June 26, 2017

Ms. Marlene Dortch, Secretary
Federal Communications Commission
455 12th Street SW
Washington DC 20554

Re: Comments on Additional NGSO-Like Satellite Applications or Petitions for Operations in the 12.75-13.25 GHz, 13.85-14.0 GHz, 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz bands, DA 17-524

Dear Ms. Dortch:

Hughes Network Systems, LLC ("Hughes") files these comments in response to the Public Notice dated May 26, 2017 (DA 17-524), requesting comments on several applications for non-geostationary orbit ("NGSO") satellite systems seeking to operate in the 12.75-13.25 GHz, 13.85-14.0 GHz, 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz bands.[1]

Hughes is the largest provider of satellite broadband services in the United States and globally, with more than one million subscribers in North America. Hughes offers Federal Communications Commission ("Commission")-defined broadband speeds of over 25 Mbps down and 3 Mbps up for residential customers, and 55 Mbps down and 5 Mbps up for enterprise users, across the Continental United States and southern Alaska. Since launching its new high-speed broadband service in March 2017, Hughes has added over 100,000 new satellite broadband subscribers[2] and that number continues to grow daily.

[1] *Telesat Canada Petition for Declaratory Ruling Granting Access to the U.S. Market for the Telesat System*, IBFS File No. SAT-PDR-20161115-00108; *The Boeing Company Petition for Declaratory Ruling Granting Access to the U.S. Market for the Boeing System*, IBFS File No. SAT-LOA-20161115-00109; *Space Norway AS Petition for Declaratory Ruling Granting Access to the U.S. Market for the Space Norway System*, IBFS File No. SAT-PDR-20161115-00111; *LeoSat MA, Inc. Petition for Declaratory Ruling Granting Access to the U.S. Market for the LeoSat System*, IBFS File No. SAT-PDR-20161115-00112; *Karousel LLC Petition for Declaratory Ruling Granting Access to the U.S. Market for the Karousel System*, IBFS File No. SAT-LOA-20161115-00113; *O3b Limited Petition for Declaratory Ruling Granting Access to the U.S. Market for the O3b System*, IBFS File No. SAT-AMD-20161115-00116; *Audacy Corporation Petition for Declaratory Ruling Granting Access to the U.S. Market for the Audacy System*, IBFS File No. SAT-LOA-20161115-00117; *Space Exploration Holdings, LLC Petition for Declaratory Ruling Granting Access to the U.S. Market for the SpaceX System*, IBFS File No. SAT-LOA-20161115-00118; *ViaSat, Inc. Petition for Declaratory Ruling Granting Access to the U.S. Market for the ViaSat System*, IBFS File No. SAT-PDR-20161115-00120 (the "ViaSat Application"); *Theia Holdings A, Inc. Petition for Declaratory Ruling Granting Access to the U.S. Market for the Theia System*, IBFS File No. SAT-LOA-20161115-00121

[2] Press Release, *HughesNet Gen5 Delivers True FCC-Defined Broadband, Attracts New Customers in Every Continental U.S. State*, June 5, 2017 (*available at* https://www.hughes.com/who-we-are/resources/press-releases/hughesnet-gen5-surpasses-100000-subscribers-just-two-months).

As the Commission has noted, 34 million people across the United States live in areas that lack sufficient access to terrestrial fixed, high-speed Internet.[3] As the nation's leading provider of satellite broadband, Hughes is meeting this demand by deploying ubiquitous, cost-efficient, and resilient broadband services to customers in areas of the country that are unserved or underserved by traditional terrestrial broadband networks. Hughes has also applied to the Commission for authority to construct, launch, and operate its next generation satellite, HNS95W, to ensure that we can continue to deliver advanced broadband services across the United States.[4]

Hughes, as an operator in the 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz bands (the Ka band), requests that the Commission seek further information from NGSO applicants to demonstrate compliance with the single-entry and aggregate EPFD limits contained in Article 22 of the International Telecommunications Union ("ITU") Radio Regulations and Resolution 76 (Rev. WRC-15), respectively. Without such information, it is impossible to determine the potential for harmful interference from the proposed NGSO systems into Hughes' actual satellite system. Accordingly, to protect against such a result, the Commission should condition any NGSO license in the Ka band upon currently required single-entry and aggregate EPFD limits, as established in the ITU Radio Regulations.

Further, Hughes is also concerned about the application of ViaSat, Inc. ("ViaSat")[5] which proposes to utilize portions of the Ka band to support inter-satellite links. Since use of these frequency bands for inter-satellite service ("ISS") links has not been studied, the Commission should defer consideration of this portion of the application until it can adequately study the use of fixed satellite service ("FSS") Ka band frequency allocations, as opposed to ISS allocations, for medium-earth orbit ("MEO")-to- geosynchronous earth orbit ("GSO") links. Once those studies have been completed, the Commission will then be able to determine any required technical and operational rules for MEO-to-GSO links to avoid interference with other GSO networks' Earth-to-space links.

EPFD Compliance Issues

An initial review of the NGSO applications accepted for filing indicates that the applicants have addressed single-entry and aggregate EPFD issues to widely varying extents. Hughes is continuing its review of these applications' treatment of this issue and will discuss the treatments in further detail at the reply comment stage. Accordingly, Hughes urges the Commission to ask for this additional information and ensure there is compliance before acting on any applications. This is critical to ensure that these NGSO systems will not cause harmful interference to existing GSO systems, such as Hughes' broadband system.

While the Commission moves forward with obtaining additional information from the NGSO applicants, Hughes supports a more streamlined approach, as the Commission

---

[3] *See* Federal Communications Commission "2016 Broadband Progress Report," January 29, 2016. Available at: https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report.

[4] Hughes Network Systems, LLC Application for Satellite Space Station Authorizations, IBFS File No. SAT-LOA-20170621-00092.

[5] ViaSat Application, supra note 1, call sign S2985.

proposed in its NGSO NPRM proceeding. [6] In that proceeding, the Commission proposed to codify the NGSO EPFD limits contained in Article 22 of the ITU Radio Regulations for the 17.8-18.6 GHz, 19.7-20.2 GHz, 27.5-28.35 GHz, and 29.5-30.0 GHz bands.[7]

Additionally, Hughes urges the adoption of a realistic and practicable mechanism to ensure that aggregate EPFD limits established in ITU Resolution 76 are met by all licensed NGSO systems in the United States. As there has never been an environment of multiple NGSO systems, the only mechanism that will guarantee sufficient protection to GSO operations at this time are the aggregate EPFD limits. Irrespective of the likelihood of concurrent worst case scenarios, there is still a substantial probability that compliance by individual NGSO systems with single-entry EPFD limits will be insufficient to protect GSO FSS operations, and therefore, regulations should consider an enforcement mechanism for the compliance of such aggregate EPFD limits.

Therefore, Hughes requests that the Commission adopt these rules in its NGSO NPRM proceeding or at a minimum, condition each license accordingly.

ViaSat Application MEO-to-GSO links

In its NGSO application, ViaSat proposes to use FSS uplink and downlink spectrum in the Ka band "to support high-speed transmissions between its NGSO constellation and its in-orbit GSO satellites."[8] In order to support its request to use FSS allocations for inter-satellite links for MEO-to-GSO, it cites to the definition of the FSS.[9] ViaSat is correct to note that satellite-to-satellite links are mentioned in the definition.[10] However, there are no studies or technical references that support the generic use of FSS allocations, including in the Ka band, for inter-satellite communications.

The appropriate radio service ViaSat should be looking to utilize is the ISS, which accommodates satellite-to-satellite links without condition:

> *Inter-Satellite Service.* A radiocommunication service providing links between artificial earth satellites.[11]

Yet, none of the frequency bands proposed by ViaSat for MEO-to-GSO links are allocated to the ISS. This is concerning because specific allocations of frequency bands to the ISS have been made by competent World Radiocommunication Conferences based on study contributions and analysis that guarantee the safe use of those frequency bands for such service. In general, frequency bands FSS allocations have not been made to

---

[6] *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016) ("*NGSO NPRM*"). *See* EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC Reply Comments in IB Dkt. No. 16-408 filed April 10, 2017.

[7] *See* Reply Comments of EchoStar Satellite Operating Corp. and Hughes Network Systems, LLC, *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, IB Docket No. 16-408, at 8 (filed April 10, 2017).

[8] ViaSat *Petition for Declaratory Ruling*, p.5 (filed November 15, 2016) (proposing to use 27.5-29.1 GHz and 29.5-30.0 GHz in the MEO-to-GSO direction, as well as 17.8-19.3 GHz and 19.7-20.2 GHz in the GSO-to-MEO direction).

[9] *Id.* at 6 & n.6.

[10] 47 C.F.R. §25.103.

[11] *Id*.

accommodate ISS, except on a case by case basis, as noted in the ITU and Commission definitions.

Of equal importance, ViaSat has not provided a technical analysis to demonstrate that there would not be harmful interference to other GSO and NGSO satellite systems operating on a co-channel basis in the same bands with its proposed ISS use. Without further analysis being done and appropriate rules being adopted, there is a risk that ViaSat's proposal could result in harmful interference to other systems. It is imperative then that further action on ViaSat's MEO-to-GSO proposal should be deferred until standards for antenna pointing accuracy, performance standards, and interference avoidance can be addressed. A MEO will orbit at a velocity of thousands of miles per hour, and would only in view of the intended GSO target for a portion of its orbital cycle. The tracking and switching techniques to avoid interference in such situations are nontrivial, and should be considered before acting on ViaSat's request or any similar NGSO-to-GSO satellite link.

Accordingly, consideration of ViaSat's application requesting use of portions of the Ka band for ISS should be deferred until appropriate studies are concluded and appropriate technical and operational rulers for MEO-to-GSO links to avoid interference with other GSO networks' Earth-to-space links are adopted.

Based on the foregoing, Hughes requests that the Commission take the actions mentioned herein, including requesting additional information from the NGSO applicants on compliance with EPFD limits and the adoption of appropriate conditions, and deferring consideration of the ViaSat application for use of portions of the Ka band for satellite-to-satellite links until studies are concluded that ensure protection of FSS operations in these bands.

Respectfully,

/s/*Jennifer A. Manner*

_____

Jennifer A. Manner
Senior Vice President, Regulatory Affairs
Hughes Network Systems, LLC
11717 Exploration Lane
Germantown, MD 20876
(301) 428-5893

/s/ *Brennan Price*

_____

Brennan Price
Senior Principal Engineer, Regulatory Affairs
Hughes Network Systems, LLC
11717 Exploration Lane
Germantown, MD 20876
(301) 428-1654

cc: Jose Albuquerque
Kerry Murray
Bob Nelson
Stephen Duall