

Before the
Federal Communications Commission
Washington DC 20554

In the Matter of)
)
Service Rules for the Fixed Service) File No. RM- _____
in the 41.0-42.5 GHz Band)

PETITION FOR RULEMAKING

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May 9, 2012

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Pursuant to Section 1.401 of the Commission’s Rules, the Fixed Wireless Communications Coalition (FWCC)¹ seeks to restart the Commission’s pending proceeding to establish service rules for Fixed Service operations at 41-42.5 GHz (42 GHz band).

A. SUMMARY

The Commission has repeatedly recognized the growing need for broadband spectrum, particularly for backhaul operations that carry data between a wireless provider’s network facilities and the towers that relay the data to and from an end user’s mobile device.² The 42 GHz band is ideally suited to handling broadband backhaul over the relatively short distances

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.

² *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 and Notice of Proposed Rulemaking, 26 FCC Rcd 11614, ¶ 1 (2011) (“*Wireless Backhaul Order*”).

encountered in urban and suburban environments, where the demand for wireless broadband service tends to be highest.

The rules we propose are in keeping with the Commission's "soft segmentation" plan, which prioritizes certain Fixed Service/Fixed Satellite Service applications within sub-bands between 37.5 and 42.5 GHz (V-Band). Our proposal also conforms to international band segmentations, not only giving U.S. providers ready access to equipment already developed for overseas markets, but also promoting exports by U.S. manufacturers.

For the reasons we explain below, the FWCC strongly opposes area licensing for 42 GHz Fixed Service operations, and instead urges the Commission to adopt link-based licensing with prior frequency coordination. Most of the other service rules applicable to the existing point-to-point bands should apply to 42 GHz as well.

B. BACKGROUND

The Commission first proposed service rules for the 37-38.6 GHz and 42.0-42.5 GHz and bands in 2004, but has not resolved that proceeding.³ Last year, in a different matter, the Commission recognized the indispensable role of fixed wireless backhaul by taking important steps to remove outdated regulatory barriers and make additional spectrum available for the Fixed Service in the 7 and 13 GHz bands.⁴ Yet further spectrum for wireless backhaul is still needed, especially for short links in densely populated areas, to support the sharp growth in demand for backhaul to carry data-intensive mobile broadband traffic to and from cell towers. The 42 GHz band, already allocated for the Fixed Service, lacks only service rules to allow the construction and use of new links.

³ *Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands*, Third Notice of Proposed Rulemaking, 19 FCC Rcd 8232 (2004) ("*Third NPRM*").

⁴ *Wireless Backhaul Order*, *supra* note 2.

1. Band segmentation and FS/FSS sharing

The United States has allocated the Fixed Service (FS) and Fixed Satellite Service (FSS) on a co-primary basis from 37.5-40.0 GHz and 41-42 GHz. In keeping with the “soft segmentation” approach adopted by the International Telecommunication Union (ITU) at the 2000 and 2003 World Radiocommunication Conferences, the Commission has “designated” 37.0-40.0 GHz for FS and 40.00-42.0 GHz for FSS.⁵ A designation, in this context, denotes the type of service that the Commission believes should principally occupy a band that is allocated among multiple services having the same regulatory status but different and potentially incompatible technical characteristics.⁶ The soft segmentation plan uses service rules to encourage FS deployment below 40 GHz by imposing more restrictive power flux limits on satellite operators below 40 GHz and more liberal limits above 40 GHz, and by limiting earth stations below 40 GHz to gateways.⁷

A designation of either FS or FSS, however, need not preclude the other service from operating in the same band, providing it can meet the technical constraints imposed by appropriate service and licensing rules.⁸ The ITU’s “soft segmentation” approach anticipates that national administrations will adopt FS licensing and service rules even in FSS-predominant

⁵ *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*, Report and Order, 18 FCC Rcd 25428, ¶¶ 1, 14 (2003) (“*V-Band Designation Order*”).

⁶ *V-Band Designation Order*, *supra* note 5, ¶ 20 (“A designation of more than one technically dissimilar service in a given band is impractical because, by definition, only one service type could predominate in the band due to operational characteristics.”) (citation footnote omitted).

⁷ *V-Band Designation Order*, *supra* note 5, ¶¶ 23, 32-33.

⁸ *V-Band Designation Order*, *supra* note 5, ¶¶ 20, 67.

frequencies, as indicated by the ITU channelization recommendations discussed below in Part B(2).

FS/FSS sharing at 41-42 GHz should conform to the co-primary allocation between these services.⁹ Even in bands where FS and FSS are supposedly co-primary, however, FSS enjoys considerable priority. The Commission routinely licenses an FSS earth station for the entire band, without regard to any actual need for bandwidth, while point-to-point FS terrestrial licensees are limited to frequencies needed. Moreover, earth stations are routinely licensed for all azimuths and elevations that point to the geosynchronous arc, and can deny coordination to terrestrial operators on that basis, while each FS link is licensed only for a particular azimuth. As a result, terrestrial users must protect large amounts of unused bandwidth over large unused azimuth sectors, while earth station operators need protect only the terrestrial spectrum and directions in actual use.¹⁰

The FWCC does not presently seek to redress this imbalance.¹¹ The asymmetry in coordination means, however, that FS/FSS sharing in an FSS-designated band, while detrimental to the FS, will have relatively little impact on FSS earth stations.

At 42.0-42.5, sharing between FS and FSS is not an issue, as this band is domestically allocated and designated for FS but not FSS.¹² New service rules can thus be

⁹ 47 C.F.R. § 2.106.

¹⁰ See *Communications Satellite Corp.*, Memorandum Opinion, Order and Authorization, 8 FCC 2d 1001, 1003 (1967) (describing consistent practice in the United States to “coordinate[] the entire bands 5925-6425 MHz (transmit) and 3700-4200 MHz (receive) and all azimuths from 0°-360° and all elevation angles from 5° and above, in order to allow for flexibility of operation.”) The same is true in other shared bands. Although this 1967 opinion found “little or no adverse affect upon terrestrial systems in the areas concerned,” *id.*, that stopped being true many years ago.

¹¹ See *FWCC Request for Declaratory Ruling on Partial-Band Licensing of Earth Stations*, Second Report and Order, 17 FCC Rcd 2002 (2002).

implemented at 42-42.5 GHz without triggering spectrum sharing concerns, assuming the Commission does not authorize Broadcast Satellite Service (BSS) operations in the band.¹³

2. 2004 NPRM proposed service rules for 42 GHz

In 2004, the Commission released a notice of proposed rulemaking (NPRM) laying out, among other things, new service rules for the 37.0-38.6 GHz (37 GHz) and 42.0-42.5 GHz bands.¹⁴ That proposal would substantially conform the service rules for these bands to those in force for the 38.6-40.0 GHz band (39 GHz band): *viz.*, licenses auctioned by Economic Area (EA) with a “substantial service” build-out requirement.¹⁵ The NPRM also suggested an alternative approach: site-based link registration like that used in the 70, 80, and 90 GHz bands.¹⁶

The FWCC strongly opposes area licensing at 42 GHz, for the reasons given below, and instead proposes a modified version of the Commission’s second approach.

C. PROPOSED SERVICE RULES FOR THE 42 GHz BAND

1. The 39 GHz service rules are unsuitable for 42 GHz

The 39 GHz-style rules proposed in 2004 were “premised on the assumption that service providers will be ready, willing, and able to build out fully and provide service on an EA-wide

¹² 47 C.F.R. § 2.106.

¹³ The Commission has proposed to delete the allocation for Broadcast Satellite Services at 42.-42.5 GHz. *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*, Third Notice of Proposed Rulemaking, 255 FCC Rcd 15663, ¶ 12 (2010) (“*V-band Sharing NPRM*”). NTIA requested the deletion to protect radio astronomy reception at 42.5-43.5 GHz. *Id.*

¹⁴ *Third NPRM*, *supra* note 3.

¹⁵ *Third NPRM*, *supra* note 3, ¶ 2.

¹⁶ *Third NPRM*, *supra* note 3, ¶ 9.

basis.”¹⁷ Even at that time, the Commission expressed concern that service providers might not be able to develop the 39 GHz band, much less require “overflow capacity” in the 37 and 42 GHz bands.¹⁸ Those concerns proved to be well founded: today, the 39 GHz band remains severely underutilized, notwithstanding Commission efforts to provide additional flexibility through secondary markets and leasing.¹⁹ There is no current need for additional area licensing. There is, however, an immediate and growing need for additional spectrum available through site-by-site licensing. In recent years this category of service has expanded along near-exponential curves in the 11, 18, and 23 GHz bands, driven in part by the growing need for wireless backhaul to support data-intensive mobile broadband devices.

The 39 GHz service rules are largely responsible for the band’s underutilization. FWCC members who hold 39 GHz licenses report that renewal standards in particular are a significant obstacle to building out. In particular, a reliance on quantitative “safe harbors” for renewal-time showings of substantial service can work against needed technologies and long-term business models. The comments of 39 GHz licensee FiberTower Corporation are worth a second look:

By relying almost exclusively on quantitative safe harbors, the Commission has narrowly limited its review to whether a licensee has made investments specifically for the service area and frequencies at issue in the renewal application instead of considering investments made by the licensee to place it in a position to even develop its spectrum on a nationwide or regional basis. Investments in fiber, in real estate rights, in equipment warehousing and a distribution network, in a [network operations center], and in the development of reliable long-term relationships with equipment partners make it possible for FiberTower to provide service in the relevant area even though the investment is not

¹⁷ *Third NPRM, supra* note 3, ¶ 11.

¹⁸ *Id.*

¹⁹ *See Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 20604 (2003).

considered for purposes of the safe harbor. In fact, *the investments necessary to groom the spectrum for commercial long-term use often represent more than 90% of the actual costs of providing service.* In other words, more than 90% of the costs must be incurred prior to ever installing a radio.²⁰

The present renewal requirements can have the perverse effect of actually hindering build-out. A company that fails to meet the requirements, and thereby loses its license, will have to walk away from whatever investment it has made in the band. Compounding this loss is the subsequent and substantial investment in alternative technology to carry traffic originally provisioned on the abandoned link. A prudent licensee will refrain from making the substantial upfront investment described above if it perceives a risk that it may lose its license before reaching the stage of profitable returns.

An additional level of renewal uncertainty arises from the Commission's pending proposal for a unified renewal showing for multiple wireless services.²¹ Such a potential and unknown change in the requirements for wireless point-to-point services adds to the disincentive to invest in building out. Finally, the nature of exclusive geographic licensing prevents other potential users from easily stepping in when a licensee fails to construct. A 39 GHz license abandoned for the above reasons may take years to relicense.

²⁰ *Amended Comments of Fiber Tower*, WT Docket No. 10-112, at 15 (filed Aug. 6, 2010) (emphasis added; footnote omitted).

²¹ *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*, Notice of Proposed Rulemaking and Order, 25 FCC Rcd 6996 (2010). The proposed renewal standard would include a substantial service showing and a "regulatory compliance demonstration" showing substantial compliance with the Commission's rules, policies, and the Communications Act. *Id.* ¶ 17. The FWCC criticized this approach. Reply Comments of the FWCC in Docket No. 10-112 (filed Aug. 23, 2010).

For all of the above reasons, the FWCC opposes the 39 GHz service rules as a suitable model for 42 GHz, and suggests the following framework instead.

2. Proposed service rules for 41-42.5 GHz

We recommend service rules for 41-42.5 GHz that are similar to those in effect for the 11, 18, and 23 GHz, and other site-licensed point-to-point FS bands.

Licensing. Facilities should be authorized on a link-by-link basis using the prior coordination procedures outlined in Section 101.103(d). The approach achieves very dense deployments, where demand is high, and thus yields highly efficient use of the spectrum.

The automated frequency coordination database used for 70/80/90 GHz, proposed by the Commission for 42 GHz,²² is less suitable for this band. That approach entails unlimited, non-exclusive nationwide licenses, coupled with automated frequency coordination for each specific link on a first-come, first-served basis.²³ The automated coordination works in part because 70/80/90 GHz antennas produce narrow “pencil beams” that reduce the potential for interference.²⁴ Applicants at 42 GHz, using broader beamwidths and subject to lower free-space attenuation, will benefit from a system that provides upfront recourse to a frequency coordinator.

Term. 10 years, renewable.²⁵

Construction. Links must be placed in operation within 18 months of initial license grant.²⁶

²² *Third NPRM, supra* note 3, ¶ 9.

²³ *Third NPRM, supra* note 3, ¶ 18.

²⁴ *Service Rules for the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands*, Report and Order, 18 FCC Rcd 23318, ¶ 44 (2003), *recon. granted in part*, Memorandum Opinion and Order, 20 FCC Rcd 4889 (2005).

²⁵ 47 C.F.R. § 101.67.

Spectrum efficiency. Above 13 GHz, the required Part 101 minimum spectrum efficiency is 1 bit/sec/Hz.²⁷ We recommend that the Commission apply that requirement to 42 GHz.

Conditional licensing. Links at 42 GHz should be eligible for conditional licensing, subject to the prerequisites laid out in Section 101.31(b)(1).

Regulatory status. An applicant should be permitted to specify either common carrier or private operational fixed service.

Channelization. Channel bandwidths at 42 GHz should be multiples of 7 MHz bandwidth (7 MHz, 14 MHz, 28 MHz, 56 MHz, and 112 MHz), in keeping with ITU Recommendation ITU-R F.2005²⁸ for FS systems operating in the 40.5-43.5 GHz band. This proposal would conform U.S. practice to international standards, thus improving the competitiveness of U.S. manufacturers in overseas markets and allowing U.S. FS operators a greater range of available products.

Antenna standards. Antennas at 42 GHz should be required to comply with the standards in Section 101.115(b) as applicable to 39 GHz.

D. SHARING WITH SATELLITE SERVICES

The Commission released an NPRM in 2010 proposing various ways to further coordinate satellite and terrestrial use in the 37.5-42.5 GHz band.²⁹ Among other changes, the Commission proposed deleting the Broadcasting-Satellite Service (BSS) and Broadcasting

²⁶ 47 C.F.R. § 101.63(a).

²⁷ 47 C.F.R. § 101.141(a)(1).

²⁸ Recommendation ITU-R F.2005, Radio-frequency channel and block arrangements for fixed wireless systems operating in the 42 GHz (40.5-43.5) band, Doc. 5/311 (Rev.1).

²⁹ *V-band Sharing NPRM*, *supra* note 13.

Service allocations from the 42.0-42.5 GHz band, and sought comment on whether to allocate FSS in the band.

The FWCC agrees that FS and BSS sharing is not feasible in this band due to the ubiquitous, uncoordinated nature of BSS, and supports deleting the BSS allocation and Broadcasting Service allocations.³⁰ There is presently no FSS allocation at 42.0-42.5 GHz, and we oppose creating one. As explained above, co-primary FS/FSS sharing disproportionately hampers FS service relative to FSS. Furthermore, such an unpaired band would be of minimal value to FSS while of great potential importance to FS operators, being the only portion of the band designated to the Fixed Service that would harmonize with the ITU recommendations above 40 GHz.

If the Commission nevertheless introduces an allocation for FSS at 42.0-42.5 GHz, it should be subject to the rules applicable to the 37.5-40 GHz band as to power flux density and limitation to gateway use. Any additional rules adopted to protect FS operations below 40 GHz should apply equally to 42.0-42.5 GHz, with appropriate changes to reflect link-by-link licensing.³¹

E. PUBLIC INTEREST

Fixed Service wireless backhaul is an essential and rapidly expanding component of the nation's communications infrastructure, needed to support a wide range of voice and data services. The Commission recently acknowledged the crucial importance of point-to-point microwave links as a "cost-effective alternative to traditional copper circuits and fiber optic links," noting that "[i]n certain rural and remote locations, microwave is the only practical high-

³⁰ *V-band Sharing NPRM*, *supra* note 13, ¶¶ 14, 16.

³¹ *See V-band Sharing NPRM*, *supra* note 13, ¶¶ 26-35.

capacity backhaul solution available.”³² All data sent to or from a mobile device must pass over a backhaul connection. While some of those connections can use fiber-optic cable, that option is disproportionately expensive for many installations, both in rugged rural terrain and in built-up urban areas. In many such cases, microwave links may be the best (or only) choice; in urban environments, where needed links tend to be short, 42 GHz is ideal.

As wireless data use continues to expand, wireless backhaul capacity must keep pace. The 42 GHz band is already allocated for the Fixed Service. We urge the Commission to adopt practical service rules that will put these frequencies to productive use.

CONCLUSION

The Commission should adopt a Further Notice of Proposed Rulemaking, based on the above suggestions, at the earliest possible date.

Respectfully submitted,



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May 9, 2012

³² *Wireless Backhaul Order*, *supra* note 2, ¶ 1.

Excerpt from Table of Allocations (47 C.F.R. § 2.106)

Frequency (GHz)	Federal Allocation	Non-Federal Allocation	Designation
37-37.5	FIXED MOBILE	FIXED MOBILE	FS
37.5-38	SPACE RESEARCH (space-to-Earth)	FIXED FIXED-SATELLITE (space-to-Earth)	FS
38-38.6	FIXED MOBILE	MOBILE	FS
38.6-39.5		FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	FS
39.5-40	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE	FS
40-40.5	EARTH-EXPLORATION SATELLITE (Earth-to-space) FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-Space) Earth-exploration satellite (space-to-Earth)	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	FSS
40.5-41	FIXED-SATELLITE (space-to-Earth) Mobile-Satellite (space-to-Earth)	FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING –SATELLITE Fixed Mobile Mobile-satellite (space-to-Earth)	FSS
41-42		FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING –SATELLITE	FSS
42-42.5		FIXED MOBILE BROADCASTING BROADCASTING -SATELLITE	FS

TECHNICAL CERTIFICATION

I am a technically qualified person who reviewed the foregoing Petition for Rulemaking. I certify that the technical statements therein are correct to the best of my knowledge.



Larrie Sutliff
Chairman, Technical Committee
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May 8, 2012

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