



July 7, 2017

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

**Re: Reply 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”) provides these reply 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.<sup>1</sup>

As discussed below, Hughes, an FCC licensed geostationary orbit (“GSO”) satellite operator in portions of the 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz bands (collectively, “the Ka band”),<sup>2</sup> supports concerns raised in initial comments related to 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. Further, Hughes supports Inmarsat, Inc.’s (“Inmarsat”)<sup>3</sup> comments about ViaSat, Inc.’s (“ViaSat”)<sup>4</sup> proposal to utilize portions of the Ka band to support links

---

<sup>1</sup> *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 (the “Boeing Application”); *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; *Audacity Corporation Petition for Declaratory Ruling Granting Access to the U.S. Market for the Audacity 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 (the “SpaceX Application”); *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

<sup>2</sup> Hughes is authorized to use 18.6-18.8 GHz, 19.7-20.2 GHz, and 29.25-29.5 GHz under three FCC space station licenses (call signs S2663, S2753, and S2834).

<sup>3</sup> Inmarsat, Inc., Petition to Deny application of ViaSat, Inc., IBFS File No. SAT-PDR-20161115-00120 (the “Inmarsat Petition to Deny”).

<sup>4</sup> ViaSat Application, supra note 1, call sign S2985.

between medium earth orbit (“MEO”) NGSO and GSO satellites, and reiterates that consideration of this proposal should be deferred until appropriate studies are concluded and appropriate technical and operational rules for MEO-to-GSO links are adopted. Finally, Hughes supports the comments of WorldVu Satellites Ltd. d/b/a OneWeb (“OneWeb”),<sup>5</sup> regarding SpaceX’s request for waivers of rules imposing buildout milestones and treaty-mandated EPFD restrictions, as well as Boeing’s proposal for a three-tiered, open ended milestone schedule, as these requests are not in the public interest.

### **EPFD Compliance Issues**

As a GSO satellite operator, Hughes agrees with ViaSat that the FCC needs to implement aggregate EPFD limits that will ensure that the proposed NGSO systems will not cause harmful interference to existing GSO systems.<sup>6</sup> Hughes supports ViaSat’s request to:

(i) condition[] any grant of authority on the outcome of the pending NGSO rulemaking proceeding in IB Docket No. 16-408; and (ii) mak[e] clear that, unless and until suitable aggregate limits and related enforcement mechanisms are adopted, each and every NGSO operator is responsible for immediately implementing whatever technical or operational changes are necessary to protect GSO operations from harmful interference.<sup>7</sup>

Accordingly, Hughes reiterates its support for the FCC to adopt an approach consistent with the Commission’s proposal in the NGSO NPRM proceeding.<sup>8</sup> 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.<sup>9</sup>

Hughes also continues to urge 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. Therefore, regulations should consider an enforcement mechanism for to ensure compliance with such aggregate EPFD limits.

---

<sup>5</sup> WorldVu Satellites Ltd., comments on SpaceX Application, IBFS File No. SAT-LOA-20161115-00118 (the “OneWeb Comments on the SpaceX Application”); WorldVu Satellites Ltd., comments on Boeing Application, IBFS File No. SAT-LOA-20161115-00109 (the “OneWeb Comments on the Boeing Application”).

<sup>6</sup> ViaSat, Inc., Petition to Deny or Impose Conditions (“ViaSat Petition to Deny”), pp.2-3 (filed June 26, 2017).

<sup>7</sup> *Id.* at 3.

<sup>8</sup> *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.

<sup>9</sup> 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).

## **ViaSat Application MEO-to-GSO links**

Inmarsat also raises concerns with ViaSat's use of fixed satellite spectrum for MEO-to-GSO inter-satellite links. Inmarsat correctly notes that MEO-to-GSO links as proposed by ViaSat complicate the upward EPFD analysis:

[T]he bands where ViaSat proposes to operate satellite-to-satellite links are highly utilized by GSO FSS satellites which stand to be joined soon by a plethora of NGSO FSS satellites. This heavy level of use creates a contested interference environment. ViaSat itself has raised concerns that the current equivalent power-flux density ("EPFD") limits, which were adopted 20 years ago, may not be sufficient to protect current and future GSO FSS satellites. Introducing new sources of interference from NGSO-satellite-to-GSO-satellite transmissions would only exacerbate the potential for interference to GSO FSS satellites.<sup>10</sup>

Hughes agrees that this issue must be considered for MEO-to-GSO links outside of the inter-satellite service in the FSS frequency bands suggested by ViaSat (27.5-29.1 GHz and 29.5-30.0 GHz for MEO-to-GSO transmissions, and 17.8-19.3 GHz and 19.7-20.2 GHz for GSO-to-MEO transmissions). Accordingly, Hughes reiterates its request that consideration of ViaSat's application requesting use of portions of the Ka band for MEO-to-GSO links be deferred until appropriate studies are concluded and appropriate technical and operational rules for MEO-to-GSO links are adopted.<sup>11</sup> Hughes further requests that any such use be subject to suitable single-entry and aggregate EPFD limits to be adopted in the NGSO NPRM.

## **SpaceX Application Waiver Requests**

Hughes supports OneWeb's objections to two waiver requests in the SpaceX Application: the Commission's milestone obligations<sup>12</sup> and downlink PFD requirements.<sup>13</sup> Neither of these waiver requests is in the public interest, and both should be denied.

FCC license milestone obligations ensure that all market participants have fair opportunity access to orbital and spectrum resources without warehousing.<sup>14</sup> The requested waiver of the milestones could result in an inefficient use of the spectrum; something that milestones expressly protect against. Further, waiver of the milestones would hamper the coordination process between NGSO and GSO operators in the Ka band, impacting the near-term use of spectrum while there remains a possibility that additional satellites will be launched.

---

<sup>10</sup> Inmarsat Petition to Deny, supra note 5, p.4 (internal citations omitted); see also ViaSat Petition to Deny, supra note 10, p.2 (citing aggregate uplink interference as an issue that should be resolved in the NGSO NPRM).

<sup>11</sup> Hughes Letter, supra note 9, p.4.

<sup>12</sup> 47 C.F.R. § 25.164(b).

<sup>13</sup> 47 C.F.R. § 25.208(e).

<sup>14</sup> 47 C.F.R. § 25.164(b); *In re Amendment of Commission's Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10827-28 ¶ 173-175 (2003).

Further, SpaceX's requested waiver of the downlink PFD limits in the 18.8-19.3 GHz band increases the risk of interference to space-to-Earth links that Hughes is authorized to use in the United States.<sup>15</sup> Although GSO use of this band is on a non-interference basis to NGSOs, the requested waiver would affect all users of the 18.8-19.3 GHz band and change the conditions established by Section 25.208(e), upon which Hughes based its decision to operate on a non-interference basis.<sup>16</sup> SpaceX's waiver request, if granted, could have an impact on Hughes' current and future broadband satellite systems, and would contravene the obligations imposed by Article 21 of the Radio Regulations.<sup>17</sup> In order to protect against harmful interference, the FCC should deny this waiver request or impose conditions to protect all existing operations.

### **Boeing Application Milestone Requests**

Hughes supports OneWeb's comments on the Boeing Application objecting to Boeing's requested three-tier milestone schedule.<sup>18</sup> While Boeing's request is less open-ended than that proposed by SpaceX,<sup>19</sup> it still would result in possible spectrum speculation. Grant of Boeing's request would effectively remove its incentive to deploy its entire constellation in a timely manner and could result in an inefficient use of spectrum that milestones protect against. Further, it would complicate coordination between NGSO and GSO operators when an unknown number of additional NGSO satellites could be launched. For these reasons, Boeing's proposal for a milestone schedule would not service the public interest and should be denied.

### **Conclusion**

Based on the foregoing, Hughes requests that the Commission take the following actions:

- 1) adopt appropriate aggregate EPPD limits for NGSO systems in the Ka band and conditions NGSO operation on compliance with those limits;
- 2) defer 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 GSO FSS operations in these bands;
- 3) deny SpaceX's requested waivers of milestone and downlink PFD rules; and
- 4) deny Boeing's request for a three-tiered milestone schedule.

---

<sup>15</sup> Hughes is authorized to use the 18.8-19.3 GHz band on a non-interference basis under two space station licenses, call signs S2753 and S2834.

<sup>16</sup> See, e.g., Amateur Radio Service, Final Rule, 68 Fed. Reg. 33020 (June 3, 2003) (denying petition for secondary allocation to amateur service at 135.7-137.8 kHz and 160-190 kHz because of incumbent power line carrier systems operating on a non-interference basis in these bands); WRC-12 Implementation Report and Order, 82 Fed. Reg. 27178 (June 14, 2017) (imposing coordination requirement and waiting period for licensed amateur service stations wishing to use secondary allocations at 135.7-137.8 kHz and 472-479 kHz, in which power line carrier systems operate on a non-interference basis).

<sup>17</sup> ITU Radio Regulations, Edition of 2016, Table 21-4, No. 21.16.6, incorporated at 47 CFR 25.208(e).

<sup>18</sup> Boeing Application, pp. 23-24 (filed November 15, 2016).

<sup>19</sup> Boeing agrees to the six-year requirement for the first phase of its deployment. *Id.* at 24. Boeing requests a ten-year requirement for the second phase of its deployment (comprising 20 additional satellites) (*id.* at 10), and no deployment date required for the third phase thirty satellites (*id.* at 24-25).

Such actions will ensure that both GSO and NGSO satellites can operate successfully in the 18.6-20.2 GHz and 27.5-30 GHz bands and protect against spectrum speculation.

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