

Before the
Federal Communications Commission
Washington DC 20554

In the Matter of)	
)	
Use of Spectrum Bands Above 24 GHz for Mobile Radio Services)	GN Docket No. 14-177
)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands)	IB Docket No. 15-256
)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band)	RM-11664
)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services)	WT Docket No. 10-112
)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0- 38.0 GHz and 40.0-40.5 GHz for Government Operations)	IB Docket No. 97-95
)	

**REPLY COMMENTS OF THE
FIXED WIRELESS COMMUNICATIONS COALITION**

The Fixed Wireless Communications Coalition, Inc. (FWCC)¹ files these reply comments

¹ The FWCC is a coalition of companies, associations, and individuals actively involved in the fixed services—*i.e.*, 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,

in response to the Notice of Proposed Rulemaking in the above-referenced dockets.²

A. SATELLITE INDUSTRY PROPOSALS WOULD IMPEDE DEVELOPMENT OF INNOVATIVE SERVICES.

The satellite industry, while calling for ostensibly even-handed treatment between satellite and terrestrial services, in practice would tip the balance so far in its own favor as to severely hinder the operation of other services.³

Today fixed satellite service (FSS) gateway earth station operations at 28 GHz are secondary to LMDS.⁴ Several satellite commenters want that status elevated to co-primary with the new Upper Microwave Flexible Use Service (UMFUS).⁵ A closer look at this proposal shows that co-primary in this context would not mean co-equal access to spectrum, but rather satellite priority to the detriment of UMFUS.

Our earlier comments explained how the Commission has long tolerated a gross asymmetry in frequency coordination between co-primary FSS and Fixed Service users: an FSS earth stations routinely coordinates the entire band and the entire geostationary arc, even if it intends to communicate with only one satellite on one frequency, while a Fixed Service applicant

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.

² *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177 *et al.*, Notice of Proposed Rulemaking, FCC 15-138, 30 FCC Rcd 11878 (released Oct. 23, 2015) (Notice).

³ We except from this statement the joint filing by EchoStar Satellite Operating Corporation, Hughes Network Systems, LLC, and Alta Wireless, Inc., which favors a more equitable approach between satellite and terrestrial operations.

⁴ 47 C.F.R. § 25.202(a)(1) (table n.2).

⁵ Satellite Industry Association at 18; Global VSAT Forum at 3, 6; O3b Limited at 26; Inmarsat at 11; EchoStar *et al.* at 15 *et seq.*

can coordinate only the frequencies and azimuths it will actually use.⁶ The effect is to lock the Fixed Service out of frequencies and real estate the FSS operator is not using and may have no plans to use. Unless this practice changes, the co-primary status requested by satellite interests would extend this imbalance into the millimeter wave bands.

But the satellite parties seek much more. The Satellite Industry Association wants the FCC to receive information on existing *and potential future* FSS earth stations and space stations for the purpose of limiting terrestrial mobile operations.⁷ If UMFUS has to protect “potential future” FSS facilities, that would effectively make UMFUS secondary to FSS.

Similarly, O3b Limited objects that co-primary status would give mobile licensees “the power to [1] displace incumbent FSS users or [2] preclude future FSS use.”⁸ Part [1] of this statement is wrong: co-primary UMFUS mobiles could not displace a previously coordinated earth station. Part [2] is right: a previously coordinated mobile licensee could indeed preclude later applications for FSS use. That is what co-primary status means.

ViaSat likewise asserts:

as long as terrestrial mobile operators design their networks to accept a reasonable amount of unwanted energy from FSS earth stations, coexistence in the band appears feasible.⁹

This describes secondary, not co-primary operation for UMFUS.

The Commission suggests a mechanism for achieving true co-equal operation: requiring FSS earth stations to obtain UMFUS licenses either at auction or via the secondary market.¹⁰

⁶ Fixed Wireless Communications Coalition at 11-12.

⁷ Satellite Industry Association at 19.

⁸ O3b Limited at 12 (numbers added).

⁹ ViaSat, Inc. at 13.

¹⁰ Notice at ¶¶ 132-34.

Satellite operators oppose the idea.¹¹ They object to participating in an auction because even county-size areas are too large for their needs,¹² and to participating in the secondary market on the wholly speculative ground that they would be “subjected to extortionate demands.”¹³ Simply displacing UMFUS is not an acceptable alternative.

As stated in our earlier comments, we do not oppose UMFUS sharing spectrum with FSS earth stations, even on a co-primary basis, so long as UMFUS is not disadvantaged in access to spectrum—as it would be under the satellite positions summarized above. At a minimum we request continuation of the current limitation to gateway stations in the 28 GHz band and even-handed frequency coordination in all bands, with satellite operators’ coordinating only the frequencies and azimuths they will actually use.

B. THE COMMISSION SHOULD RETHINK ITS PROPOSED LICENSING RULES.

1. License Areas

The FWCC argued that counties are too variable in size, and in general too small, to be practical as license areas. We noted that geographically small counties are a particular problem because the proposed limitation on field strength at the borders would affect operations through most or all of the license area. Conversely, some geographically large counties having sparse populations spread over a wide area will be difficult to serve, and may not attract serious auction bids.¹⁴

¹¹ Satellite Industry Association at 15-16; O3b Limited at 17-18; Inmarsat at 6.

¹² Satellite Industry Association at 15-16.

¹³ O3b Limited at 19. *See also* Satellite Industry Association at 16 (“the incentive for terrestrial operators to negotiate in good faith will be very low”); EchoStar *et al.* at 24 (terrestrial operators “could charge a prohibitively high price” for access to spectrum).

¹⁴ Fixed Wireless Communications Coalition at 4-5. Skyriver Communications, Inc. (at 9) adds that no carrier is likely to bid on a rural county in which there is no demand for service, so that if demand develops later, there will be no way to meet it.

Several parties side with the FWCC in questioning county-sized license areas. These include some of the companies most likely to participate in a 5G auction.

Verizon, for example, asks for license areas no smaller than BTAs or EAs.¹⁵ County-level licenses, it argues, would increase administrative costs both for the Commission and for operators, would stifle secondary markets, and—coupled with county-by-county build-out requirements—would deter operators from acquiring licenses for less densely populated counties. That would result in what Verizon calls a “Swiss cheese” of service areas.¹⁶

AT&T argues that many planned 5G applications would benefit from large licensing tracts covering densely populated areas. As examples it mentions smart grids, telemedicine, smart cities, connected cars, and the Internet of Things. AT&T notes also that county-based licensing would require extensive and burdensome interference coordination efforts as licensees attempt to coordinate across numerous neighboring counties, would require synchronizing time division duplexing across neighboring counties, and would add administrative burdens. Larger areas would reduce the technical difficulties and simplify coordination along the perimeters.¹⁷

Nokia notes that 5G use cases—such as vehicle communications, telemedicine, smart grids, and smart cities—may span several counties, making implementing easier in larger license areas.¹⁸

T-Mobile agrees that county-sized licenses would increase administrative burdens, particularly if the Commission imposes performance requirements on a county basis. T-Mobile

¹⁵ Verizon at 10-13.

¹⁶ Verizon at 11.

¹⁷ AT&T at 17-19. *Accord*, XO Communications, LLC at 20; Consumer Technology Association at 11-12; 4G Americas at 5-9.

¹⁸ Nokia at 18. Nokia includes the former Alcatel-Lucent, a global leader in fixed wireless communications and the home of innovation pioneer Bell Labs.

also prefers geographic areas that are consistent with other terrestrial mobile licensing schemes, so that providers can obtain licenses that are co-extensive with their current coverage.¹⁹ We note also that large license areas such as BTAs and EAs are drawn with borders running mostly through lightly populated rural areas, which minimizes the need for coordination among licensees.

Several parties urge the use of BTA license areas at 28 GHz, and EAs at 37 and 39 GHz, both to be consistent with present licensing and to simplify the management of interference between new and existing licensees.²⁰

We agree with all of these arguments, and note the paucity of support in the record for county-size licenses.

2. *Renewal Requirements*

The FWCC opposes “substantial service” renewal requirements with coverage-based safe harbors for the millimeter wave bands. These have worked badly in the past, and in fact may have deterred the facilities construction they were intended to encourage.²¹ The weight of opinion in the record agrees with us.

XO Communications points out that 5G mobile base stations will each likely serve a small geographic area, often one-tenth of a square mile or less, so that many licensees would have to deploy an enormous number of base stations to cover the Commission-proposed 40

¹⁹ T-Mobile at 10. *Accord*, Straight Path Communications Inc. at 18. In fairness, T-Mobile notes that providers using millimeter wave spectrum to supplement capacity may not need it in large geographic areas, and that small-area licensing would permit others access to the same spectrum nearby. T-Mobile at 10.

²⁰ Nokia at 18; Qualcomm at 7; Mobile Future at 13; Skyriver Communications, Inc. at 7-9.

²¹ Fixed Wireless Communications Coalition at 5-7.

percent of the population. The cost would be exorbitant, says XO, with particularly high deployments costs in rural, less populated counties that lack significant population centers.²²

CTIA and AT&T both support a “substantial service” requirement with a safe harbor but, in a critical omission, neither suggests what the safe harbor should be.²³ Verizon favors a flexible view of “substantial service” and offers creative ideas for safe harbors that count deployments at places where people transit or visit but do not live, such as highways, stadiums, industrial parks, shopping malls, and dense business districts. (We would add hospitals, amusement parks, and university campuses.) Verizon proposes specific non-population measures such as a network’s potential throughput or the operator’s investment in deployment under the license, perhaps computed as percentage of the value of the license.²⁴ T-Mobile would abandon performance requirements altogether and instead incentivize construction by requiring licensees to pay a warehousing fee for spectrum not in use.²⁵ Nokia suggests performance metrics that reflect the diversity of 5G applications, perhaps the number of transmitters in service, the number of connected devices, or amount of carried traffic.²⁶ Nokia makes the additional important point that the Commission may have to revisit its measures based on lessons learned from deployments.²⁷

²² XO Communications, LLC at 21.

²³ CTIA at 25-26; AT&T at 22-23.

²⁴ Verizon at 19-20.

²⁵ T-Mobile at 19.

²⁶ Nokia at 20. *See also* Cisco Systems, Inc. at 14 (number of connected devices, carried traffic, session count); 4G Americas at 10-11 (same); Telecommunications Industry Association at 27 (number of connections to recognize importance of machine-to-machine and Internet of Things connectivity).

²⁷ Nokia at 20.

We agree that all of these ideas are worthwhile alternatives to requirements based on population coverage, and are worth careful evaluation.

Finally, the Commission’s “use or share” proposal—that portions of a license area remaining unused after five years be available for shared use by others—received almost universal condemnation.²⁸ We concur that the proposal would layer added risks onto an already risky deployment scenario. The Commission should abandon it.

C. THE 71-76/81-86 GHZ BANDS SHOULD BE RESERVED FOR FIXED OPERATION.

The Commission properly declined to propose mobile operations in the 71-76/81-86 GHz bands. It noted that these bands are thickly populated with fixed links and saw no clear way to control mobile units so as to avoid causing interference.²⁹

A few parties want these bands opened to mobile operation.³⁰ Huawei Technologies, making a lot of questionable assumptions, argues that an operator can achieve synergies by self-coordinating mobile traffic with its own point-to-point backhaul.³¹ We disagree. Huawei writes as though the band were empty and being licensed for the first time, while in fact almost fourteen thousand links are currently registered.³² Huawei also assumes that the only fixed use for the band will be to backhaul mobile service in the same bands, while we foresee non-backhaul applications and backhaul for other mobile bands—which are part of the usage today. In

²⁸ CTIA at 26-27; Verizon at 20-21; AST&T at 20-22; Nokia at 20; National Cable & Telecommunications Association at 10-11; XO Communications, LLC at 29-31; Mobile Future at 16. *Contra*, Facebook, Inc. at 6-7.

²⁹ Notice at ¶ 87.

³⁰ T-Mobile at 8-9; Huawei Technologies at 20-22.

³¹ Huawei Technologies at 21.

³² Data courtesy of Comsearch.

particular, we expect 28 and 37-39 GHz licensees will use 71-76/81-86 GHz to meet some of their backhaul needs.

Having expressly declined to propose rules for licensed mobile operation, the Commission cannot now adopt such rules from the present Notice. The Administrative Procedure Act requires the Commission first to issue and receive comment on a Further Notice of Proposed Rulemaking.³³

The Wi-Fi Alliance asks that both bands be made available for unlicensed operation, for no reason beyond the generality of “stimulating innovation in unlicensed devices.”³⁴ Dynamic Spectrum Alliance wants unlicensed authority in the 71-76 GHz band solely because of its proximity to the 64-71 GHz band, in which the Commission *might* permit unlicensed use.³⁵

We think the Commission got it right. Mobile or unlicensed operation at 71-76/81-86 GHz would threaten interference to the many thousands of fixed links in these bands, especially in light of pending rulemaking and waiver requests for relaxed antenna standards to facilitate small-cell backhaul, and would threaten needed expansion in this band to accommodate the rapidly growing need for backhaul and other fixed services.³⁶ Mobile and unlicensed use should not be permitted.

³³ 5 U.S.C. § 553.

³⁴ Wi-Fi Alliance at 9-10.

³⁵ Dynamic Spectrum Alliance at 3.

³⁶ Fixed Wireless Communications Coalition at 9.

CONCLUSION

The Commission should proceed promptly with its plans to develop UMFUS, subject to the comments above and in the FWCC's filing of January 27, 2016.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'Cheng-yi Liu', written in a cursive style.

Cheng-yi Liu
Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0400
Counsel for the Fixed Wireless
Communications Coalition

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