

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of	)	
	)	
Amendment of Part 101 of the	)	
Commission's Rules to Facilitate the Use of	)	WT Docket No. 10-153
Microwave for Wireless Backhaul and Other	)	
Uses and to Provide Additional Flexibility to	)	
Broadcast Auxiliary Service and Operational	)	
Fixed Microwave Licensees	)	
	)	
Request for Interpretation of Section	)	
101.141(a)(3) of the Commission's Rules	)	WT Docket No. 09-106
Filed by Alcatel-Lucent, Inc., <i>et al.</i>	)	
	)	
Petition for Declaratory Ruling Filed by	)	WT Docket No. 07-121
Wireless Strategies, Inc.	)	
	)	
Request for Temporary Waiver of Section	)	
101.141(a)(3) of the Commission's Rules	)	
Filed by Fixed Wireless Communications	)	
Coalition	)	

**Reply Comments of the Fixed Wireless Communications Coalition**

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The Fixed Wireless Communications Coalition (FWCC)<sup>1</sup> files these reply comments in the above-captioned proceeding.<sup>2</sup>

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<sup>1</sup> 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](http://www.fwcc.us).

<sup>2</sup> *Use of Microwave for Wireless Backhaul and Other Uses*, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 11246 2010 (“*Notice*”).

## A. ADAPTIVE MODULATION

### 1. Advantages

The record shows overwhelming support for allowing adaptive modulation—*i.e.*, temporary drops below the minimum payload capacity specified in Section 101.141, for short periods when necessary to maintain an operational link.<sup>3</sup>

The advantages of adaptive modulation noted in the first-round comments include:

- aiding the survivability of critical traffic across a microwave link during periods of deep fading;<sup>4</sup>
- offering the potential to increase the reliability of critical microwave links,<sup>5</sup> especially over longer distances;<sup>6</sup>
- preserving at least some service when otherwise there would be no service at all,<sup>7</sup> including the additional outage time otherwise required to resynchronize the network;<sup>8</sup>
- maximizing the data carrying capabilities of backhaul infrastructure;<sup>9</sup> increasing operational efficiency and flexibility while promoting reliability;<sup>10</sup> and

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<sup>3</sup> The FWCC is among the original proponents of adaptive modulation. *See* Letter from Mitchell Lazarus on behalf of Alcatel-Lucent, Dragonwave Inc., Ericsson Inc., Exalt Communications, Fixed Wireless Communications Coalition, Harris Stratex Networks, and Motorola, Inc. to Marlene H. Dortch, Secretary, FCC, in WT Docket No. 09-106 (filed May 8, 2009).

<sup>4</sup> Ceragon at 5; National Spectrum Management Association at 6-7; Telecommunications Industry Association at 4.

<sup>5</sup> Verizon at 5.

<sup>6</sup> Sprint Nextel at 5.

<sup>7</sup> United States Cellular at 5.

<sup>8</sup> Motorola at 6.

<sup>9</sup> T-Mobile USA at 9.

<sup>10</sup> AT&T at 10.

- facilitating the use of wireless backhaul in rural areas.<sup>11</sup>

AT&T expands on this last point:

In rural areas, microwave systems are more likely than in urban areas to have long path lengths. As a result, fixed links in rural areas are more likely to face difficulties with signal fades. The use of adaptive modulation would improve availability and reduce interruptions to data and voice communications service in these areas.<sup>12</sup>

Other parties also express support.<sup>13</sup>

One party opposes adaptive modulation, on the stated ground that any atmospheric conditions severe enough to cause anomalous fading would also take down the link.<sup>14</sup> This is simply wrong, as shown in the multiple comments cited above from manufacturers, providers, and frequency coordinators. Further evidence for the effectiveness of adaptive modulation lies in its successful use in other countries.<sup>15</sup>

## 2. *System design*

Some parties fear that allowing adaptive modulation will encourage inefficient systems that use more spectrum than necessary.<sup>16</sup> The FWCC explained in its first-round comments why we think this concern is misplaced.<sup>17</sup> The Commission need not agree with us, however, because the record shows an emerging consensus on how to address the issue.

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<sup>11</sup> FiberTower at 7.

<sup>12</sup> AT&T at 12.

<sup>13</sup> *E.g.*, Cielo Networks at 1; Sierra Telecom at 1-2 (would make adaptive modulation mandatory); Wireless Internet Service Providers Association at 3-4.

<sup>14</sup> Engineers for the Integrity of Broadcast Auxiliary Services Spectrum at 7.

<sup>15</sup> AT&T at 12-13.

<sup>16</sup> Verizon at 5.

<sup>17</sup> Fixed Wireless Communications Coalition at 9-11.

Most parties addressing the issue agree the best solution is to ensure that links are “designed with good engineering practice to a high availability.”<sup>18</sup> Specifically, the design should “assure expected operation at or above the minimum required payload except when a significant propagation anomaly occurs.”<sup>19</sup> Several commenters recommend that path designs be required to meet specific minimum availability targets, ranging from 99.95% to 99.999%.<sup>20</sup>

The FWCC supports this approach (but does not take sides on a particular number).

Alternative suggestions are time limits and a throughput “floor.” Two comments suggest limiting the periods of time that link throughput can fall below the current minimum capacity requirements.<sup>21</sup> Such a requirement would raise equipment costs, and ultimately the cost of service.<sup>22</sup> As Verizon notes, it could also cause a system to cut out, with undesirable consequences, during infrequent but long-duration fading events.<sup>23</sup> On the other hand, Verizon favors setting a floor for throughput at two-thirds of the relevant value specified in Section 101.143.<sup>24</sup> Verizon does not explain where the two-thirds number comes from, or indeed, why a floor is needed at all. Both time limits and floors will be unnecessary if the Commission specifies an appropriately stringent minimum availability.

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<sup>18</sup> National Spectrum Management Association at 7.

<sup>19</sup> *Id.* See also Motorola at 7 (rules should require that receiver operate at modulation level that supports minimum payload requirements of Sec. 101.141).

<sup>20</sup> Verizon at 10 (99.999%); Aviat Networks at 2 (99.999%); Comsearch at 19 (99.999%, but Category A antennas 99.995%); Motorola at 7 (99.95%).

<sup>21</sup> Sprint Nextel at 5; T-Mobile USA at 10.

<sup>22</sup> We similarly oppose other suggested equipment requirements, Verizon at 12-13, as entailing costs out of proportion to any protective benefit.

<sup>23</sup> Verizon at 10 n.21.

<sup>24</sup> Verizon at 7-9.

### 3. *Frequency coordination*

Several parties favor requiring that a prior coordination notice (PCN) indicate the intended use of adaptive modulation.<sup>25</sup> Comsearch, however, points out that the current rules require the PCN to include the emission designators (showing bandwidth) and loading (payload).<sup>26</sup> Comsearch concludes that a new requirement is unnecessary. While we agree with Comsearch on the facts, we still see value in flagging PCNs that propose adaptive modulation, to help ensure these receive close attention.

The Satellite Industry Association asks the Commission either to allow adaptive modulation only in bands not shared with satellite users, or to indicate the use of adaptive modulation on both PCNs and licenses.<sup>27</sup> We think this is overkill. A requirement that the PCN show all intended modulations will fully protect co-frequency satellite users.

#### **B. SPECTRUM SHARING BETWEEN BAS/CARS, AND FIXED SERVICE**

The Commission proposed allowing Fixed Service operations in the Broadcast Auxiliary Service (BAS) and the Cable Television Relay Service (CARS) bands at 6875-7125 MHz and 12.7-13.2 GHz.<sup>28</sup> The FWCC's first-round comments did not oppose this idea, but we foresaw coordination problems, particularly with BAS TV pickup units.<sup>29</sup>

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<sup>25</sup> AT&T at 13; Motorola at 8; National Spectrum Management Association at 7; Verizon at 11-12. Verizon (at 11) also suggests the availability calculations be included in the PCN. Sprint Nextel (at 5) favors filing only the largest data rate and highest modulation, which would not alert recipients to adaptive modulation.

<sup>26</sup> Comsearch at 20, *citing* 47 C.F.R. § 101.103(d).

<sup>27</sup> Satellite Industry Association at 13-14.

<sup>28</sup> *Notice* at ¶¶ 11-20.

<sup>29</sup> Fixed Wireless Communications Coalition at 4-7. The FWCC also explained that mismatched bandwidths between the services would result in large amounts of wasted spectrum. *Id.* at 6.

Several other parties share our concerns about coordination.<sup>30</sup> These include major frequency coordinators for both BAS and Fixed Service spectrum, whose views are entitled to considerable weight. The major groups representing broadcasters argue against any sharing attempt among these services.<sup>31</sup>

A few comments suggest addressing the incompatibilities by segmenting the bands.<sup>32</sup> While it would make coordination easier, this step this would largely eliminate any gains in spectrum efficiency from sharing. We think the best answer is to leave things as they are.

The FWCC previously tied repeal of the final link rule to BAS/CARS sharing.<sup>33</sup> If the Commission takes the coordinators' advice to reject the sharing proposal, then it should also keep the final link rule.

### **C. THE FIXED SERVICE AND THE GEOSTATIONARY ARC**

Comsearch urges the Commission to conform Sections 101.145(b) and (c) of its rules to the ITU Radio Regulations with regard to Fixed Service transmitters pointing close to the geostationary arc.<sup>34</sup> The change that Comsearch proposes would reduce the need for Fixed Service application waivers, without increasing the risk of interference to satellites.<sup>35</sup>

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<sup>30</sup> Association for Maximum Service Television and National Association of Broadcasters at 3-7; Aviat Networks at 1-2; Comsearch at 20-21; Engineers for the Integrity of Broadcast Auxiliary Services Spectrum at 1-5; National Spectrum Management Association at 2-5; Orion Broadcast Solutions at 1; Society of Broadcast Engineers at 3-10; Verizon at 3-4.

<sup>31</sup> Association for Maximum Service Television and National Association of Broadcasters at 5-7; Society of Broadcast Engineers at 14-15.

<sup>32</sup> Ceragon at 2-3; Comsearch at 21; Verizon at 3-4.

<sup>33</sup> Fixed Wireless Communications Coalition at 4-7.

<sup>34</sup> The geostationary arc is an imaginary circle 22,236 miles above the equator. A satellite orbiting in the geostationary arc remains at nearly the same point over the surface of the earth.

<sup>35</sup> See Comsearch at 29-34.

The reduction in waivers is important because a pending waiver request bars conditional authorization, and hence delays the operation of a fixed link.<sup>36</sup>

The FWCC supports Comsearch's request.

#### **D. AUCTION VS. LINK LICENSING**

XO Communications argues that point-to-point licensing undercuts the value of LMDS licenses.<sup>37</sup> It argues the Commission should either auction point-to-point bands or impose spectrum fees.<sup>38</sup> Although XO puts the point more delicately, its purpose is to raise the cost of point-to-point service so as to drive traffic to LMDS.<sup>39</sup>

XO's proposal is unworthy of further consideration.

Participants in the 1998-1999 LMDS auctions made their bids with full knowledge of competition from point-to-point services, which had been in place for decades. This followed a proceeding in which LMDS proponents made extravagant promises for their technology, and in which the Commission allocated an unprecedented 1300 MHz of spectrum.<sup>40</sup> Net bids for the spectrum exceeded \$600 million.<sup>41</sup>

Ten years later, as the licenses approached expiration, the promises were mostly unfulfilled and the spectrum mostly empty. Many licensees had to request additional years to

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<sup>36</sup> 47 C.F.R. § 101.31(b)(1)(iii).

<sup>37</sup> XO Communications at 2.

<sup>38</sup> *Id.* at 2-3.

<sup>39</sup> *Id.* at 3.

<sup>40</sup> CC Docket No. 92-297.

<sup>41</sup> FCC Auctions Nos. 17 and 23.



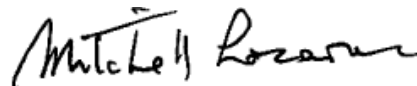
construct.<sup>42</sup> The FWCC supported these requests.<sup>43</sup> But the failure to build out suggests that some LMDS licensees overbid for their spectrum. That is always a business risk. XO now seeks to move the negative outcomes of that risk onto the point-to-point Fixed Service. By saddling point-to-point users with excessive costs, XO in effect hopes to offset the excessive amounts invested by the LMDS industry.

The FWCC vigorously objects.

### CONCLUSION

There is an industry-wide consensus for the Commission to allow adaptive modulation, conditioned on the link being designed with good engineering practice to a high degree of availability. There is a near-consensus that sharing between BAS/CARS and the Fixed Service would be more trouble than it is worth. The FWCC supports Comsearch's proposed rule change on coordination near the geostationary arc. And the Commission should firmly reject XO's suggestions for auctions or spectrum fees for fixed point-to-point spectrum.

Respectfully submitted,



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<sup>42</sup> *Licensees in the Local Multipoint Distribution Service (LMDS) Seeking Extensions of Time to Construct and Demonstrate Substantial Service*, 23 FCC Rcd 5894 (Wireless Telecommunications Bur. 2008) (extending time to construct for 678 LMDS licensees).

<sup>43</sup> Comments of the Fixed Wireless Communications Coalition in DA 08-54 (filed Jan. 18, 2008).

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