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 Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees	)	WT Docket No. 10-153
	)	
Fixed Wireless Communications Coalition, Petition to Amend Part 101 of the Commission's Rules for Automated Government Frequency Coordination and Conditional Licensing in the 23 GHz Fixed Service Band	)	RM-11610

EX PARTE COMMENTS OF MIMOSA NETWORKS
AND REQUEST FOR EXPEDITED CONSIDERATION

Mimosa Networks, Inc. ("Mimosa"), by its counsel, hereby submits these *ex parte* Comments in the above-captioned proceedings.

I. EXECUTIVE SUMMARY

Mimosa proposes to modify the rules governing the 21.2 – 23.6 GHz ("23 GHz") band to permit 80 MHz, 160 MHz and 320 MHz channels and to increase the payload capacity requirements. Combining these wider channels with a higher efficiency standard will enable operators to provide much higher data throughput than is currently possible using the 50 MHz maximum channel width permitted today. With the exponential growth in Internet traffic, the

proposed Part 101 modifications will greatly increase the utility of the 23 GHz band. Mimosa submits that wider channels will enable operators to routinely provide 10 Gbps links, matching the throughput of fiber links most commonly used for metro-area networking.

II. BACKGROUND

The FCC has not re-examined the appropriate channel size and channel plan for operations in the 23 GHz band in 13 years, despite significant changes in technology, the nature of traffic being transmitted, and the exponential growth in the traffic that needs to be transmitted. The issue was raised nearly four years ago by Clearwire Corporation, and supported by other parties, but the FCC deferred action. Mimosa urges the FCC to promptly re-examine this issue on an expedited basis.

A. FCC Adoption of Channel Plan, and 50 MHz Channel Maximum, in the 23 GHz Band.

The FCC adopted the current channel plan for the 23 GHz band in July 2002, based upon a 1998 recommendation from the Telecommunications Industry Association ("TIA"):

> TIA's proposed plan … is *based upon the current industry standard 50 MHz channel plan*. *** TIA's proposal will make the 23 GHz band more attractive for short-haul, high-capacity fixed point-to-point microwave service systems that comprise the backbone of a national wireless infrastructure.[1]

TIA's Petition for Rulemaking was filed in March 1998.[2] Thus, the "current industry standard 50 MHz channel plan" was already over four years old when adopted and codified by the FCC, and that standard is now at least 17 years old.

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[1] In the Matter of Amendment of Part 101 of the Commission's Rules to Streamline Processing of Microwave Applications in the Wireless Telecommunications Services, WT Docket No. 00-19, FCC 02-218, rel. July 31, 2002, at ¶¶ 57 and 59 (emphasis added).

[2] TIA Petition for Rulemaking, RM-9418 (filed March 5, 1998).

B. A Prior Request for Wider Channels in the 23 GHz Band has been Pending before the FCC for Almost Four Years.

Clearwire Corporation ("Clearwire") sought wider channels in the 23 GHz band nearly four years ago, other parties supported Clearwire's request, and no party opposed Clearwire's request. In its Comments filed October 4, 2011 in response to the FCC's *2011 Order*,[3] Clearwire asked the FCC to "consider … channel bonding rules for the 18 and 23 GHz bands" to permit channels as wide as 150 MHz.[4] Clearwire noted that:

> Channel aggregation (also referred to as "channel bonding") … in the 23 GHz [band] would provide … 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.[5]

Clearwire also:

> encourage[d] the Commission to adjust the minimum payload requirements to account for the increased capacity that would be available with wider bandwidth channels. Payload requirements should be established that ensure that wider bandwidth channels are reserved for truly high-capacity services …. Clearwire suggests that the payload requirements should not be simply additive but increased to reflect the more productive use of a wider channel plan.[6]

The Fixed Wireless Communications Coalition ("FWCC"), in its Reply Comments, stated that it "has no objection to Clearwire's proposal to allow combining adjacent channels in

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[3] 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 Licensees, Report and Order, Further Notice of Proposed Rulemaking and Memorandum Opinion and Order, WT Docket No. 10-153, WT Docket No. 09-106, FCC 11-120, rel. Aug. 9, 2011 ("*2011 Order*").

[4] Clearwire Comments, filed October 4, 2011, at 2. Clearwire proposed channel aggregation in the 23 GHz band that would enable operators to aggregate adjacent 40 or 50 MHz channels into 80 MHz, 100 MHz, 120 MHz or 150 MHz channels. Id.

[5] Id. at 9.

[6] Id. at 10.

the 18 and 23 GHz bands …, in cases where the quantity of traffic exceeds the capacity of the widest channel specified in the rules."[7] Similarly, Comsearch clarified in its Reply Comments that its concerns about wider channels applied only to the 6 GHz and 11 GHz bands, and "do not apply at 18 and 23 GHz."[8] Comsearch agreed "that aggregating 18 and 23 GHz channels as Clearwire suggests appears viable but should be subject to efficiency standards that are significantly more stringent than the present … requirement …."[9]

C. The FCC Deferred Action on the Request for Wider Channels in the 23 GHz Band.

In its *2012* Order, the FCC noted that Clearwire had asked in its Comments that the FCC allow licensees to aggregate channels in the 18 GHz and 23 GHz bands to allow 80 MHz, 100 MHz, 120 MHz, or 150 MHz channels.[10] The FCC also noted that FWCC had filed a Petition for Rulemaking asking, among other things, that conditional authority be authorized throughout the 23 GHz band, and seeking changes to the mechanism for coordinating operation with NTIA.[11]

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[7] FWCC Reply Comments, filed October 25, 2011, at 4.

[8] Comsearch Reply Comments, filed October 25, 2011, at 4.

[9] Id.

[10] 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 Licensees, Second Report and Order, Second Further Notice of Proposed Rulemaking, Second Notice of Inquiry, Order on Reconsideration, and Memorandum Opinion and Order, WT Docket No. 10-153, RM-11602, FCC 12-87, rel. Aug. 9, 2011 ("*2012 Order*") at ¶ 109.

[11] *See Petition for Rulemaking of the Fixed Wireless Communications Coalition in the Matter of Amendment of Parts 2 and 101 of the Commission's Rules for Automated Government Frequency Coordination and Conditional Licensing in the 23 GHz Fixed Service Band*, RM-11605, filed July 26, 2010.

In its *2012 Order*, the FCC deferred consideration of these requests (wider channels, availability to operators of conditional authorization for all of the 23 GHz band, and streamlined coordination with NTIA), and noted that these requests should be considered together at a later time.[12]

III. Authorization of Wider Channels Will Serve the Public Interest

In its *2012 Order*, the FCC authorized wider channels in the 6 GHz and 11 GHz bands, finding that:

> allowing [wider channels] … would serve the public interest by allowing backhaul operators to handle more capacity and offer faster data rates. In light of the explosive growth in demand for broadband services, we believe it is important to provide operators with the capability to offer faster services wherever possible. Allowing wider channels can also result in more efficient spectrum utilization.[13]

The 23 GHz band offers 2.4 times the amount of spectrum available in the 11 GHz band, and thus presents the opportunity for much greater data throughput using channels much larger than the current 50 MHz maximum. Quantification of the greater data throughput is set forth in the table below:

Channel Size	QAM rate and polarization	bps/Hz	Aggregate Throughput Capacity
50 MHz	4QAM ½ Single polarization	1.0	100 Mbps
80 MHz	16QAM ¾ Single polarization	3.0	480 Mbps

[12] *2012 Order* at ¶ 110.

[13] *Id.* at ¶ 52.

160 MHz	256QAM 7/8 Single polarization	7.0	2,240 Mbps
320 MHz	256QAM 7/8 Dual polarization	7.0	8,960 Mbps
320 MHz	1024QAM 9/10 Dual Polarization	9.0	11,520 Mbps

As the FCC is well aware, Internet traffic has grown exponentially over the last fifteen years. Businesses and consumers demand ever more bandwidth, but traditional copper-based technologies cannot scale to meet the challenge.[14] While fiber has made major inroads, it is not economically viable to run fiber to all locations. Consequently, there is an increasing need for fixed wireless technologies to bridge the gap. Given that the most common backhaul fiber speed is 10 Gbps, Mimosa believes that 10 Gbps backhaul radios represent the logical solution to meet the needs of access to the modern Internet. Allowing wider channels in the 23 GHz band will enable operators to offer 10 Gbps wireless backhaul.

[14] When the 23 GHz band plan, with a maximum channel size of 50 MHz, was adopted in 2002, worldwide Internet traffic (according to Cisco estimates) was only 100 GB/second. Table 1, http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI_Hyperconnectivity_WP.html). By 2014, only 12 years later, Internet traffic had grown to 16,144 GB/second, a compound annual growth rate of almost 53%. Id.

IV. SPECIFICS OF MIMOSA'S PROPOSAL

A. Wider Channels and Revised Band Plan

Mimosa proposes to modify the rules governing the 23 GHz band to permit 80 MHz, 160 MHz and 320 MHz channels. Specifically, Mimosa proposes to modify Section 101.109(c) to specify a maximum bandwidth of 320 MHz for the frequency band 21,200 to 23,600 MHz. Mimosa further proposes to modify the channel plan in Section 101.147(s) by adding new subsections (s)(8), (9), and (10) as set forth in Exhibit 1 hereto.

These new channels would be in addition to the 2.5 MHz, 5 MHz, 10 MHz, 20 MHz, 30 MHz, 40 MHz and 50 MHz channels currently defined under Part 101.147(s)(1) through (s)(7). A license for the larger channels would be subject to the frequency coordination requirements set forth in Section 101.103.

B. Payload Capacity Requirements

Mimosa agrees with Clearwire that the FCC should adjust the minimum payload capacity requirements to account for the increased capacity that would be available with wider bandwidth channels. As Clearwire noted, "payload requirements should be established that ensure that wider bandwidth channels are reserved for truly high-capacity services …."[15]

Mimosa proposes that the payload capacity requirement for channels in the 23 GHz band that are 80 MHz or larger should be 3 bps/Hz, matching the payload requirement for channels that are 20 MHz or larger in the 10.55 – 13.25 GHz band. *See* Section 101.141(3)(i). The

[15] Clearwire Comments at 10.

current payload requirement of 1 bps/Hz should be retained for channels in the 23 GHz band that are 50 MHz or smaller.

V. CONCLUSION

Mimosa urges the FCC to modify the rules governing the 23 GHz band to permit 80 MHz, 160 MHz and 320 MHz channels and to increase the payload capacity requirements. Combining these wider channels with a higher efficiency standard will enable operators to provide much higher data throughput than is currently possible using the 50 MHz maximum channel width permitted today. With the exponential growth in Internet traffic, the proposed modifications will greatly increase the utility of the 23 GHz band.

Respectfully submitted,

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EXHIBIT 1

PROPOSED CHANNEL PLAN FOR SECTION 101.147(s)

(s) 21,200 to 23,600 MHz: 320 MHz authorized bandwidth

Transmit (receive) (MHz)	**Receive (transmit) (MHz)**
(8) 80 MHz bandwidth channels:	
21240	22440
21320	22520
21400	22600
21480	22680
21560	22760
21640	22840
21720	22920
21800	23000
21880	23080
21960	23160
22040	23240
22120	23320
22200	23400
22280	23480
22360	23560
(9) 160 MHz bandwidth channels:	
21320	22520
21480	22680
21640	22840
21800	23000
21960	23160
22120	23320
22280	23480
(10) 320 MHz bandwidth channels:	
21400	22600
21800	23000
22200	23400