

**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 Licensees)	
)	
Request for Interpretation of Section)	WT Docket No. 09-106
101.141(a)(3) of the Commission’s Rules)	
Filed by Alcatel-Lucent, Inc., <i>et al.</i>)	
)	
Petition for Declaratory Ruling Filed by)	
Wireless Strategies, Inc.)	WT Docket No. 07-121
)	
Request for Temporary Waiver of Section)	
101.141(a)(3) of the Commission’s Rules)	
Filed by Fixed Wireless Communications)	
Coalition)	

To: The Commission

REPLY COMMENTS OF COMSEARCH

Comsearch hereby submits its reply comments in the above-referenced *Notice of Proposed Rulemaking and Notice of Inquiry* (“*NPRM/NOI*”) proceeding.¹

As stated in its initial comments, Comsearch strongly supports the Commission’s efforts to remove regulatory barriers to the use of microwave spectrum for wireless backhaul as long as the rule changes enhance, rather than diminish, spectrum efficiency.

¹ 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, *Notice of Proposed Rulemaking and Notice of Inquiry*, FCC 10-146 (rel. Aug. 5, 2010) (“*NPRM/NOI*”). All initial comments cited herein were filed from October 13 to October 25, 2010, in WT Docket Nos. 10-153, 09-106 and 07-121.

To further these efforts, Comsearch concurs with those commenters that urge the Commission to act promptly on two pending petitions for rulemaking filed by the Fixed Wireless Communications Coalition (“FWCC”): RM-11605 where FWCC requests the Commission to amend its rules to allow non-Federal users to share the Federal 7125-8500 MHz band and RM-11610 where FWCC requests the Commission to implement coordination procedures that would allow conditional authorization in the entire 23 GHz band.² Adoption of these proposals would do far more good toward (and, as discussed below, far less harm to) the Commission’s goal of increasing wireless backhaul efficiency and reducing costs than the Commission’s proposal to allow auxiliary stations.

I. THE PROPOSAL TO PERMIT “AUXILIARY” FIXED STATIONS ONCE AGAIN RECEIVED SUBSTANTIAL OPPOSITION FROM CARRIERS AND OTHERS

In its initial comments, Comsearch strongly opposed the Commission’s proposal to allow “auxiliary stations” with secondary licensing status in conjunction with primary microwave links. Comsearch explained that the auxiliary stations proposal would undercut the basic spectral efficiency principles of the Part 101 Rules by permitting and promoting (1) the use of minimally compliant antennas as well as non-compliant antennas; (2) unreasonably high Equivalent Isotropically Radiated Power (“EIRP”); (3) Time Division Duplex (“TDD”) systems in bands with exclusively Frequency Division Duplex (“FDD”) characteristics; and (4) stations exempt from bandwidth efficiency requirements.³

² See, e.g., Comments of AT&T Inc. at 7-8; Comments of Aviat Networks, Inc. at 5; Comments of Ceragon Networks at 17; Comments of the Fixed Wireless Communications Coalition at 15; Comments of the National Spectrum Management Association at 17-18.

³ Comments of Comsearch at 5-6.

In addition to Comsearch's opposition, the auxiliary station proposal received near uniform opposition from the major carriers that actively are seeking to promote flexibility and reduce the costs of using microwave spectrum for wireless backhaul. Furthermore the proposal was opposed by manufacturers, state and local governments, and a wide variety of industry associations and others.⁴

The extent of the carriers' opposition to the proposal was impressive. Verizon and Verizon Wireless jointly filed comments explaining that the auxiliary stations proposal is patently inconsistent with the principles underlying the point-to-point FS licensing methodology by creating incentives for operators to expand their "service areas" by specifying excessive transmitter power and utilizing minimal standard antennas.⁵ T-Mobile USA, Inc. stated that permitting auxiliary stations would create interference that impairs the operations and reliability of existing systems, increase congestion, and ultimately make spectrum unavailable for wireless backhaul.⁶ United States Cellular Corporation explained that the construction of hundreds of auxiliary stations within the sidelobes of existing licensed facilities, even after frequency coordination, could only have the effect of increasing harmful interference to present

⁴ See Supplemental Comments of the Fixed Wireless Communications Coalition at 3-10; Comments of the National Spectrum Management Association at 8-13; Comments of the Telecommunications Industry Association at 3-9; Comments of Ceragon at 6-14; Comments of San Mateo County at 1-3; Comments of Gary Gray, City of Fort Lauderdale at 1-2; Comments of the Association of Maximum Service Television, Inc. and the National Association of Broadcasters at 7; Comments of Cielo Networks, Inc. at 1; Comments of Consolidated Spectrum Services at 1; Comments of EIBASS at 7-9; Comments of Rural Telecommunications Group, Inc. at 2.

⁵ Initial Comments of Verizon and Verizon Wireless ("Verizon") on the Notice of Proposed Rulemaking and the Notice of Inquiry at 14.

⁶ Comments of T-Mobile USA, Inc. at 10-11.

licensed facilities.⁷ Stratos Offshore Services Company noted that the WSI proposal is based on flawed assumptions and would encourage applicants to operate at unnecessarily high power with cheaper but less efficient widebeam antennas.⁸ Clearwire Corporation urged the FCC to reject the auxiliary station proposal because it will increase the probability of interference in an already congested environment and will promote the introduction of TDD operations into historically FDD bands.⁹

The fact that these major carriers strongly oppose the auxiliary station concept even as they all search for ways to enhance their backhaul efficiency undercuts the rationale for the Commission’s proposal. Even Sprint Nextel Corporation, which has been supportive of the WSI proposal, suggested that auxiliary stations will not always be feasible but only would be “a promising alternative to network backhaul capacity challenges in some circumstances.”¹⁰

Auxiliary station proponents do not agree on the intended usage of such stations. On the one hand, Sprint Nextel suggested that they can be used as a backhaul option in “dense, urban environments where auxiliary stations could be deployed to accommodate several cell sites in need of backhaul.”¹¹ Another supporter, however, the Wireless Internet Service Providers Association (“WISPA”) stated the opposite, predicting that “in congested areas of the country auxiliary station use may not be possible.”¹² Precise specifications of these systems would be necessary to clarify the vision of their operation;

⁷ Comments of United States Cellular Corporation at 6-7.

⁸ Comments of Stratos Offshore Services Company at 2-7.

⁹ Comments of Clearwire Corporation at 9.

¹⁰ Comments of Sprint Nextel Corporation at 6-7.

¹¹ *Id.* at 7.

¹² Comments of the Wireless Internet Service Providers Association at 4.

but such specifications have never been filed, and without them the Commission cannot conclude that auxiliary stations are viable.

The proponents of the auxiliary station concept appear to be interested in using the systems to provide subscriber access. WSI claims auxiliary stations would decrease the cost of broadband backhaul and access.¹³ OEM Communications LLC (“OEM”) stated that under the auxiliary stations proposal “licensed fixed wireless service operators will be able to provide hundred megabit services to multiple end users.”¹⁴ To the extent primary links would be licensed to carve out service areas for auxiliary stations for access rather than backhaul, the Commission’s primary goal in this proceeding of facilitating use of microwave for backhaul would not be realized.

Another major carrier, AT&T Inc., also opposed the auxiliary stations proposal. It noted, among other things, that the proposal’s chief proponent, WSI, failed to support its claims about the use of “smart antennas” and has not made its technical specifications public or available for testing.¹⁵ AT&T’s criticism was borne out in review of WSI’s initial comments in which WSI once again failed to provide sufficient technical information to support its claims of no increased risk of interference. For example, WSI did not provide any substantive response to the numerous criticisms that its proposal inappropriately would mix TDD operations into point-to-point microwave bands characterized exclusively by FDD usage, resulting in inefficient spectrum use. Instead, WSI provided a series of questionable and unproven assertions concerning the alleged

¹³ Comments of Wireless Strategies Inc. (WSI) at 1.

¹⁴ Comments of OEM Communications LLC (“OEM”) at 2.

¹⁵ Comments of AT&T Inc. at 18-19.

benefits of the auxiliary stations proposal, typically citing numbers and percentages that are completely unsupported:

- Increase the effective use of spectrum by well over ten times.¹⁶
- Decrease the cost of backhaul and access by ninety percent.¹⁷
- For backhaul applications, a licensed station's frequency would support one hundred 4G cell sites and in excess of one thousand locations for Tier 3 "Smart Grid" applications.¹⁸
- Through the use of auxiliary stations, a primary station's authorized spectrum's traffic load could be increased by at least 800% relative to a legacy main (primary) link's traffic load requirement.¹⁹
- Increasing the effective use of an FS licensed station's authorized bandwidth from hundreds of megabits per second to gigabits per second.²⁰
- Making it possible to increase the number of locations served in a heavily used frequency band (for example 6 GHz in Los Angeles, CA) by hundreds of percent.²¹
- Lowering the costs to provide broadband licensed backhaul and access in urban and rural areas by as much as ninety percent.²²

In addition to the foregoing unsupported assertions, WSI's claim that an auxiliary station can be designed and located such that it will never cause or be subject to harmful interference is not credible, because the location of future paths are unknown at the time the auxiliary station is designed.²³ But to the extent primary links are allowed to use TDD, minimal antenna discrimination patterns, and excessive power, the auxiliary

¹⁶ Comments of Wireless Strategies, Inc. (WSI) at 1.

¹⁷ *Id.*

¹⁸ *Id.* at 6.

¹⁹ *Id.*

²⁰ *Id.* at 8.

²¹ *Id.* at 9.

²² *Id.*

²³ *Id.* at 4.

stations may experience less interference, but only because the primary links crowd out paths from other licensees.

Moreover, contrary to WSI's claim that it expects innovative applicants to design "smart" main (primary) links with the minimum amount of power necessary to carry out the communications desired, the record in this proceeding demonstrates the opposite. The comments of both the Engineers for the Integrity of Broadcast Auxiliary Services Spectrum ("EIBASS") and San Mateo County, California, noted that the prior coordination notices ("PCNs") recently distributed by auxiliary stations proponent OEM propose 84.7 dBm EIRP, just shy of the maximum,²⁴ even though Comsearch had shown that historically the large majority of Part 101 links have EIRP values at least 10 to 20 dB lower.²⁵ San Mateo County included copies of OEM's PCNs and quoted an email from Michael Mulcay, the chairman and CTO of WSI, purportedly justifying the excessively high EIRP proposed by OEM. These PCNs belie WSI's claim that applicants employing its approach will use the minimum power necessary.

II. ALTHOUGH THE COMMISSION SHOULD ADOPT RULES PERMITTING ADAPTIVE MODULATION, THOSE RULES SHOULD NOT ENCOURAGE DEPLOYMENT OF LOWER PERFORMANCE ANTENNAS

The Commission's proposal for adaptive modulation, whereby a microwave link may operate temporarily below the minimum capacity requirements in order to enable FS links to maintain critical communications during periods of fading, deservedly received widespread support from commenters. As explained by several commenters, adaptive modulation could enhance efficiency, boost the reliability of fixed wireless traffic and

²⁴ Comments of EIBASS at 7-9; Comments of San Mateo County at 2.

²⁵ Comments of Comsearch at 11-12.

reduce system outages, which would make long haul microwave links more useful in rural areas and attractive for backhaul.

Comsearch, however, agrees with those commenters that urge the Commission to adopt limitations on use of adaptive modulation more specific than “during periods of anomalous signal fading.” For example, Sprint and T-Mobile suggest limits on the time operating below minimum payload capacity.²⁶ As Verizon points out, without limits on the scope and duration of deviations from minimum payload capacity requirements, the Commission will encourage use of minimal standard antennas or wider channels, resulting in efficient use of the spectrum.²⁷ Comsearch submits that the language additions to Section 101.141(a)(3) that it proposed in its initial comments would meaningfully address these concerns.²⁸

Comsearch agrees with Sprint Nextel’s proposal to simplify the application process for stations using adaptive modulation. However, requiring the applicant to file only for the highest data rate and modulation that would be used²⁹ is not sufficient to address interference concerns unless Comsearch’s suggestion to require a constant transmitter power spectral density through modulation shifts is also adopted and unless the transmitter power listed on the application is the highest that is to be used.³⁰ This transmitter power should correspond to a modulation level that complies with the Section 101.141(a)(3) payload capacity requirement.³¹

²⁶ Comments of Sprint Nextel Corporation at 5; Comments of T-Mobile USA, Inc. at 9-10.

²⁷ Comments of Verizon at 5.

²⁸ See Comments of Comsearch at 19.

²⁹ Comments of Sprint Nextel Corporation at 5.

³⁰ See Comments of Comsearch at 19.

³¹ Id.

The Satellite Industry Association suggests that the Commission allow FS systems to employ adaptive modulation initially only in bands not shared with other co-primary services such as the Fixed Satellite Service (“FSS”).³² However the only band not shared with FSS but subject to the Section 101.141(a)(3) payload capacity requirements that are at issue is 10 GHz, which is not suitable for high capacity backhaul. The Commission therefore, should promptly issue rules allowing adaptive modulation in the shared lower and upper 6 GHz and 11 GHz bands with appropriate safeguards (as delineated in Comsearch’s initial comments) and with conditions to protect FSS earth stations such as a requirement for a robust path design, uniform transmitter power spectrum, and a limitation on power increases through adaptive modulation profile shifts.³³

III. COMMENTERS AGREE THAT THE COMMISSION SHOULD REVIEW ITS ANTENNA STANDARDS

In its initial comments, Comsearch supported further Commission review of authorizing smaller antennas that still have good suppression of the farther sidelobes and good front-to-back ratios and provided specific recommendations.³⁴ Sprint Nextel suggests smaller antennas under Category B for specific frequency bands: 4 foot dishes in the 6 GHz band, 18 inch dishes in the 12700-13200 MHz and 18 GHz bands, and 6 inch dishes in the 23 GHz band.³⁵ Comsearch concurs with these recommendations subject to careful consideration and improvement where possible of the Category B pattern requirements as suggested in its initial comments. We do oppose, however, any

³² Comments of the Satellite Industry Association at 13.

³³ Comments of Comsearch at 19.

³⁴ Comments of Comsearch at 25-26

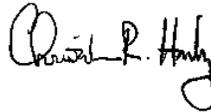
³⁵ Comments of Sprint Nextel Corporation at 8.

recommendation that the Commission permit the use of point-to-multipoint antennas with 30 or 60 degrees beamwidth in the Part 101 point-to-point bands, as the radiation patterns of such antennas are not compatible with the goals of frequency re-use and spectral efficiency.³⁶

IV. CONCLUSION

For the foregoing reasons, Comsearch encourages the Commission to take action in this proceeding consistent with the recommendations set out above.

Respectfully submitted,



Christopher R. Hardy
Vice President

COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, Virginia 20147

November 22, 2010

³⁶ Id.