

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Spectrum Horizons)	ET Docket No. 18-21
)	
Battelle Memorial Institute Petition for)	RM-11713
Rulemaking to Adopt Fixed Service Rules in)	(Terminated)
the 102-109.5 GHz Band)	
)	
Request for Waiver of ZenFi Networks, Inc. and)	WT Docket No. 15-245
Geneva Communications LLC)	(Terminated)
)	
James Edwin Whedbee Petition for Rulemaking)	RM-11795
to Allow Unlicensed Operation in the 95-1,000)	
GHz Band)	

REPLY COMMENTS OF ECHOSTAR SATELLITE OPERATING CORPORATION
AND HUGHES NETWORK SYSTEMS, LLC

EchoStar Satellite Operating Corporation (“ESOC”) and Hughes Network Systems, LLC (“Hughes”, and collectively “EchoStar”) submit these reply comments in response to the Federal Communications Commission’s (“Commission”) Notice of Proposed Rulemaking (“*NPRM*”),¹ in support of the comments filed by the Satellite Industry Association (“SIA”) and in support of urging the Commission to ensure that the bands above 95 GHz remain unencumbered by premature service rules. Service rules in these bands are best developed when a viable service is identified that can make efficient use of the spectrum.² EchoStar supports the Commission making up to 36

¹ In the Matter of Spectrum Horizons, *et al.*, ET Docket No. 18-21, *Notice of Proposed Rulemaking*, FCC 18-17 (Feb. 28, 2018) (“*NPRM*”).

² See Comments of SIA in ET Dkt. Nos. 18-21 *et. al* filed May 2, 2018.

GHz of spectrum in the bands above 95 GHz available for the fixed service (“FS”), while ensuring that the spectrum shared between FS and fixed satellite service (“FSS”) or mobile satellite service (“MSS”) remains available for the development of new technology.³ EchoStar agrees with SIA that it would be premature for the Commission to introduce mobile services (“MS”) into the frequency bands above 95 GHz at this time, and that it would be inappropriate to extend the restrictive earth station siting rules from the 28 and 37/39 GHz bands into this greenfield spectrum without further development of the services that the satellite networks will share with.⁴ EchoStar further reiterates SIA’s call for dedicated spectrum for purposes of ubiquitously deployed user terminals, as the Commission recognized as necessary in its Spectrum Frontiers proceeding.⁵

ESOC is the largest United States-based commercial geostationary orbit satellite operator, and fourth largest commercial geostationary orbit operator globally. ESOC owns or operates a fleet of 24 satellites, providing broadcast, fixed, and mobile services.

Hughes is the largest provider of satellite broadband services in the United States and globally. With the launch of its Gen5 service in March 2017, Hughes provides customers across the continental United States, southeastern Alaska, Puerto Rico, and the U.S. Virgin Islands with broadband internet at or above Commission-defined speeds of 25 Mbps down and 3 Mbps up. The Hughes Gen5 service has been very popular among Hughes’ customers, with almost half of its 1.2 million subscribers already migrated to the new service and four consecutive quarters of reduced retail customer churn.⁶

³ Ibid.

⁴ Ibid.

⁵ See In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, *et al.*, GN Docket No. 14-177, *Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order*, ¶189 (Nov. 22, 2017) (“*Spectrum Frontiers Second Order*”).

⁶ See Ex parte of Hughes in WC Dkt. No. 10-90, filed January 18, 2018.

In order to continue to meet consumer demand for increased capacity and speed, Hughes has received Commission authority to construct and launch EchoStar XXIV/Jupiter 3, a state-of-the-art Ultra-High Density Satellite (“UHDS”). EchoStar XXIV is currently under construction at Space Systems Loral in California, and is slated for launch in 2021. This revolutionary, first-of-its-kind UHDS satellite will provide services throughout the United States using the Ka, Q, and V-bands, with speeds upwards of 100 Mbps.⁷

EchoStar XXIV, and its Q/V band payload, is the next chapter in the long history of satellite innovation and deployment to develop higher frequency bands. Over the past forty years, satellite operators have been leaders in developing technologies to provide data services globally and increasing the efficiency of spectrum usage. As demand for data services increased and customers demanded more capacity at greater speeds, the satellite industry has developed and deployed improved technology, often making the inaugural forays into higher, unproven frequency bands. While lower frequency bands enable denser deployments due to favorable propagation characteristics, the increasing congestion of the lower bands required satellite operators to use other frequency bands to meet user demands for high speed data services.

Historically, satellite operators preferred delivering services across lower frequency bands.⁸ When these bands became increasingly congested, and the demand for consumer data availability surged, satellite operators needed to explore higher frequency bands to expand their service offerings.

⁷ See Hughes Application for HNS 95W space station, IBFS File No. SAT-LOA-20170621-00092 (filed June 21, 2017); See also Hughes, *Press Release: Hughes Selects Space Systems Loral to Build Next-Generation Ultra High Density Satellite*, <https://www.echostar.com/en/Press/Newsandmedia/Hughes%20Selects%20Space%20Systems%20Loral%20To%20Build%20Next-Generation%20Ultra%20High%20Density%20Satellite.aspx> (August 9, 2017).

⁸ Such as 4-6 GHz (C band) and 11-17 GHz (“Ku band”).

By the start of 2012, there were 419 satellites operating in the 26.5-40 GHz bands.⁹ While Ka band has become the anchor band for satellite broadband services, increased demand for services is the most significant factor in the satellite industry's continuing push to gain access to new, unutilized frequency bands for the expansion of FSS. The first of these bands being developed are the Q/V bands. Additionally, satellite operators have also begun obtaining experimental licenses in the above 95 GHz bands in order to test viable expansion bands.¹⁰ Ensuring continued access to these bands is critical for the growth and development of satellite services.

EchoStar concurs with SIA that the identification of 36 GHz of spectrum above 95 GHz for FS not shared with satellite communication services will provide adequate spectrum for future growth of FS, and therefore, has no objections to the immediate adoption of service rules for FS deployment in those bands.¹¹ With regard to the remaining 66.2 GHz of spectrum in the bands above 95 GHz that were identified in the *NPRM* as ripe for development of new communication services, EchoStar urges the Commission to exercise restraint when adopting service rules in bands that are shared by FS and FSS/MSS. Most of the development in these bands is in the nascent stages, and conforming technologies to predetermined service rules may hinder the potential creativity and ingenuity that can come from greenfield expansion. The 36 GHz of unshared FS spectrum is sufficient for the immediate deployment terrestrial services described today, while service rules for the remaining 66.2 GHz of shared spectrum should be adopted as the technology further develops to efficiently utilize the bands.

⁹ This figure includes both government and commercial satellite networks. See "Ka-band: The Future of Satellite Technology" Norsat International Inc. Oct. 27, 2012. Available at: <http://www.norsat.com/ka-band-the-future-of-satellite-technology/>.

¹⁰ Comments of the Boeing Company, at pg. 13.

¹¹ Comments of SIA, at pg. 2-3.

EchoStar urges the Commission to defer any designations for MS and corresponding service rules until there is additional clarity on the need for and potential use of these bands, including sharing parameters with other services. None of this is available today.¹² Even T-Mobile concurs, noting that it supports the Commission's deferral on service rules in the bands above 95 GHz.¹³ EchoStar agrees and urges the Commission to defer adoption of service rules for MS in the bands above 95 GHz.

In that same vein, EchoStar objects to the Commission's proposal to expand the earth station siting regime that was crafted during the Spectrum Frontiers proceeding for the 28 and 37/39 GHz bands.¹⁴ As SIA noted, the foundational premise for which these service rules were adopted, to facilitate wide-area mobile networks, is precluded by the propagation characteristics of these higher bands.¹⁵ Given the near impossibility of wide-area signal transmission in these bands, MS, if ever deployed, will likely be short-range. Even if the Commission determines that the spectrum should be made available for mobile uses now, adoption of this highly restrictive siting regime will serve as a limitation satellite services, as it prematurely restricts satellite network design before mobile operators have demonstrated an ability, or even plans, to deploy in these bands. Rather, the Commission should adopt SIA's proposal that the 70/80/90 GHz band rules, with respect to individually licensed earth stations, would be the more logical extension, as it provides adequate notice of sharing to terrestrial licensees without prematurely specifying sharing conditions.¹⁶

¹² See *Spectrum Frontiers Second Order* (observing that commenting parties "initially raised considerable doubt about the advisability and desirability of introducing mobile services into the 70/80/90 GHz bands in the near future").

¹³ Comments of T-Mobile, at pg. 5.

¹⁴ *NPRM*, ¶ 46.

¹⁵ Comments of SIA, at pgs. 8-9.

¹⁶ *Ibid.* at 10.

With regard to sharing conditions, T-Mobile's undeveloped assertions regarding FSS use of spectrum should be rejected. T-Mobile's blanket statement that "FSS use of spectrum...will necessarily limit terrestrial providers' ability to deploy the spectrum,"¹⁷ and will result in a "limitation of other services,"¹⁸ misses the importance of enabling the most efficient use of the spectrum resource. The role of the Commission, in this and other proceedings, is to determine the most efficient means by which to share spectrum in order to maximize its potential. Sharing by its very nature is a limitation on service; regardless of which services are making use of the spectrum. The key objective is to maximize the efficiency of the limited spectrum resource.

In this proceeding, the Commission has repeatedly noted how FSS/MSS shares effectively with FS in many bands.¹⁹ In fact, the majority of bands designated for FSS/MSS above 95 GHz are also shared with FS.²⁰ EchoStar does not object to sharing the spectrum resource with the other services and has ensured that its service offerings can be compatible with the limitations adopted by the Commission, with one notable, but very limited, exception: ubiquitously deployed user terminals.

While most components of a satellite network can share spectrum with other services without causing harmful interference, there is a requirement to provide for dedicated uplink spectrum for ubiquitously deployed end user terminals, as the Commission recognized in the Spectrum Frontiers proceeding.²¹ End user terminals are located in diverse locations throughout the country, and dedicated spectrum is required in order for satellite systems to locate and communicate with them, without interfering with other ubiquitously deployed services, such as

¹⁷ Comments of T-Mobile, at pg. 12.

¹⁸ Ibid. at pg. 13.

¹⁹ See e.g. *NPRM* ¶¶ 39, 47.

²⁰ Ibid. Table 1.

²¹ See *Spectrum Frontiers Second Order* at ¶189.

MS. While satellite end user technology may develop to a point where these bands can ultimately be shared with other services, under the auspices of the *NPRM*, where greenfield spectrum is available for development, there is no need to encumber satellite service deployment in such manner. Thus, while T-Mobile asserts that enabling satellite capacity results in a “limitation of other services”, it offers no proposals to use the frequency bands themselves, but rather proposes that the Commission limit two other services in anticipation that MS may one day require the spectrum that the others are currently developing.²²

EchoStar supports the Commission moving early to propose a plan for the bands above 95 GHz that facilitates growth and innovation by various communication services. However, EchoStar urges restraint in adopting service rules too far in advance of deployment-ready technology as it may hinder, rather than foster, innovation as companies try to fit within pre-established parameters. Satellite communications have capacity to grow and innovate in these high frequency bands, and with the continued support of the Commission to adopt reasonable siting rule and allocate adequate spectrum for both individually licensed earth stations, spacecraft, and user terminals, the potential of these bands will be achieved.

Respectfully Submitted,

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²² In addition to its comments requesting that satellite services receive no additional spectrum designations, T-Mobile asks the Commission be “mindful” of future mobile uses in the spectrum bands above 95 GHz, a specific request to limit FS use and deployment. *See* Comments of T-Mobile, at pg. 5.

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May 17, 2018