

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:)
)
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) IB Docket No. 97-95
Bands; Allocation of Spectrum to Upgrade Fixed)
and Mobile Allocations in the 40.5-42.5 GHz) RM-8811
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)

REPLY COMMENTS OF HUGHES COMMUNICATIONS, INC.

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EXECUTIVE SUMMARY

The comments in this proceeding demonstrate that satellite operators have an increasing need for more spectrum at V-band. Every satellite operator that addressed this point identified the need for additional spectrum for satellite use beyond that provided by the Commission's 2+2 GHz proposal. Moreover, the record in this docket, along with the fifteen pending satellite system applications for V-band spectrum, seven of which requested at least 6 GHz of spectrum, confirm that a broad consensus exists that it is imperative that the Commission allocate and make available sufficient expansion spectrum at V-band for satellite use.

Since the Order on Reconsideration in this docket, new developments demonstrate that the Commission can easily designate an additional 1 GHz of paired V-band spectrum for satellite use (for a total of 3 GHz of uplink and 3 GHz of downlink spectrum) without adversely affecting other interested parties. Specifically, the Commission can designate an additional 1 GHz of satellite uplink spectrum at 47.2-48.2 GHz and an additional 1 GHz of satellite downlink spectrum at 37.6-38.6 GHz for the ubiquitous deployment of satellite earth terminals. HAPS proponents have abandoned the spectrum at 47.2-48.2 GHz, and no other terrestrial interest has expressed in this docket a need, or even a desire, for spectrum in the 47.2-48.2 GHz band. Designation of that spectrum for satellite uplinks will provide a critical, contiguous 3 GHz band for satellite uplinks at 47.2-50.2 GHz.

Consistent with the Hughes proposal to designate the 47.2-48.2 GHz band for satellite use, the Commission should retain the current allocations of exclusive Government use for the 42.5-43.5 GHz band and exclusive non-Government use for the 47.2-48.2 GHz band.

The commenters overwhelmingly support the Commission's proposal to designate the 41.0-42.0 GHz band for satellite downlink spectrum and to allocate the band for primary

non-Government use which, together with the existing 1 GHz of satellite downlink spectrum at 40.0-41.0 GHz, will provide 2 GHz of contiguous satellite downlink spectrum at 40.0-42.0 GHz. In addition, the 37.6-38.6 GHz band provides the most promising option for an additional 1 GHz of satellite downlink spectrum. Thus, together with the 40.0-42.0 GHz band, this additional 1 GHz of spectrum at 37.6-38.6 GHz would provide 3 GHz of needed satellite downlink spectrum.

Another option to provide the 1 GHz of satellite downlink spectrum would be to designate 500 MHz of the 37.6-38.6 GHz band along with the 42.0-42.5 GHz band for satellite use, provided that WRC-03 and the Commission significantly relax the out-of-band emission pfd limits to protect radio astronomy operations in the 42.5-43.5 GHz band.

Every commenter addressing the point also supports the Commission's proposal to add a non-Government FSS allocation to the 37.5-37.6 GHz band. However, the Commission also should make this band available for the ubiquitous deployment of satellite earth stations.

Hughes supports the Commission's proposal to add an MSS designation for non-Government satellite use at 40.5-41.0 GHz. In contrast, the majority of satellite commenters addressing the point oppose a primary Government MSS allocation at 40.5-41.0 GHz.

The Commission should adopt the WRC-2000 pfd limit formulation, and the WRC-2000 pfd values, for the 38.6-40.0 GHz band. However, a majority of the satellite interests agree that the Commission should not adopt the WRC-2000 provisional out-of-band pfd limits for satellite operations at 42.0-42.5 GHz in advance of WRC-03. Similarly, the satellite comments strongly oppose the deletion of the current BSS allocation at 42.0-42.5 GHz.

Lastly, any limitation or restriction with respect to earth terminals in a band shared with terrestrial users (e.g., 38.6-40.0 GHz) should exclude the 1 GHz of spectrum at the 37.6-38.6 GHz band, which should be designated solely for satellite use.

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REPLY COMMENTS OF HUGHES COMMUNICATIONS, INC.

Hughes Communications, Inc. (“Hughes”) hereby replies to the comments filed in response to the Commission’s Further Notice of Proposed Rulemaking (“FNPRM”), which proposes to modify the domestic allocation and designation plan for the 36 -51.4 GHz band (the “V-band”).¹

I. THE COMMENTS CONFIRM THE NEED FOR MORE SATELLITE SPECTRUM AT V-BAND

The comments in this proceeding demonstrate that satellite operators have an increasing need for more spectrum at V-band. Every satellite operator that addressed this point identified the need for additional spectrum for satellite use beyond that provided by the

¹ *In the Matter of Allocation and Designation 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*, Report and Order, 13 FCC Rcd 24649 (1998) (“Band Plan Order”).

Commission's 2+2 GHz proposal.² Moreover, the record in this docket,³ along with the fifteen pending satellite systems applications for V-band spectrum,⁴ seven of which requested at least 6 GHz of spectrum,⁵ confirm that a broad consensus exists that it is imperative that the Commission allocate and make available sufficient expansion spectrum at V-band for satellite use.

The passage of time since this docket commenced has made the need for additional satellite spectrum that much more critical. In particular, Hughes agrees with Boeing that increasing congestion in the lower frequency bands makes expansion in the V-band crucial

² Boeing supports a primary allocation at 47.2-48.2 GHz for satellite use and an allocation at 37.6-38.6 GHz for the fixed-satellite service ("FSS"). Boeing also supports an FSS allocation at 37.5-37.6 GHz. Comments of The Boeing Company at 5, 10-14, 15 ("*Boeing Comments*"); TRW supports restoring the 47.2-48.2 GHz band to FSS uplink use and allocating the 37.5-37.6 GHz band for the FSS. TRW also supports allocating the 42.0-42.5 GHz band to the FSS. Comments of TRW Inc. at 5, 7, 13-14, 15-18 ("*TRW Comments*"); Spectrum Astro supports non-Government FSS use at 47.2-48.2 GHz. Spectrum Astro also supports FSS allocations at 37.5-37.6 GHz and at 42.0-42.5 GHz. Comments of Spectrum Astro, Inc. at 2-5, 6-8 ("*Spectrum Astro Comments*"); Intelsat Global supports allocating the 47.2-48.2 GHz band and the 37.5-37.6 GHz band for FSS use. Intelsat Global also supports FSS use of the 42-42.5 GHz band. Comments of Intelsat Global Service Corporation at 3-4, 5-7 ("*Intelsat Global Comments*"); SIA supports making the 47.2-48.2 GHz band available for FSS uplink use and allocating the 37.5-37.6 GHz and for FSS use. Satellite Industry Association Comments at 2 ("*SIA Comments*").

³ Comments of Hughes Communications, Inc. at 9, IB Docket No. 97-95 (filed May 5, 1997); Reply Comments of Hughes Communications, Inc. at 4, IB Docket No. 97-95 (filed June 3, 1997) ("*Hughes Reply Comments*"); *see generally* Hughes Reply Comments at 5-6 (*citing* Comments of GE American Communications, Inc. at 1-2, 4-5; Comments of Motorola Satellite Systems, Inc. at 8).

⁴ *See* Band Plan Order at ¶11, ¶25.

⁵ Petition for Reconsideration, IB Docket 97-95 at 4 (filed Feb. 16, 1999)(*citing* applications of Hughes Communications, Inc. (SpaceCast and Expressway), Motorola, Inc. (M-Star), GE American Communications (GE*StarPlus), Lockheed Martin Corporation (Global Q/V-Band Satellite Communications System), TRW, Inc. (TRW Global EHF Satellite Network), and PanAmSat Corporation (V-Stream))("Petition for Reconsideration").

for satellite operators.⁶ Ka-band licensees are proceeding with their systems,⁷ and in a relatively short time even this relatively new band will develop the same congestion as other satellite bands.⁸ As available spectrum is depleted, satellite operators must seek new spectrum in order to meet the increasing demand of satellite service users. The V-band presents a unique opportunity to satisfy the increasing capacity requirements by making spectrum available in large segments to support the burgeoning demand for broadband services.⁹

The public interest would be served by increasing the amount of V-band spectrum available to the satellite services.¹⁰ As noted in Hughes's Comments, the Commission has maintained a policy of promoting competition in telecommunications services to provide the public with as wide an array of services and technology as possible. Commercial satellite systems are an essential form of communications technology in the United States and around the world. Satellite systems provide emergency services and a competitive alternative to terrestrial networks. In addition, satellites provide ubiquitous coverage at a cost that is distance insensitive. This unique characteristic has facilitated the critical role that satellites play in serving the communications needs of rural and other underserved communities.¹¹ In contrast, the most optimistic build-out plans of the terrestrial fixed service target only large urban areas,¹² and, as the Commission is well aware, many terrestrial broadband service providers have failed or significantly curtailed their system build-outs.

⁶ See generally Boeing Comments at 4.

⁷ *Id.* at 6-7.

⁸ *Id.* at 7.

⁹ *Id.*

¹⁰ *See id.* at 7-8.

¹¹ Comments of Hughes Communications, Inc. at 3 (“*Hughes Comments*”).

Not surprisingly, as demand for satellite spectrum in the V-band increases, the interest of terrestrial operators in this band has waned.¹³ As the Commission notes in the FNPRM, the High Altitude Platform Service (“*HAPS*”) operators have withdrawn their interest in the spectrum at 47.2-48.2 GHz.¹⁴ In addition, as noted by industry commenters, terrestrial fixed service operators have encountered financial obstacles that make it very unlikely that they will implement or expand at V-band.¹⁵ As stated by Boeing, “[s]ince the last time that the Commission examined this issue, many terrestrial operators offering similar services have encountered severe financial difficulties that call into question their ability to build out and utilize existing spectrum allocations.”¹⁶

Moreover, the comments of the satellite and fixed service providers as well as the results of the 2000 World Radiocommunication Conference (“*WRC-2000*”) confirm, as Hughes has maintained consistently in this docket,¹⁷ that terrestrial operators have no interest in or need for spectrum outside the 38.6-40.0 GHz band. In particular, the terrestrial fixed service has not

¹² Boeing Comments at 8

¹³ *See generally* Hughes Comments at 4.

¹⁴ FNPRM at ¶30; *see also* Hughes Comments at 4; Boeing Comments at 5-6.

¹⁵ Hughes Comments at 4; *see also* Boeing Comments at 4-5 (citing the recent bankruptcies of fixed service operators).

¹⁶ Boeing Comments at 5

¹⁷ Hughes Reply Comments at 11 (“[T]he terrestrial industry was virtually silent as to its need, or even its desire, for terrestrial spectrum designations outside the 38.6-40.0 GHz band.”); *see also* Petition for Reconsideration at 2, 5; Boeing Comments at 9 (“Based on the record in this proceeding, only the existing wireless services sub-bands at 38.6-40 GHz warrant a wireless services designation in the V-band. Because there is no significant wireless deployment or demonstrated demand for such services anywhere else in the 36-51 GHz band, the Commission should not add or maintain wireless service designations anywhere outside this limited sub-band . . .”).

made any deployment, either actual or planned, in the 37.6-38.6 GHz band.¹⁸ As stated by Winstar, fixed service providers have implemented their systems to some extent in the 38.6-40.0 GHz band.¹⁹ However, the comments of the fixed service providers are tellingly silent regarding any current or planned deployment at 37.6-38.6 GHz.

Thus, since the Order on Reconsideration in this docket,²⁰ new developments, including both the U.S. preparatory process for WRC-2000 and the final WRC-2000 results, demonstrate that the Commission can and should allocate and designate additional V-band spectrum for satellite use. As stated by Boeing, these “new factual developments . . . warrant a re-evaluation of the proposed division of spectrum resources between satellite and non-satellite uses.”²¹ The FNPRM empowers the Commission to reapportion the terrestrial and satellite V-band allocations and designations to accommodate the growing spectrum demand of the satellite operators.

Based on the comments of the fixed service operators themselves, providing additional needed spectrum to the satellite operators would have little, if any, effect on the terrestrial operators. Moreover, given the waning interest of the terrestrial operators in the V-band and the ubiquitous characteristics of satellite systems, providing additional needed spectrum to the satellite operators would be the most efficient use of this valuable resource.

¹⁸ Hughes Comments at 6.

¹⁹ Comments of Winstar Communications, Inc. at 5 (“*Winstar Comments*”).

²⁰ *In the Matter of 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*, Order on Reconsideration, FCC 99-375 (1999)(“Order on Reconsideration”).

²¹ Boeing Comments at 4.

II. ALLOCATING AN ADDITIONAL 1 GHz OF UPLINK AND DOWNLINK SPECTRUM IN THE V-BAND WILL SUPPORT THE DEMONSTRATED NEEDS OF THE SATELLITE INDUSTRY

In the FNPRM, the Commission designates 2 GHz of paired spectrum for satellite use. The Commission retains the designation of 2 GHz of satellite uplink spectrum at 48.2-50.2 GHz and proposes to designate the 41.0-42.0 GHz band for satellite downlink spectrum and to allocate the band for primary non-Government FSS use which, together with the existing 1 GHz of satellite downlink spectrum at 40.0-41.0 GHz, will provide 2 GHz of satellite downlink spectrum at 40.0-42.0 GHz.²² The commenters overwhelmingly support the Commission's proposal to designate the 41.0-42.0 GHz band for satellite downlink spectrum and to allocate the band for primary non-Government FSS use.²³ This will provide 2 GHz of *contiguous* satellite downlink spectrum, to match the 2 GHz of contiguous uplink spectrum, which greatly facilitates the provision of broadband and mobile services.

As Hughes noted in its Comments, the developments since the Commission's Order on Reconsideration in this docket make clear that the Commission can easily designate an additional 1 GHz of paired V-band spectrum for satellite use (for a total of 3 GHz of uplink and 3 GHz of downlink spectrum) without adversely affecting other interested parties.²⁴ Specifically, the Commission can designate an additional 1 GHz of satellite uplink spectrum at 47.2-48.2 GHz and an additional 1 GHz of satellite downlink spectrum at 37.6-38.6 GHz. With appropriate power flux density ("*pf_d*") limits (see discussion below), this plan will provide 3 GHz of paired uplink and downlink spectrum that could be used for the deployment of small, ubiquitous satellite earth terminals, which is crucial for the success of satellite systems at V-band.

²² FNPRM at ¶6, ¶¶12-13, ¶15, ¶27.

²³ See Hughes Comments at 5-6, 8; TRW Comments at 7; Intelsat Global Comments at 2; Boeing Comments at 17; SIA Comments at 2; Winstar Comments at 3.

HAPS proponents have abandoned the spectrum at 47.2-48.2 GHz,²⁵ and no other terrestrial interest has expressed in this docket a need, or even a desire, for spectrum in the 47.2-48.2 GHz band. Designation of that spectrum for satellite uplinks will provide a critical, contiguous 3 GHz band for satellite uplinks at 47.2-50.2 GHz. Moreover, the comments of every satellite interest addressing this point support making the 47.2-48.2 GHz band available for satellite uplink use.²⁶ As noted in the Hughes Comments, no rational reason exists to retain the Commission's current designation of the 47.2-48.2 GHz band for terrestrial wireless services.²⁷ Thus, the Commission should convert the designation at 47.2-48.2 GHz from terrestrial wireless services to satellite use.

Consistent with the Hughes proposal to designate the 47.2-48.2 GHz band for satellite use, the Commission should retain the current allocations of exclusive Government use for the 42.5-43.5 GHz band (because of the radio astronomy uses of that band) and exclusive non-Government use for the 47.2-48.2 GHz band.²⁸ Moreover, NTIA supports the current

²⁴ Hughes Comments at 5.

²⁵ FNPRM at ¶30.

²⁶ Hughes Comments at 5; Boeing Comments at 5, 10 (“Removal of the wireless services designation in [the 47.2-48.2 GHz] band and converting it to primary satellite use would make an additional gigahertz of primary satellite spectrum available at 40/50 GHz, and would contribute to a full ‘3+3’ GHz of satellite spectrum”); Intelsat Global Comments at 5-6; SIA Comments at 2; TRW Comments at 5, 14; Spectrum Astro Comments at 8. As noted below, Hughes disagrees with the recommendation of TRW and Spectrum Astro to return the 47.2-48.2 GHz band to its original allocation for both Government and non-Government use.

²⁷ Hughes Comments at 5.

²⁸ Intelsat Global also supports the Commission's proposal to maintain the current allocation in these bands. Intelsat Global Comments at 5-6.

allocation in these bands and indicates that some Federal operations currently exist in the 42.5-43.5 GHz band.²⁹

No company that operates commercial satellites supports returning the 47.2-48.2 GHz band to its original allocation for co-primary Government and non-Government use.³⁰ Moreover, without additional information regarding the intended Government uses in this band, Hughes cannot adequately address the potential sharing constraints that may be involved in returning the 47.2-48.2 GHz band to shared Government and non-Government use.

Related to the Hughes proposal to designate an additional 1 GHz of satellite uplink spectrum at 47.2-48.2 GHz, the 37.6-38.6 GHz band provides the most promising option for the corresponding additional 1 GHz of satellite downlink spectrum. Together with the 40.0-42.0 GHz band, the additional 1 GHz of spectrum at 37.6-38.6 GHz would provide 3 GHz of needed satellite downlink spectrum. Every satellite operator addressing this point supports FSS use in the 37.6-38.6 GHz band.³¹

As noted by Boeing, designating the 37.6-38.6 GHz band “for wireless services is inappropriate due to the propagation characteristics of the band and the experience of limited deployment of wireless services in comparable spectrum, such as the 38.6-40.0 GHz band.”³²

²⁹ Comments of United States Department of Commerce National Telecommunications and Information Administration at 2 (“NTIA Comments”).

³⁰ The only two companies that support opening the 47.2-48.2 GHz band for shared Government and non-Government use are Government contractors and may therefore have a significant interest in supporting additional Government spectrum at the expense of commercial satellite operations. *See* TRW Comments at 5, 13-14; Spectrum Astro Comments at 8.

³¹ *See* Boeing Comments at 5, 11, 13-14; *see also* TRW Comments at 11-13 (proposing that if FSS use of the 40.0-41.0 GHz band is constrained by Government MSS or FSS use, then the Commission should allocate the 37.5-38.6 GHz band for non-Government FSS use).

³² Boeing Comments at ii.

Moreover, no terrestrial fixed service operator has deployed, or announced any plans to deploy, services in the band, and the comments of the terrestrial fixed service operators confirm the availability of this spectrum for satellite use. Thus, Hughes proposes that the Commission retain the satellite designation at 37.6-38.6 GHz.

While Hughes agrees with Boeing's desire to open the 37.6-38.6 GHz band for satellite use, Hughes does not agree with Boeing's proposal for a "general" allocation for this band to include both satellite and fixed service operators rather than a primary allocation and designation for satellite use as proposed by Hughes.³³ Boeing's approach would hinder the widespread deployment of satellite based services by increasing both the cost to deploy earth stations and the potential for interference. Thus, Hughes opposes an allocation for both satellite and terrestrial uses in the 37.6-38.6 GHz band and, instead, favors a primary allocation and designation for satellite use in the band.

Every commenter addressing the point also supports the Commission's proposal to add a non-Government FSS allocation to the 37.5-37.6 GHz band.³⁴ However, consistent with the Hughes proposal for the 37.6-38.6 GHz band, the Commission should make the 100 MHz at 37.5-37.6 GHz available for the deployment of ubiquitous satellite earth stations. Any limitations or restrictions on the deployment of earth terminals in this band could render it unusable for ubiquitous deployment of small terminals that would support the provision of broadband services to a wide range of end-users, regardless of the location.

³³ See *id.* at 5, 11, 13-14; see also Hughes Comments at 6, 8.

³⁴ See TRW Comments at 7; Spectrum Astro Comments at 2-3; Intelsat Global Comments at 3; SIA Comments at 2; Boeing Comments at 15. Hughes disagrees with the suggestion of TRW and Spectrum Astro to limit the use of the 37.5-37.6 GHz band to gateway operations unless 1 GHz of additional spectrum is made available elsewhere for ubiquitous FSS terminals.

NTIA opposes the allocation of the 37.5-37.6 GHz band to the FSS.³⁵ However, if the Commission decides to allocate this band to the FSS, NTIA proposes to restrict use of the band to geostationary satellites and gateway earth stations.³⁶ If the Commission determines that an FSS allocation and designation for ubiquitous deployment in the 37.6-38.6 GHz band is the best option for providing a much needed additional 1 GHz of satellite downlink spectrum, or if the Commission determines that Hughes's second option (discussed below) is feasible, then Hughes does not oppose restricting the 100 MHz band at 37.5-37.6 GHz to gateway use because an additional 1 GHz would be made available elsewhere for ubiquitous satellite service. Thus, any accommodation for the NTIA at 37.5-37.6 GHz should not be at the expense of providing the satellite interests with an additional 1 GHz of needed satellite downlink spectrum for ubiquitous deployment of satellite earth terminals, which is crucial for the success of satellite systems at V-band.

As Hughes noted in its Comments, another option to provide the additional 1 GHz of satellite downlink spectrum would be to designate 500 MHz of the 37.6-38.6 GHz band along with the 42.0-42.5 GHz band for satellite use.³⁷ This arrangement would provide a greater amount of contiguous downlink spectrum for satellite systems. Many other satellite commenters also support allocating the 42.0-42.5 GHz band to the fixed-satellite service.³⁸

However, it is premature to adopt such an approach, because this allocation would not meet the needs of the industry unless and until the out-of-band emission pfd limits adopted provisionally at WRC-2000 to protect radio astronomy operations in the 42.5-43.5 GHz band are

³⁵ NTIA Comments at 1-2.

³⁶ *Id.* at 2.

³⁷ Hughes Comments at 6-7.

significantly relaxed. Moreover, the Committee on Radio Frequencies proposes a pfd limit for geostationary orbital systems that is even more restrictive than the WRC-2000 value.³⁹

Similarly, NTIA suggests that the WRC-2000 pfd limits are not sufficient to protect radio astronomy operations if the broadcast satellite service (“BSS”) allocation is implemented at 42.0-42.5 GHz.⁴⁰ In addition, NTIA believes that the Commission should not allocate the 42.0-42.5 GHz band to the FSS because of protection concerns for radio astronomy observations.⁴¹

Hughes understands that papers submitted as a part of the U.S. preparatory process for WRC-03 propose to modify these pfd limits to permit greater satellite use of the adjacent spectrum while providing more realistic protection of radio astronomy operations. But, until after that is resolved in 2003, this approach is not a viable means of providing additional satellite downlink spectrum, particularly in light of NTIA’s reservation.

Hughes opposes Spectrum Astro’s suggestion that any FSS allocation in the 42.0-42.5 GHz band be subject to the same conditions proposed for the FSS in the 37.5-40.0 GHz band.⁴² Imposition of these constraints would prevent the ubiquitous deployment of small satellite earth terminals in this band because the proposed pfd limits only allow for the deployment of large FSS gateway earth stations.

Thus, if the WRC in 2003 and the Commission sufficiently relax the out-of-band emission pfd limit applicable to the 42.5-43.5 GHz band to permit satellite use of the 42.0-42.5

³⁸ TRW Comments at 5, 18; Spectrum Astro Comments at 3-5; Intelsat Global Comments at 7.

³⁹ Comments of the National Academy of Sciences’ Committee on Radio Frequencies at 5 (“*CORF Comments*”).

⁴⁰ NTIA Comments at 2-3.

⁴¹ *Id.* at 2.

⁴² Spectrum Astro Comments at 3-4.

GHz band, then the Commission could add an FSS allocation at 42.0-42.5 GHz and could designate the band for FSS and BSS use.

Moreover, the comments of the satellite interests strongly oppose the deletion of the current BSS allocation at 42.0-42.5 GHz.⁴³ In order to preserve the maximum flexibility for potential future use of this band by satellite licensees, the Commission should not delete this allocation.

Hughes also supports the Commission's proposal to add an MSS designation for non-Government satellite use at 40.5-41.0 GHz.⁴⁴ As stated in the Hughes Comments, Hughes agrees with the Commission that licensees need the maximum flexibility to implement their systems⁴⁵ and, especially as Hughes has proposed a V-band MSS system,⁴⁶ the Commission should make provision for non-Government MSS systems at V-band.⁴⁷ Although the ITU international table of allocations only contains a secondary MSS allocation for the 40.5-41.0 GHz band in Region 2, Hughes believes that the U.S. can successfully undertake an effort to upgrade their international allocation to primary status. However, as discussed below and in the Hughes Comments, the Commission should not adopt a primary Government MSS allocation at 40.5-41.0 GHz unless and until it is clear that Government use of that spectrum will not interfere with the deployment and operation of commercial systems in the same band.

⁴³ See Comments of Astrolink International LLC at 6-7 ("*Astrolink Comments*"); TRW Comments at 5-6, 18; Boeing Comments at 19-20.

⁴⁴ FNPRM at ¶16.

⁴⁵ *Id.*

⁴⁶ See StarLynx Application of Hughes Communications, Inc. (filed Sept. 1997) ("*StarLynx*").

⁴⁷ Hughes Comments at 9-10.

Hughes understands the concerns of Intelsat Global and TRW with the deployment of MSS systems on a primary basis.⁴⁸ However, MSS systems can work in a way that creates no greater level of interference than FSS systems. As noted by Intelsat Global, MSS systems can be deployed using FSS transponders. Intelsat Global supports this approach to MSS deployment because “[u]sing FSS transponders for such services would safeguard against unduly impacting the deployment of the FSS in the band.”⁴⁹ Hughes supported this concept of MSS systems using the FSS band in its StarLynx application.⁵⁰ If other MSS systems are created in a similar fashion, then no reason exists for limiting non-Government MSS in the 40.5-41.0 GHz band.

In contrast, the Commission’s proposal to shift the band anticipated for primary Government FSS and MSS use from 39.5-40.5 GHz to 40.5-41.0 GHz⁵¹ would effectively shift the burden of coordinating with these Government systems from one that is shared between commercial fixed service and commercial satellite interests to a burden that falls solely on commercial satellite interests. Unless it is clear that Government use of the band will not hamper commercial satellite use of the band, it is inappropriate to disproportionately burden commercial satellite interests with the risk of coordination with Government systems. There is no way for the industry to fully comment on the impact of such Government systems because the details of the Government operations are not known.

⁴⁸ Intelsat Global Comments at 4; TRW Comments at 5, 8.

⁴⁹ Intelsat Global Comments at 4.

⁵⁰ *See* StarLynx.

⁵¹ FNPRM at ¶¶24, 26.

Thus, the majority of satellite interests commenting on this point oppose a primary Government MSS allocation at 40.5-41.0 GHz.⁵² TRW suggests that a Government FSS allocation at 40.5-41.0 GHz might work if Government systems are limited to orbital locations outside 70° W.L. to 120° W.L.⁵³ Hughes objects to such a proposal because it would unduly constrain the ability of commercial operators to provide international service. In fact, a number of slots requested in Hughes's pending applications for its SpaceCast and Expressway systems fall outside the 70°-120° W.L. range. Given the inherent problem of developing a sharing solution when no information is available about the Government systems, Hughes opposes a compromise Government/non-Government co-primary allocation.

III. THE SATELLITE INDUSTRY OVERWHELMINGLY SUPPORTS THE ADOPTION OF THE WRC-2000 PROVISIONAL PFD LIMITS PENDING THE OUTCOME OF WRC-03

Every satellite interest addressing this point supports the adoption of the WRC-2000 pfd limit formulation,⁵⁴ which set higher pfd limits to account for fade conditions prevalent at V-band, and in Region 2, required coordination among administrations for deployment of satellite systems with pfd levels that exceed the listed pfd limits minus 12 dB.⁵⁵ The WRC-2000 formulation of these pfd limits is a more practical approach than the Commission's proposal in

⁵² See Boeing Comments at 16, TRW Comments at 8-11 (“[A]doption of this proposal would undermine the viability of the entire soft segmentation scheme by compromising the utility of the two gigahertz of contiguous spectrum set aside for FSS operations at 40.0-42.0 GHz.”); SIA Comments at 3; Intelsat Global Comments at 5. Intelsat Global is also concerned with a primary Government FSS allocation in this band.

⁵³ TRW Comments at 5, 14-15, n.29.

⁵⁴ Boeing Comments at 17-18; Intelsat Global Comments at 7-8; TRW Comments at 21-24; SIA Comments at 3.

⁵⁵ See ITU Resolution 84 (WRC-2000), resolves 2.

the FNPRM, which sets lower pfd levels and allows operators to increase power by 12 dB during fade conditions to account for increased propagation loss.⁵⁶

Hughes agrees with TRW that satellite operators have every incentive to reduce power when it is not needed to overcome fade conditions.⁵⁷ In addition, the Commission's proposal is much more complicated to implement than the WRC-2000 approach. Under the Commission's proposal, it is unclear when and how often fade compensation would be permitted and how it would be monitored. Moreover, it is difficult to specify exactly when the additional 12 dB could be added to the pfd limit because fade compensation on the downlink might be implemented in different ways. In addition, the Commission's proposal would require satellite operators to implement unproven technology that would have a significant impact on business plans.

Hughes agrees with Boeing, TRW, and Intelsat Global that the Commission's adoption of the WRC-2000 approach will minimize deviation between the U.S. and international use of the V-band - - a critical factor in the ability to competitively deploy an international satellite network.⁵⁸ Moreover, as noted by Intelsat Global,⁵⁹ the subject of downlink fade compensation is currently under study by the ITU-R pursuant to Resolution 84 (WRC-2000). These studies are crucial to this very complicated and novel area. Therefore, the Commission should adopt the WRC-2000 pfd limit formulation, and the WRC-2000 pfd values, for the 38.6-40.0 GHz band, at least until the ITU-R study group process completes further study of the fade compensation question. In the alternative, if the Commission does not designate the 37.6-38.6

⁵⁶ FNPRM at ¶37, ¶¶41-42.

⁵⁷ Hughes Comments at 10; *see generally* TRW Comments at 24.

⁵⁸ Boeing Comments at 17; Intelsat Global Comments at 7-8; *see generally* TRW Comments at 22-24.

GHz band for satellite use, as Hughes proposes above, then the Commission should apply the WRC-2000 pfd limit formulation, and the WRC-2000 pfd values, to the 37.5-40.0 GHz band.

Consistent with the need to allocate the 37.6-38.6 GHz band for satellite use, Hughes supports the proposals of TRW and the SIA to eliminate the power control provisions from the 37.5-38.6 GHz band.⁶⁰ There would be no need for such power limits in a band allocated only for satellite use.

Hughes also agrees with TRW's proposal to specify that the WRC-2000 clear-sky pfd limitation of 12 dB applies only when FSS satellites are serving the U.S. As noted by TRW, "[t]he reduced clear-sky PFD concept of Resolution 84 (WRC-2000) applies only in ITU Region 2. . . . [A]ny extension beyond Region 2 territory would put U.S. satellites at a disadvantage with respect to their foreign counterparts, and thus be unwieldy."⁶¹

Hughes does not take any position at this time with respect to the percentage of time operators may increase power during fade conditions under the Commission's proposal because this issue is the subject of future study in the ITU. For similar reasons, Hughes also does not take a position regarding a definition for the term "fading conditions."

Finally, an overwhelming majority of the satellite interests agree that the Commission should not adopt the WRC-2000 provisional out-of-band pfd limits for satellite operations at 42.0-42.5 GHz in advance of WRC-03.⁶² As discussed above, Hughes believes

⁵⁹ Hughes Comments at 11; Intelsat Global Comments at 8.

⁶⁰ TRW Comments at 25-26; SIA Comments at 3-4.

⁶¹ TRW Comments at 22, n.50; *see also* Intelsat Global Comments at 9 (proposing that any pfd limits that the Commission adopts be restricted to those beams covering the continental U.S. only).

⁶² Hughes Comments at 11; Astrolink Comments at 3-4; Boeing Comments at 20-21; TRW Comments at 15-18; *see generally* SIA Comments at 4. Spectrum Astro is alone in its

these out-of-band limits can be significantly relaxed, while providing sufficient protection of radio astronomy operations at 42.5-43.5 GHz. The relaxation of these limits would permit greater satellite use of the spectrum adjacent to 42.5-43.5 GHz. Thus, pending further study in preparation for WRC-03, the Commission should not adopt the WRC-2000 provisional pfd limits at this time.

IV. EARTH STATION LIMITATIONS

As discussed above, the satellite industry broadly supports the idea that the Commission retain the primary satellite designation in the 37.6-38.6 GHz band. This proposal, along with the Commission's proposed designation of the 40.0-42.0 GHz band for satellite use, would provide the 3 GHz of satellite downlink spectrum that is needed for the ubiquitous deployment of satellite earth stations. In the FNPRM, the Commission proposed to limit the satellite earth station operations that may be deployed in the 37.5-40.0 GHz band only to "gateway facilities."⁶³ The Commission further proposed to restrict satellite earth stations facilities in this band by prohibiting ubiquitous deployment and those facilities that serve "individual consumers."⁶⁴

However, as a number of commenters have established, retention of primary satellite use of the 37.6-38.6 GHz band is critical for the success of advanced V-band satellite systems. Therefore, any limitation or restriction with respect to earth terminals in a band shared

recommendation to adopt the WRC-2000 provisional out-of-band limits for satellite operations at 42.0-42.5 GHz. Spectrum Astro Comments at 5-6.

⁶³ FNPRM at ¶46.

⁶⁴ FNPRM at ¶47.

with terrestrial users (e.g., 38.6-40.0 GHz) should exclude the 1 GHz of spectrum at the 37.6-38.6 GHz band, which should be designated solely for satellite use.⁶⁵

Hughes agrees with TRW that the Commission's proposal to prohibit satellite earth station facilities that serve "individual consumers" is unclear and over broad.⁶⁶ Among other things, the provision would appear to prevent a satellite operator from serving an individual retail customer or other business location with a larger earth terminal facility. The Commission's language does not adequately distinguish among possible end users of the service and would unduly restrict the deployment of earth stations that would not pose any problems for the terrestrial service.

Hughes opposes WCAI's proposal to require FSS systems to provide fixed service systems with prior notice of intent to construct gateway stations in the 37.0-40.0 GHz band.⁶⁷ Hughes also opposes WCAI's proposal to limit the number of gateway stations in the 37.0-40.0 GHz band that may be constructed by any single fixed-satellite service operator.⁶⁸ At the outset, for the reasons set forth above, these proposals simply should not apply to the 37.6-38.6 GHz band. Even in bands that are shared terrestrially, WCAI has not provided any reason for hampering the deployment of earth terminals in this manner. In contrast, the Commission's approach, supported by TRW, to treat earth stations and wireless licensees on level terms, where sharing between satellite and terrestrial operators is necessary, is a more equitable approach.⁶⁹

⁶⁵ Cf. Boeing Comments at 18-19. Boeing opposes any restrictions on earth station use in the 37.5-40.0 GHz band.

⁶⁶ TRW Comments at 26-27.

⁶⁷ Comments of the Wireless Communications Association International, Inc. at 7 ("*WCAI Comments*").

⁶⁸ *Id.*

⁶⁹ FNPRM at ¶¶49-51; TRW Comments at 27-28.

V. CONCLUSION

Since the Order on Reconsideration in this docket, new developments, including both the U.S. preparatory process for WRC-2000 and the final WRC-2000 results, demonstrate that the Commission can and should allocate and designate additional V-band spectrum for satellite use beyond that provided by the Commission's 2+2 GHz proposal. Based on these developments, the Commission can easily designate an additional 1 GHz of paired V-band spectrum for satellite use, for a total of 3 GHz of paired spectrum, without adversely affecting other interested parties. Moreover, given the waning interest of the terrestrial operators in the V-band, providing additional needed spectrum to the satellite operators would be the most efficient use of this valuable resource. Thus, Hughes respectfully requests that the Commission reappportion the terrestrial and satellite V-band allocations and designations to accommodate the growing spectrum demand of the satellite operators.

Respectfully submitted,

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