

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

In the Matter of)	
)	
RADWIN LTD.)	RM No. 11812
)	
Amendment of Part 15 of the Commission's)	
Rules to Advance Improved Broadband)	
Services in the U-NII-1 and U-NII-3 Bands)	

REPLY COMMENTS OF CAMBIUM NETWORKS, LTD.

Cambium Networks, Ltd. (“Cambium”), pursuant to Section 1.405(b) of the rules of the Federal Communications Commission (“FCC”), submits these Reply Comments in connection with the above-referenced Petition for Rulemaking (“Petition”) filed on June 18, 2018 by RADWIN LTD.¹ Cambium concurs with others who recommend that the FCC open a rulemaking proceeding to consider the rule changes that RADWIN proposes in the Petition. The Petition provides the FCC and the public with new opportunities to examine ways to create significant public interest benefits by affording service providers with new opportunities to deploy more cost-effective networks and spectrally efficient solutions, particularly to rural areas, thereby expanding and increasing the potential for broadband and other operations in the U-NII-1 (5150-5250 MHz) and U-NII-3 (5725-5850 MHz) bands. Cambium submits these Reply Comments to set forth some additional proposals for which the FCC should seek public comment should the FCC move forward with issuing an NPRM based on the Petition.

¹ Petition for Rulemaking, RADWIN LTD., RM 11812, *Amendment of Part 15 of the Commission's Rules to Advance Improved Broadband Services in the U-NII-1 and U-NII-3 Bands*, (filed June 18, 2018); *Consumer and Governmental Affairs Bureau Reference Information Center Petition for Rulemakings Filed*, RM-11812, Public Notice, Report No. 3097 (rel. June 29, 2018).

Background

Cambium builds Wi-Fi and fixed wireless broadband point-to-point and point-to-multipoint solutions to support communications networks deployed by service providers, enterprises, governmental and military agencies, oil, gas and utility companies, Internet service providers and public safety first responders. Cambium develops products and services to support a variety of broadband deployments using several spectrum bands, and of relevance here, products using the U-NII-1 (5150-5250 MHz) and U-NII-3 (5725-5850 MHz) bands. The company plays a growing role in the FCC's overarching efforts to accelerate the deployment of broadband services, particularly in rural areas.

Cambium agrees with those commenters who urge the FCC to consider whether and to what extent to amend the power limits for the U-NII-1 and U-NII-3 bands to promote more efficient, cost effective and intensive use of the spectrum. The U-NII-1 and U-NII-3 bands include allocations for unlicensed point-to-point and point-to-multipoint applications and uses, such as the Industrial Internet of Things, SMART Cities, backhaul and fixed residential and enterprise wireless broadband Internet access services, particularly in underserved geographies. Cambium repeatedly has urged the FCC to adopt service and technical rules to facilitate these uses and to promote new broadband deployments in rural areas. The proposals set forth in the Petition warrant broader consideration and public comment to evaluate new ways to improve the utility of these bands in the public interest.

Discussion

RADWIN requests that the FCC "modify Section 15.407 of the rules to allow devices that emit multiple directional beams sequentially in the U-NII-1 and U-NII-3 bands to operate at power

limits that are allowed for point-to-point systems in those bands.”² According to RADWIN, this rule change would harmonize certain technical limits of the U-NII bands with those in the 2.4 GHz bands, and the use of beamforming technology would not result in interference greater than the interference that would be generated by directional point-to-point devices or by legacy wide-beam devices. In fact, beamforming technology has been demonstrated to generate far less interference than legacy wide-band technologies, resulting in greater spectral efficiency. Cambium agrees with those commenters in this proceeding who urge the FCC to issue a formal notice of proposed rulemaking in connection with RADWIN’s petition so that the Commission may develop and consider a full and complete record on these issues.³

Sound technical reasons may exist to allow point-to-multipoint devices employing sequential multiple directional beam technology to operate at power levels allowed for point-to-point devices, so it would be beneficial for the FCC to seek wide public input from interested parties. Adopting higher power limits could benefit operators and the public that they serve by allowing deployments to have better coverage and greater capacity. A higher transmit power limit would allow end-user devices at longer distances to connect to the transmitting device, and it would allow all end user devices to receive at a higher level. This means that on average, operations would occur at a higher modulation mode, and therefore higher throughput and better spectral efficiency would result. In addition, the FCC should obtain comment on whether and to what extent its approach to the U-NII-1 and U-NII-3 bands should be harmonized in light of the technical differences among these bands.

² Petition at 2. The proposed rule changes apply to Section 15.407(a)(1)(iii) and 15.407(a)(3), respectively.

³ *See, e.g.*, Comments of Frontier Communications Corporation and Windstream Services, LLC at 1, 3-4 (filed July 30, 2018); Comments of The Wireless Internet Service Providers Association at 1, 2-3 (filed July 30, 2018); comments of Wi-Fi Alliance at 4.. Cambium takes no position at this time on Globalstar’s request to have RADWIN’s petition consolidated with GlobalStar’s petition. See Opposition of Globalstar, Inc. at 1, 5 (requesting denial of the Petition or in the alternative that the Petition be considered as part of GlobalStar’s May 21, 2018 Notice of Inquiry regarding the noise floor at 5.1 GHz.

In Cambium's view, such an NPRM also should request public input on whether to modify power levels in closely related situations. For example, the FCC should seek public comment on whether to adopt higher transmit power limits for U-NII-1 and U-NII-3 technologies that use multiple operating modes. Modern devices have sophisticated algorithms that allow seamless transitions among operating modes. Some operating modes allow transmission of information to all end user devices, and therefore must transmit over a wider beamwidth, while other operating modes use beamforming technology to transmit information via a narrow beam to the end user. Accordingly, in a NPRM, the FCC should invite comment on allowing devices that support multiple operating modes to use the higher power limits associated with narrow beams while the device transmits with a narrow beam, while applying the current power limits to operations that radiate over a larger beamwidth.

In addition, Cambium agrees with other commenters that an NPRM should seek comment on applying the proposed higher power limits not only to a single directional beam, but also to multiple simultaneous directional beams.⁴ While such simultaneous narrow-beam transmissions may be more spectrally efficient and may enhance system capacity in terms of concurrent service to a greater number of end users, the FCC should consider applying the power limit per beam, not to overall transmission (i.e. dividing the allowed power over a number of beams). Otherwise, dividing the power limit over multiple beams would require each beam to transmit at a lower power relative to a single beamformed transmission, thereby reducing on average each transmission's modulation level. This difference in power limits disadvantages the more spectral efficient technology (multiple directional beam) compared to the less spectral efficient solution (one single directional beam). To this end, Cambium disagrees with NCTA – The Internet and Television

⁴ See, e.g., National Public Safety Telecommunications Council Comments ("NPSTC Comments") at 4.

Association⁵ and concurs with those commenters who urge the FCC to seek comment on power limits for simultaneous point-to-multipoint systems as well as sequential point-to-multipoint systems should the FCC grant RADWIN's Petition.⁶ Accordingly, should the FCC initiate an NPRM in response to the Petition, it would be appropriate to raise such matters for consideration in the context of determining whether to revise the power limits for the U-NII-1 and U-NII-3 bands.

Conclusion

Cambium believes that the public interest would be served by obtaining broader public input on these matters. For the reasons set forth above, Cambium concurs with those commenters who support the opening of a rulemaking proceeding to examine potential increases in the power limits for the U-NII-1 and U-NII-3 bands. Cambium encourages the FCC to continue its efforts to facilitate widespread broadband deployment and to evaluate rule changes to give service providers new tools to deploy more spectrally efficient and cost effective services, particularly in rural areas that are costly to serve.

Respectfully submitted,

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⁵ NCTA—The Internet and Television Association Comments at 2-3.

⁶ NPSTC Comments at 4.

CERTIFICATE OF SERVICE

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