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June 19, 2012

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Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: WT Docket No. 10-153, Amendment of Part 101 to Facilitate Wireless Backhaul

Dear Ms. Dortch:

On behalf of the Fixed Wireless Communications Coalition (FWCC),¹ pursuant to Section 1.1206(b)(2) of the Commission's Rules, I am electronically filing this written *ex parte* communication in the above-referenced docket.

At a meeting on January 25, 2012, we discussed with officials of the Wireless Telecommunications Bureau whether the Commission should relax its Part 101 spectrum efficiency standards for links in rural areas, and if so, how the Commission should define "rural" for this purpose.

¹ 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.

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The efficiency rules in question help to ensure productive use of the spectrum by requiring a minimum data payload for each hertz of radio bandwidth.² Proponents of relaxation for rural links argue that lower data rates permit longer links, other properties being equal, and also that lower demand for spectrum in rural areas makes the payload rules unnecessary.

FWCC representatives at the January 25 meeting argued against easing the payload requirements. As we explained then, FWCC members are not aware of specific cases in which the present efficiency standards hinder the construction or operation of links in rural areas. We argued further that the Commission's new rule allowing adaptive modulation, together with the Comsearch proposal for Category B2 antennas, will allow longer links and bring down costs.³ We acknowledged, however, that reduced efficiency standards might allow the construction of longer links, which could facilitate the provision of backhaul in underserved areas. And we agreed to work toward a definition of "rural" suitable for triggering the easing of efficiency requirements.

Most characterizations of "rural" turn on some threshold of population density, but counts of population alone are not suitable here. A remote mountaintop in an isolated region of Wyoming, for example, might exhibit low population density, yet still be highly congested in terms of microwave links. To relax efficiency requirements at such a site would encourage inefficient use of locally scarce spectrum. At a minimum, then, a definition of "rural" should incorporate not only low population density, but also some measure of local microwave congestion.

The Commission has dealt with this kind of problem before. A decade ago, it had the task of deciding where best to locate non-geostationary-orbit (NGSO) gateway earth stations for 10.7-11.7 GHz downlinks, while causing minimum disruption to Fixed Service operations in that band. The FWCC, on behalf of the Fixed Service, and SkyBridge L.L.C., on behalf of NGSO fixed satellite service providers, jointly proposed the concept of "Growth Zones," defined as counties in which 30 or more 11 GHz Fixed Service links terminated, the list to be updated every six months. The frequency coordination of gateway stations located within Growth Zones would have required certain assumptions calculated to leave room for future expansion of Fixed Service facilities.⁴ (The issue never reached a decision, as the Commission dropped the Growth Zone concept after SkyBridge turned down its NGSO FSS authorization.⁵)

² 47 C.F.R. § 101.141(a)(3).

³ See Letter from Mitchell Lazarus to Ms. Marlene H. Dortch, Secretary, FCC in WT Docket No. 10-153 (filed Jan. 26, 2012).

⁴ Letter from Leonard R. Raish, Thomas J. Keller, and Jeffrey H. Olson to Magalie Roman Salas, Secretary, FCC in ET Docket No. 98-206 (Dec. 8, 1999).

⁵ *Coordination Between the Non-Geostationary and Geostationary Satellite Orbit Fixed-Satellite Service and Fixed, Broadcast Auxiliary and Cable Television Relay Services*, Report and Order, 25 FCC Rcd 622 at ¶ 24 (2010).

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The use of counties as basic building blocks in the FWCC/SkyBridge proposal drew some criticism, mainly on the ground that counties vary widely in area. Unlike other geographic divisions used by the Commission, however, such as MTAs, BTAs, MSAs, RSAs, etc., which require the use of special maps, counties on the whole tend to be more suitably sized, and their boundaries are widely known and easily ascertainable. (MTAs and BTAs follow county boundaries, but are drawn to include population centers, so that many include both rural and non-rural areas.) We suspect, moreover, that counties vary much less in population than they do in area. Although we have not attempted a statistical analysis, a glance at the census map shows that larger counties tend to have lower population densities.⁶ This suggests that counties are more similar in population than the variation in their areas would suggest. Among the various alternatives, counties seem best suited to a workable distinction between rural and non-rural.

Considering the Commission's present purpose for a definition of "rural," economic status might also be a relevant consideration. A county that otherwise qualifies as rural, but has a well-to-do population, may well have access to adequate broadband service with or without a relaxation of the spectrum efficiency rules. If the goal is to reduce the costs of bringing broadband backhaul into underserved areas, while causing the least harm to spectrum efficiency overall, then the triggering definition could reasonably include a limitation to areas suffering from economic disadvantage.

Combining all of these factors, we propose that an area be considered "rural," for purposes of relaxing spectrum efficiency requirements, if it is a county meeting three tests: a population of less than the mean U.S. county population (currently about 99,138⁷); a median household income of less than the median U.S. household income (currently \$50,046 for year 2010⁸); and a total of fewer than 50 Fixed Service links terminating in the 4, 6, 11, 18, and 23 GHz bands combined. Both ends of a link must be in rural areas to qualify for exemption from the spectrum efficiency requirements.

We recommend that the list of rural counties be reassessed annually. Existing licensees having a termination in a county that moves from rural to non-rural status should not be required to upgrade. (If a link is very long, non-rural compliance might require constructing intermediate relay stations, the threat of which could well deter construction under the rural rules.) But any application filed after either end of a link has become non-rural must meet the requirements for spectrum efficiency.

As a potentially simpler alternative to the above three-part standard, the Commission might instead exploit the fact that heavily-used microwave routes tend to connect population centers, much as major

⁶ One example: http://www.theodora.com/maps/new9/usa_population_density.jpg

⁷ We propose the mean here, rather than the median, because we did not find a convenient source for median county population. There are 3,143 counties or county-equivalents in the United States, and a total 2011 population of 311,591,917, for a mean county population of 99,138. Because county populations are not uniform, using the mean, rather than the median, has the effect of classifying more counties as rural. But we have no objection to using the median county population, if the Commission prefers.

⁸ <http://www.census.gov/prod/2011pubs/acsbr10-02.pdf>

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highways do. In fact, U.S. maps of 6 GHz links and of Interstate highways show remarkable similarities—related much like capillaries and arteries, respectively. (See the attached map.) The Commission could plausibly define a “rural location” as one situated at least 50 km from the nearest Interstate highway, and a “rural link” as one connecting two such rural locations. We expect this approach would roughly parallel one based on population density and microwave congestion, and might be easier to apply in practice.

We have two final thoughts on implementation. First, rather than eliminate spectrum efficiency requirements altogether for rural links, we suggest the Commission apply a reduced standard, perhaps corresponding to a “downshift” by one or two QAM modulations. Second, as an alternative, the Commission might consider retaining the current spectrum efficiency requirements for rural areas, but relaxing the 99.95 percent availability standard for adaptive modulation to a more lenient value.⁹

We hope the Commission finds these ideas helpful. Please do not hesitate to contact me with any questions.

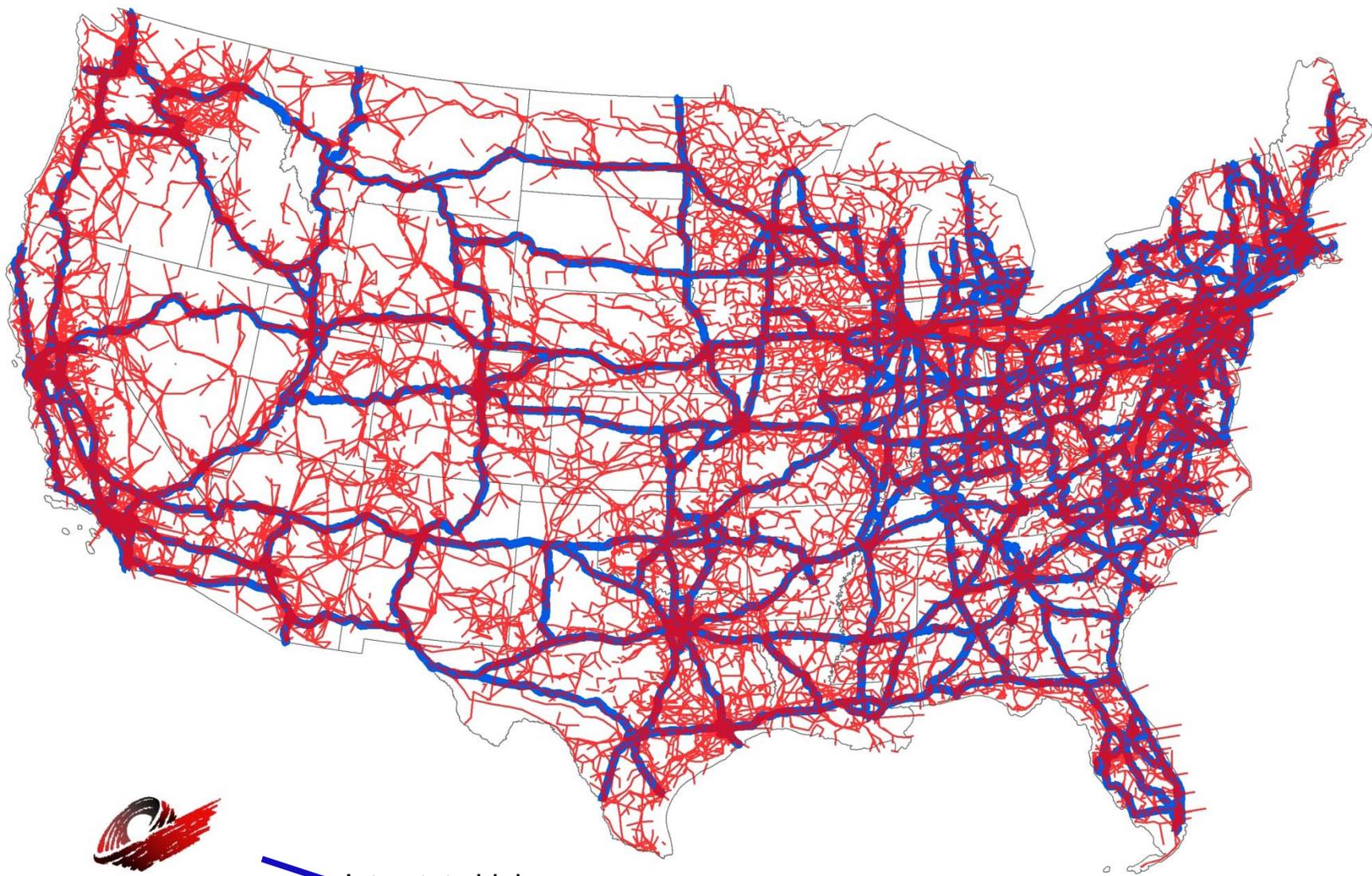
Respectfully submitted,



Mitchell Lazarus
Counsel for the Fixed Wireless
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cc: Chris Andes
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⁹ 47 C.F.R. § 101.141(a)(3).



 Interstate highways
 6 GHz links

Interstate Highways and 6 GHz Links Compared

Data Source:
Comsearch Microwave Database 2012
ESRI Data & Maps v10