

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Revision of Part 15 of the Commission's Rules to)
Permit Unlicensed National Information) ET Docket No. 13-49
Infrastructure (U-NII) Devices in the 5 GHz Band)

To: The Commission

**REPLY COMMENTS OF
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

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SUMMARY

The Wireless Internet Service Providers Association (“WISPA”) submits these Reply Comments in response to certain of the initial Comments filed in this proceeding.

Among the many actions the Commission can take to preserve and expand unlicensed use in the 5 GHz band, of critical importance to WISPA is the preservation of rules permitting the continued use of high-gain antennas for point-to-point links in the 5725-5850 MHz band. High-gain antennas provide vital broadband connectivity to distant communities that cannot be reached via other unlicensed frequencies. Both wireless Internet service providers and cable companies rely on high-gain antennas in the 5725-5850 MHz band to provide connectivity that is often unavailable from other terrestrial sources.

A number of commenters misconstrue the causes of interference to Terminal Doppler Weather Radio (“TDWR”) facilities operating in the 5600-5650 MHz band in suggesting elimination of high-gain antennas. A careful reading of the causes underlying interference shows that the Commission can adopt measures far less damaging to substantially mitigate, if not eliminate, TDWR interference. In some cases, the record demonstrates that interference resulted when devices were *illegally modified* to operate in a sub-band where dynamic frequency selection (“DFS”) is required. These cases can be prevented by requiring devices to incorporate enhanced security measures that will tamper-proof devices so they cannot be illegally modified. In other cases, the record demonstrates that TDWR interference can result from equipment *legally operating* in the 5470-5725 MHz U-NII-2C band that does not properly detect the presence of TDWR signals. As many parties have suggested, these cases can be remedied by adopting the Commission’s proposed improvements to DFS waveform testing.

Adopting these measures will not compromise the goal of harmonizing across the 5 GHz bands and, according to the record, can be implemented without significant cost or additional complexity. The Commission should reject as overkill proposals that would sacrifice a vibrant ecosystem for misguided interpretations of the sources of TDWR interference.

There was no objection in the record to the addition of 25 megahertz to the U-NII-3 band. The Commission should adopt this proposal.

The Commission also should allow higher-power outdoor operations in the U-NII-1 band. WISPA believes that Globalstar’s earth stations can be protected from interference through a combination of protection zones and professional installation. The U-NII-1 rules should be harmonized with the rules for the U-NII-3 band, thereby enabling more flexible spectrum use.

For the U-NII-2B and U-NII-4 bands, the record demonstrates the need for additional study of spectrum sharing. WISPA looks forward to being part of the dialogue with the Commission and NTIA. While those processes move forward, the Commission should not delay in adopting enhanced security measures, extending the U-NII-3 band by 25 megahertz and permitting higher-power outdoor use of the U-NII-1 band.

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The Wireless Internet Service Providers Association (“WISPA”) hereby submits its Reply Comments in response to the initial Comments filed in the above-captioned proceeding.¹ Above all else, WISPA urges the Commission to retain Section 15.247 of its rules for the 5725-5850 ISM band to allow continued operation of high-gain antennas that are important for long-distance point-to-point links for wireless Internet service providers (“WISPs”).² Those commenters agreeing with the Commission’s proposal to eliminate these rules misinterpret the record of enforcement proceedings in suggesting that equipment authorized for the 5725-5850 MHz ISM band is causing interference to Terminal Doppler Weather Radar (“TDWR”) facilities, when a careful reading of the record shows that it is primarily *illegally configured equipment* that caused such interference – interference that can largely be remedied by requiring U-NII and ISM devices to be certified with enhanced security measures to prevent unauthorized out-of-band operation. Additionally, the Commission should authorize the 5150-5250 MHz band for outdoor

¹ *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, ET Docket No. 13-49 (rel. Feb. 20, 2013) (“*NPRM*”). Commission staff extended the Reply Comment deadline to July 24, 2013. See *Order*, DA 13-1388 (rel. June 17, 2013).

² See Comments of WISPA, ET Docket No. 13-49 (May 28, 2013) (“*WISPA Comments*”) at 12-16.

use and add 5725-5850 MHz to the U-NII-3 band. WISPA also supports other changes that will enhance testing and improve radar detection.

For the 5350-5470 (U-NII-2B) and 5850-5925 MHz (U-NII-4) bands, the record demonstrates broad interest in allowing unlicensed use on a shared basis while protecting incumbents against interference. WISPA agrees with a number of commenters that further analysis and public participation with respect to these bands is warranted, and WISPA plans to actively contribute to the record going forward.

DISCUSSION

I. THE COMMISSION SHOULD REJECT ITS PROPOSAL TO ELIMINATE THE USE OF POINT-TO-POINT ANTENNAS WITH GREATER THAN 23 dBi GAIN IN THE 5725-5850 MHz BAND.

The record demonstrates confusion over the types and sources of interference to TDWR facilities. Primarily, interference results when devices authorized in other 5 GHz non-DFS sub-bands have been *illegally modified* to operate in a sub-band where DFS is required. These cases can be prevented by requiring devices to incorporate enhanced security measures that prevent 5 GHz devices from operating in a band for which they have not been certified. Secondly, TDWR interference can result from equipment *legally operating* in the 5470-5725 MHz U-NII-2C band that does not properly detect the presence of TDWR signals. These cases do not lead to enforcement actions and can be remedied by adopting the Commission's proposed improvements to DFS waveform testing. WISPA addresses below each of these two scenarios and shows that it would be both unnecessary and contrary to the public interest to eliminate the flexibility afforded by the point-to-point antenna gain rule contained in Section 15.247.

A. The Section 15.247 Rule Permitting High-Gain Point-to-Point Antennas Provides A Unique And Significant Public Benefit.

In the WISPA Comments, WISPA strongly opposed the Commission's proposal to eliminate the Section 15.247 antenna gain rule, which permits the use of antennas with more than 23 dBi gain only for point-to-point links in the 5725-5850 MHz band.³ WISPA presented a number of reasons why the public interest supported retention of that rule. The 5725-5850 MHz band is the only 5 GHz band that allows unlimited antenna gain for point-to-point operations; therefore, this is the only unlicensed spectrum that WISPs have to use for deploying long-distance backhaul links that provide broadband service for remote communities, most of which have no other broadband provider.⁴ In a recent ex parte presentation, WISPA's FCC Committee Chair pointed out that, to deliver broadband service to distant communities, his company maintains a point-to-point link of approximately 65 miles using high-gain antennas and equipment certified under Section 15.247. This distance is unachievable in any other unlicensed band.⁵

Other parties pointed out the benefits of retaining the Section 15.247 ISM point-to-point antenna gain rules and the harm that will result by failing to do so. First Step Internet and SPITwSPOTS, two WISPs that have deployed a large number of point-to-point links in the 5 GHz band to provide connectivity to distant communities, stated that limiting operations in the 5725-5850 MHz band to the technical confines of Section 15.407 would cause significant harm, strand investment and make it more difficult, if not impossible, to continue operating long-range

³ *NPRM* ¶ 28.

⁴ *See* WISPA Comments at 12-13.

⁵ *See* Letter from Matt Larsen, WISPA FCC Committee Chair, to Marlene H. Dortch, FCC Secretary, ET Docket No. 13-49 (July 12, 2013) at 1.

links.⁶ Cambium, a leading manufacturer of 5 GHz and other unlicensed band equipment, agreed that “the addition of a limit in EIRP for fixed point-to-point application will hamper useful deployment of larger links in hard-to-reach rural areas.”⁷ Time Warner Cable also pointed out that the current rules for the 5725-5850 MHz band have “proven ideal for outdoor Wi-Fi deployments” and “provided the capacity for critical point-to-point links” where its cable plant is not directly accessible.⁸ The Commission must consider the unique benefits that the high-gain antenna rule is bringing to areas of the country where broadband is limited or non-existent or where consumers lack choice in terrestrial broadband providers.

B. The Record Demonstrates That Devices Certified And Operating Pursuant To Section 15.247 Are Not The Source Of Interference To TDWR Facilities.

In the *NPRM*, the Commission cited a number of enforcement cases involving interference to TDWR facilities, stating that:

Most frequently we have seen devices certified to operate in the 5.725-5.825 GHz band with higher power levels and later modified to enable operation in the U-NII-2 frequency bands. These device modifications have resulted in non-compliant devices creating interference scenarios that were not anticipated when the U-NII rules were created.⁹

WISPA agrees with the Commission that none of the enforcement cases involved interference from *compliant* equipment certified under Section 15.247 and operated legally, but rather resulted from equipment that had been *illegally modified* to operate on frequencies or with technical parameters for which the device was not certified.¹⁰ Wi-Fi Alliance noted that “the published decisions make clear that most of the interference cases associated with TDWR

⁶ See Comments of First Step Internet LLC, ET Docket No. 13-49 (May 28, 2013) at 4; Comments of SPITwSPOTS Inc., ET Docket No. 13-49 (May 28, 2013) at 4.

⁷ Comments of Cambium Networks Ltd., ET Docket No. 13-49 (May 28, 2013) (“Cambium Comments”) at 4. See also Comments of Fastback Networks, ET Docket No. 13-49 (May 28, 2013) at 2-3.

⁸ Comments of Time Warner Cable Inc., ET Docket No. 13-49 (May 28, 2013) (“Time Warner Comments”) at 3, 8.

⁹ *NPRM* ¶ 25.

¹⁰ See WISPA Comments. at 13-15. Interference from compliant devices, which are not certified under Section 15.247 and are not the subject of enforcement actions, is discussed in Section II, *infra*.

installations were a result of devices approved under Section 15.247 unlawfully operating in the U-NII-2C band,”¹¹ and other parties concurred.¹² In fact, a review of the TDWR interference enforcement actions shows that no party has been sanctioned for causing TDWR interference while using legally operating Section 15.247 devices with legal high-gain point-to-point antennas. To quote Cisco, “actual interference can be traced to a small number of fundamental issues with respect to outdoor deployments” involving a *combination* of high-site antennas, clear line-of-sight to TDWR facilities and at least one of the following: (a) illegal modification of devices certified in other bands that do not require dynamic frequency selection (“DFS”), (b) illegal modification of devices to disable DFS or otherwise operate with unauthorized technical parameters; and (c) illegal operation in the U-NII-2C band of devices certified for operation in the 5725-5850 MHz band.¹³ IEEE 802 similarly stated that the Commission’s enforcement cases “thus far present co-channel interference with TDWR, and are the result of user-generated issues, sometimes enabled by an overly flexible configuration capability that the FCC has since declared off limits.”¹⁴ Further, out-of-band emissions are clearly not a cause of TDWR interference. Cambium stated it is “not aware of a documented link between out of band emissions for devices certified under Section 15.247 and interference to TDWRs operating at 5600 to 5650 MHz.”¹⁵

Based on a misunderstanding of the Commission’s enforcement actions and the *NTIA 5 GHz Report*,¹⁶ a few parties – none of which actually have operations in the 5725-5850 MHz

¹¹ Comments of Wi-Fi Alliance, ET Docket No. 13-49 (May 28, 2013) (“Wi-Fi Alliance Comments”) at 10-11.

¹² See also Comments of Cisco Systems, Inc., ET Docket No. 13-49 (May 28, 2013) (“Cisco Comments”) at 29-30; Comments of IEEE 802, ET Docket No. 13-49 (May 28, 2013) (“IEEE 802 Comments”) at 16 (“[h]ad an improved security showing been in effect for master devices in the U-NII-3 band, it would have eliminated most interference cases, based on the record of cases resolved to date”).

¹³ Cisco Comments at 26.

¹⁴ IEEE 802 Comments at 22.

¹⁵ Cambium Comments at 4.

¹⁶ U.S. Department of Commerce, National Telecommunications and Information Administration, *Evaluation of the 5350-5470 MHz and 5850-5925 MHz Bands Pursuant to Section 6406(b) of the Middle Class Tax Relief and Job Creation Act of 2012* (Jan. 2013) (“*NTIA 5 GHz Report*”).

band – supported the Commission’s proposal. Baron Services claims that TDWR facilities have experienced interference from “adjacent-channel emissions.”¹⁷ However, high-gain antennas are not the reason for such interference – it was a consequence of the DFS algorithm not changing to a frequency far enough away from the TDWR frequency. Hubbard Broadcasting, citing a phrase from the *NTIA 5 GHz Report*, stated that “properly certified and otherwise compliant U-NII devices that nonetheless failed to detect the TDWR signals” caused interference to TDWR facilities.¹⁸ But this statement fails to accurately reflect the *NTIA 5 GHz Report’s* statement that attributes such interference to a failure of DFS to detect the TDWR signal – interference that can result *only* from operations *within* the U-NII-2C band where DFS is required, not from devices operating 75 megahertz or more away in the 5725-5850 MHz band. Hubbard Broadcasting’s Comments therefore provide no support for eliminating the Section 15.247 rules for point-to-point antennas. In failing to acknowledge the important and unique benefits flowing from the use of high-gain antennas, the Telecommunications Industry Association (“TIA”) took the more generic approach of simply suggesting that certain rule changes, such as imposing power and PSD reductions for high-gain antennas, “will not prove particularly controversial.”¹⁹

The Comments filed by Baron Services, Hubbard Broadcasting and TIA illustrate a failure to appreciate both the broadband-delivery benefits of the Section 15.247 point-to-point antenna gain rule and the fact that any interference to TDWR facilities caused by equipment certified for the 5725-5850 MHz band occurred *only when the equipment was illegally modified*

¹⁷ Comments of Baron Services, Inc., ET Docket No. 13-49 (May 28, 2013) (“Baron Comments”) at 4. *See also* Comments of SES SA and Intelsat SA, ET Docket No. 13-49 (May 28, 2013) at 9.

¹⁸ Comments of Hubbard Broadcasting, Inc., ET Docket No. 13-49 (May 28, 2013) at 3. *See also* Baron Comments at 4, n.13. Savari Networks states that compliance with Part 15 rules offers no assurance that spectrum in the U-NII-4 can be successfully shared. *See, e.g.*, Comments of Savari Networks, ET Docket No. 13-49 (May 28, 2013) at 32-33. As discussed herein, interference caused by illegally modified devices operating in unauthorized bands is at the root of TDWR interference issues, and improvements to testing of in-band devices should resolve any purported defects in DFS capability.

¹⁹ TIA Comments at 11.

to operate in the 5600-5650 MHz band. *No interference from high-gain antennas was reported from devices actually operating legally in the 5725-5850 MHz band* in either the Commission's enforcement actions or in the *5 GHz NTIA Report*, and WISPA is unaware of any circumstance where such legal operations would cause interference to TDWR facilities operating 75 or more megahertz away.

C. Interference To TDWR Facilities Caused By Illegal Operation Can Be Eliminated By Requiring Enhanced Security Measures In Devices.

WISPA pointed out that requiring enhanced security features in devices certified under Section 15.247 to operate in the 5725-5850 MHz band would substantially eliminate interference to TDWR facilities in the 5600-5650 MHz band, and it thus would be wholly unnecessary for the Commission to take the draconian step of imposing an outright prohibition on the use of Section 15.247 compliant devices.²⁰ Instead of eliminating the delivery of broadband services to distant, rural communities by disabling hundreds of existing point-to-point WISP backhaul links in the 5725-5850 MHz ISM band, the Commission should instead adopt rules that will better prevent U-NII and ISM devices from being modified to operate illegally in other bands.

Other commenters agreed with WISPA's approach. Citing the Commission's Software Defined Radio Application Guide,²¹ Cisco recommended incorporating the "well-known" security requirements applicable to software defined radios ("SDR") into the requirements for 5725-5850 MHz devices, asserting that these enhanced security rules "will go far to mitigate the problem of interference to TDWR."²² Similarly, IEEE 802 stated that the improved SDR

²⁰ See WISPA Comments at 13-15.

²¹ See OET, FCC, *Software Defined Radio Application Guide*, KDB 442812 (Oct. 24, 2012).

²² Cisco Comments at 33.

security guidelines “appear to work well.”²³ Both suggested applying these same requirements to U-NII devices.

This should be all that is needed. Nevertheless, some parties – even those that agree with WISPA that enhanced security requirements will be sufficient to prevent interference to TDWR facilities – ask the Commission to go further and prohibit high-gain antennas certified under Section 15.247. These arguments appear to be based on a misunderstanding of the causes of reported interference to TDWR facilities. One example is the Wi-Fi Alliance, which over-generalized in stating that “using the more restrictive antenna gain will help ensure that there is no increase in interference potential from U-NII devices.”²⁴ Another example is Cisco, which claimed that the “record before the Commission suggests that outdoor point-to-point operations in the 5 GHz band that employ high-gain directional antennas are a significant part of the TDWR interference problem.”²⁵ IEEE 802 stated that “[w]hile the reduction in antenna gain resulting from the adoption of Section 15.407 limits in the U-NII-3 band will reduce the range of point-to-point transmissions, the problems associated with these high gain systems have been highly disruptive to industry, resulting in a temporary suspension of certification approvals, and highly disruptive to government users and the FCC’s own enforcement resources.”²⁶ But the alleged “problems” are not interference from *compliant* ISM devices causing interference, but are from devices that have been *illegally modified* and are causing interference to TDWR facilities. The

²³ IEEE 802 Comments at 16.

²⁴ Wi-Fi Alliance Comments at 13.

²⁵ Cisco Comments at 35. No doubt, Cisco was misguided by the *NTIA 5 GHz Report* attributing interference to “building-mounted, high-gain point-to-point antennas.” *Id. quoting NTIA 5 GHz Report* at 3-4. This passage omits the relevant information that only *illegally modified* equipment using high-gain antennas has caused interference to TDWR facilities.

²⁶ IEEE 802 Comments at 18-19. *See also* Comments of Motorola Solutions, Inc., ET Docket No. 13-49 (May 28, 2013) (“MSI Comments”) at 3 (arguing that different rule sections “raises potential interference concerns” without any apparent understanding that such interference results only from *illegally modified* equipment and not from having two sets of rules); Comments of Motorola Mobility LLC, ET Docket No. 13-49 (May 28, 2013) (“Motorola Mobility Comments”) at 3 (same); Comments of Wi-Fi Alliance at 13 (same).

risk of interference disappears with the addition of enhanced security requirements that prevent devices certified for the 5725-5850 MHz band from illegally operating in the U-NII-2C band. When carefully and properly examined, the record shows that there is no relationship between interference caused by legally operating 5725-5850 MHz equipment using high-gain antennas and interference to TDWR facilities.

The Commission can implement the less restrictive solution of amending its device certification procedures to ensure that devices cannot be modified to operate on unauthorized frequencies without upsetting its overall goal of harmonizing across the 5 GHz sub-bands. Indeed, harmonization can still exist by preserving Section 14.247 alongside Section 15.407. Those users that want to use the band for higher-power point-to-point operations under the ISM rules can do so without preventing lower-power 802.11ac or other operations under the U-NII-3 rules.

Moreover, claims made by some parties about the purported complexity of maintaining two sets of rules are unavailing.²⁷ As it explained in the *NPRM*, the Commission has a history of certifying devices under both rule sections and has issued public guidance for testing of emissions.²⁸ And to the extent there is any actual complexity, that inconvenience is a drop in the bucket when compared to the severe disruption that would occur in the market place, the loss in service to consumers in distant rural consumers and the elimination of flourishing equipment product lines. The Commission, the manufacturing industry, WISPs and consumers have survived and thrived under a current regulatory regime that, despite the unfounded fears of some commenters, does not contribute to interference when legally operated. The Commission should

²⁷ See, e.g., MSI Comments at 3; Cambium Comments at 4. MSI's concerns about potential interference to TDWR facilities are addressed *supra*.

²⁸ See *NPRM* ¶ 25 and n.37.

not, in the name of harmonization or other false pretexts, go overboard in gutting the benefits of Section 15.247 when simply improving device security requirements will do the job.

To the extent the Commission elects to consolidate the provisions of Section 15.247 into Section 15.407, WISPA has no objection so long as the rules and benefits associated with unlimited gain point-to-point antennas remain. WISPA suggests that this goal could be met by allowing unlimited antenna gain for all point-to-point devices newly certified under Section 15.407.

II. THE RECORD SHOWS THAT ADOPTION OF THE COMMISSION'S PROPOSED MODEST CHANGES TO THE U-NII RULES WILL BE SUFFICIENT TO PREVENT CO-FREQUENCY TDWR INTERFERENCE.

In the WISPA Comments,²⁹ WISPA agreed with the Commission's proposal to require devices certified for the U-NII bands to incorporate improved security features "so that third parties are not able to reprogram the devices to operate outside the parameters for which the device was certified."³⁰ WISPA also explained that other measures, such as geolocation databases and spectrum sensing, would not be necessary to address co-frequency interference potential and would introduce unneeded complexity and expense to device manufacturing.³¹

A broad consensus of parties supported these same positions. Cambium, which would be directly affected by any device design changes that the Commission might impose, stated that:

rules for tighter software security should enforce operation in the approved mode and prevent operation in modes intended for other regulatory domains. Software security should additionally ensure that only authorized software supplied by the manufacturer can be installed in the unlicensed device, and should make it impossible (or practically impossible) for a third party to modify software supplied by the manufacturer.³²

²⁹ See WISPA Comments at 17.

³⁰ NPRM ¶ 51.

³¹ See WISPA Comments at 17.

³² Cambium Comments at 2.

Cambium added that “there may be some additional development costs for manufacturers that do not presently implement software security, but it is unlikely that there will be any additional manufacturing costs.”³³ Cisco suggested that the Commission should permit manufacturers to have flexibility in implementing enhanced security so long as the master devices “include a mechanism that will disable operations in the U-NII-2A and U-NII-2C bands if software or firmware is replaced, modified or reconfigured by other than the manufacturer.”³⁴ NCTA similarly “requests that the Commission’s rules specify only the desired end result rather than mandating the specific manner in which these features must be incorporated into devices.”³⁵

Several parties also urged the Commission to adopt the proposed new Bin 1 Waveforms, which “now includes test patterns that reflect actual TDWR operation.”³⁶ These same parties endorse improved DFS capability,³⁷ but do not favor imposing on U-NII-2C users any additional spectrum sharing obligations such as geolocation databases and spectrum sensing.³⁸ WISPA agrees. The more modest approach of improving DFS capability would address the potential for interference caused by co-frequency devices that, under present circumstances, may not

³³ *Id.*

³⁴ Cisco Comments at 34. *See also* Fastback Comments at 7; IEEE 802 Comments at 16; Wi-Fi Alliance Comments at 14; Baron Comments at 16; Comments of the National Association of Broadcaster, ET Docket No. 13-49 (May 28, 2013) (“NAB Comments”) at 7-8.

³⁵ Comments of the National Cable & Telecommunications Association, ET Docket No. 13-49 (May 28, 2013) (“NCTA Comments”) at 23-24.

³⁶ IEEE 802 Comments at 23. *See also* Cisco Comments at 28-29; Wi-Fi Alliance Comments at 17.

³⁷ *See, e.g.*, Cisco Comments at 37; IEEE 802 Comments at 23-24; Wi-Fi Alliance Comments at 17-18.

³⁸ *See, e.g.*, Cambium Comments at 5-6; Cisco Comments at 38-41; Wi-Fi Alliance Comments at 21-24; Comments of the Telecommunications Industry Association, ET Docket No. 13-49 (May 28, 2013) (“TIA Comments”) at 10, n.23. Other parties suggest that geolocation database capability could be optional. *See* Fastback Comments at 7; Comments of Google Inc. and Microsoft Corporation, ET Docket No. 13-49 (May 28, 2013) (“Google/Microsoft Comments”) at 7; Motorola Mobility Comments at 7. Although WISPA believes a geolocation database is unnecessary to prevent TDWR interference in light of its other suggestions, WISPA does not object to optional use of geolocation database capability in U-NII-2C devices.

accurately detect TDWR signals or do not activate DFS to a frequency sufficiently distant from the TDWR frequency.³⁹

Shared Spectrum disagreed, citing “the significant additional cost and complexity of tamper-proof solutions.”⁴⁰ Shared Spectrum provides no data to support its proposition, while other manufacturers indicate that adding software to devices will not add to the manufacturing costs.⁴¹ In addition to enhancing DFS, NAB asked the Commission to require devices to also include geolocation database capabilities because, in NAB’s words, “spectrum sensing alone – even if it performs as designed – does not always prevent harmful interference to incumbent systems.”⁴² NAB ignored the fact that new Bin 1 Waveforms and modest DFS improvements will more completely address co-frequency TDWR interference without requiring manufacturers to install geolocation software in devices and without requiring the Commission to establish and maintain a database. The record overwhelmingly demonstrates that the Commission’s proposals are reasonable, not cost-prohibitive and should be adopted, and that geolocation databases and spectrum sensing are unnecessary to substantially improve the ability of U-NII devices to detect radar signals and to prevent devices from being illegally modified to defeat DFS or to operate on unauthorized frequencies.

³⁹ WISPA agrees that DFS requirements should not be imposed outside the U-NII-2A and U-NII-2C bands. *See, e.g.*, NCTA Comments at 20; Cablevision Comments at 7; Comcast Comments at 26; TIA Comments at 12, n.29; Time Warner Comments at 13.

⁴⁰ Comments of Shared Spectrum Company, ET Docket No. 13-49 (May 28, 2013) at 5.

⁴¹ *See* Cambium Comments at 2.

⁴² NAB Comments at 5.

III. THE RECORD SUPPORTS ALLOWING OUTDOOR OPERATIONS IN THE 5150-5250 MHz BAND.

The record demonstrates broad support for removal of restrictions on the 5150-5250 MHz (U-NII-1) band that prohibit higher-power outdoor operations.⁴³ Only one party, Globalstar, asked the Commission to retain the existing rules.⁴⁴ Recycling arguments it made in 1997,⁴⁵ Globalstar alleged that the increase in noise level to its feeder links and earth stations caused by unlicensed devices operating outdoors at higher power levels will require substantial limitations on the number of unlicensed devices that could be simultaneously used.⁴⁶

WISPA believes that Globalstar's claims are overstated, and that any potential for interference can be addressed by establishing protection zones around Globalstar's authorized earth stations and by requiring professional installation of outdoor devices in the U-NII-1 band.⁴⁷ WISPA explained that "[b]ecause incumbent operations are identifiable and fixed, it is not necessary for the Commission to require DFS or other sharing mechanisms in this band."⁴⁸ Cisco suggested that "less restrictive approaches to outdoor usage" could be implemented.⁴⁹ Noting the difficulty in enforcing such restrictions, Fastback Networks agreed that the outdoor use restriction should be removed, and asked the Commission to establish "professionally-

⁴³ See, e.g., Comments of the Consumer Electronics Association, ET Docket No. 13-49 (May 28, 2013) at 12; Comments of Cablevision Systems Corporation, ET Docket No. 13-49, (May 28, 2013) ("Cablevision Comments") at 6; Comments of Comcast Corporation, ET Docket No. 13-49 (May 28, 2013) ("Comcast Comments") at 3; Comments of Fastback Networks, ET Docket No. 13-49 (May 28, 2013) at 5; Google/Microsoft Comments at 5; Motorola Mobility Comments at 2.

⁴⁴ See Comments of Globalstar Inc., ET Docket No. 13-49 (May 28, 2013) ("Globalstar Comments").

⁴⁵ See *In the Matter of Amendment of the Commission's Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range*, 12 FCC Rcd 1576 (1997). Following adoption of the Report and Order, Globalstar acquired the interests of L/Q Licensee, Inc. Thus, references to L/Q in the record of that proceeding can be attributed to Globalstar.

⁴⁶ See *id.* at 5-6.

⁴⁷ See WISPA Comments at 11. See also Cisco Comments at 57 (suggesting that "less restrictive approaches to outdoor usage" could be implemented).

⁴⁸ *Id.*

⁴⁹ Cisco Comments at 57.

installed devices” and “transportable devices” categories.⁵⁰ Like WISPA, Fastback Networks also proposed to harmonize the U-NII-1 rules with the U-NII-3 rules, but with restrictions on power at certain antenna elevation angles to protect earth-to-space communications on Globalstar’s feeder links.⁵¹ The record demonstrates support for removal of the outdoor use restrictions in the U-NII-1 band with appropriate, required interference mitigation techniques.

The sharing techniques that the International Telecommunications Union (“ITU”) adopted for sharing among Microwave Landing Service (“MLS”) and MSS feeder link stations in the 5000-5150 MHz band illustrate some other co-frequency interference mitigation principles.⁵² In a Recommendation it adopted in 1997, the ITU stated that:

[p]rovisionally, coordination will not be required between MSS feeder link earth stations and MLS transmitter sites at the same altitude and which are separated by more than 450 km (243 nmi.). Beyond 450 km, MLS airborne stations are expected to be sufficiently beyond the radio line-of-sight of the MSS feeder link earth station to protect MLS.⁵³

From this example, it would appear that protection zones, of appropriate size, around MSS feeder link earth stations would be a reasonable way to allow shared use of the 5150-5250 MHz band while preventing interference to Globalstar’s operations. To permit operations *within* the 450 km protection zone, the ITU identified some relevant factors that should also be considered, such as (a) site-specific attenuation factors such as terrain blocking and radio horizon (b) increased filtering of MSS feeder link uplink signals; (c) antenna orientation and directive gain characteristics of MSS transmit antennas, and (d) alternative locations for the MSS feeder link

⁵⁰ See Fastback Comments at 5.

⁵¹ See *id.* at 6. Google/Microsoft proposed to use a geolocation database to protect Globalstar’s feeder links. See Google/Microsoft Comments at 9. WISPA believes that the combination of identified and fixed protection zones and a professional installation requirement will provide the same protection from interference but without the added costs associated with integrating geolocation capability into U-NII-1 devices.

⁵² MLS is allocated internationally to the 5000-5150 MHz band for precision approach and landing. Like the adjacent U-NII-1 band at 5150-5250, Globalstar’s MSS feeder links in the 5096-5250 MHz band are co-frequency.

⁵³ International Telecommunications Union, Recommendation ITU-R S.1342 (1997) at 2.

earth stations.⁵⁴ Though the differing characteristics of MLS and U-NII-1 devices may mandate protection zones of different sizes, the use of the co-frequency interference mitigation techniques that WISPA and Fastback Networks have suggested should effectively protect Globalstar's operations. To simply accept Globalstar's claims at face value would disserve the public interest.

Parties differ on whether the U-NII-1 rules should be harmonized with the adjacent U-NII-2A rules⁵⁵ or with the U-NII-3 rules,⁵⁶ which allow for higher-power operations. WISPA agrees that adopting rules similar to those applicable to the U-NII-3 band will provide greater flexibility for WISP deployments, without compromising U-NII operations at lower power. As depicted in Appendix A of the WISPA Comments, the lower U-NII-2A and U-NII-2C EIRP limits should be a "baseline" minimum, but higher EIRP should be permitted in the U-NII-1 and U-NII-3/ISM sub-bands.⁵⁷

IV. THE COMMISSION SHOULD CONTINUE TO EXAMINE DESIGNATION OF THE U-NII-2B AND U-NII-4 BANDS FOR UNLICENSED USE.

The Comments in this proceeding reflect wide disparity on whether and to what extent the Commission should designate the 5350-5470 MHz (U-NII-2B) and 5850-5925 MHz (U-NII-4) bands for unlicensed use. These differences demonstrate the need to study further and better understand the sharing challenges and possibilities that exist. Based on a review of the record, WISPA agrees that these issues should be carefully considered with full, cooperative and transparent public participation. This view is shared by four House Members, who wrote in a letter dated today that "the FCC should proceed expeditiously with collaborative testing of

⁵⁴ See *id.* at 3.

⁵⁵ See, e.g., Comcast Comments at 22; IEE 802 Comments at 27; TIA Comments at 12.

⁵⁶ See, e.g., Cablevision Comments at 5; Time Warner Comments at 10. Cisco suggested that the Commission should harmonize the U-NII-1 power and PSD limits with those of the U-NII-2A band, but "seriously explore" harmonization with the higher-power U-NII-3 rules. Cisco Comments at 54.

⁵⁷ See WISPA Comments at Appendix A.

promising spectrum sharing solutions involving both incumbents and the Wi-Fi industry” to promote co-existence and the “immediate economic and consumer benefits of expanding Wi-Fi in the 5 GHz band.”⁵⁸

As many commenters have recommended, while studying the U-NII-2B and U-NII-4 bands, the Commission can and should move forward with the less controversial proposals, namely removing outdoor restrictions and increasing power limits for the 5150-5250 MHz band, implementing improved security features for devices in the U-NII bands, adding 25 megahertz to the 5725-5825 MHz band and implementing updated Bin 1 Waveforms.

That said, WISPA is intrigued by Qualcomm’s suggestion that the U-NII-4 band could be segmented to allow exclusive use by Dedicated Short Range Communications (“DSRC”) licensees of the upper 20-30 megahertz for safety services, with the remaining 45-55 megahertz shared among non-safety DSRC licensees and unlicensed users.⁵⁹ As another idea, it may be possible for DSRC licensees, which operate at short distances and at street level, to share with unlicensed users that operate with a *minimum* antenna height above ground level. Although certainly requiring further study and testing, such horizontal, space-division spectrum sharing techniques may enable non-interfering use for a number of disparate applications and services and should not be discounted out-of-hand.

CONCLUSION

Of paramount importance in this proceeding is the preservation of rules that will continue to enable long-distance, point-to-point connectivity in the 5725-5850 MHz band pursuant to Section 15.247. The Commission’s proposals to eliminate these rules not only threaten the existence of a vast ecosystem that facilitates fixed wireless broadband services to distant

⁵⁸ Letter dated July 24, 2013 from the Honorable Anna G. Eshoo, the Honorable Darrell Issa, the Honorable Doris O. Matsui and the Honorable Bob Latta to the Honorable Mignon Clyburn, Acting Chairwoman, at 1.

⁵⁹ See *generally* Comments of Qualcomm Incorporated, ET Docket No. 13-49 (May 28, 2013).

communities, but are also entirely unnecessary to address interference to TDWR facilities. To eliminate the potential for interference to TDWR facilities, the Commission should require manufacturers to incorporate enhanced security measures into devices to prevent their illegal modification and adopt other reasonable steps that enjoy strong record support. For the 5150-5250 MHz band, WISPA believes that Globalstar's concerns about potential for interference can be addressed through protection zones and professional installation. Given the more challenging protection and sharing issues in the U-NII-2B and U-NII-4 bands, WISPA suggests that further analysis be conducted before those bands are designated for unlicensed use.

Respectfully submitted,

**WIRELESS INTERNET SERVICE
PROVIDERS ASSOCIATION**

July 24, 2013

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