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

In the Matters 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 IN SUPPORT OF PETITION FOR RECONSIDERATION

I. INTRODUCTION.

The Commission's goal in the White Spaces Order was to "allow the development of new and innovative types of unlicensed devices that provide broadband data and other services for businesses and consumers without disrupting the incumbent television and other authorized services that operate in the TV bands."[1] Although the Order over-protects incumbents, the Commission can expand broadband access by making the minor, but important, rule changes Dell and Microsoft outlined in their Petition for Reconsideration.[2] In contrast, adopting the proposals of white space opponents would exacerbate existing overprotection for incumbents and create dangerous and unnecessary new accommodations for actors currently entitled to no interference protection whatsoever – all at the expense of broadband innovation.

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1 *Unlicensed Operations 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, ¶ 2 (2008) ("*Second R&O*").

2 *See generally* Petition for Reconsideration of Dell, Inc. and Microsoft Corp. (filed Mar. 19, 2009) ("Dell and Microsoft Petition"). *See also* Dell Inc. and Microsoft Corp., Consolidated Opposition to Petitions for Reconsideration (filed May 8, 2009) ("Dell and Microsoft Opposition").

II. UNNECESSARY NEW OVER-PROTECTIONS OF WIRELESS MICROPHONES WILL RENDER WHITE SPACE USE INFEASIBLE IN LARGE PARTS OF THE COUNTRY.

A. Sensing Requirements are Unnecessary Given the Commission's Decision to Use a Multi-Layered Protection Strategy.

Innovators, the IEEE, public interest groups, and wireless ISPs agree that the sensing requirement should be relaxed or eliminated given the substantial protection that geolocation will provide.[3] Dell and Microsoft support these requests, as well as the Public Interest Spectrum Coalition's call to remove the requirement that white space devices notify consumers if they detect a television signal outside of its protected service contour.[4] Nevertheless, with respect to wireless microphone operations, Shure and others argue that the Commission should layer *even more stringent* sensing requirements on top of geolocation and channel set asides.[5] These arguments disregard the fact that the Commission's goal in this proceeding was not to amass multiple, redundant restrictions to accommodate microphones, but rather to ensure that authorized licensees receive the protection to which they are entitled while enabling innovative broadband applications and services.[6]

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[3] *See, e.g.*, Opposition to Petitions for Reconsideration of the Public Interest Spectrum Coalition at 9-11 (filed May 8, 2009) ("PISC Opposition"); IEEE 802 Petition for Reconsideration at 5-6 (filed Mar. 16, 2009); Wi-Fi Alliance Petition for Reconsideration at 4-5 (filed Mar. 17, 2009); Opposition and Comments of Google Inc. at 4-13 (filed May 8, 2009) ("Google Opposition"); Motorola Inc. Opposition to Petitions for Reconsideration at 17-20 (filed May 8, 2009); Comments of the Federation of Internet Solution Providers of the Americas at 2 (filed May 8, 2009) ("FISPA Comments"); Carlson Wireless Technologies, Inc., Comments on Petitions for Reconsideration at 4-5 (filed May 8, 2009) ("CWT Comments"); Wireless Internet Service Providers Association, Consolidated Opposition to Petitions for Reconsideration at 2-6 (filed May 8, 2009).

[4] Petition for Reconsideration of the Public Interest Spectrum Coalition at 9-10 (filed Mar. 19, 2009).

[5] *See generally* Shure Incorporated Opposition to Petitions for Reconsideration (filed May 8, 2009) ("Shure Opposition"); Comments of Sennheiser Electronic Corporation (filed May 8, 2009) ("Sennheiser Comments"); Opposition of the Coalition of Wireless Microphone Users to Petitions for Reconsideration (filed May 8, 2009) ("CWMU Opposition"). *See also* Society of Broadcast Engineers, Consolidated Opposition to Petitions for Reconsideration at 4-8 (filed Apr. 28, 2009).

[6] *Second R&O* ¶ 2.

Shure maintains that concerns regarding the significant time and expense necessary to implement sensing at an extremely conservative detection threshold are unjustified.[7] The record demonstrates otherwise. Hardware and software companies and ISPs have highlighted the costs of incorporating geolocation *and* sensing as a significant barrier to deploying white space applications and services.[8] This is especially critical for personal/portable devices, which would sacrifice processing power and battery life to operate redundant interference avoidance mechanisms.

Nor is it true, as Shure claims, that reducing or eliminating sensing would be an "unexplained turnabout" from prior advocacy.[9] The -114 dBm threshold previously proposed was an extremely conservative parameter intended for devices that would use sensing *as the sole means* of avoiding harmful interference.[10] This approach is not needed in combination with geolocation. Sensing would duplicate the protection provided by the database and would cause devices to avoid signals that are not entitled to protection. The sensing requirement should be eliminated for devices with database access.

B. Unauthorized Microphone Users Should Not be Permitted to Register in the Geolocation Database.

Shure and the Coalition of Wireless Microphone Users ("CWMU") propose that *unauthorized* wireless microphones be elevated to the status of licensees through database registration, and urge that significantly larger "keep out" zones be mandated by

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7 Shure Opposition at 6.

8 *See, e.g.*, Dell and Microsoft Petition at 2-5; Google Opposition at 10; FISPA Comments at 2; CWT Comments at 5.

9 Shure Opposition at 7.

10 *See* Dell and Microsoft Petition at 3-4.

the database.[11] CMWU concedes this will result in consumers being denied use of their white space devices in large areas, such as in midtown Manhattan.[12] This result is bad enough, but, unfortunately, it vastly understates negative impact of expanding Part 74 authorization.

CWMU suggests that the effect of its proposed changes will be limited to unspecified "discrete geographic areas."[13] In reality, these areas are in major cities where spectrum is already scarce. Restricting otherwise available spectrum in cities all but dooms white spaces in rural areas as well, since urban markets are necessary to achieve the economies of scale and scope needed to make white spaces technologies affordable to consumers.[14]

CWMU objects that those opposing the inclusion of unauthorized microphones in the database are "uninformed" about microphone use.[15] But it is precisely because of how these microphones are used that the FCC should not expand eligibility. Because microphone operators obtain their license for free or simply transmit without the required FCC authorization, they have no incentive to maximize the number of concurrent operations in a given amount of spectrum. This is why, by CWMU's own estimation, it takes 15 six MHz TV channels – a full 90 MHz – to deploy 49 narrowband microphones at a single New York location.[16]

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11 CWMU Opposition at 6, 9.

12 *Id.* at 9.

13 *Id.* at 1.

14 *See* Dell and Microsoft Opposition at 6-10 and Exhibits 1-4. *See also* Google Opposition at 10.

15 CWMU Opposition at 10.

16 *Id.* Moreover, there are likely to be only five vacant channels in channels 21-51 in New York City at the close of the DTV transition. Thus, if it really does take 15 television channels to accommodate the uses CWMU describes, the majority of these microphones will not be able to operate post-DTV transition in any event unless they intend to operate co-channel to licensed television stations.

Dell and Microsoft share PISC's assessment that it would be contrary to the public interest to allow unauthorized transmissions to restrict operation of lawful devices.[17] This is especially true since database protection simply is not necessary for the majority of uses for which CWMU seeks protection, such as for use in "business presentations."[18] Other microphone configurations are clearly available. For example, even Sennheiser concedes that legal UWB microphones are available and "should be capable of high audio quality."[19] These systems may lack the "range and wall penetration"[20] of systems that might be needed for the production of Monday Night Football, but they are perfectly suited for use in boardrooms, schools, and houses of worship. The FCC's rules protect broadcast auxiliary uses. If others want to operate microphones, they should do so through one of the mechanisms the Commission has authorized for lawful general use. In fact, the white spaces rules provide an avenue for developing lawful microphones.

It is worth noting that, although many wireless microphones are unauthorized, they operate in a manner similar to authorized Part 15 devices. Therefore, if the Commission chooses to authorize such microphones, it should ensure that these devices obtain no more protection than that due to white space devices under Part 15 of the Commission rules. The resulting Part 15-authorized wireless microphones certainly should not be protected in the database, for the reasons outlined above.

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17 PISC Opposition at 8.

18 CWMU Opposition at 12.

19 Sennheiser Comments at 3.

20 *Id.*

III. OVER-PROTECTING MVPDS IS UNNECESSARY AND WOULD UNDERMINE CONSUMER USE OF WHITE SPACES DEVICES.

A. The Commission's Rationales for Rejecting Cable Direct Pickup Arguments are Even More Applicable to Direct Broadcast Satellite.

Supporting NCTA, DIRECTV argues that DBS providers also may be subject to direct pickup interference from white space devices.[21] But, as Dell and Microsoft have explained, the FCC already thoroughly considered and rejected the direct pickup arguments raised by NCTA,[22] determining instead "that the risk of [direct pickup] interference is [not] sufficiently great to warrant a reduction in power that could impede the viability of certain TVBD applications."[23] DBS, which already operates "all digital" systems, faces substantially less interference risk than the cable systems the Commission already concluded did not justify a reduction white space device in transmit power. DBS providers, unlike cable, are incumbent licensees entitled to interference protection. However, the frequencies on which they are entitled to interference protection are at 12.2-12.7 GHz (for Ku-band) and 18.3-18.8 GHz and 19.7-20.2 GHz (for Ka-band) – nowhere near the highest operating frequency for a white space device.

DIRECTV objects that its in-home wiring, like that of cable companies, uses frequencies that correspond to the TV bands.[24] However, this does not mean that DBS systems would face the "worst case" interference scenarios NCTA has claimed, all of which presuppose using *analog* cable signals.[25] NCTA did not even test any digital signals using any UHF frequency on which personal portable white space devices will

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[21] Comments in Support of Petitions for Reconsideration of DIRECTV, Inc. at 1-6 (filed May 8, 2009) ("DIRECTV Comments").

[22] Dell and Microsoft Opposition at 10-13.

[23] *Second R&O* ¶ 126.

[24] DIRECTV Comments at 2.

[25] *See* Dell and Microsoft Opposition at 11-12.

operate. There is little dispute that digital signals are far less susceptible to direct pickup, and the FCC specifically determined that "[c]able systems are rapidly moving to digital technology which should further alleviate the potential for interference."[26] DBS providers have no legacy analog systems to convert – they already operate all-digital systems.

Finally, like cable systems, the frequencies used in DIRECTV's in-home wiring correspond to numerous existing and planned wireless services authorized to operate at powers far in excess of the 100 mW maximum transmit power authorized for personal/portable white space devices, including the spectrum won by CMRS providers in the 700 MHz auction. Because DIRECTV's system extends up to 2 GHz, it is using frequencies already corresponding to mobile operations. Thus, as with cable systems, direct pickup interference in the TV band does not appear to be an issue for DBS systems. If it is, it is one that DBS providers undoubtedly already are addressing as they prepare in-home wiring to accommodate new 700 MHz services and other services that will soon begin operation on the frequencies used in DBS home wiring.

B. Over-Protecting Cable Headends is Unnecessary and will Undermine Consumer Use of White Space Devices.

Public interest groups share Dell and Microsoft's concern that vast new protections to cable headends will have substantial harmful effect on white space operations[27] and could significantly inhibit innovation and deployment. As PISC notes, no one but the cable companies know how many headends there are, or where they are

[26] *Second R&O* ¶ 126.

[27] *See* PISC Opposition at 17.

located.[28] Cable companies apparently are unwilling to share this information. In fact, NCTA even has maintained that "unrestricted access to information [in the white spaces database] … such as cable headends, would pose an unnecessary risk of misuse," and should not be disclosed to anyone other than registered entities in the database.[29]

NCTA does not dispute that a headend 80 km away from a contour could restrict spectrum access in an area roughly the size of the state of Rhode Island.[30] And even where these areas are substantially smaller – perhaps the size of a city – the cumulative effect on white space operations could be severe.

As Dell and Microsoft have explained, these impacts can be mitigated somewhat by limiting database registrations by cable companies to *local* channels, rather than out-of-market distant signals.[31] Cable companies have no obligation to carry distant signals; they do so when, and only when, it improves profits. Significantly, NCTA raises no concerns about the technical feasibility of obtaining signals through alternate means. Rather, it proposes a toll bridge of sorts, suggesting that "[i]f a provider of WSD-based services wants access to an additional channel within the protected zone of a headend, it should pay the operator's costs to obtain the programming via an alternate means."[32] The suggestion that the public interest is served by barring public access to otherwise available spectrum unless cable companies are paid a fee is wrong.

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28 *Id.*

29 Comments of the National Cable & Telecommunications Association on Petitions for Reconsideration at 13-14 (filed May 8, 2009) ("NCTA Comments").

30 *See* NCTA Comments, Large Report at 11.

31 Dell and Microsoft Petition at 8.

32 NCTA Comments, Large Report at 11.

IV. GEOLOCATION PROTECTS LAND MOBILE OPERATIONS BELOW CHANNEL 21.

Finally, Shure and private land mobile incumbents raise concerns about permitting personal/portable devices below channel 21.[33] To be clear, Dell and Microsoft do not propose that personal/portable devices operate below channel 21 in the 13 markets where private land mobile operations have been authorized.[34] However, the Commission should allow all white space devices with geolocation to operate on vacant channels where there are *no* land mobile operations, including on channel 14-20 outside of the 13 markets at issue.

Because these devices will use geolocation to determine whether a channel is available, Shure's contention that land mobile operations have different spectral characteristics than televisions or microphones is of no moment.[35] Similarly, while APCO notes that "waivers allow public safety use of 470-512 MHz channels in areas beyond that which is specified in the Commission's rules,"[36] these locations likewise can be registered in the database. Indeed, because fixed-access white space devices can operate below channel 21 outside of the markets at issue, these locations will have to be registered.

Shure contends that white space devices might operate on channels 14-20 even if the database is "compromised."[37] This is not how the database will work. Each time a device changes locations, it must contact the database to receive a list of available

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[33] *See, e.g.*, Shure Opposition at 19; Comments in Response to Petitions for Reconsideration of the Land Mobile Communications Council (filed May 8, 2009); County of Los Angeles Opposition to Petitions for Reconsideration of Motorola, Inc. and of Dell, Inc. and Microsoft Corporation (filed May 8, 2009).

[34] *See* Dell and Microsoft Petition at 6.

[35] Shure Opposition at 18.

[36] Opposition of APCO to Petitions for Reconsideration of Motorola, Inc. and of Dell, Inc. and Microsoft Corp. at 3 (filed May 8, 2009).

[37] Shure Opposition at 19.

channels.[38] If the database is incapable of providing the list, the white space device cannot operate.

Shure also speculates that the database could be hacked to issue fraudulent authorizations.[39] However, as Dell and Microsoft and others already have explained, data integrity and security are core components of database design.[40] A bad actor intent on jamming public safety can do so today simply by modifying cheap, readily available RF transmitters. The likelihood is vanishingly small that such individuals would instead marshal substantial resources to defeat encryption and authentication techniques that are routinely used for secure network communications. Spectrum that could be used for innovative applications should not lie fallow throughout the country based on such conjecture.

V. CONCLUSION.

By making the minor changes Dell and Microsoft have outlined, the Commission can provide the flexibility necessary to enable innovative broadband applications using the white spaces while still maintaining substantial protections that will ensure licensed incumbents receive the protection to which they are entitled. White space opponents would, on the other hand, prohibit consumers from using white space devices in large areas of the country, but have not shown any benefit for such restrictions. The Commission should therefore grant Dell and Microsoft's Petition for Reconsideration and reject those of white space opponents.

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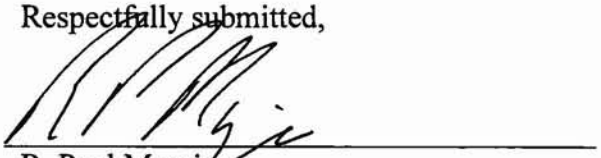
38 47 C.F.R. § 15.711(b)(3)(ii).

39 Shure Opposition at 19.

40 Dell and Microsoft Opposition at 17. *See also* Google Opposition at 19.

Respectfully submitted,



R. Paul Margie
Edmond J. Thomas*
S. Roberts Carter

HARRIS, WILTSHIRE & GRANNIS LLP
1200 Eighteenth Street, NW
Washington, DC 20036
(202) 730-1300

* Senior Technology Policy Advisor

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CERTIFICATE OF SERVICE

I, Alexander B. Reynolds, certify that on this 18th day of May 2009, I have caused a true and correct copy of the foregoing Reply in Support of Petition for Reconsideration to be served via first class mail, postage paid, upon:

Catherine Wang
Timothy Bransford
Bingham McCutchen LLP
2020 K Street, N.W.
Washington, DC 20006

Counsel to Shure Incorporated

Neal M. Goldberg
Loretta P. Polk
National Cable & Telecommunications Association
25 Massachusetts Avenue, N.W.
Suite 100
Washington, D.C. 20001-1431

Susan Eid
Stacy R. Fuller
DIRECTV, Inc.
901 F Street, N.W. Suite 600
Washington, DC 20004

Christopher D. Imlay, Esq.
General Counsel, Society of Broadcast Engineers
Booth, Freret, Imlay & Tepper, P.C.
14356 Cape May Rd.
Silver Spring, MD 20904

Michael Calabrese
Benjamin Lennett
Wireless Future Program
NEW AMERICA FOUNDATION
1899 L Street NW, Suite 400
Washington, DC 20036

Harold Feld
Legal Director
PUBLIC KNOWLEDGE
1875 Connecticut Avenue, NW
Suite 650
Washington, DC 20009

E. Ashton Johnston
Mark J. O'Connor
Joanna I. Georgatsos
LAMPERT, O'CONNOR & JOHNSTON, P.C.
1776 K Street NW, Suite 700
Washington, DC 20006

Counsel for Google Inc.

Steve B. Sharkey
Robert D. Kubik
Motorola, Inc.
1455 Pennsylvania Avenue, NW
Suite 900
Washington, DC 20004

Jim Hollis
Federation of Internet Solution Providers of the Americas
PO Box 2270
Matthews, NC 28106-2270

James Carlson
Carlson Wireless Technologies, Inc.
1385 8th Street
Arcata, CA 95521

Stephen Coran
Rini Coran, PC
1615 L Street. NW. Suite 1325
Washington. DC 20036

Counsel to the Wireless Internet Service Providers Association

Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th floor
Arlington VA 22209

Counsel for Sennheiser Electronic Corporation

Antoinette C. Bush
David H. Pawlik
SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP
1440 New York Avenue, N.W.
Washington, D.C. 20005

Counsel for the Coalition of Wireless Microphone Users

Robert M. Gurss
FLETCHER, HEALD & HILDRETH, PLC
1300 North 17th Street
11th Floor
Arlington, VA 22209

Counsel for the County of Los Angeles, California

Al Ittner
Land Mobile Communications Council
8484 Westpark Drive Suite 630
McLean, VA 22102

Robert M. Gurss
APCO International
1426 Prince Street
Alexandria, VA 22314

Michael Lynch
IEEE 802.18 Radio Regulatory Technical Advisory Group
108 Brentwood Court
Allen, TX 75013

Rich Kennedy
Wi-Fi Alliance Regulatory Task Group
7305 Napier Trail
Austin, TX 78729

Alexander B. Reynolds