

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

In the Matter of)	
Amendment of Part 101 of the Commission's)	
Rules to Facilitate the Use of Microwave for)	WT Docket No. 10-153
Wireless Backhaul and Other Uses and to Provide)	
Additional Flexibility to Broadcast Auxiliary)	
Service and Operational Fixed Microwave)	
Licenses)	
)	
Petition for Rulemaking filed by Fixed Wireless)	RM-11602
Communications Coalition to Amend Part 101 of)	
the Commission's Rules to Authorize 60 and)	
80 MHz Channels in Certain Bands for Broadband)	
Communications)	

**REPLY COMMENTS OF CLEARWIRE CORPORATION TO
FUTHER NOTICE OF PROPOSED RULEMAKING**

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Clearwire Corporation (“Clearwire”) hereby respectfully submits these reply comments in the above-captioned proceedings.¹

I. DISCUSSION

A. Clearwire Supports the Commission’s Proposal to Permit the Use of Smaller Antennas in the 6, 18 and 23 GHz Bands

Clearwire joins with Comsearch, Fibertower, the Fixed Wireless Communications Coalition and other commenters that have expressed support for the proposal to allow smaller

¹ In the Matter of Amendment of Part 101 of the Commission’s Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licenses, *Report and Order, Further Notice of Proposed Rulemaking and Memorandum Opinion and Order*, WT Docket No. 10-153, WT Docket No. 09-106 (rel. Aug. 9, 2011) (“*FNPRM*”).

diameter antennas at 6, 18, and 23 GHz.² The use of smaller diameter antennas, especially at 23 and 18 GHz will significantly increase the number of candidate sites/towers carriers can use while reducing deployment costs and the need for structural modifications to the sites/towers.

Clearwire agrees that smaller antennas can be accommodated in these bands without causing harmful interference to existing users. Specifically, Clearwire endorses Comsearch's technical analysis and recommendations for:

- High-performance 3-foot diameter antennas in the 6 GHz bands
- High performance 1-foot diameter antennas in the 18 GHz bands
- High performance 8-inch diameter antennas in the 23 GHz bands

Comsearch has also pointed out that under the Commission's proposed rules for antennas in the 6, 18 and 23 GHz bands, some antennas that currently qualify under the Commission's category B standard would no longer qualify.³ The Commission can avoid this result by revising the proposed rules to conform with Comsearch's proposal. In the alternative, the Commission should explicitly grandfather existing, deployed Category B antennas that qualify under today's rules.

B. Clearwire Supports Allowing Wider Channels in the 6 and 11 GHz Bands

Clearwire supports the Fixed Wireless Communications Coalition's ("FWCC's") proposal for allowing Fixed Service operators to combine 30 and 40 MHz channels in the 6 and 11 GHz bands. For the same reasons that wider channels make sense in the 6 and 11 GHz bands, Clearwire encourages the Commission to develop rules that would allow wireless backhaul

² See generally Comments of Comsearch, WT Docket No. 10-153 (filed Oct. 4, 2011) ("Comsearch Comments"); Comments of FiberTower Corporation, WT Docket No. 10-153 (filed Oct. 4, 2011) ("FiberTower Comments"); Comments of the Fixed Wireless Communications Coalition, WT Docket No. 10-153 (filed Oct. 4, 2011) ("Comments of Fixed Wireless Communications Coalition").

³ Comsearch Comments at 2.

network operators to aggregate contiguous channels for multi-gigabit operation over a single carrier in the 18 and 23 GHz bands. Channel aggregation (also referred to as “channel bonding”) in the lower frequency bands of 11, 18 and 23 GHz would provide Clearwire the option of deploying single radio/single antenna, multi-gigabit capacity backhaul links on all structure types and at path lengths 3-5 times longer than that achievable with millimeter wave radios. Channel aggregation would allow wireless backhaul network operators to aggregate adjacent 40 or 50 MHz channels in the 11, 18 or 23 GHz bands, per Part 101.147, into either one 80 MHz wide channel, one 100 MHz wide channel, one 120 MHz wide channel, or one 150 MHz wide channel, subject to interference analysis and frequency coordination.

Comsearch has expressed concern about whether wider 6 and 11 GHz channels would increase the difficulty of frequency coordination as a result of the loss of cross-polarization advantage over the long term. Clearwire believes that the burden of the frequency coordination issues cited by Comsearch is far outweighed by the cost savings and deployment advantages associated with wider channels. In any case, Comsearch’s concerns regarding cross-polarization applies primarily at 6 GHz and to a lesser degree at 11 GHz, but does not apply at 18 and 23 GHz. To provide wireless backhaul network operators more flexibility and more low cost options for deploying multi-gigabit capacity links, Clearwire encourages the Commission to develop rules to allow channel aggregation at 11, 18, and 23 GHz.

Clearwire also agrees with Comsearch that the Commission should adjust the minimum payload requirements to account for the increased capacity that would be available with wider bandwidth channels.⁴ Payload requirements should be established to ensure that wider bandwidth channels are reserved for truly high-capacity services that will put the spectrum to its highest and best use. But simply modifying Section 101.141(a)(3) for a consistent bits-per-

⁴ Comsearch Comments at 10-11.

second-Hertz requirement will not account for the more technologically advanced microwave network designs that are being deployed today and into the future. Any new minimum payload requirement must take into account network topology as well as “pure” link capacity. As discussed in Clearwire’s comments, it has deployed a cascading ring topology of 25 to 50 microwave sites that provides high capacity and redundancy. Under normal operating conditions, a ring is split in half with traffic travelling clockwise on one half and counterclockwise on the other half. If there is a radio failure anywhere on a link in the cascading ring, the traffic is aggregated and re-routed around the failed/downed link. Under such circumstances, capacity on one more rings must range up to 100% of the aggregated traffic for the 25-50 sites typically served by each cascading ring to mend a failure in another part of the network. Consequently, the Commission should recognize that a “bits-per-second-Hertz” requirement designed for star or hub and spoke topologies may not be a good fit for a ring design. Any minimum payload requirement must be flexible enough to fully accommodate differing network topologies, including advanced ring topologies that are necessary to support today’s existing and future 4G broadband networks.

II. CONCLUSION

For the foregoing reasons, Clearwire largely supports the Commission’s proposals to promote the efficient use of spectrum for backhaul and for providing more flexible use of microwave frequencies for backhaul.

Respectfully submitted,

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