Before the
Federal Communications Commission
Washington DC 20554

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

REPLY COMMENTS OF THE
FIXED WIRELESS COMMUNICATIONS COALITION

The Fixed Wireless Communications Coalition, Inc. (FWCC)[1] files these Reply Comments in the above-captioned proceeding.[2]

The FWCC opposes the Commission's proposal to limit the gain of fixed, point-to-point antennas in the 5725-5850 MHz band.[3] In this respect we side with the Wireless Internet Service Providers Association (WISPA), [4] although for different reasons.

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[1] The FWCC is a coalition of companies, associations, and individuals interested in the fixed service—i.e., in terrestrial fixed microwave communications. Our membership includes manufacturers of microwave equipment, fixed microwave engineering firms, licensees of terrestrial fixed microwave systems and their associations, and communications service providers and their associations. The membership also includes railroads, public utilities, petroleum and pipeline entities, public safety agencies, cable TV providers, backhaul providers, and/or their respective associations, communications carriers, and telecommunications attorneys and engineers. Our members build, install, and use both licensed and unlicensed point-to-point, point-to-multipoint, and other fixed wireless systems, in frequency bands from 900 MHz to 95 GHz. For more information, see www.fwcc.us.

[2] *Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013) (*Notice*).

[3] *Notice* at ¶ 33.

[4] Wireless Internet Service Providers Ass'n at 12-16. *See also* First Step Internet, LLC at 4.

A. BACKGROUND

The *Notice* seeks to resolve a discrepancy between the U-NII rules at 5725-5825 MHz, which set a maximum EIRP of 53 dBm,[5] and the "digital modulation" rules at 5725-5850 MHz, which permit unlimited EIRP.[6]

Until 2002, these two sets of rules contained another distinction as well. Section 15.247 included a "spread spectrum" requirement that limited data throughput to about 11 Mbps, while U-NII systems could use any modulation at any data speed. A system designer in those days had to choose between unlimited antenna gain under Section 15.247 and unlimited data speed under Section 15.407. The Commission's abolishing the spread spectrum requirement in 2002, and permitting any digital modulation,[7] put the two sets of rules on an equal footing except for antenna gain.[8]

Maintaining these two sets of rules for point-to-point operations in the 5.8 GHz band makes little sense. We support the Commission's goal of harmonizing them. There are good public interest reasons, however, for retaining Section 15.247's unlimited antenna gain in the harmonized rules. Further, the arguments in the record against unlimited antenna gain are misplaced.

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[5] Section 15.407(a)(3) permits 1W output power but requires fixed, point-to-point systems using an antenna gain higher than 23 dBi to reduce the output power by 1 dB for every dB that the antenna gain exceeds 23 dBi. The maximum EIRP is thus 30 dBm (equivalent to 1 watt) + 23 dBi = 53 dBm.

[6] Section 15.247(b)(4)(ii) permits fixed, point-to-point systems to use 1W output power at any antenna gain, and hence unlimited EIRP.

[7] *Amendment of Part 15 of the Commission's Rules Regarding Spread Spectrum Devices*, 17 FCC Rcd 10755 (2002).

[8] Section 15.247 also provides 25 MHz more bandwidth, a discrepancy that the Commission proposes to rectify. *Notice* at ¶ 27.

B. PUBLIC INTEREST IN UNLIMITED ANTENNA GAIN

Commercial providers and professional users of *licensed* fixed service facilities—including wireless phone companies needing backhaul, entities that maintain and support critical infrastructure, and companies handling time-sensitive business data—sometimes must operate a link immediately, without waiting for Part 101 frequency coordination and license application. A common practice in these cases is to install a 5.8 GHz unlicensed link temporarily, until the licensed link can lawfully be turned on. The needed EIRP for these temporary links sometimes exceeds the 53 dBm permitted under Section 15.407.

Moreover, when the licensed link will use the 6 GHz band, it is often feasible to operate the temporary unlicensed 5.8 GHz link through the same antenna that is proposed for the 6 GHz licensed link. This is both efficient and economical, as it requires only a single tower siting. Once the application is filed and conditional authorization applies,[9] a change to the electronics puts the link onto the appropriate 6 GHz licensed frequency and power. The Commission's antenna standards for 6 GHz, however, require gains of either 38 dBi or 32 dBi,[10] well above the 23 dBi permitted under the U-NII rules without a power penalty. Imposition of the U-NII antenna rules on the 5725-5850 MHz band would eliminate the possibility of these extremely useful 5.8 GHz links on a temporary basis, and put the operator to the trouble and expense of installing an antenna that will serve for only a short time.

Long links at 5.8 GHz have proved to be invaluable in supporting emergency and disaster relief efforts and prompt restoration of service in areas ravaged by hurricanes, tornadoes, flooding, fires, and the like. The current 5.8 GHz rules allow these links to be established on very

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[9] 47 C.F.R. § 101.31(b).

[10] 47 C.F.R. § 101.115(b) (table) (38 dBi for Category A or B1; 32 dBi for Category B2).

short notice, while the availability of high gain antennas lets operators route critical communications traffic as needed. The extended range made possible by these antennas can be a literal "life saver" in quickly establishing emergency links.

We oppose the proposed rule change because it would eliminate these applications and efficiencies without bringing any concomitant benefit.

C. LACK OF INTERFERENCE FROM HIGH-GAIN ANTENNAS

We are not aware of any instance in which a lawful 5.8 GHz transmitter caused interference reasonably attributable to a high-gain antenna.

Two of the parties that support the proposed limit on EIRP, IEEE 802 and Cisco, argue that limiting EIRP will help prevent interference to Terminal Doppler Weather Radars (TDWRs).[11] We disagree. High antenna gain and TDWR interference are issues in different bands. TDWRs operate at 5600-5650 MHz, in a band where the U-NII power limit is 250 mW and where antenna gains in excess of 6 dBi (not 23 dBi) must be accompanied by a power reduction of 1 dB for each dB that the antenna gain exceeds 6 dBi.[12] This sets the maximum EIRP to only 30 dBm.[13] The band has no provision that allows higher antenna gains for fixed, point-to-point systems, and there is no pending proposal to raise either the power limit or the

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[11] IEEE 802 at 18-19 ("[H]igh gain antenna systems have been the source of many of the issues with TDWRs. … Once equipment is certified and marketed under the new rule, the risk of interference to TDWRs (or other radars) should be reduced."); Cisco at 35 ("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. … By retaining the provisions of Section 15.407(a)(3) requiring reductions in power when high-gain point-to-point antennas are deployed, the Commission can mitigate the potential for interference to TDWR that has been found to be caused by the use of high-gain antennas.")

[12] 47 C.F.R. § 15.407(a)(2).

[13] 24 dBm (equivalent to 250 mW) + 6 dBi = 30 dBm.

antenna gain. The frequencies at issue for unlimited antenna gain are in a different band at 5725-5850 MHz, well removed from TDWR frequencies.

In a word, limiting antenna gain at 5725-5850 MHz will have no direct effect on TDWR interference.

The only possible connection we see between limiting antenna gain at 5725-5850 MHz and limiting interference to TDWR at 5600-5650 MHz is highly tenuous: some of the TDWR interference has resulted from 5 GHz equipment that is certified for non-TDWR frequencies and illegally retuned to overlap the TDWR band.[14] IEEE 802 and Cisco might reason that limiting antenna gain at 5725-5850 MHz would eliminate the sale of new high-EIRP systems that unscrupulous vendors could unlawfully retune to TDWR frequencies. This rationale underestimates the ingenuity of black market purveyors and installers. Moreover, even under the Commission's proposal, it will still be permissible to market very high gain antennas for use at 5725-5850 MHz, albeit with a power penalty above 23 dBi. This might put a black market operator to the trouble of turning up the power as well as retuning the frequency. We doubt this will be much of a deterrent, and certainly not worth the cost of eliminating valuable lawful applications. The Commission can better address concerns about modifications to high-EIRP systems with rules that make the equipment harder to modify.

The only other objection to keeping the current rules on antenna gain is a comment that "using the more restrictive antenna gain will help ensure that there is no increase in interference potential from U-NII devices."[15]Again, we disagree. Higher antenna gains do not necessarily increase interference.

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[14] *E.g.*, *AT&T, Inc.*, 27 FCC Rcd 10803 (2012) (device certified at 5735-5840 MHz found to operate at center frequency of 5605 MHz, caused interference to TDWR).

[15] Wi-Fi Alliance at 13.

Unquestionably, increasing the antenna gain increases the range, which could result in interference at a greater distance from the antenna. But increasing the antenna gain also *decreases* the beamwidth, which tends to reduce the area over which victim receivers are potentially exposed to interference.[16]

The "gain" of an antenna is something of a misnomer; the antenna is a passive device that cannot add to the output power delivered by the transmitter. That power, capped at 1 watt,[17] represents a certain total interference potential. The only effect of different-gain antennas is to distribute that same one watt of power differently over three-dimensional space.[18] Higher-gain antennas put that same fixed power into longer, narrower shapes. They do not increase the total energy available to cause interference.

For all of these reasons, antennas having higher gain are not intrinsically more interfering than those with lower gain.

CONCLUSION

The Commission's proposal to limit antenna gain in the 5725-5850 MHz band would needlessly hamper commercial providers and professional users of licensed fixed service facilities that need a temporary 5.8 GHz link, sometimes through the same antenna that will subsequently be licensed. The rule change would have no positive benefit, would not help to

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[16] Under free space assumptions, every 6 dB increase in antenna gain doubles the range and halves the beamwidth. In practice, ground clutter tends to reduce the range and further reduce the beamwidth.

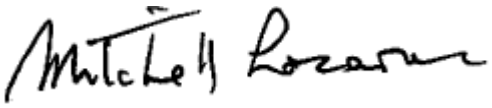
[17] 47 C.F.R. § 15.247(b)(3) (maximum peak power); 47 C.F.R. § 15.407(a)(3) (maximum conducted output power).

[18] We ignore the potential for differing losses among antennas.

alleviate TDWR interference, and would not make 5.8 GHz equipment less interfering overall.

The Commission should retain unchanged the current version of Section 15.247(b)(4)(ii).

Respectfully submitted,



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