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 Infrastructure (U-NII) Devices in the 5 GHz Band	)	ET Docket No. 13-49

REPLY TO CONSOLIDATED RESPONSE OF CISCO SYSTEMS, INC.

Cambium Networks, Ltd. ("Cambium"), by counsel and pursuant to Section 1.429(g) of the rules of the Federal Communications Commission ("FCC"), files this Reply to the Consolidated Response of Cisco Systems, Inc. to Petitions for Reconsideration ("Cisco Response")[1] of certain actions taken in the First Report and Order in the above-captioned proceeding.[2] Cisco opposes Cambium's Petition for Reconsideration[3] of the "unwanted emissions" limit ("OOBE limit") adopted in the *First R&O* as applied to certification of devices in the U-NII bands, particularly the U-NII-3 band at 5.725-5.850 GHz. Citing vague and unsupported concerns about supposed interference risks, and over the objections of dozens of service providers and others with a stake in the success of rural broadband, the Cisco Response raises unsupported and alarmist objections. The Cisco Response is without merit.

[1] Consolidated Response of Cisco Systems, Inc. to Petitions for Reconsideration, ET Docket No. 13-49 (filed August 14, 2014) ("Cisco Response"). Under Section 1.429(f) of the Rules, Cisco was obligated to serve Cambium with its Opposition, but did not do so.
[2] *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, First Report and Order, ET Docket No. 13-49 (rel. April 1, 2014)("*First R&O*").
[3] Petition for Reconsideration of Cambium Networks, Ltd., ET Docket No. 13-49 (filed August 4, 2014) ("Cambium Petition").

Background

The *First R&O* replaced the Section 15.247 OOBE limit with the much more restrictive limit found in Section 15.407.[4] In Comments,[5] and later in the Cambium Petition,[6] Cambium demonstrated that this rule change would make the 5.725 – 5.825 GHz band unusable for long-range fixed wireless links for broadband and backhaul in rural areas – one of the primary pre-existing uses of this spectrum. Cambium's was one of seven petitions for reconsideration filed in this proceeding, and the petitions of the Wireless Internet Service Providers Association ("WISPA") and JAB Wireless, Inc. ("JAB") also supported retention of the Section 15.247 OOBE limit.

Application of the Section 15.407 limit will make 5.8 GHz long-range equipment significantly more expensive for Cambium and other manufacturers to produce[7] and significantly more expensive for wireless Internet service providers ("WISPs") to deploy, while simultaneously rendering such equipment materially less effective in providing service to retail subscribers. The rule change effectively nullifies the benefits that the First R&O cited in retaining unlimited antenna gain for the band for long-range links such as backhaul, and it imposes a disproportionate harm for rural areas, where in many cases fixed wireless architecture is the only viable option for broadband access. The rule change also makes broadband deployment to these areas *effectively impossible*, to the detriment of service providers, customers, businesses, equipment manufacturers and to the Commission's policies.

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[4] *Compare* 47 C.F.R. §15.247 *with* 47 C.F.R. §15.407. The difference in required attenuation of unwanted emissions imposed by these two sections is as much as 50 dB.
[5] Comments of Cambium Networks, Ltd., ET Docket No. 13-49 (filed May 28, 2013) ("Cambium Comments"), p. 4.
[6] Cambium Petition at pp. 6-15.
[7] *See* discussion *infra* pp. 5-6.

Cisco opposes the retention of the Section 15.247 OOBE limit on the grounds that returning the unwanted emissions limits to earlier levels would be "*potentially* subjecting incumbent users to increased risk of interference."[8] As described herein, this position is not supported in the record and exacts an unreasonable tradeoff – an overrestrictive limitation to protect certain users from speculative, undefined interference at the expense of thousands of radios that already are lawfully deployed and providing service to rural America.

I. COMMENTERS OVERWHELMINGLY SUPPORT RETAINING THE SECTION 15.247 OOBE LIMIT

Cisco is alone in insisting on the Section 15.407 limit on unwanted emissions for all operations in the 5 GHz band and in Cisco's attacks on certain WISPs. Indeed, Cisco's outlier position is heavily outweighed by numerous commenters representing a variety of interests, all of whom urge the FCC to retain the Section 15.247 OOBE limit for operations in the 5.725-5.850 GHz band.

More than 100 WISPs, some of which are Cambium customers and some of which are not, have submitted comments in support of one or more of the Petitions for Reconsideration that seek retention of the Section 15.247 OOBE limit. These WISPs discuss the severe financial burden that the First R&O rule change would cause to their business and to the broader goals of providing broadband Internet access service to residences, businesses, community anchor institutions and others across the United States. In the WISPA Petition, the organization notes that WISPs "'rely heavily' on the 5725-5850 MHz band to provide backhaul and connectivity to rural and remote communities where fiber and other wired solutions are simply unavailable."[9]

The rule change harms many users of the U-NII-3 band that are not WISPs. The record

[8] Cisco Response at 1 (emphasis added).
[9] WISPA Petition at 2.

has comments from WISP customers who themselves have concerns about the loss of service that would result from the tightened emissions limit. As Cambium noted in its Petition, Cambium customers "include a variety of WISPs, other internet service providers ("ISPs"), governmental and military agencies, oil, gas and utility companies, and public safety networks."[10] The Fixed Wireless Communications Coalition, Inc. ("FWCC") describes its membership as companies that include railroads, public utilities, petroleum and pipeline entities, public safety agencies, cable TV providers, backhaul providers, communications carriers and others who build, install and use fixed wireless systems. According to FWCC, several of its members are users of high-gain antennas and would be unduly harmed by the application of Section 15.407.[11] The Utilities Telecom Council reports the out-of-band emission limit will "impair the performance of point-to-point and point-to-multipoint operations in the band, including those by utilities and other critical infrastructure industries."[12]

In sum, the impact of the rule change extends far beyond the needs and interests of the WISPs who provide service and, in turn, the equipment manufacturers such as Exalt, Fastback, Motorola Solutions, Inc., Ubiquiti Networks, Inc., Mimosa Networks and others that serve WISPs. The record in this proceeding demonstrates far-ranging effects and unintended adverse consequences to a variety of users of the band.

II. THE RECORD DEMONSTRATES SIGNIFICANT HARMS ASSOCIATED WITH TIGHTENING THE OOBE LIMIT

Cisco, standing alone, dismisses the concerns of Cambium and others as so much "doom

[10] Cambium Petition at p. 2.
[11] Comments of Fixed Wireless Communications Coalition, ET Docket No. 13-49, (filed August 14, 2014) ("FWCC Comments") at p. 4.
[12] Comments of The Utilities Telecom Council, ET Docket No. 13-49 (filed August 14, 2014) at p.1

and gloom,"[13] but presents not a single piece of evidence to support its position – only character attacks on the WISP industry. Both the engineering statement in Cambium's original Comments and the Declaration of Nigel King (and the various exhibits/attachments thereto), present uncontroverted facts -- changes to the OOBE limit would add prohibitive cost increases that would necessitate the integration of filtering and would increase by as much as four times the cost of compliant WISP equipment. In addition, Cambium demonstrated that product performance would suffer dramatically, necessitating the use of additional, costly base stations to replicate the performance of previously approved equipment.

Other spectrum bands are inadequate substitutes because they lack the performance or cost attributes that are economically viable for the type of fixed point-to-point wireless solutions that are needed in many rural and remote parts of the United States. Cisco "can *assume* that even if U-NII-3 equipment becomes prohibitively expensive as a result of the more restrictive unwanted emissions limit, most subscribers can be migrated to other bands when the 5 GHz equipment they use today reaches the end of its life,"[14] but as Cambium demonstrated, such assumptions are unfounded.[15]

Other manufacturers join Cambium in concerns about tightening the OOBE limit to levels that are economically unsustainable for service providers and manufacturers. According to Mimosa Networks, Inc., the FCC's "suggestion that the stringent emissions limits can be met by reducing power or decreasing antenna gain ignores the realities of fixed wireless broadband deployment in sparsely populated areas."[16] Ubiquiti Networks, Inc. states that "the modification

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[13] Cisco Response at p. 12.
[14] Cisco Response at p. 13.
[15] See, generally, Cambium Petition. The U-NII-3 band is optimum in part because it is further removed spectrally from the band where TDWR systems operate.
[16] Mimosa Networks, Inc. Petition for Partial Reconsideration, ET Docket No. 13-49 (filed June 4, 2014) at p. 5.

of the adjacent band emission limits for the 5725 to 5850 MHz band will have a significant negative impact on the industry's ability to provide cost-effective internet connectivity for isolated rural areas. To meet the new regulations, the industry will be forced to choose among the following options: significantly increase product costs, reduce transmitter power, and/or use only channels which are far from the band edges."[17] Fastback Networks finds that the FCC "has imposed unnecessarily restrictive rules on the presumption – one not supported by the record – that retaining the current rules would result in harmful interference, and despite the lack of record of interference from compliant devices operating under the current, less restrictive rules."[18] Finally, in a recent filing, Motorola Solutions, Inc. has refined its position and supports reconsideration of the OOBE limits adopted for U-NII-3 devices.[19]

Cisco's unwarranted dismissal of such concerns clearly is countered by the record here. Cambium urges the FCC to take a hard look at the economic and policy impact of the stricter OOBE limit, as demonstrated by Cambium and others, and to reinstate the Section 15.247 limit.

III. THE FIRST R&O ADOPTS APPROPRIATE MEASURES TO GUARD AGAINST HARMFUL INTERFERENCE WITHOUT TIGHTENING THE OOBE LIMIT IN THE U-NII-3 BAND

Cisco supports harmonization of the OOBE limits for the U-NII-3 band with other U-NII bands in part on the grounds that such an effort "ensures appropriate interference protection to TDWR and to Dedicated Short Range Communications."[20] Cisco never explains, nor could it, how "harmonization" relates to interference protection.

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[17] Comments in Support of Petition for Reconsideration by WISPA, et al filed by Greg Bedian, Director of Engineering, Ubiquiti Networks, et al, ET Docket No. 13-49 (filed July 30, 2014) ("Ubiquiti Comments") at p. 1.
[18] Comments of Dr. Kevin J. Negus, Chairman, CTO and Co-Founder, Fastback Networks, ET Docket No. 13-49 (filed August 4, 2014) at p. 2.
[19] Comments of Motorola Solutions, Inc., ET Docket No. 13-49 (filed August 4, 2014) at pp. 2-4.
[20] Cisco Response at p. 10.

The First R&O states that "*no cases have been attributed to certified equipment operating properly in accordance with their grant of equipment authorization*." Instead the FCC stated that the devices "had been illegally modified and operated at high power levels in elevated locations."[21] Harmonization does not stop people from breaking rules, it just punishes those who follow the rules.

Cisco cites to an NTIA report that purports to raise OOBE concerns because it relates to "U-NII devices used for outdoor point-to-point operations." This Report clearly relates to operations at 5.4 GHz, not in the U-NII-3 Band, because NTIA identified interference risks associated with a U-NII DFS device detecting a radar system and moving to a new channel. The NTIA stated that "[b]ased on the TDWR interference investigation NTIA determined that some devices were not moving far enough away in frequency and their out-of-channel emissions were causing interference to TDWR."[22] But U-NII-3 devices do not have DFS functionality and are 75 MHz removed from TDWR operations, *so the NTIA Report by definition is not referring to U-NII-3 operations*. Accordingly, Cisco has failed to offer evidence that lawful U-NII-3 operations under the OOBE limits in Section 15.247 have resulted in harmful interference to TDWR users. (In fact, operations in the U-NII-2 band are subject to out-of-band emissions levels in Section 15.407, and remain so after the First R&O.)

The First R&O adopted for all unlicensed devices enhanced security measures and new authentication and security requirements, thus preventing unauthorized software changes that would increase the likelihood of interference with TDWR. [23] In addition, detailed new compliance measurement procedures were adopted for devices operating in the 5.25-5.35 GHz

[21] First R&O at ¶12 (emphasis added).
[22] NTIA Report at p. 4-10
[23] Terminal Doppler Weather Radar ("TDWR") units operate at 5.6-5.65 GHz.

and 5.47-5.725 GHz bands. With the FCC's endorsement,[24] WISPA has administered a database since 2010 to allow operators to identify TDWR locations and to avoid operations within 35 km or the line-of-sight of TDWR sites.[25] The aggregate effect of these changes will be substantial interference protection to TDWR facilities, and when measured against the trade-off of the devastating impact on rural broadband deployments, these measures are sufficient.

Conclusion

For the foregoing reasons, Cambium reiterates its call for FCC reconsideration of the First R&O's adoption of a more restrictive OOBE limit to devices certified to operate in the U-NII-3 band. As Cambium and other commenters have made abundantly clear, the Section 15.247 GHz OOBE standard for those longer-range communications links should be retained. Cisco's concerns about harmful interference are not supported by the record. The FCC found there are no instances where lawful use of equipment certified under Section 15.247 rules in the 5.725-5.825 GHz (U-NII-3) band resulted in any cases of harmful interference.

No other participant in this proceeding supports Cisco. The FCC should reject Cisco's position and reinstate the Section 15.247 OOBE limit.

Respectfully submitted,
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[24] First R&O at ¶¶ 14, 72.
[25] http://www.wispa.org/tdwr-locations-and-frequencies (visited 8/25/2014)

CERTIFICATE OF SERVICE

I, David J. Kaufman, of the law firm of Rini O'Neil, P.C., hereby certify that I have caused a copy of the foregoing **REPLY TO CONSOLIDATED RESPONSE OF CISCO SYSTEMS, INC.** to be sent by e-mail, this 2nd day of September, 2014 to:

Mary L. Brown
Director, Government Affairs
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_____/s/_____
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