO&O*). Rules adopted in this proceeding were published in the Federal Register Feb. 17, 2009. *See* 74 Fed. Reg. 7314 (Feb. 17, 2009). This petition is filed pursuant to Section 1.429(d).

Bands channels in all rural areas for fixed, licensed operations” to “encourage the deployment of new fixed, licensed services with sufficient capacity and scalability and help expand wireless backhaul facilities to facilitate rural broadband deployment.”<sup>3</sup> FiberTower offers no new argument, however. It merely asserts that the Commission “failed to consider adequately the robust record supporting fixed, licensed use of a portion of the White Spaces for backhaul solutions.” The Commission should therefore reject the *Petition* as repetitious.<sup>4</sup>

PISC does not disagree with FiberTower concerning the challenges associated with middle-mile infrastructure in rural areas and the utility of wireless backhaul as an alternative infrastructure for broadband networks.<sup>5</sup> But this cannot justify foreclosing open, shared access to TV white space spectrum, particularly when FiberTower and the Commission have other means to address the general problem of backhaul. The Commission properly determined the first time that the benefits of the FiberTower proposal do not outweigh costs to the public.

FiberTower, *et al.* and its co-filers have many other more spectrally efficient options for point-to-point wireless backhaul solutions. Of course, since FiberTower, *et al.* have been intent in this proceeding on securing exclusive (“licensed”) access to TV white space free of charge (through a proposal to license by rule), these parties may well view their options for *free* and exclusive use of spectrum to be limited. Nevertheless, even under this “free lunch” licensing scenario, FiberTower and its customers can freely access the lightly-licensed 3.65 MHz band, frequencies better suited for point-to-point backhaul links and coordinate among each other and

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<sup>3</sup> *Petition for Reconsideration of FiberTower, et al.* at 7.

<sup>4</sup> See 47 C.F.R. 1.429.

<sup>5</sup> There is substantial evidence that large incumbent local exchange carriers (ILECs) continue to charge excessive prices and carry out unreasonable provisioning for their data transmission offerings, including backhaul for wireless services. See, e.g., *FCC Needs to Improve Its Ability to Monitor and Determine the Extent of Competition in Dedicated Access Services*, U.S. GAO Report to the Chairman, Committee on Government Reform, House of Representatives, GAO-07-80, November 2006, at 1 (“GAO Report”); Letter from Colleen Boothby, Ad Hoc Telecommunications Users Committee, to Marlene Dortch, FCC, WC Docket 06-125, dated October 9, 2007 (“Ad Hoc Letter”).

other WISPs across most of rural America. There is also considerable and relatively cost-effective spectrum available at 2.5 GHz and in other bands. Moreover, fixed backhaul services in other, less encumbered bands can operate at considerably higher power levels that seem better suited to the needs of commercial carriers. While FiberTower argues that these alternatives are more costly or otherwise less desirable from FiberTower's perspective that does not change the overall public interest calculus. The use of TV band white space is inherently constrained and encumbered. There is no reason to believe that reserving a TV white space channel for exclusive or "licensed" use would justify a transmit power any greater than the 4 Watts EIRP and 40 mW permitted in the Order for non-adjacent and adjacent channels, respectively. It is elementary "Spectrum 101" that very low-frequency bands below 1 GHz are most valuable for mobility, for broadcasting connectivity over large areas, and for propagating around dense foliage and hilly terrain. In any particular area, the share of the spectral capacity that would actually be put into service for point-to-point backhaul would be fractional, thereby perpetuating the current gross underutilization of the TVWS channels.

Rather than reconsider its previous determination here, PISC recommends the Commission move expeditiously to the promised *Notice of Inquiry* on higher power for unlicensed rural transmitters.<sup>6</sup> This proceeding would provide the appropriate context to address the legitimate need for rural wireless backhaul in a manner conducive to the development of unlicensed devices in the broadcast white spaces.

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<sup>6</sup> *Second R&O/MO&O* ¶ 106. Also *see*, Statements of Michael J. Copps, Jonathan Adelstein, and Robert M. McDowell, *Second R&O/MO&O*.

## **B. Excluding TVBDs from the 50 Markets is Unjustified**

In their *Petition for Reconsideration*, Richard Rudman and Dana Erickson argue that TVBDs should be excluded from operating in the top 50 standard metropolitan areas (SMSA's).<sup>7</sup> Rudman and Erickson argue that the migration of TV translator Relay stations, Low Power Auxiliary (LPA) and Broadcast Auxiliary Service (BAS) out of the 700 MHz band (channels 52-69) will leave little or no available white space for TVBDs in large metropolitan markets.<sup>8</sup> They claim that there is no channel availability in Los Angeles and only one channel available for TVBDs in New York City and Washington, DC. Their analysis is highly misleading and their conclusion unfounded.

First, they do not base their analysis on the actual signal B contours that the Commission will utilize to determine protected channels. Instead, they list stations within 80 km of a metro area, leading them to count a number of out-of-market television stations. Thus, many channels they list as occupied would most certainly be available to at least low-power TVBDs. Detailed channel mapping of a number of large metropolitan markets has demonstrated that there are a sufficient number of available adjacent channels for the robust deployment of at least low-power mobile services and innovation. For example, there are potentially seven unlicensed low-power channels available in New York City, 13 in Dallas/Fort Worth, 16 in the Boston market and 17 in Detroit.<sup>9</sup> Second, they incorrectly conclude no TVBDs will be able to operate on channels adjacent to full-power TV signals.<sup>10</sup> Although, the Commission did not permit the use of higher-powered fixed TVBDs to operate on adjacent channels, it did permit personal/portable devices to

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<sup>7</sup> See *Petition for Reconsideration of Richard A. Rudman, CPBE, and Dane E. Ericksen P.E., CSRTE, 8-VSB, CBNT, Broadcast Engineers* at 3.

<sup>8</sup> *Id* at 2.

<sup>9</sup> Michael Calabrese and Gregory Rose, "The Economics of Auctioning DTV White Space Spectrum," New America Foundation, Working Paper 22, September 2008, available at [http://www.newamerica.net/files/NoWindfallInWS\\_CalRose.pdf](http://www.newamerica.net/files/NoWindfallInWS_CalRose.pdf)

<sup>10</sup> See *Petition of Rudman* at 3, *supra* note 7.

operate at 40 mW.<sup>11</sup> Even under Rudman and Erickson's analysis, device manufacturers will still be able to develop and market personal/portable TVBDs in these large metropolitan areas. Although PISC agrees that the relatively small number of white space channels available in a few very congested areas, such as New York City, is a challenge to the development of national markets for TVBD equipment, the Rudman and Erickson filing provides no reasoned basis for the Commission to consider a blanket ban of TVBDs in any market.

### **C. Allocating Two Additional Channels Between 21 and 51 for Wireless Microphones Nationwide is Wasteful and Inefficient.**

The Society of Broadcast of Engineers (SBE) asks the Commission to allocate, on a nationwide basis, at least two additional channels between 21 and 51 exclusively for use by wireless microphones.<sup>12</sup> As PISC argued in its Petition for Reconsideration, given the ability of licensed microphone users to protect themselves by registering their location and times of use in the TVWS database, it is wasteful and inefficient to allocate specific channels in each market exclusively for wireless microphone users.<sup>13</sup> Considering the relatively small number of licensed wireless microphone users (fewer than 1,000 Part 74 licensees as of mid-2008), their power levels, periodic use and the control they typically have over their performance venues, even prohibiting other low-power mobile devices from three or four channels to keep them clear for wireless microphones would be an enormous waste of spectrum capacity on an aggregate, national basis.

The Commission has effectively reserved channels below 21 for wireless microphones in every market by prohibiting the operation of personal/portable devices on those channels. In addition, the Order allocates two additional channels for wireless microphones above channels

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<sup>11</sup> *Second R&O/MO* ¶ 176.

<sup>12</sup> *See Petition for Reconsideration of the Society for Broadcast Engineers, Inc.* at 21.

<sup>13</sup> *See Petition for Reconsideration of Public Interest Spectrum Coalition* at 17.

21 in the 13 PLMRS markets, while allowing licensed microphone users to register in the database to reserve channels above 21. SBE argues that additional reserve channels are needed because spectrum sensing is an unreliable means to detect wireless microphones. However, assuming *arguendo* that at this time sensing is not a reliable method for protecting licensed microphone users, then the most spectrum efficient remedy is for microphone users to either operate below channel 21 and/or register in the TVWS database. Among all of those channels, even a venue that needed to coordinate a number of microphones at a particular location and time could find a sufficient number of 200 khz slots.

Motorola suggests, as a concession, that if TVBDs relying on the geolocation database are not required to sense wireless microphones, this could justify the allocation of two channels nationwide between 21 and 51.<sup>14</sup> We disagree. Any reservation of channels for wireless microphones would only be justified if they had no ability, or very limited ability, to block TVBDs on the other channels above 21 by registering in the TVWS database. Given the ability of authorized wireless microphone users to register in the database and the limited geographic area of use, there is no need to block-off channels nationwide exclusively for occasional and narrow-band wireless microphone use. The Commission decision to block 26 channels for intermittent wireless microphone use in the 13 PLRMS markets is already unnecessarily wasteful. The notion that a scattering of legal, low-power users needs to exclude all other consumers and innovation from fully two additional channels nationwide in order to operate is not supported by the record nor in the public interest.

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<sup>14</sup> See *Petition for Reconsideration and Clarification of Motorola, Inc.* at 19.

**D. Given the Existing Database Protections for Wireless Microphones, the Commission Should Allow Personal/Portable TVBDs to Operate Below Channel 21.**

Because the Commission has decided to require TVBDs to rely on a geolocation database to protect incumbent licensees, including Part 74 devices, the Commission should further allow personal TVBDs to operate below channel 21. As Dell and Microsoft correctly note in their joint Petition, the Commission's exclusion of personal/portable TVBDs from channels below 21 that rely on the same interference avoidance method (the geolocate look-up database) as higher-power fixed TVBDs is inconsistent.<sup>15</sup> Although Dell and Microsoft acknowledge that in earlier filings they had conceded the exclusion of personal/portable TVBDs from channel 14 – 20, that concession was based upon the challenges associated with utilizing spectrum sensing as the only means to prevent interference with public safety users in the spectrum. Given the ample protection afforded by the geolocation database, it is no longer necessary to exclude personal/portable devices from utilizing spectrum below channel 21 if they rely on the geolocate/look-up database. There is no reason to believe that the TVWS database certified by OET will somehow be less accurate with respect to channel occupation below channel 20, than compared with channel occupation above channel 20. And if the Commission's actual intent is to effectively reserve channels below 21 for wireless microphones, then Part 74 devices should not be able to use the TVWS database to block TVBD access to channels above 20.

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<sup>15</sup> See *Petition for Reconsideration of Dell, Inc. and Microsoft Corp.* at 5.

## **II. THE COMMISSION SHOULD NOT EXPAND INTERFERENCE PROTECTIONS FOR WIRELESS MICROPHONES**

### **A. The Commission Has Not Addressed the Issue of Expanding Interference Protections to Currently Unauthorized Microphone Users.**

Shure asks the Commission to clarify that a database administrator “may not disregard protection for microphones based on the use application of the microphone..., the power levels used by the microphone, or FCC license status (for example, protecting wireless microphone users that provide FCC license information but not those who do not provide such information or who . . . are not eligible for a wireless microphone license.”<sup>16</sup> .While Shure apparently regards widespread violation of the Commission’s licensing rules<sup>17</sup> as a modest peccadillo to be overlooked at need, the Commission is not in a position to provide protection for devices operating in express violation of the Commission’s rules – and certainly not at the expense of devices authorized by the Commission and lawfully operated.

Even if the Commission could reverse 75 years of law at a whim, allowing even limited new categories of these devices, to access the TVWS database and block *authorized* TVBDs would essentially destroy the utility of the TV white space spectrum for broadband and other innovative services, while giving *de facto* license rights to tens of thousands of users that are not currently authorized to operate under FCC rules. In this proceeding the Commission has not even noticed the issue of whether wireless mics and other devices operating unlawfully on the band should be given licensing rights superior to authorized TVBDs, nor is there anything in the record offering a reasoned rationale for rewarding unlawful behavior in this particular band to the detriment of broadband deployment and innovation.

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<sup>16</sup> *Petition for Reconsideration of Shure, Incorporated* at 16.

<sup>17</sup> *See Petition for Rulemaking of Public Interest Spectrum Coalition*, WT Docket No. 08-167, July 15, 2008.

In an effort to solve the problem, PISC suggested the Commission establish a new General Wireless Microphone Service (GWMS) licensed by rule pursuant to Section 307(e) to operate on vacant broadcast UHF channels below Channel 52, with GWMS with co-equal status to recently authorized TVBDs.<sup>18</sup> The Commission has never permitted illegal and unauthorized users to establish seniority to authorized users. At best, the Commission has promised amnesty to unlicensed radio operators that agreed to cease illegal operations and abide by Commission rules. *See Ruggiero v. FCC*, 317 F.3d 239, 241-42 (D.C. Cir. 2003) (*en banc*). Unauthorized operators who accepted such amnesty received no right to continue broadcasting on the same frequencies or even a preference for selection for the newly authorized low-power FM service. Given the current unauthorized status of the vast majority of wireless microphone users, it would not be in the public interest nor follow precedent for the Commission to provide them with Part 74 or any other license rights that would restrict spectrum access for TVBDs authorized under this Order.

### **B. The Current Sensing Requirements for TVBDs Relying on the Geolocation Database is Overly Burdensome**

Shure Inc. asks the Commission to reconsider TVBD operation on channels adjacent to TV broadcasts above channel 21 and requests “the Commission to modify Section 15.711(c) to require all TVBDs to accurately detect the presence of incumbent microphone signals at threshold levels of -114 dBm while in the presence of interfering signals +/- one (1) channel that reach -20 dBm”<sup>19</sup> Shure does not, however, provide any engineering analysis to demonstrate why this is necessary to prevent harmful interference. Rather, Shure argues prototype “TVBDs were overwhelmed by the mix of ambient RF signals,” and unable to maintain -114 sensitivity in the presence of interfering signals on adjacent channels.

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<sup>18</sup> *Id.*

<sup>19</sup> *Petition of Shure*, at 12, *supra* note 16.

Even assuming the necessity for the -114 level, Shure’s argument with regard to the performance of the prototypes is irrelevant. As IEEE 802 noted, at such a sensitive detection level (-114 or below), “[i]t is difficult, if not impossible, for a sensing approach to differentiate between a legal Part 74 device and any other narrowband signals sources such as spurious signals as allowed by Part 15.209(a) since the specified sensing threshold proposed by the FCC is 33.5 dB below the permitted level from such a source at a 10 m distance.”<sup>20</sup> The failure to detect certain low-power microphones in the presence of a high-power adjacent TV signal is a minor problem compared to the false positives – and attendant loss of spectrum utility – that results from requiring TVBDs to sense for microphones at all if they are relying on permission from the TVWS geolocate database. Given the additional interference protections provided by the geolocation database it is unnecessary to require TVBDs to sense at -114 dBm and the Commission should consider eliminating the requirement for TVBDs relying on geolocation capabilities. This would limit an unnecessary burden on TVBDs, ensure the utility of white spaces by reducing the likelihood of false positives,<sup>21</sup> and reduce consumer prices for TVBDs and equipment costs for Rural WISPs.<sup>22</sup>

If the Commission decides to maintain the sensing function as a backup it should consider raising the sensing level to -107 dBm for TVBDs relying on the geolocation database and for low-power sensing only TVBDs. As Microsoft and Dell noted, “IEEE 802.18 determined that -107 dBm was an appropriate sensing level even for fixed devices operating at 4 Watts EIRP, which have 40 times the maximum power permitted for the personal/portable

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<sup>20</sup> *Petition for Reconsideration of IEEE 802* at 6.

<sup>21</sup> *Id.*

<sup>22</sup> *See Petition of Dell and Microsoft* at 4, *supra* note 15. Also *see Petition for Reconsideration of Wireless Internet Service Providers Association* at 6.

devices at issue here.”<sup>23</sup> In addition, Shure assumed a -107 dBm threshold in its initial comments in this proceeding.<sup>24</sup> Further, the Commission should consider reducing sensing level of all TVBDs commensurate with their transmit power level. As Dell and Microsoft argue, the Commission could “implement a dB-for-dB compensation for lower-power white space operations, increasing the level at which wireless microphones would need to be sensed commensurate with the decrease in power of the TVBD transmission.”<sup>25</sup> This would allow for a diversity of TVBDs for consumers and provide for an empirically based standard setting that would establish the appropriate incentives for device manufacturers to continue to improve and advance sensing technology.

### **C. Requiring Real-Time Database Look-up to Protect Registered Microphone Users is Excessive and Unnecessary**

Shure “urges the Commission to modify Section 15.715(k) to require database administrators to synchronize at least every hour and modify Section 15.711(b) to require TVBDs to access and check frequency availability in real-time, near real-time or at a minimum once every hour.”<sup>26</sup> Shure argues that “given the nominal amount of information collected by a database administrator, there should be no objection to making registration information collected from wireless microphone incumbents available to TVBDs and other database administrators more frequently.”<sup>27</sup>

We strongly disagree. Requiring the database repository, database look-up services and protected microphone incumbent licensees to update and synchronize their database information in real time – or for any period substantially less than daily – is both wholly unnecessary,

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<sup>23</sup> *Petition of Dell and Microsoft* at 4, *supra* note 15.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.* at 5.

<sup>26</sup> *See Petition of Shure* at 15, *supra* note 16.

<sup>27</sup> *Id.*

possibly unworkable and imposes undue costs that ultimately fall on the individual consumers of TVBDs and related services. Because wireless microphone venues know well in advance when they will be operating for a purpose that truly justifies blocking off a channel, such as the live broadcast of a professional sporting event, in most cases the location, time and frequency information can be posted in the TVWS database months, weeks, or at least many days in advance. Indeed, because *other* potential users of the frequencies being reserved – including other wireless microphone operators – may benefit from the ability to plan ahead, every incentive should be for a notice period of substantially more than 24 hours.

Even if the database repository and channel look-up service is an integrated monopoly (which we oppose and which is not contemplated by the industry consortium planning a database model) even hourly updating would place a substantial and unnecessary cost burden on database administration and ultimately consumers. Further, if the channel query service is handled by an entity or entities that are separate from the administrator of the database repository, it may not even be possible to do anything close to real-time updating. Indeed, such a requirement could introduce a greater chance of erroneous data, since in many cases there would be virtually no time between the posting of information and the blocking of channels. Shure argues that certain wireless microphone users “routinely deploy on short notice and require clean channels immediately”<sup>28</sup> Shure cites examples such as golf courses, parades, marathons etc. where the exact deployment of the microphone may be unknown until the user arrives on site.<sup>29</sup> However, the current 1 km protection zone for registered sites – or even a 0.5 km protection zone -- would provide registered wireless microphone users with sufficient wiggle-room regarding the exact location of a wireless microphone site. It would be preferable to give microphone operators the

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<sup>28</sup> *Id.* at 15

<sup>29</sup> *Id.* at footnote 38.

ability to initially over-reserve for the precise hours that the event will be operating rather than require that the database repository and related service providers be able to accommodate real-time adjustments in the precise placement of microphones. In addition, itinerant wireless microphone users such as electronic news teams, who may have insufficient information or time to register in the database, will not need to reserve channels above 20 since they have, in addition to their own licensed BAS bands, access to channels 2 – 20 where personal/portable devices are prohibited and in addition exclusive use of 2 channels above 21 in the 13 PLMRS markets. In sum, there appears to be no compelling need for any contemplated and authorized wireless microphone user to require anything more frequent than daily updating and/or checking by TVBDs of the database repository.

**D. Given the Specificity of the Database it is Unnecessary to Require a Non-Occupancy Periods for Channels Being Utilized by Wireless Microphones.**

Shure argues that “the Commission erred in not requiring a non-occupancy period in Section 15.711(c) for channels deemed to be in use by higher priority incumbents.”<sup>30</sup> Shure points to crowded RF environments such as sporting events, where personal/portable TVBDs relying on sensing alone could conceivably cause more than momentary interference based on the current 60-second recheck requirement. However, Shure’s proposal for a 60-minute non-occupancy period for all TVBDs is excessive.

As an initial matter, we note that the issue of an appropriate mandatory recheck period should apply only to devices relying on sensing alone. Authorized wireless mic users have the ability to register their location, time and channel use in the database, inhibiting the potential of personal/portable device to operate on an occupied channel. As we argue above, we believe the Commission should not require TVBDs relying on database permission to sense at all. But even

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<sup>30</sup> *Id.* at 13.

assuming that all TVBDs must rely to some degree on sensing, a no-occupancy period that is substantially longer than the recheck requirement is unnecessary and unduly burdensome. As the Commission provided in declining a non-occupancy period, “The requirements to monitor a channel for 30 seconds before commencing operation, combined with the requirement to periodically monitor a channel being used and quickly vacate when an authorized user begins operation, will adequately protect against operation on occupied channels.”<sup>31</sup> Imposing such an excessive requirement would force every TVBD to vacate a channel for an hour even if someone simply turned on a wireless microphone to test it. This requirement would unnecessarily limit spectrum in crowded urban markets and would be completely unnecessary for fixed TVBDs, particularly those operating in rural areas. In addition, manufacturers of personal/portable devices are likely to impose their own non-occupancy periods, albeit considerably more limited than Shure’s proposal, in an effort to conserve battery power.

**E. Extending Interference Protection Zones for Registered Wireless Microphone Venues to 2 km is Excessive and an Inefficient Use of Spectrum**

Shure asks “the Commission to reconsider Section 15.712(f) and modestly increase the protective zone around microphones to a radius of two (2) kilometers for fixed TVBD operations.”<sup>32</sup> Shure argues “the record collected in this proceeding demonstrates that the interference range for a fixed TVBD with four (4) Watts of EIRP extends for many kilometers and is hugely disproportionate to a registered wireless microphone’s one (1) kilometer protective zone.”<sup>33</sup> Even so, Shure acknowledges “that absolute proportionality is [not] required between the interference range of a fixed TVBD and the protective zone around a registered wireless microphone... [g]iven that fixed TVBDs must register in the geolocation database and identify

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<sup>31</sup> *Second R&O/MO&O* ¶ 248

<sup>32</sup> *Petition of Shure* at 13, *supra* note 16.

<sup>33</sup> *Id.*

their location, and because they cannot operate on adjacent channels, the wireless microphone user community will be able to predict and largely avoid the frequencies where co-channel interference with this type of TVBD is likely to occur.”<sup>34</sup> One reason Shure waffles on the question of “proportionality” may well be because whatever the appropriate protection distance may be for a fixed TVBD operating up to 4 W EIRP, even the Order’s stated 1 km protection zone is overkill vis-à-vis a personal-portable device operating at 40 or 50 mW.<sup>35</sup> If, as Shure seems to urge, the rules follow absolute proportionality, then there would be no empirical justification for a 1 km exclusion zone – and certainly not for *quadrupling* the area of that exclusion zone by doubling the protection radius to 2 km. The spectrum inefficiency inherent in a 1 km protection radius vis-à-vis personal/portable devices is even more pronounced in urban and suburban areas – or inside buildings or vehicles – where most mobile devices would operate, and where a 40 mW transmission would be attenuated over even relatively short distances. Under the current rules, a citizen living even half a kilometer from a registered microphone venue would be prohibited from accessing vacant channels with a personal/portable device, such as a home router, that could not possibly cause harmful interference to the microphone operator. The Commission should reconsider its blanket exclusion zone for registered wireless microphone users and its impact on reducing the amount of usable spectrum, particularly in crowded urban markets.

### **III. THE COMMISSION SHOULD NOT EXPAND INTERFERENCE PROTECTIONS FOR CABLE HEADENDS**

The Commission has generously expanded protection to cable headends outside of the protected TV station contours, stretching the protection zone to cable headends within 80

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<sup>34</sup> *Id.* at footnote 35.

<sup>35</sup> *See* 47 C.F.R. § 15.712(f).

kilometers of a TV station's protected contour. Although this enormous protection zone is likely to have unforeseen and possibly devastating consequences for the availability of TV white space channels in many markets where they are already in short supply, NCTA argues that the Commission should further stretch that protection to *all* cable headends, regardless of their distance from a station's protected contours. In our view, the Commission has already gone too far by extending the interference protection to cable headends that have never been licensed<sup>36</sup> and without even a showing of interference from authorized users in the TV band. As NCTA readily admits, the current protection scheme is "effective for the majority of cable headends."<sup>37</sup> Also, there are much more efficient and reliable methods for cable headends outside of the signal contours to receive over-the-air programming including via fiber-optic cable, microwave towers, satellites and return channels on the cable systems itself. We believe the Commission should not only reject NCTA's petition on this issue, but also grant the request in the petition filed by Dell and Microsoft to "clarify the circumstances under which these facilities would be entitled to protection and reduce or eliminate these 'exclusion zones' where practicable."

The current rules already foreclose TVBD's from operating in substantial amounts of spectrum. Dell and Microsoft note that the current 80 km protection limit would result in some cases of restricting "spectrum access in huge areas roughly the size of the state of Rhode Island, in multiple locations."<sup>38</sup> A blanket protection regime for all cable headends beyond the signal contours of a TV station, with the increased protection levels would foreclose massive amounts

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<sup>36</sup> See *Second R&O/MO&O* ¶ 223.

<sup>37</sup> See *Petition for Reconsideration and Clarification of the National Cable and Telecommunications Association* at 15.

<sup>38</sup> *Petition of Dell and Microsoft* at 7, *supra* note 15.

of spectrum for TVBDs. From estimates in 2005, there were nearly 9,000 cable headends throughout the U.S.<sup>39</sup>

Because headends were under no prior obligation to register their location, the Commission has no idea how many headends there are, nor where they are located, and therefore has no means to assess the cost/benefit of extending protection to *all* cable headends and what the impact the extended protections will have on available spectrum for TVBD's in local areas. Given, this uncertainty the Commission has an obligation to examine these issues carefully in an additional notice and provide for adequate public input and discussion.

NCTA further requests the Commission allow cable headends inside the protected contour of a TV signal to register in the database.<sup>40</sup> NCTA points to a report from Dave Large that claims even a personal/portable device operating at 40 mW on an adjacent channel to a full-power signal with the protected contour will cause interference to a headend, if it is operating within the main beam of the receiving antenna.<sup>41</sup> However, test headend in the Large Report was situated outside the protected TV signal contour under study,<sup>42</sup> and thus would be eligible to register in the database and afforded substantial protection as provided in Section 15.712(b). Large then extrapolates from this limited data set that a headend inside the contour would suffer similar interference problems. This seems unlikely given the disproportionate power levels of a DTV signal compared to the 40 mW limit of personal/portable devices. In addition, headend

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<sup>39</sup> See *Petition for Rulemaking of the National Cable & Telecommunications Association on Resolving the "Phantom Signal" Issue*, Copyright Office, Library of Congress, August 17, 2005, at 9, available at <http://www.ncta.com/DocumentBinary.aspx?id=553>.

<sup>40</sup> See *Petition of NCTA* at 16, *supra* note 37. DIRECTV and Dish Network also asked for the Commission to extend protection to all local receive facilities. See *Petition for Clarification and Reconsideration of DIRECTV, Inc. and Dish Network, LLC* at 3. SBE also asked for TV translators inside protected contours to be registered in the database. See *Petition of SBE*, at 14, *supra* note 12.

<sup>41</sup> See *Petition of NCTA* at 16, *supra* note 37.

<sup>42</sup> See Dave Large "Field Tests to Assess Adequacy of Protections Afforded Cable Television Operations from White Spaces Devices," *Petition of NCTA* at 16, *supra* note 37 (hereinafter referred to as Large Report), "As noted in the attached report, the headend used for these tests was located in Fredericksburg, VA, which is slightly outside the protected contour of WCVW in Richmond, VA., whose digital signal on channel 44 was used for the tests." Also, see Large Report, Appendix IV.

receivers seem to be perfectly capable of dealing with interference from DTV signals occupying adjacent channels.<sup>43</sup>

Adaptrum noted in its Petition for Reconsideration the current separation requirement of 8 km for TVBDs operating on adjacent channel to protect headend channels is questionable based on data from FCC laboratory testing. FCC laboratory testing of the Adaptrum device found that even with a marginally receivable DTV signal, “consumer grade antenna and receiver, a modest 10m antenna height and a worst case geometry in which the Adaptrum prototype was only 12.2m away from the receive antenna,” and “along the same radial as the receive antenna boresight and oriented to maximize mainbeam-to-mainbeam coupling,” there was no interference observed.”<sup>44</sup> Given that most headends utilize far superior antennas with higher gain and frequency selectivity than the broadband antenna utilized for testing by the Commission, the current 8 km seems unjustified and excessive. We concur with Adaptrum that a more reasonable separation distance would be a 100m.<sup>45</sup>

To further avoid unnecessary foreclosure of spectrum for TVBDs, the Commission should also clarify that database protection will only be afforded to channels in which the headend is receiving an over-the-air TV signal. The Commission should only permit headends to register channels in the database only in instances where the headend is actually relying on an over-the-air signal rather than another signal delivery method.<sup>46</sup> In addition, those registered channels should be limited to local channels, not out of market distant signals. As noted by Microsoft and Dell, cable systems are under no obligations to carry out-of-market distant signals

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<sup>43</sup> See Large Report, Appendix IV at footnote 3.

<sup>44</sup> See *Petition for Reconsideration of Adaptrum, Inc.* at 11.

<sup>45</sup> *Id.*

<sup>46</sup> See *Petition of Dell and Microsoft* at 8, *supra* note 15.

in a local market.<sup>47</sup> At a minimum, the Commission should also consider whether a distinction should be made between fixed and very low-power personal/portable TVBDs with respect to the ability of cable headends to block off TV white space channels over substantial geographic areas.

#### **IV. THE COMMISSION SHOULD NOT PLACE FURTHER RESTRICTIONS ON THE OPERATION OF PERSONAL/PORTABLE TVBDS**

##### **A. Prohibiting personal/portable TVBDs from Adjacent Channel Operation is Excessive and Would Eliminate White Space in Crowded Urban Markets.**

Shure asks the Commission to prohibit the operation of personal/portable TVBDs on the first channel adjacent to TV broadcasts above channel 21.<sup>48</sup> Shure argues that itinerant users, such as electronic news teams, that tend to operate on adjacent channels will be harmed by inability of TVBDs to sense wireless microphone signals in the presence of strong adjacent DTV signals. The FCC considered and rejected precisely this argument previously, and Shure points to no new facts or changes in circumstances which would alter the Commission's previous analysis.

Shure points to FCC testing of prototype devices, where the sensing threshold of devices was degraded in the presence of DTV signals in adjacent channels. Although, those early test devices were not perfect in the detection, it does not follow that actual devices submitted for certification as sensing-alone devices will be unable to improve and overcome this obstacle. More fundamentally, as noted above, the Commission has taken great measures to accommodate the relatively small but important use of spectrum by mobile broadcast news teams in the current rules. Itinerant uses such as electronic news gathering only require a small number of audio channels and the safe harbors currently provided are more than enough to accommodate their

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<sup>47</sup> *Id.*

<sup>48</sup> See *Petition of Shure* at 8 – 9, *supra* note 16.

use. In addition, mobile news teams have access to valuable and underutilized BAS bands set aside for that purpose.

Not only is Shure's request excessive it would eliminate most available white space in crowded urban markets such as New York City – where virtually all of the available channels to TVBDs are adjacent to DTV signals. The result of this ban would be to eliminate the possibility of national markets for TVBDs, meaning that the few if any manufacturers would develop devices and resulting in an abject failure of the proceeding – all in an effort to provide absolute protection to a very small group of itinerant wireless microphone users.

**B. The Power Limits on Personal/Portable TVBDs are Already Overly Restrictive and Should Not be Further Reduced.**

Petitions filed by Shure and SBE request that the Commission reduce the maximum EIRP of personal/portable devices to substantially below 40 mW to protect users of wireless microphones and television viewers, respectively. PISC believes that the 40 mW power limit on mobile devices is already overly cautious considering evidence in the record showing that with rudimentary filtering and minimal back-off from the edge of the channel, operation at power limits up to 100 mW are extremely unlikely to cause interference even to a weak signal near the edge of a station's licensed viewing area. Proposals to limit TVBDs to 10 or 20 mW power are simply efforts to re-argue the already well-settled question of whether the current "vast wasteland" of TV band white space should be opened for new broadband services and innovation.

Shure proposes a 10 mW limit to protect wireless microphones, based on its assertion that "the average wireless microphone, taking into account the typical attenuation of the signal from

the user's body, has less than 10 mW of EIRP.<sup>49</sup> But as Shure acknowledges, the Commission rules for Part 74 devices allow wireless microphones to operate at a power level of 250 mW, six times greater than that of personal/portable devices. Thus, the 10 mW average reflects the design decisions by wireless microphone manufacturers. The Commission is under no obligation to further limit the functionality of TVBDs to accommodate the designs of microphones that are permitted to operate at substantially higher power. More importantly, Shure assumes as a factual predict that all other forms of interference mitigation already mandated will not work, and that the only way to protect licensed LPAS is to allow them to "overwhelm" signals from TVBDs. As noted previously, however, Shure has utterly failed to provide a shred of engineering evidence in support of its claim that TVBDs will interfere with licensed LPAS. The Commission should accordingly reject this proposal as yet one more needless, costly encumbrance on a technology which even Shure concedes will serve the public interest.<sup>50</sup>

SBE asks the Commission to impose a power level as low as 5 mW for adjacent channel personal/portable operation.<sup>51</sup> SBE argued that the 40 mW limit is insufficient to protect DTV viewers from interference. However, as Adaptrum explained in its *Petition*, only a small part of a TVBD emission on an adjacent channel can actually effect DTV reception.<sup>52</sup> To the extent that the Commission finds that there is a problem with adjacent channel power levels at 40 mW or above, Adaptrum describes three clear ways to alleviate this problem and provide designers with flexibility to maximize the functionality of TVBDs:

- 1) Reducing TVBD inband transmission power

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<sup>49</sup> *Id.* at 9.

<sup>50</sup> See *Petition of Shure* at 1, *supra* note 16.

<sup>51</sup> See *Petition of SBE* at 10, *supra* note 12.

<sup>52</sup> See *Petition of Adaptrum* at 4, *supra* note 44.

2) Reducing TVBD inband transmission bandwidth (less adjacent channel power will be integrated into the TV receiver filter response if the TVBD transmission bandwidth is reduced)

3) Improve the TVBD OOBE<sup>53</sup>

We believe this is a much more reasonable approach than restricting the power level to such an insignificant level that the utility of personal/portable TVBDs is completely lost.

## **V. THE COMMISSION SHOULD NOT MAKE THE CERTIFICATION PROCESS FOR TVBDS MORE BURDENSOME**

Shure argues the “Commission erred in failing to mandate rigorous and transparent evaluation procedures” (as mandated for sensing-only TVBDs) “for spectrum sensing features that will be incorporated in hybrid geolocation/spectrum sensing devices.”<sup>54</sup> Shure asks the Commission to make test procedures transparent to the public, including providing the public an opportunity to comment on the test process and any changes that are made during the course of the test.<sup>55</sup> This appears to be yet another of the many efforts by Shure to deter and burden the efficient use of fallow TV white space spectrum. After more than four years of deliberation, public comment and several rounds of public laboratory and field testing, the Commission has sufficient information to test and certify TVBDs. There is no reason that after decades of operating a generally successful process for certifying devices, that the Commission should do things radically different vis-à-vis devices in this particular band. As the Commission’s compliance requirements clearly state, all TVBDs “must be capable of sensing TV and wireless microphone signals at levels as low as -114 dBm.”<sup>56</sup> Further, the Commission has gone to great

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<sup>53</sup> *Id.*

<sup>54</sup> *Petition of Shure* at 4, *supra* note 16.

<sup>55</sup> *Id.* at 6.

<sup>56</sup> *Second R&O/MO&O*, ¶ 116.

lengths – excessive lengths in our view – to protect both venue-based and itinerant wireless microphone users. Shure’s request only seeks to unnecessarily delay TVBDs certification and rehash issues the Commission has already aired exhaustively.

## **VI. THE COMMISSION SHOULD RE-EXAMINE THE BORDER EXCLUSION ZONE**

PISC supports the proposal of Tribal Digital Village Network for the Commission to reconsider its decision to apply the Border Exclusion zone. As the Commission itself has previously observed, Section 301 itself does not apply to transmitters at sufficiently low power that they pose no risk of harmful interference.<sup>57</sup> The Commission makes no attempt to explain in the *Order* how it is possible for unlicensed devices to qualify as broadcast devices subject to the treaty when they do not even meet the threshold requirement of requiring licenses under Section 301.<sup>58</sup>

### **CONCLUSION**

For the above stated reasons, the Commission should deny the *Petitions for Reconsideration* of the parties cited above.

Respectfully Submitted,  
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Common Cause  
Consumer Federation of America  
Consumers Union  
EDUCAUSE  
Free Press  
Media Access Project  
New America Foundation  
The Open Source Wireless Coalition  
U.S. PIRG

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<sup>57</sup> See *Revision of Part 15 of the Commission’s Rules Regarding Ultra-Wideband Transmission Systems, Second Report and Order and Second Memorandum Opinion and Order*, 19 F.C.C.R. 24,558 (2004) (Second UWB R&O).

<sup>58</sup> Pursuant to Section 302, of course, these devices must be certified by the Commission before being marketed or sold in the United States. 47 U.S.C. §302a(b).

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May 8, 2009

## CERTIFICATE OF SERVICE

I, Benjamin Lennett, hereby certify that a true and correct copy of the foregoing Oppositions to *Petitions for Reconsideration* was sent this 8<sup>th</sup> day of May, 2009 by first-class mail, postage prepaid, to the following:

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