

FCC FACT SHEET*

ViaSat Authorization

Order and Declaratory Ruling – IBFS File No. SAT-PDR-20161115-00120
and SAT-APL-20180927-00076

Background: ViaSat, Inc. requests U.S. market access for its proposed non-geostationary-satellite orbit (NGSO) fixed-satellite service (FSS) constellation consisting of 20 satellites. The proposed grant would allow ViaSat to provide ubiquitous and low-latency broadband service to users in the United States.

What the Order Would Do:

- Grant ViaSat's request to operate in the following Ka and V FSS bands:
 - 17.8-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, 27.5-29.1 GHz, 29.5-30.0 GHz, 37.5-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz.
- Authorize satellite-to-satellite communications while protecting terrestrial operations in bands used for such communications.
- Specify conditions to protect or accommodate other operations including:
 - Geostationary-orbit (GSO) satellite operations: ViaSat would protect GSO operations by meeting specific equivalent power-flux density limits where applicable.
 - NGSO operations: ViaSat would comply with the avoidance of potential interference situations sharing method specified in the Commission's rules for any NGSO system licensed or granted U.S. market access pursuant to the same processing round.
 - Terrestrial operations: ViaSat would comply with Commission rules and protect terrestrial operations by meeting power-flux density limits. In particular, ViaSat would be required to protect Upper Microwave Flexible Service in certain frequency bands.
 - Out-of-band emissions: ViaSat would comply with Commission rules regarding out-of-band emission limits or future limits.
- Require modification of ViaSat's operations to bring them into accordance with any future rules or policies adopted by the Commission.

* This document is being released as part of a "permit-but-disclose" proceeding. Any presentations or views on the subject expressed to the Commission or its staff, including by email, must be filed in IBFS File No. SAT-PDR-20161115-00120 and/or SAT-APL-20180927-00076, which may be accessed via the International Bureau Filing System (<https://licensing.fcc.gov/myibfs>). Before filing, participants should familiarize themselves with the Commission's *ex parte* rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission's meeting. See 47 CFR § 1.1200 et seq.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
ViaSat, Inc.) IBFS File No. SAT-PDR-20161115-00120
and SAT-APL-20180927-00076
Petition for Declaratory Ruling Granting Access for)
a Non-U.S.-Licensed Non-Geostationary Orbit) Call Sign S2985
Satellite Network)

ORDER AND DECLARATORY RULING*

Adopted: "Insert Adopted Date"

Released: "Insert Release Date"

By the Commission:

I. INTRODUCTION

1. In this Order and Declaratory Ruling (Order), we grant the request of ViaSat, Inc. (ViaSat) for U.S. market access, as amended, for its proposed non-geostationary orbit (NGSO) satellite system that will provide fixed-satellite service (FSS). ViaSat seeks market access for a constellation of 20 satellites operating in four orbital planes of five satellites each. ViaSat’s proposed satellites would communicate with earth stations in the United States in the Ka-band and V-band using the following specific frequencies: 17.8-18.6 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz and 37.5-42.0 GHz (space-to-Earth); and 27.5-29.1 GHz, 29.5-30.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz (Earth-to-space). ViaSat states that grant of its request for market access would allow it to more intensively use spectrum that is already

*This document has been circulated for tentative consideration by the Commission at its April 2020 open meeting. The issues referenced in this document and the Commission’s ultimate resolution of those issues remain under consideration and subject to change. This document does not constitute any official action by the Commission. However, the Chairman has determined that, in the interest of promoting the public’s ability to understand the nature and scope of issues under consideration, the public interest would be served by making this document publicly available. The FCC’s ex parte rules apply and presentations are subject to “permit-but-disclose” ex parte rules. See, e.g., 47 CFR §§ 1.1206, 1.1200(a). Participants in this proceeding should familiarize themselves with the Commission’s ex parte rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR §§ 1.1200(a), 1.1203.

1 ViaSat, Inc., Petition for a Declaratory Ruling Granting Access to the U.S. Market for a Non-U.S. Licensed Non-geostationary Orbit Satellite Network, IBFS File No. SAT-PDR-20161115-00120 (filed Nov. 15, 2016) (ViaSat Petition) and SAT-APL-20180927-00076 (filed Sept. 27, 2018) (ViaSat Amendment).

2 The term “Ka-band” refers to the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz bands, also known as the “conventional Ka-band,” which the Commission has designated as primary for GSO FSS operation. See 47 CFR § 25.103. ViaSat also requests use of the 17.8-18.3 GHz and 18.8-19.7 GHz bands, which will also be referred to as Ka-band frequencies for the purposes of this Order.

3 For purposes of this Order, we use the term “V-band” to refer to frequencies ranging from 37.5 GHz to 52.4 GHz.

4 ViaSat also requested to operate in the 18.6-18.8 GHz (space-to Earth) band, but the request for market access in this band was not accepted for filing.

being used, or is planned for use, by its existing and planned satellites in geostationary orbit (GSO), and to provide ubiquitous and low-latency broadband services to users in the United States.⁵

II. BACKGROUND

2. *Petition and Amendment.* On November 15, 2016, ViaSat filed a petition for declaratory ruling requesting access⁶ to the U.S. market for a proposed NGSO FSS satellite system⁷ operating under the authority of the Netherlands.⁸ ViaSat's proposed NGSO satellites would operate in circular medium earth orbits (MEO) at an altitude of 8,200 km, inclined at 87° to the equator.⁹ In its Petition, ViaSat requests U.S. market access for these satellites to communicate with U.S.-licensed earth stations within the continental United States, Hawaii, Puerto Rico, Alaska, and the U.S. Virgin Islands.¹⁰ As part of its Petition, ViaSat also seeks waivers of certain Commission policies and rules.¹¹

3. ViaSat's proposed system also includes high-speed transmissions between its MEO satellites operating at 8,200 km and GSO satellites operating at an altitude of 35,786 km.¹² For these satellite-to-satellite communication links, ViaSat proposes to use the 17.8-19.3 GHz and 19.7-20.2 GHz

⁵ ViaSat Petition at 2-3.

⁶ The Commission developed the market access procedure we follow here to facilitate the participation of non-U.S.-licensed satellite systems in the FCC licensing process, even though such systems do not seek a U.S. space station license. As such, favorable action on such a request is in the nature of a policy statement or declaratory ruling with respect to the availability of spectrum and other public interest considerations for future licensing of U.S. earth stations that would operate with the non-U.S.-licensed space station. *See Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Satellites to Provide Domestic and International Service in the United States*, Report and Order, 12 FCC Rcd 24094, 24106, para. 29, 24173-74, paras. 184-88 (1997) (*1997 Report and Order*). In the present Petition, ViaSat is not applying for earth station authorizations; but when it does seek earth station authorizations, it must file, and the Commission must approve, corresponding earth station applications before it may provide its proposed services in the United States.

⁷ The ViaSat Petition was filed as part of three processing rounds for NGSO-like applications and petitions: (i) in the Ku- and Ka-band frequencies requested by OneWeb Satellites Limited (*OneWeb Petition Accepted for Filing, IBFS File No. SAT-LOI-20160428-00041; Cut-Off Established for Additional NGSO-Like Satellite Applications or Petitions for Operations in the 10.7-12.7 GHz, 14.0-14.5 GHz, 17.8-18.6 GHz, 18.8-19.3 GHz, 27.5-28.35 GHz, 28.35-29.1 GHz, and 29.5-30.0 GHz Bands*, Public Notice, DA-16-804, 31 FCC Rcd 7666 (IB Sat. Div. Jul. 15, 2016)); (ii) in additional Ku- and Ka-band frequencies (*Cut-Off Established for 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, 29.1-29.5 GHz Bands*, Public Notice, DA 17-524, 32 FCC Rcd 4180 (IB Sat. Div. May. 26, 2017)); and (iii) in V-band frequencies requested by The Boeing Company (*Boeing Application Accepted for Filing in Part, IBFS File No. SAT-LOA-20160622-00058; Cut Off Established for Additional NGSO-like Satellite Applications or Petitions for Operations in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz Bands*, Public Notice, DA 16-1244, 31 FCC Rcd 11957 (IB Sat. Div. Nov. 1, 2016)).

⁸ ViaSat Petition at 1.

⁹ *Id.* at 3-4.

¹⁰ *Id.* at 2. ViaSat notes that its NGSO network will also provide service outside of the United States. *Id.* at 4-5.

¹¹ ViaSat seeks waivers of sections 25.112, 25.202(a), 25.156(d)(5), 25.210(i), and 25.217(b)(1) of the Commission's rules. 47 CFR §§ 25.112, 25.202(a), 25.156(d)(5), 25.210(i), and 25.217(b)(1). In addition, ViaSat requests waiver of the Commission's Ka- and V-band Plans, as well as rules and policies governing the submission of Schedule S information. ViaSat Petition at 11 and 23-30; Attachment 1 to ViaSat Petition at 31-33.

¹² ViaSat states that these GSO points of communications will include, but are not limited to, its own GSO satellites. ViaSat Petition, Attachment A, Technical Annex, p. 8, n.3; *see also* Letter from John P. Janka, Latham & Watkins, to Marlene H. Dortch, Secretary, Federal Communications Commission, IBFS File Nos. SAT-PDR-20161115-00120 (filed Aug. 13, 2018).

bands for transmissions from GSO to MEO and the 27.5-29.1 GHz and 29.5-30.0 GHz bands for transmissions from MEO to GSO.¹³ According to ViaSat, the communication links between GSO and MEO satellites can provide “alternative means of transmitting essential data to, and ‘backhauling’ essential data from, MEO satellites, and thereby would enable a wide variety of services, including remote sensing ... [and] reduce the need to find, coordinate, reserve, and license additional spectrum for sensing missions.”¹⁴ ViaSat states that the spectrum for the satellite-to-satellite communication links will be used in the same direction of transmission as other FSS communications relative to GSO satellites, *i.e.* transmissions from NGSO satellites to GSO satellites will occur in band segments designated for the Earth-to-space direction, and transmission from GSO satellites to NGSO satellites will occur in the segments designated for space-to-Earth direction.¹⁵

4. On September 27, 2018, ViaSat amended its Petition to reflect three technical changes which it states are aimed at reducing potential interference into other satellite networks: (1) a reduction in the number of satellites in the proposed constellation from 24 to 20; (2) an increase in the number of orbital planes from 3 to 4; and (3) a reduction in the number of satellites per orbital plane from 8 to 5.¹⁶ Other than these three technical changes, ViaSat’s amended Petition is unchanged from its original Petition and no frequency bands were added or dropped from its market access request.

5. *Comments and Pleadings.* The International Bureau issued a Public Notice requesting comment on ViaSat’s Petition for market access in the Ka-band on May 26, 2017 (May 2017 Public Notice), but deferred a determination concerning the acceptability for filing of ViaSat’s request for market access in the 18.6-18.8 GHz band, citing No. 5.522B of the Radio Regulations of the International Telecommunication Union (ITU).¹⁷ In response to the May 2017 Public Notice, two parties filed petitions to deny ViaSat’s Petition,¹⁸ and several parties filed comments.¹⁹ ViaSat opposed or replied to these pleadings,²⁰ and several parties submitted reply comments and/or replied to ViaSat’s opposition and reply.²¹ The International Bureau issued a Public Notice seeking comment on ViaSat’s Petition for

¹³ ViaSat Petition at 5.

¹⁴ *Id.* at 5-6.

¹⁵ *Id.* at 5.

¹⁶ ViaSat Amendment at 3-6, 16.

¹⁷ *Satellite Policy Branch Information: Space Station Applications Accepted for Filing*, Public Notice, DA 17-524, 32 FCC Rcd 4180 (IB rel. May 26, 2017). The International Bureau accepted for filing ViaSat’s petition for U.S. market access in the following frequency bands: 17.8-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth); and 27.5-29.1 GHz and 29.5-30.0 GHz (Earth-to-space). Article 5.522B of the ITU Radio Regulations states that “[t]he use of the band 18.6-18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20,000 km.” Because the International Bureau has not accepted the portion of ViaSat’s request concerning the 18.6-18.8 GHz band for filing, this portion of ViaSat’s request is not before us, and we defer action until after such time as the Bureau accepts the request for filing.

¹⁸ Inmarsat, Inc. Petition to Deny (filed June 26, 2017) (Inmarsat Ka-band Petition to Deny); Telesat Canada Petition to Deny (filed June 26, 2017) (Telesat Ka-band Petition to Deny).

¹⁹ Space Norway AS (filed June 26, 2017) (Space Norway Ka-band Comments); Hughes Network Systems, LLC (filed June 26, 2017) (Hughes Ka-band Comments); SES S.A. and O3b Limited (filed June 26, 2017) (SES/O3b Ka-band Comments); Space Exploration Technologies Corp. (filed June 26, 2017) (SpaceX Ka-band Comments); and WorldVu Satellites Limited (filed June 26, 2017) (WorldVu Ka-band Comments).

²⁰ ViaSat Consolidated Opposition and Reply (July 7, 2017) (ViaSat Opposition); ViaSat Reply (July 14, 2017).

²¹ The Boeing Company (filed July 7, 2017) (Boeing Ka-band Reply), and Hughes Network Systems, LLC (filed July 7, 2017) (Hughes Ka-band Reply); Inmarsat (filed July 14, 2017) (Inmarsat Ka-band Reply); Space Exploration

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market access in the V-band on June 16, 2017 (June 2017 Public Notice).²² In response to the June 2017 Public Notice, several parties filed comments,²³ ViaSat opposed or replied to these comments,²⁴ and several parties replied to ViaSat's comments.²⁵ The International Bureau issued a Public Notice seeking comment on ViaSat's Amendment on November 2, 2018.²⁶ In response, one party filed a petition to dismiss or defer (which ViaSat opposed),²⁷ and several parties filed comments and replies.²⁸

6. *Subsequent Rulemakings.* In September 2017, following the close of the comment cycles for the ViaSat Petition, but prior to ViaSat filing its amendment, the Commission adopted the *NGSO FSS Report and Order* that updated several rules and policies governing NGSO FSS systems.²⁹ The *NGSO FSS Report and Order* adopted, among other things, spectrum sharing rules and a more flexible milestone schedule for NGSO systems.³⁰

7. In November 2017, the Commission adopted the Spectrum Frontiers Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order,³¹ which, among other things, made or affirmed determinations that the 40-42 GHz

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Holdings, LLC (filed July 14, 2019) (SpaceX Ka-band Reply); SES/O3b (filed July 14, 2017) (SES/O3b Ka-band Reply); Telesat (July 14, 2017) (Telesat Ka-band Reply), and WorldVu Satellites Limited (filed July 14, 2017) (WorldVu Ka-band Reply).

²² *Satellite Policy Branch Information: Space Station Applications Accepted for Filing*, Public Notice, Report SAT-01245 (IB rel. June 16, 2017). The International Bureau accepted for filing ViaSat's petition for U.S. market access in the following frequency bands: 37.5-42.0 GHz (space-to-Earth) and 47.2-50.2 GHz and 50.4-51.4 GHz (Earth-to-space).

²³ Hughes Network Systems, LLC, (filed July 17, 2017) (Hughes V-band Comments); SES/O3b (filed July 17, 2017) (SES/O3b V-band Comments); Space Exploration Holdings, LLC (filed July 17, 2017) (SpaceX V-band Comments); Telesat Canada (filed July 17, 2017) (Telesat V-band Comments).

²⁴ ViaSat, Inc. (filed Aug. 1, 2017) (ViaSat V-band Reply).

²⁵ SES/O3B (filed Aug. 11, 2017) (SES/O3b V-band Reply); Space Exploration Technologies Corp. (filed Aug. 11, 2017) (SpaceX Ka-band Reply); The Boeing Company (filed August 18, 2017) (Boeing V-band Reply).

²⁶ *Satellite Policy Branch Information: Space Station Applications Accepted for Filing*, Public Notice, Report No. SAT-01357 (IB rel. Nov. 2, 2018).

²⁷ Comments and Petition to Dismiss or Defer by Hughes Network Systems, LLC (filed Dec. 3, 2018) (Hughes Amendment Comments and Petition to Dismiss or Defer); ViaSat Opposition to Petition to Dismiss or Defer and Reply to Comments (filed Dec. 18, 2018) (ViaSat Amendment Opposition).

²⁸ Comments of Space Exploration Technologies Corp. (filed Dec. 13, 2018) (SpaceX Amendment Comments); SpaceX Reply (SpaceX Amendment Reply) (Dec. 31, 2018); Hughes Consolidated Reply (Hughes Amendment Reply) (Dec. 28, 2018).

²⁹ *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (*NGSO FSS Report and Order*).

³⁰ Most of these rule changes went into effect on January 17, 2018. *See* 82 Fed. Reg. 59972 (Dec. 18, 2017). The amendments to sections 25.114, 25.115, 25.146, and 25.164, however, contained new and modified information collection requirements that required approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act, and these amendments therefore did not become effective until May 31, 2018. *See Updates Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, 83 Fed. Reg. 22391 (May 15, 2018) (announcing OMB approval of information collection requirements and setting effective date for rule amendments containing those requirements).

³¹ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services et. al.*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017). When citing to the *Second Report and Order* portion of the document, we will refer to the

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and 48.2-50.2 GHz bands will be reserved for FSS use,³² while limiting satellite operations to communications with individually licensed earth stations in the 37.5-40.0 GHz and 47.2-48.2 GHz bands.³³ The Commission also affirmed the existing power flux density (PFD) limits applicable to satellite operations in the 37.5-40.0 GHz band.³⁴

8. And in the *Spectrum Frontiers Fifth Report and Order*, the Commission adopted rules permitting licensing of individual FSS earth stations in the 50.4-51.4 GHz.³⁵

III. DISCUSSION

9. After review of the record, we conclude that grant of the ViaSat Petition will serve the public interest, subject to the requirements and conditions specified herein. ViaSat is a well-established provider of broadband communications using a fleet of Ka-band geostationary satellites, and the addition of the proposed non-geostationary space stations operating in the V-band as well as Ka-band will provide ViaSat with an alternative means to better serve American customers with more broadband capacity. Below we address the various outstanding issues raised by commenters on the Petition, and also address ViaSat's waiver requests. Where appropriate, we defer matters of general applicability to ongoing or potential future rulemakings. And we note that where rules are modified as a result of the *Spectrum Frontiers* proceeding, the *NGSO FSS* proceeding, or in other relevant proceedings, ViaSat's operations will be subject to those modified rules.

A. Procedural Issues

10. Before we address the substance of ViaSat's Petition, we must first resolve a procedural issue. Specifically, Hughes contends that, under section 25.116 of the Commission's rules,³⁶ the changes put forth in ViaSat's Amendment constitute a major amendment to ViaSat's proposed system³⁷ and, as a result, we must dismiss the pending ViaSat Petition and treat it instead as a newly filed petition for market access outside of the current Ku/Ka-band and V-band processing rounds.³⁸ Section 25.116(b)(1) of the Commission's rules states that an amendment will be deemed to be a major amendment if it "increases the potential for interference or changes the proposed frequencies or orbital locations to be used."³⁹ Hughes argues that by increasing the number of orbital planes from three to four, the satellites within those orbital planes will move through space in a different configuration than originally proposed, which

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Spectrum Frontiers Second R&O, when citing to the *Second Further Notice of Proposed Rulemaking* portion of the document, we will refer to the *Spectrum Frontiers Second FNPRM*, and when citing to the *Memorandum Opinion and Order* portion of the document, we will refer to the *Spectrum Frontiers MO&O*.

³² *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11050-51, paras. 189, 192.

³³ *Spectrum Frontiers Second R&O and MO&O*, 32 FCC Rcd at 11005, 11061, paras. 55, 220.

³⁴ *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11058-60, paras 214-16.

³⁵ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Service*, Fifth Report and Order, 34 FCC Rcd 2556, 2560, paras. 10-12 (2019).

³⁶ 47 CFR § 25.116. Specifically, section 25.116(c) states that an "application for a NGSO-like satellite license ... will be considered a newly filed application if it is amended by a major amendment ... after a 'cut-off' date applicable to the application." *Id.* at 47 CFR § 25.116(c). In this instance, the cut-off dates were the filing deadlines established for the Ku/Ka-band and V-band processing rounds, and both of these deadlines passed prior to ViaSat filing its amendment.

³⁷ ViaSat amended its Petition by reducing the number of satellites from 24 to 20, increasing the number of orbital planes from 3 to 4, and reducing the number of satellites per orbital plane from 8 to 5.

³⁸ Hughes Amendment Comments and Petition to Dismiss or Defer at 1.

³⁹ 47 CFR § 25.116(b)(1).

Hughes argues constitutes a change in the orbital locations to be used and triggers the major amendment provisions of section 25.116.⁴⁰ ViaSat and SpaceX both argue that Hughes' "orbital location" concept is inapplicable in the NGSO context.⁴¹ No party alleges that the ViaSat Amendment increases the potential for interference or changes proposed frequencies.⁴²

11. We disagree with Hughes' interpretation of section 25.116. The term "orbital location" is a term generally used in the context of GSO satellite operations, where satellites are licensed to operate at a particular location on the geostationary arc, defined as the longitude east or west of the prime meridian. Because the interference environment in geostationary orbit is largely a factor of the spacing between satellites on the geostationary arc, a change in the orbital location of a GSO satellite almost certainly changes the interference environment between it and neighboring satellite systems. Thus, an amendment changing the orbital location of a GSO satellite (for example, from 100 degrees west longitude to 102 degrees west longitude) would likely change the interference environment and render the amendment a "major" amendment under section 25.116. Therefore, the reference to "orbital locations" in section 25.116(b)(1) is only applicable to GSO space station applications.⁴³ For NGSO space station applications or petitions for market access such as ViaSat's, the triggers for a major amendment under section 25.116(b)(1) that are relevant to our analysis are a change in proposed frequencies or an increase in the potential for interference. Significantly, the triggers under section 25.116(b)(1) reflect the Commission's determination that the key element of a major amendment is "one that increases the potential for interference."⁴⁴

12. ViaSat has not requested a change in proposed frequency bands nor actions that would result in an increased potential for interference. To the contrary, the fact that the number of satellites proposed is reduced, the altitude of the proposed orbits remains the same, and the frequencies requested are unchanged mean that the number of potential interference events between ViaSat's proposed satellites and other satellites being proposed in the same processing rounds is likely to be decreased and the number of times constellations will be required to reduce spectrum will also likely be smaller. As both ViaSat and SpaceX assert, and we agree, these changes decrease the potential for interference, rather than increase it.⁴⁵ Thus, we conclude that ViaSat's Amendment is not a major amendment and deny Hughes' request to remove the ViaSat Petition from the existing Ku-/Ka-band and V-band processing rounds.

⁴⁰ *Id.* at 3.

⁴¹ ViaSat Amendment Opposition at 5-6; SpaceX Amendment Comments at 5 and SpaceX Amendment Reply Comments at 2.

⁴² Hughes argues that ViaSat has not provided substantial evidence that ViaSat's Amendment does not increase the potential for interference but does not provide any claim or evidence itself that the changes proposed would increase the interference potential to other NGSO systems in the processing round. Hughes Comments and Petition to Dismiss or Defer at 3-4.

⁴³ The Commission previously dismissed a similar argument when a party opposed Orbcomm's requested change in orbital planes, arguing that it should be considered a major amendment under section 25.116(b). The Commission stated that "any discussion of orbit locations is inapposite here, as LEO systems operate in orbital planes, and are not assigned to specific-and scarce-geostationary orbital slots." See also SpaceX Amendment Reply Comments at 2-3, citing, *Orbital Communications Corp.*, 9 FCC Rcd 6476, para. 26 (1994).

⁴⁴ *Amendment of the Commission's Space Station Licensing Rules and Policies*, Notice of Proposed Rulemaking and First Report and Order, 17 FCC Rcd 3847, 3860 para. 36 (2002) (stating, "Generally, a 'major amendment' is one that increases the potential for interference."); *First Space Station Licensing Reform Order*, 18 FCC Rcd at 10813, para. 136 (stating, "Generally, a 'major amendment' is one that increases the potential for interference to other applicants or licensees.").

⁴⁵ ViaSat Amendment Opposition at 3 and 7; SpaceX Amendment Comments at 4 and SpaceX Amendment Reply Comments at 4.

B. Ka-Band FSS Issues

13. ViaSat's Petition, as accepted for filing, proposes communications with U.S.-licensed earth stations in the following Ka-band frequencies: 17.8-18.6 GHz (space-to-Earth), 18.8-19.3 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-29.1 GHz (Earth-to-space), and 29.5-30.0 GHz (Earth-to-space). ViaSat states that these frequency bands will also be used for satellite-to-satellite communications between its NGSO space stations and GSO space stations (including, but not limited to, other ViaSat GSO space stations) in the same direction (that is, away or towards the Earth) as the allocation in the requested frequency band.⁴⁶ For the reasons set forth below, we find that the public interest is served by granting U.S. market access for the ViaSat NGSO FSS system to communicate with U.S. earth stations in the requested Ka-band frequencies.

14. We are not however, granting access for proposed satellite-to-satellite communications. If these communications are between a ViaSat NGSO space station licensed by the Netherlands and a GSO space station licensed by another foreign Administration, they are not subject to Commission jurisdiction. If such communications are with a U.S.-licensed GSO space station, they can be addressed in the licensing of that particular GSO space station, not in this market access request for ViaSat's NGSO constellation. In this order, we address ViaSat's satellite-to-satellite communications below solely in the context of our responsibility to ensure that any such communications do not cause harmful interference to communications between earth stations licensed by the Commission and space stations approved to provide service to the United States, which is part of our review of ViaSat's Petition for market access for communications between ViaSat's satellites and earth stations in the United States.⁴⁷

15. *The 18.8-19.3 GHz and 28.6-29.1 GHz Bands.* In the 18.8-19.3 GHz and 28.6-29.1 GHz bands, we grant ViaSat's request to communicate with U.S.-licensed earth stations since the request is consistent with the Commission's Ka-band Plan that designates these frequency bands for NGSO FSS operations on a primary basis.⁴⁸ We address below ViaSat's request to communicate with U.S.-licensed earth stations in the remaining Ka-band frequencies that are not designated for primary NGSO FSS operations.

16. *Space-to-Earth Operations in the 17.8-18.6 GHz Band.* The Commission has added a non-Federal FSS allocation to the 17.8-18.3 GHz band on a secondary basis and designated NGSO FSS on a secondary basis to GSO FSS in the 18.3-18.6 GHz band.⁴⁹ ViaSat confirms that its operations with earth stations in the United States will avoid harmful interference into, and accept any interference received from, primary users of the band.⁵⁰ ViaSat also states that such operations will comply with all

⁴⁶ The ViaSat Petition generally refers to communications between its MEO satellites and GSO satellites, without specifying whether these GSO satellites will be U.S.-licensed or non-U.S. licensed. We assume that ViaSat contemplates communications with U.S.-licensed GSO satellites at some point.

⁴⁷ Some commenters raise concerns whether the Commission has jurisdiction over ViaSat's satellite-to-satellite communications, which do not originate or terminate within the United States, and whether the ViaSat Petition must be dismissed under section 25.112 of the Commission's rules, 47 CFR § 25.112, because the frequencies that ViaSat proposes for satellite-to-satellite communications have not been specifically allocated internationally for space-to-space operations. See Letter from Giselle G. Creeser, Director, Regulatory, Inmarsat, to Marlene H. Dortch, Secretary, FCC, IBFS File No. SAT-PDR-20161115-00120, (filed Nov. 20, 2017); Letter from Jennifer A. Manner, Senior Vice President, Regulatory Affairs, Hughes Network Systems, LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, IBFS File Nos. SAT-PDR-20161115-00120 (filed Oct. 187, 2017). As noted above, we are not licensing, or granting market access to, ViaSat's satellite-to-satellite communications.

⁴⁸ *NGSO FSS Report and Order*, Appendix B.

⁴⁹ *Id.* at 3-4.

⁵⁰ ViaSat Petition at 15-16.

applicable Commission and ITU downlink power flux density limits.⁵¹ In particular, ViaSat has presented a demonstration that it will comply with international equivalent power flux density (EPFD) limits designed to protect GSO networks in the 17.8-18.6 GHz band and set forth in Article 22 of the ITU Radio Regulations (ITU-RR).⁵² As per section 25.146(c), prior to initiation of service, ViaSat must receive a favorable or “qualified favorable” finding in accordance with Resolution 85 (WRC-03) with respect to its compliance with applicable equivalent power flux-density limits in Article 22 of the ITU Radio Regulations. Accordingly, we grant ViaSat’s request for market access in this band.

17. *Space-to-Earth Operations in the 19.7-20.2 GHz Band.* The 19.7-20.2 GHz band is designated for GSO FSS on a primary basis in the United States. In its Petition, ViaSat provided technical demonstrations to show that it will comply with international EPFD limits designed to protect GSO networks in the 19.7-20.2 GHz band and set forth in Article 22 of the ITU Radio Regulations (ITU-RR).⁵³ Prior to initiation of service, ViaSat must receive a favorable or “qualified favorable” finding in accordance with Resolution 85 (WRC-03) with respect to its compliance with applicable EPFD limits in Article 22 of the ITU Radio Regulations.⁵⁴ In addition, ViaSat states that it will not cause harmful interference to and is willing to accept interference from GSO FSS operators in this frequency band.⁵⁵ We therefore grant ViaSat’s request for market access in this band.

18. *Earth-to-Space Operations in the 27.5-28.6 GHz Bands.* The 27.5-28.35 GHz band is designated for FSS on a secondary basis in the United States.⁵⁶ The FSS (Earth-to-space) is secondary to the Upper Microwave Flexible Use Service (UMFUS) in the band except for FSS operations associated with certain excepted earth stations, as specified in the Commission’s rules. ViaSat’s operations within the United States are on a secondary basis to UMFUS and are subject to the earth station siting provisions of section 25.136 of the Commission’s rules.⁵⁷

19. ViaSat has presented a demonstration that it will comply with international EPFD limits designed to protect GSO networks in the 27.5-28.6 GHz band set forth in Article 22 of the ITU Radio Regulations (ITU-RR).⁵⁸ ViaSat’s request for market access in this band is granted on a non-protected non-interference basis with respect to GSO FSS systems and subject to the applicable EPFD limits. The broadband services ViaSat proposes to provide will benefit American consumers conditioned on protection of other services.

20. *Earth-to-Space Operations in the 29.5-30.0 GHz Band.* The U.S. Table of Frequency Allocations designates the 29.5-30.0 GHz band as co-primary for non-Federal Fixed Satellite, and Mobile Services.⁵⁹ In the *NGSO FSS Report and Order*, the Commission reiterated that the 29.5-30.0 GHz band is designated for non-Federal GSO FSS operations on a primary basis and for NGSO FSS operations on a secondary basis.⁶⁰ ViaSat states that its NGSO satellites would be compatible with GSO FSS operations in the band and would be obligated to avoid harmful interference into, and accept any interference

⁵¹ *Id.* at 16 and Technical Annex at 27-28, 30-31.

⁵² ViaSat Technical Annex at 21-22, Exhibit 1 at 2-3.

⁵³ *Id.* at Technical Annex at 21-22, Exhibit 1 at 3-5.

⁵⁴ *See* 47 CFR § 25.146(c).

⁵⁵ ViaSat Petition at 17-18.

⁵⁶ *NGSO FSS Report and Order*, App. B.

⁵⁷ 47 CFR § 25.136.

⁵⁸ ViaSat Technical Annex at 28-29, Exhibit 1 at 7-9.

⁵⁹ U.S. Table of Frequency Allocations, 47 CFR § 2.106.

⁶⁰ *NGSO FSS Report and Order*, 32 FCC Rcd at 7813, para. 9.

received from, primary users.⁶¹ Specifically, ViaSat has demonstrated that its operations in this band will comply with EPFD levels set forth in Article 22 of the ITU Radio Regulations.⁶² Prior to initiation of service, ViaSat must receive a favorable or “qualified favorable” finding in accordance with Resolution 85 (WRC-03) with respect to its compliance with applicable equivalent power flux-density limits in Article 22 of the ITU Radio Regulations.⁶³ Consistent with the decisions in the *NGSO FSS Report and Order*, we grant ViaSat’s request for market access in the 29.5-30.0 GHz band.

21. *Satellite-to-Satellite Communications.* Although the Commission is not including in this market access grant any authority for satellite-to-satellite communications, we do share the concern expressed in the record regarding the potential for interference to GSO space stations generated by transmission from ViaSat NGSO satellites to other satellites in the geostationary orbit and will condition ViaSat accordingly to ensure protection of GSO space station receivers.

22. Specifically, several parties allege that ViaSat has not demonstrated in its technical analysis that the satellite-to-satellite communications proposed as part of its NGSO system will not cause harmful interference to GSO and NGSO systems operating in the same Ka-band frequencies.⁶⁴ While OneWeb raises a number of technical objections to ViaSat’s Petition, OneWeb agrees that the additional information provided by ViaSat significantly reduces OneWeb’s concerns about potential harmful interference; OneWeb, however, still seeks conditions on ViaSat’s inter-satellite communications.⁶⁵ Boeing supports conditional market access for ViaSat’s proposed NGSO constellation.⁶⁶ In this context, Boeing suggests that ViaSat should conduct EPFD_{up} and EPFD_{down} calculations associated with the proposed satellite-to-satellite communications or complete coordination of these transmissions with potentially affected GSO operators.⁶⁷ ViaSat responds that none of the commenters have provided a technical demonstration that its proposed satellite-to-satellite communications would result in harmful interference.⁶⁸

⁶¹ ViaSat Petition at 13-14.

⁶² *Id.* at Technical Annex at 21-22, Exhibit 1 at 7-10.

⁶³ *See* 47 CFR § 25.146(c).

⁶⁴ *See, e.g.,* Hughes Ka-band Comments at 2-3; OneWeb Ka-band Comments at 2-5; SES/O3b Ka-band Comments at 5-6; Inmarsat Ka-band Petition to Deny at 3-4. Hughes and Inmarsat also request that we dismiss or deny ViaSat’s Petition until the issues surrounding the satellite-to-satellite communications are resolved. Hughes Ka-band Comments at 3-4; Letter from Jennifer A. Manner, Senior Vice President, Regulatory Affairs, Hughes Network Systems, LLC, and Inmarsat, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, IBFS File Nos. SAT-PDR-20161115-00120 (filed Oct. 18, 2017) (Hughes and Inmarsat Oct. 18 *Ex Parte* Letter). Inmarsat also asserts that ViaSat’s proposal does not satisfy the criteria in the ITU Radio Regulations for the protection of GSO space stations from NGSO systems. Inmarsat Ka-band Reply at 4.

⁶⁵ WorldVu Ka-band Reply at 4. ViaSat states that it necessarily makes certain assumptions about the number of users simultaneously transmitting within any given satellite footprint, and that it does not intend to operate its system in the manner suggested by OneWeb. ViaSat Opposition at 10. OneWeb requests that the Commission condition any grant of market access on complying with these operating parameters and requests that the Commission require that ViaSat’s Ka-band satellite-to-satellite communication link not cause harmful interference to or claim protection from, other NGSO FSS systems operating in the same direction of transmission. WorldVu Ka-band Reply at 4.

⁶⁶ Boeing Ka-band Reply at 3.

⁶⁷ *Id.* at 3. Boeing also observes that interference to GSO satellites could be avoided if a ViaSat NGSO satellite operating within the nominal coverage “disk” of the GSO space station uses the same earth station pointing and off-axis transmission requirements that exist for earth stations at fixed locations or on mobile platforms. *Id.*

⁶⁸ ViaSat Ka-band Reply at 12-13 (filed July 14, 2017).

23. We find the conditions we adopt herein are sufficient to reach a determination that the public interest will be served by granting ViaSat's proposed satellites access to the U.S. market, even taking into account the possibility of satellite-to-satellite communications licensed by another Administration. We note, however, that during transmissions from a ViaSat MEO satellite to a GSO satellite, the MEO antenna will be intentionally pointed at the target satellite for the duration of the transmission, rather than—as is the case with an earth station that transmits to an NGSO satellite transiting in the sky—pointing only incidentally toward GSO satellites. Accordingly, the victim GSO satellites (typically those closest to the target GSO satellite) will not experience the same degree of time-variation in the interfering signal as would be the case with earth-station-to-NGSO transmissions.⁶⁹ Therefore, we believe that EPFD limits, which intrinsically take into account this time-variation, may not be the most appropriate regulatory mechanism by which to ensure protection of GSO space stations. Rather, we believe that ViaSat's proposed inter-satellite transmissions from MEO to GSO satellites should produce, at the GSO, off-axis power flux density levels no greater than those that would be produced by an earth-based antenna operating in compliance with the off-axis EIRP density limits contained in section 25.218(i)(1)-(4), as alternatively proposed by Boeing. We condition ViaSat's operations accordingly. Given the importance of avoiding interference into U.S.-licensed GSO satellites, this condition is appropriate even though we are not including satellite-to-satellite transmissions in this market access grant. In addition, ViaSat would have an obligation to protect any terrestrial operations in the frequency bands used for transmissions from its MEO satellites to a GSO space station.

C. V-band FSS Issues

24. *Space-to-Earth Operations in the 37.5-40.0 GHz Band.* The 37.5-40.0 GHz band is currently allocated to the fixed and mobile services on a primary basis. The band is also allocated to the FSS (space-to-Earth) on a primary basis, but operations are limited to communications with individually licensed earth stations, which must not be ubiquitously deployed and must not be used to serve individual consumers.⁷⁰ In addition, earth station operations in the FSS shall not claim interference protection from stations in the fixed and mobile services, except for FSS operations associated with certain excepted earth stations, as specified in FCC rules.⁷¹ We grant ViaSat market access in this band, consistent with these requirements.

25. *Space-to-Earth Operations in the 40-42 GHz Band.* In the *Spectrum Frontiers* proceeding, the Commission reserved the 40-42 GHz band for FSS use.⁷² ViaSat's proposed use of the 40-42 GHz band is consistent with the Commission's rules and the Table of Frequency Allocations.⁷³ We therefore grant ViaSat's request for market access in this band.

26. *Earth-to-Space Operations in the 47.2-50.2 GHz Band.* The 47.2-48.2 GHz portion of the V-band is currently allocated in the U.S. Table of Frequency Allocations for FSS, fixed service, and mobile service, limited to non-Federal stations, and the 48.2-50.2 GHz portion is allocated for these same services for both Federal and non-Federal stations.⁷⁴ In the *Spectrum Frontiers Second R&O*, the

⁶⁹ In other words, the ViaSat MEO satellite will always be pointed at the target GSO satellites, so any interference caused to neighboring GSO satellite will not be transitory in nature.

⁷⁰ 47 CFR § 25.202(a)(1)(ii).

⁷¹ 47 CFR § 25.136.

⁷² *Spectrum Frontiers MO&O*, 32 FCC Red at 11051, para. 192.

⁷³ U.S. Table of Frequency Allocations, 47 CFR § 2.106.

⁷⁴ Historically, the 47.2-50.2 GHz band has been subject to a band plan for sharing between wireless services and FSS. In 1998, as part of the V-band plan, the Commission designated the lower segment of the band, 47.2-48.2 GHz, for wireless services use, and the upper 48.2-50.2 GHz segment for FSS use. *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, et.*

(continued....)

Commission decided to limit operations to individually-licensed earth stations in the 47.2-48.2 GHz portion of the band, which will also be authorized for terrestrial UMFUS operations,⁷⁵ and it declined to provide any mechanism for satellite end user equipment in that band. In addition, earth station operations in the FSS in the 47.2-48.2 GHz band must not cause interference to stations in the fixed and mobile services, except that a limited number of individually licensed earth stations authorized under section 25.136 of the Commission's rules may operate without providing any additional interference protection to stations in the UMFUS.⁷⁶ In the *Spectrum Frontiers Second R&O*, the Commission indicated that the 48.2-50.2 GHz portion of the band will be reserved for FSS use, including for deployment of satellite user terminals.⁷⁷ We grant ViaSat's request for market access in the 47.2-50.2 GHz band, subject to the rules adopted in the *Spectrum Frontiers* proceeding.

27. *Unwanted Emissions in the 50.2-50.4 GHz Band.* In November of last year, the World Radiocommunication Conference 2019 revised the limits on unwanted emission power into the 50.2-50.4 GHz band, used by the earth exploration-satellite service (passive), from earth stations operating with NGSO FSS satellite systems in the adjacent 49.7-50.2 GHz and 50.4-50.9 GHz bands. The new limits, contained in Resolution 750, are equal to or more stringent than the unwanted emissions limits previously adopted by the Commission and set forth in footnote US156 to the U.S. Table of Frequency Allocations. In light of concerns from Federal Agencies that the protection afforded by US156 is inadequate, we will require ViaSat to operate in accordance with Resolution 750 (Rev. WRC-19) upon its entry into force on January 1, 2021.

28. *Earth-to-Space Operations in the 50.4-51.4 GHz Band and Associated Waivers.* In the V-band First Report and Order, the Commission designated the 50.4-51.4 GHz segment for use by fixed and mobile service.⁷⁸ In the *Spectrum Frontiers Fifth Report and Order*, the Commission allowed individual FSS earth stations to be authorized in the 50.4-51.4 GHz band, applying the licensing criteria adopted by the Commission for the 24.75-25.25 GHz band—that is, applying the permitted aggregate population limits within the specified earth station power flux density contour on a per-county basis and adopting constraints on the number of permitted earth stations on both a per county and a per partial economic area basis.⁷⁹ Accordingly, we grant ViaSat market access in the 50.4-51.4 GHz band, subject to the limitations imposed by section 25.136 of the Commission's rules, as modified by the *Spectrum Frontiers Fifth Report and Order*.

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al., First Report and Order, 13 FCC Rcd 24649, 24651, para. 2 (1998) (*V-band First R&O*). In 2003, the Commission noted that it was preserving the 47.2-48.2 GHz FSS uplink allocation for gateway operations, pairing with downlink operations in the 37.5-40.0 GHz band. *V-band Second R&O*, 18 FCC Rcd at 25457, para. 67. The upper 48.2-50.2 GHz (Earth-to-space) portion of the band is identified in international footnote 5.516B for use by high-density applications in the FSS in ITU Region 2. International Table of Frequency Allocations, 47 CFR § 2.106, footnote 5.516B. ViaSat's earth station operations in the 47.2-50.2 GHz band, including limitations on such operations, will be addressed as part of the earth station licensing process.

⁷⁵ *Spectrum Frontiers Second Report and Order*, 32 FCC Rcd at 11005-6, paras 54-56.

⁷⁶ Section 25.136 specifies processes for earth station applicants in the 47.2-48.2 GHz band and includes procedures to enable sharing with UMFUS. 47 CFR 25.136(d).

⁷⁷ *Spectrum Frontiers MO&O*, 32 FCC Rcd at 11050, para 189.

⁷⁸ *V-Band First Report and Order*, 13 FCC Rcd at 24651 (jointly referring to fixed and mobile services as “wireless service”).

⁷⁹ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Fifth Report and Order, 34 FCC Rcd 2556, 2560-61, paras. 10-12 (2019).

D. Other Matters

29. *Orbital Debris Mitigation.* An applicant for a space station authorization or a grant of U.S. market access must submit a description of the design and operational strategies that it will use to mitigate orbital debris, including a statement detailing post-mission disposal plans for space stations at the end of their operating life.⁸⁰ The ViaSat Petition includes such a description.⁸¹ Specifically, ViaSat states that its orbital altitude of 8,200 km will provide a minimum of 100 km with respect to other large MEO satellite networks that have been either notified to the ITU or are in coordination through the ITU process.⁸² ViaSat also states that it plans to dispose of its NGSO satellites by moving them to a storage orbit at 8,500 km and will reserve sufficient fuel for post-mission disposal maneuvers.⁸³

30. ViaSat indicates that its orbital debris mitigation plan is a preliminary assessment pending the final constellation design.⁸⁴ Accordingly, we condition our grant of the ViaSat Petition on ViaSat presenting, and the Commission granting, a modification of this market access grant to provide for review of their final orbital debris mitigation plan.⁸⁵ ViaSat's proposed disposal orbit is very similar to the operational orbit proposed by WorldVu Satellites, Ltd. for operating 2,560 satellites at an altitude of approximately 8,500 km.⁸⁶ If both systems are deployed, there will be a risk of collisions or operational impacts at the 8,500 km altitude involving ViaSat's satellites at storage orbit and WorldVu's operational satellites. We consider this potential for impacts to be within the scope of the condition on this grant concerning coordination of physical operations with other operators. A final plan needs to address such coordination, and preferably include completed coordination arrangements. We also note that disposal of satellites that operate in MEO is the subject of ongoing study. ViaSat's proposal to dispose of satellites in a stable circular orbit follows the prevailing international practice for satellites operating in circular MEO orbits. However, other strategies, such as selection of unstable disposal orbits that exploit natural forces in order to avoid concentration of disposed satellites at particular circular orbital altitudes have also been proposed as feasible disposal solutions,⁸⁷ and the recently revised U.S. Government Orbital Debris Mitigation Standard Practices, outlines multiple options for disposal of MEO satellites.⁸⁸ ViaSat's final plan should consider alternative options and provide a rationale for the proposed disposal plan.

⁸⁰ *Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd 11567, 11619 (2004) (*Orbital Debris Mitigation Order*); 47 CFR § 25.114(d)(14).

⁸¹ ViaSat Petition Technical Annex at 11-13.

⁸² *Id.* at 12-13.

⁸³ *Id.* at 13.

⁸⁴ *See Id.* at 11.

⁸⁵ The International Bureau has previously required applicants to file a modification application including updated orbital debris mitigation information in some instances. *See LeoSat MA Inc.*, Order and Declaratory Ruling, 33 FCC Rcd 11486 (2018); *Northrop Grumman Space & Mission Systems Corp.*, Order and Authorization, 24 FCC Rcd 2230, 2263-64, para. 102 (IB 2009) (*Northrop Grumman Order*); *ContactMEO Communications, LLC*, Order and Authorization, 21 FCC Rcd 4035, 4052-53, para. 47 (IB 2006).

⁸⁶ *WorldVu Satellites Limited*, Amendment to Petition for Declarator Ruling, IBFS File No. SAT-AMD-20180104-00004 (filed Jan. 4. 2018).

⁸⁷ *See, e.g.*, Constellation and "Graveyard" Collision Risk for Several MEO Disposal Strategies, Alan B. Jenkin and John P. McVey, in the Proceedings of the 5th European Conference on Space Debris, Darmstadt, Germany 30 March – 2 April 2009, (ESA SP-672, July 2009), available at: <https://conference.sdo.esoc.esa.int/proceedings/sdc5/paper/90/SDC5-paper90.pdf>.

⁸⁸ U.S. Government Orbital Debris Mitigation Standard Practices November 2019 Update, pp 5-6, available at https://orbitaldebris.jsc.nasa.gov/library/usg_orbital_debris_mitigation_standard_practices_november_2019.pdf.

31. We also note that the Commission is contemporaneously adopting a Report and Order comprehensively updating its orbital debris rules and initiating a related Further Notice of Proposed Rulemaking.⁸⁹ ViaSat's grant of market access is conditioned on ViaSat's compliance with these new rules, as well as any applicable changes further adopted by the Commission in this proceeding. Additionally, ViaSat will be subject to the same orbital debris mitigation conditions as other authorized NGSO systems, including a requirement that it coordinate its physical operations with space stations of NGSO systems operating at similar orbital altitudes.

32. *Spectrum Efficiency.* SpaceX argues that ViaSat's more powerful transmissions to its satellites in medium earth orbit could pose a significant threat of interference to SpaceX's satellites operating in low-Earth orbit and that ViaSat's system was not designed to use spectrum efficiently with other NGSO FSS systems.⁹⁰ As such, SpaceX argues that ViaSat should be required to provide information about its beam pointing in order to avoid potential interference between ViaSat and other NGSO FSS licensees or grantees in the same processing rounds.⁹¹ The Commission declined to adopt any requirements in the *NGSO FSS Report and Order* to address potential interference in such situations, and SpaceX provides no individual basis here to revisit that decision.⁹² However, we require all NGSO FSS licensees to coordinate with each other in good faith. We expect that such coordination will take into account the varying system power levels and designs.

33. *Matters Applicable to NGSO FSS Applications.* Hughes urges the Commission to adopt mechanisms for ensuring that aggregate EPFD limits are met by all NGSO systems authorized in the United States.⁹³ Space Norway requests that grant of the ViaSat Petition be conditioned on ViaSat's implementation of mechanisms to avoid in-line interference with highly elliptical orbit NGSO systems, such as that proposed by Space Norway.⁹⁴

34. Both of these comments relate to issues of general applicability that are more appropriately addressed in the context of a rulemaking. Moreover, one of these issues was already raised in the then-ongoing rulemaking proceeding concerning NGSO FSS matters⁹⁵ that was addressed in the *NGSO FSS Report and Order*.⁹⁶ Hughes expresses concerns about international EPFD limits and aggregate EPFD enforcement mechanisms,⁹⁷ but these concerns have since been addressed in the *NGSO FSS Report and Order*. Space Norway's request for a condition requiring ViaSat to protect the Space Norway NGSO system as though it were a GSO space station is in effect a request that the Commission reevaluate its licensing procedures with regard to an entire class of NGSO systems, *i.e.*, those with highly-elliptical orbits. We defer consideration of such broadly applicable matters to future rulemakings, and

⁸⁹ *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 18-313, FCC 20-[XX] (2020).

⁹⁰ SpaceX Ka-band Comments at 2-8.

⁹¹ *Id.* at 4.

⁹² *NGSO FSS Report and Order* at 7827.

⁹³ Hughes Ka-band Comments at 3.

⁹⁴ Space Norway Ka-band Comments at 2.

⁹⁵ *NGSO FSS NPRM*, 31 FCC Rcd at 13656-58, paras. 12, 17.

⁹⁶ *See generally NGSO FSS Report and Order.*

⁹⁷ Hughes Ka-band Comments at 2-3.

condition grant of the ViaSat Petition on the outcome of such rulemaking proceedings, including the most recent NGSO FSS decision.⁹⁸

35. *ITU Coordination.* In its Petition to Deny, Telesat observes that international coordination will be required between ViaSat's system and Telesat's own NGSO FSS system because the two systems will operate in overlapping geographical areas using overlapping Ka-band frequencies and that, absent a coordination agreement, band segmentation would be unworkable.⁹⁹ Telesat also claims that its own NGSO FSS system has ITU date priority. We recently declined to adopt Telesat's proposal to tie coordination obligations and licensing conditions directly to ITU filing dates by awarding priority according to those dates.¹⁰⁰ Accordingly, we deny Telesat's petition in so far as it reiterates Telesat's ITU filing date priority proposal.

36. We include a condition requiring ViaSat, like all other NGSO FSS operators, to comply with the spectrum sharing requirements specified in section 25.261 of the Commission's rules with respect to any other NGSO system licensed or granted U.S. market access pursuant to the processing rounds in which ViaSat participated.¹⁰¹ The *NGSO FSS Report and Order* adopted changes to section 25.261 that replaced the avoidance of in-line interference methodology for triggering spectrum division (absent coordination) with a default spectrum splitting sharing mechanism that is triggered when the change in system noise temperature caused by interference, or $\Delta T/T$, exceeds a threshold of 6 percent, and ViaSat is required to comply with this mechanism.¹⁰² However, we note that outside the United States (*i.e.* when communications to or from the U.S. territory are not involved) the coexistence between ViaSat's operations and operations of a system that has been licensed by the Commission or has received a grant for access to the U.S. market is governed only by the ITU Radio Regulations.

37. *EPFD and PFD Limits.* As we did in other recent approvals for NGSO FSS operations, we are permitting ViaSat to communicate with U.S. earth stations up to the PFD and EPFD levels specified in applicable regulations, rather than the levels associated with specific demonstrations in its petition. We find this flexibility is warranted given the preliminary nature of the system design, the fact that this grant is conditioned on ViaSat's satisfaction of the ITU's EPFD assessment and the condition that ViaSat cooperate with other NGSO operators to meet limits for aggregate EPFD.

38. *Sharing with GSO FSS Systems.* The Commission does not currently have service rules relevant to sharing between NGSO and GSO FSS systems in V-band frequencies. There are currently no FCC-licensed GSO FSS systems operating in the portions of V-band ViaSat has requested, although one GSO satellite application was recently granted.¹⁰³ SES and O3b requested that the Commission defer

⁹⁸ We note that this condition also addresses several comments that requested that grant of the ViaSat Petition be conditioned on compliance with certain pending and future rulemakings. *See, e.g.,* Hughes Ka-band Reply at 2.

⁹⁹ Telesat Ka-band Petition to Deny at 3-4; Telesat Ka-Band Reply; *see also* International Telecommunication Union (ITU) Radio Regulations, No. 9.12 (requiring coordination of certain NGSO systems), No. 9.53 (requiring both parties in coordination to "make every possible mutual effort to overcome [coordination] difficulties, in a manner acceptable to the parties concerned"), No. 11.42 (requiring the immediate cessation of harmful interference actually caused to a recorded assignment with which coordination is required but has not been effected).

¹⁰⁰ *NGSO FSS Report and Order* at 7825-26, para. 50.

¹⁰¹ *See* WorldVu Satellites Limited, Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System, Order and Declaratory Ruling, 32 FCC Rcd 5366, 5377 (2017) (*OneWeb Order*); Space Norway AS, *Order and Declaratory Ruling*, 32 FCC Rcd 9649, 9659, para. 24(i) (2017) (*Space Norway Order*); Telesat Canada, *Order and Declaratory Ruling*, 32 FCC Rcd 9663, 9675, para. 27(h) (2017) (*Telesat Canada Order*).

¹⁰² *NGSO FSS Report and Order* at 7825, para. 49.

¹⁰³ Hughes Network Systems, LLC was authorized to launch and operate a GSO satellite that includes operations in the 40-42 GHz (space-to-Earth) and 47.2-50.2 GHz (Earth-to-space) bands. Hughes Network Systems, IBFS File

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action on NGSO V-band applications until adequate sharing mechanisms are in place to avoid interference to GSO systems. Hughes requested that the Commission condition any grant of the ViaSat application upon compliance with any applicable EPFD or technical limits that may be adopted by the Commission or ITU in the future, and that the Commission consider applying interim or default EPFD limits comparable to those in Article 22 of the ITU Radio Regulations.

39. In the *NGSO FSS Report and Order*, the Commission adopted a new rule in section 25.289 requiring that, unless otherwise provided in the rules, an NGSO system licensee must not cause unacceptable interference to, or claim protection from, a GSO FSS or Broadcasting-Satellite Service (BSS) network. Accordingly, a condition requiring compliance with section 25.289 is included in this grant. Article 22 of the ITU Radio Regulations contains provisions to ensure compatibility of NGSO FSS operations with GSO networks. WRC-19 developed criteria for the protection of GSO FSS satellite networks from interference generated by NGSO FSS systems operating in the bands proposed by ViaSat within the 37.5 GHz to 51.4 GHz range.¹⁰⁴ ViaSat is required to meet these criteria as a way to fulfill the requirements in section 25.289.

40. *Radio Astronomy.* The transmission of out-of-band signals into allocated radio astronomy bands can cause interference to radio astronomy observations. Radio astronomy has a primary allocation in the 42.5-43.5 GHz band.¹⁰⁵ ViaSat is urged to take all practicable steps to ensure that out-of-band signals of its space station transmissions in the 40.5-42 GHz frequency band protect radio astronomy operations in the 42.5-43.5 GHz band.¹⁰⁶ In the bands in question, the relevant sites are the Green Bank Telescope, the Very Long Baseline Array, and the Very Large Array.¹⁰⁷

41. For the Earth-to-space operations in the 48.94-49.04 GHz band, ViaSat is again urged to take all practicable steps to protect spectral line observations conducted in the radio astronomy service in this frequency band.¹⁰⁸

42. The National Telecommunication and Information Administration (NTIA) also requests that ViaSat should be made aware that radio astronomy as a service frequently makes use of observations (passive) in bands not allocated to the radio astronomy service. NTIA states that this practice is a result of scientifically valuable signals being subject to the Doppler Effect and shifted in frequency outside radio astronomy-allocated bands. NTIA provided the National Science Foundation Spectrum Management Unit (esm@nsf.gov) as a point of contact to assist with coordination and information on radio astronomy sites.

E. Waivers

43. As part of its request for U.S. market access, ViaSat seeks waivers of certain Commission rules. Generally, the Commission may waive any rule for good cause shown.¹⁰⁹ Waiver is appropriate where the particular facts make strict compliance inconsistent with the public interest.¹¹⁰ In making this

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Nos. SAT-LOA-20170621-00092 and SAT-AMD-20170908-00128 (granted in part and deferred in part Mar. 20, 2018). The Commission deferred consideration of Hughes' request for operations in the 50.4-51.4 GHz band, but recently granted this request. *Id.* (grant stamp, dated June 13, 2019).

¹⁰⁴ See ITU Radio Regulations, Nos. 22.5L and 22.5M and Resolutions 769 (WRC-19) and 770 (WRC-19).

¹⁰⁵ See 47 CFR § 2.106.

¹⁰⁶ See 47 CFR § 2.106, footnote US211.

¹⁰⁷ See 47 CFR § 2.106, footnote US131, for locations of these radio astronomy observatories.

¹⁰⁸ See 47 CFR § 2.106, footnote US342.

¹⁰⁹ 47 CFR § 1.3.

¹¹⁰ *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

determination, we may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.¹¹¹ Waiver is appropriate if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest.¹¹²

44. *Waiver of Section 25.112.* ViaSat requests a partial waiver of section 25.112, governing the dismissal and return of applications. Specifically, ViaSat requests that we limit any deficiencies found in the ViaSat Petition to the particular frequency band segment and proposed use at issue, and not dismiss the entire petition.¹¹³ No deficiencies were found in the ViaSat Petition, and it was accepted for filing.¹¹⁴ We dismiss this waiver request as moot.

45. *Waiver of Section 25.156(d)(5).* ViaSat requests a waiver of section 25.156(d)(5) of the Commission's rules.¹¹⁵ At the time ViaSat filed its Petition, section 25.156(d)(5) stated that in frequency bands where the Commission has not adopted band specific service rules, the Commission will not consider applications for NGSO-like operation after it has granted an application for GSO-like operation, and vice-versa, unless the Commission establishes NGSO/GSO sharing criteria for that frequency band. The Commission, however, recently eliminated section 25.156(d)(5) in the *NGSO FSS Report and Order*.¹¹⁶ As the modified rules adopted in that proceeding are now in effect, ViaSat's request for a waiver is dismissed as moot.

46. *Waiver of Sections 25.210(i) and 25.217(b)(1).* ViaSat requests a waiver of a part of the default service rules that now cross-references a cross-polarization isolation requirement for Direct Broadcast Satellites.¹¹⁷ Section 25.217(b)(1) provides default service rules for NGSO applicants where frequency-band-specific service rules are not yet in place. When those default service rules were adopted in 2003, they required compliance with a cross-polarization isolation requirement in section 25.210 generally applicable to the FSS.¹¹⁸ This requirement was removed as to FSS space stations in 2015 and that rule section was renumbered so that section 25.210(i), which formerly referred to FSS space station requirements, now provided certain requirements for BSS stations.¹¹⁹ The Commission failed to delete the cross-reference in section 25.217(b)(1) to section 25.210(i), even though that cross-reference is plainly inapplicable. The requirement of the current section 25.210(i), which applies to DBS operations, was never intended to be applied as a default service rule for FSS operations.¹²⁰ In these circumstances, and for the forgoing reasons, we grant these waiver requests.

¹¹¹ *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972); *Northeast Cellular*, 897 F.2d at 1166.

¹¹² *Northeast Cellular*, 897 F.2d at 1166.

¹¹³ ViaSat Petition at 23; 47 CFR § 25.112.

¹¹⁴ As previously noted, the International Bureau deferred a determination concerning the acceptability for filing of ViaSat's request for market access in the 18.6-18.8 GHz band.

¹¹⁵ ViaSat Petition at 24-25.

¹¹⁶ *NGSO FSS Report and Order*, 32 FCC Rcd at 7821-22, para. 39.

¹¹⁷ ViaSat Petition at 25-26.

¹¹⁸ *Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order, 18 FCC Rcd 10760, 10903 (2003).

¹¹⁹ *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713, 14817, para. 333 (2015).

¹²⁰ ViaSat notes that the Commission eliminated certain cross-polarization requirements in section 25.210(i) because it was determined that the requirement was no longer necessary for the protection of reception of analog signals; yet, ViaSat is concerned that the Commission's default service rules still reference section 25.210(i) with respect to all

(continued....)

47. *Waivers for Frequency Use.* ViaSat requests waivers of the U.S. Table, section 25.202(a)(1), and the Ka-band plan to perform NGSO FSS operations in the 17.8-18.3 GHz, 18.3-18.6 GHz, 18.6-18.8 GHz, and 19.7-20.2 GHz bands.¹²¹ ViaSat's proposed space-to-Earth operations in the 17.8-18.3 GHz, 18.3-18.6 GHz, and 19.7-20.2 GHz bands are now in conformance with the U.S. Table and the Ka-band plan as revised in the *NGSO FSS Report and Order*.¹²² Thus, ViaSat's requests for waivers concerning NGSO FSS operations in the 17.8-18.3 GHz, 18.3-18.6 GHz, and 19.7-20.2 GHz bands are dismissed as moot.

48. ViaSat also seeks a waiver of section 25.202(a)(1) for uplinks in the 50.4-51.4 GHz band.¹²³ This band is allocated in the U.S. Table of Frequency Allocations to the FSS, but at the time ViaSat filed its petition, the 50.4-51.4 GHz band was not listed among the available frequencies for FSS in section 25.202(a)(1) of the rules. The Commission recently decided to remove the list of frequencies in section 25.202(a)(1) as unnecessary,¹²⁴ thereby eliminating this barrier against applying for FSS use of the frequencies in the 50.4-51.4 GHz band. Accordingly, ViaSat's request for a waiver of section 25.202(a)(1) is dismissed as moot.

49. *Waiver of Schedule S Requirements.* As required by the Commission's rules, ViaSat submitted a completed Schedule S for its petition, which contains certain technical information in a prescribed form. ViaSat has found that it cannot accurately describe its system in certain respects due to limitations in Schedule S itself. ViaSat cites four limitations in Schedule S that affected how the Schedule S was completed: (1) inability to enter negative values for orbital plane information; (2) the inability of Schedule S to enter more than a single use for any particular communications channel; (3) the inability to enter a correct answer to the "polarization switchable" data field for transmitting and receiving beams, and (4) inability to enter proposed satellite-to-satellite link information into Schedule S.¹²⁵ To the extent necessary, ViaSat requests that the Commission waive these aspects of Schedule S in light of these limitations.¹²⁶ In view of the fact that ViaSat has implemented a workaround for each of these limitations to allow entry of the required information, we find that a waiver of the requirement to complete certain aspects or fields of Schedule S is warranted.

IV. ORDERING CLAUSES

50. Accordingly, IT IS ORDERED that the Petition for Declaratory Ruling filed by ViaSat, Inc., as amended, and accepted for filing IS GRANTED IN PART and DISMISSED as MOOT IN PART, as set forth in this Order and Declaratory Ruling, pursuant to section 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. § 303(r) and section 25.137(c) of the Federal Communications Commission's rules, 47 CFR § 25.137(c).

(Continued from previous page) _____

band segments for which no specific service rules have been adopted" and thus could apply to its proposed system. ViaSat Petition at 26.

¹²¹ *Id.* at 15.

¹²² *NGSO FSS Report and Order*, 32 FCC Rcd at 7840, 7850, Appx. A. NGSO FSS operations are allowed in the 17.8-18.3 GHz, 18.3-18.6 GHz, and 19.7-20.2 GHz bands on a secondary basis, subject to certain power limits. *Id.* at 7812, 7813, 7815-16, paras. 7, 9-10, 19, 21. We note that any blanket-licensed earth stations in the bands 17.8-18.3 GHz, 19.3-19.4 GHz and 19.6-19.7 GHz will operate on a secondary basis to fixed services. 47 CFR § 25.115(f)(2).

¹²³ ViaSat Petition at 18.

¹²⁴ *NGSO FSS Order*, 32 FCC Rcd at 7817-18, para. 27.

¹²⁵ ViaSat Petition at 26-28.

¹²⁶ *Id.* at 29.

51. IT IS FURTHER ORDERED that any future grant of earth station licenses for operations with the ViaSat system will be subject to the following conditions:

- a. Communications between U.S.-licensed earth stations and ViaSat space stations must comport with all existing and future space station coordination agreements reached by the Netherlands with other administrations. In the absence of a coordination agreement, such communications must comport with applicable provisions of the ITU Radio Regulations.
- b. Space-to-Earth operations in the 17.8-18.6 GHz, 18.8-19.3 GHz, and 19.7-20.2 GHz bands must complete coordination with U.S. Federal systems, in accordance with footnote US334 to the United States Table of Frequency Allocations, 47 CFR § 2.106, prior to being used. The use of space-to-Earth operations in the 17.8-18.6 GHz, 18.8-19.3 GHz, and 19.7-20.2 GHz bands must be in accordance with any signed coordination agreement between ViaSat and U.S. Federal operators. Two weeks prior to the start of any operations in the 17.8-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz bands, ViaSat must provide contact information for a 24/7 point of contact for the resolution of any harmful interference to Jimmy Nguyen, Email: Jimmy.Nguyen@us.af.mil.
- c. Space-to-Earth operations in the 17.8-18.6 GHz band are authorized up to the power flux-density limits in Article 21 of the ITU Radio Regulations, and up to the equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations, as well as Resolution 76 (Rev. WRC-15) of the ITU Radio Regulations.
- d. Space-to-Earth operations in the 17.8-18.6 GHz band are on a secondary basis with respect to the fixed service.
- e. Space-to-Earth operations in the 18.8-19.3 GHz band are authorized up to the power flux-density limits in Article 21 of the ITU Radio Regulations.
- f. Space-to-Earth operations in the 19.7-20.2 GHz band are authorized up to the equivalent power-flux density limits in Article 22 of the ITU Radio Regulations, as well as Resolution 76 (Rev. WRC-15) of the ITU Radio Regulations.
- g. Earth-to-space transmissions in the 27.5-28.6 GHz and 29.5-30 GHz bands are permitted at levels up to the applicable equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations.
- h. Earth-to-space operations in the 27.5-28.35 GHz band are unprotected with respect to the non-federal fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.¹²⁷
- i. Operations in the 28.35-28.6 GHz and 29.5-30 GHz (Earth-to-space) bands are on a secondary basis with respect to GSO FSS operations.
- j. Operations in the 37.5-40.0 GHz band are unprotected with respect to the non-federal fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.
- k. Operations in the 37.5-40.0 GHz band are authorized up to the power flux-density limits in 47 CFR § 25.208(r)(1). These limits cannot be exceeded even during rain fade.
- l. Operations in the 37.5-38.0 GHz and 40.0-40.5 GHz bands must be successfully coordinated with Federal Space Research Service (SRS) facilities, pursuant to Recommendation ITU-R SA.1396, "Protection Criteria for the Space Research Service in the 37-38 GHz and 40.0-40.5 GHz Bands."

¹²⁷ See generally, *Spectrum Frontiers R&O and FNPRM; Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017).

- m. Operations in the 37.5-42 GHz band (space-to-Earth) GHz must not cause unacceptable interference to, or claim protection from, a GSO FSS or Broadcasting-Satellite Service (BSS) network. These operations have to comply with ITU Radio Regulations Nos, 22.5L and 22.5M, when these provisions become effective.
- n. Operations in the 40-42 GHz band (space-to-Earth) are authorized up to the power flux-density limits in 47 CFR § 25.208(s) and (t).
- o. Operations in the 47.2-48.2 GHz and 50.4-51.4 GHz bands (Earth-to-space) must provide interference protection to the fixed and mobile services, except for earth stations authorized pursuant to 47 CFR § 25.136.
- p. Operations in the 47.2-50.2 GHz and 50.4-51.4 GHz bands (Earth-to-space) must not cause unacceptable interference to, or claim protection from, a GSO FSS or Broadcasting-network. These operations have to comply with ITU Radio Regulations Nos, 22.5L and 22.5M, when these provisions become effective.
- q. Any future grant of earth station licenses for operations with the ViaSat system will be subject to the following condition: in the 48.94-49.04 GHz band, operations must be coordinated with radio astronomy stations operating on a co-primary basis in this band; and;
- r. In accordance with footnote US342 to 47 CFR § 2.106, ViaSat is urged to take all practicable steps to protect radio astronomy observations from harmful interference from its operations in the 48.94-49.04 GHz band.
- s. Operations of any future grant of earth station licenses in the 47.2-50.2 GHz band will be subject to the rules adopted in the *Spectrum Frontiers Proceeding*, GN Docket 14-177.
- t. Earth station emissions into the 50.2-50.4 GHz band must comport with the limits contained in ITU-R Resolution 750 (REV. WRC-19) upon its entry into force on January 1, 2021.

52. IT IS FURTHER ORDERED that this grant of U.S. market access IS SUBJECT to the following requirements and conditions:

- a. Prior to initiation of service, ViaSat must receive a favorable or “qualified favorable” finding in accordance with Resolution 85 (WRC-03) with respect to its compliance with applicable equivalent power flux-density limits in Article 22 of the ITU Radio Regulations. ViaSat must communicate the ITU finding to the Commission and submit the files containing the data used as input to the ITU validation software, unless they have been submitted before and do not need any update. *See also* 47 CFR § 25.146(c).
- b. ViaSat must cooperate with other NGSO FSS operators in order to ensure that all authorized operations jointly comport with the applicable limits for aggregate equivalent power flux-density in the space-to-Earth direction (EPFD_{down}) contained in Article 22 of the ITU Radio Regulations, as well as Resolution 76 (WRC-03) of the ITU Radio Regulations.
- c. ViaSat must coordinate physical operations of spacecraft with any operator using similar orbits, for the purpose of eliminating collision risk and minimizing operational impacts. The orbital parameters specified in this grant are subject to change based on such coordination.
- d. Upon finalization of its space station design and prior to initiation of service to and from the United States, ViaSat must seek and obtain the Commission’s approval of a modification containing an updated description of the orbital debris mitigation plans for its system, as discussed in paragraph 30 above.
- e. This grant of U.S. market access and any earth station licenses granted in the future are subject to modification to bring them into conformance with any rules or policies adopted by the Commission in the future. Accordingly, any investments made toward operations in the bands

authorized in this order by ViaSat in the United States, assume the risk that operations may be subject to additional conditions or requirements as a result of any future Commission actions.

- f. Satellite-to-satellite transmissions in the 27.5-28.6 GHz and 29.5-30.0 GHz bands cannot begin until ViaSat submits a modification to its Petition showing that off-axis power flux density levels at the GSO are no greater than those that would be produced by an earth-based antenna operating in compliance with the off-axis EIRP density limits contained in section 25.218(i)(1)-(4).
- g. Reception by a ViaSat NGSO space station of transmissions from a U.S.-licensed GSO satellite in the 17.8-18.6 GHz and 19.7-20.2 GHz bands is not entitled to protection from interference that may be generated by any other U.S.-licensed GSO satellite.
- h. ViaSat must protect any terrestrial operations in the frequency bands used for transmissions from its MEO satellites to a GSO space station.

53. IT IS FURTHER ORDERED that ViaSat must comply with the sharing of ephemeris data procedures described in section 25.146(e) of the Commission's rules, 47 CFR § 25.146(e).

54. IT IS FURTHER ORDERED that operations must comply with spectrum sharing procedures among NGSO FSS space stations specified in 47 CFR § 25.261 with respect to any NGSO system licensed or granted U.S. market access pursuant to the processing rounds initiated in Public Notice, DA 16-804, DA 16-1244, and DA 17-524. Spectrum sharing between ViaSat's operations and operations of U.S. licensed NGSO systems, or NGSO systems granted U.S. market access, where such operations do not include communications to or from U.S. territory, are governed only by the ITU Radio Regulations and are not subject to section 25.261.

55. IT IS FURTHER ORDERED that this grant of U.S. market access does not address the provision of any Direct-to-Home (DTH) service, Direct Broadcast Satellite Service (DBS)¹²⁸ or Digital Audio Radio Service (DARS) to, from, or within the United States.

56. IT IS FURTHER ORDERED that this grant of U.S. market access is also subject to the following requirements:

- a. ViaSat must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later than **[grant date plus 30 days]**, and thereafter maintain on file a surety bond requiring payment in the event of a default in an amount, at minimum, determined according to the formula set forth in 47 CFR § 25.165(a)(1); and
- b. ViaSat must launch 50 percent of the maximum number of proposed space stations, place them in the assigned orbits, and operate them in accordance with the station authorization no later than **[grant date plus 6 years]**, and ViaSat must launch the remaining space stations necessary to complete its authorized service constellation, place them in their assigned orbits, and operate each of them in accordance with the authorization no later than **[grant date plus 9 years]**. 47 CFR § 25.164(b).

Failure to post and maintain a surety bond will render this grant null and void automatically, without further Commission action. Failure to meet the milestone requirements of 47 CFR § 25.164(b)(1) may result in ViaSat's authorization being reduced to the number of satellites in use on this milestone date. Failure to comply with the milestone requirement of 47 CFR § 25.164(b) will also result in forfeiture of ViaSat's surety bond. By **[grant date plus 6 years, 15 days]**, ViaSat must either demonstrate compliance with its milestone requirement or notify the Commission in writing that the requirement was not met. 47 CFR § 25.164(f).

¹²⁸ With respect to DBS and DTH, this paragraph excludes from the scope of the grant those services specified in 47 CFR § 25.701(a)(1)-(5).

57. IT IS FURTHER ORDERED that the request for waivers of the United States Table of Frequency Allocations, 47 CFR § 2.106 and the Commission's Ka-band plan, with regard to NGSO FSS operations in the 17.8-18.3 GHz, 18.3-18.6, and 19.7-20.2 GHz bands IS DISMISSED as MOOT for the reasons set forth herein.

58. IT IS FURTHER ORDERED that the request for waivers of sections 25.112, 25.156(d)(5) and 25.202(a)(1), ARE DISMISSED as MOOT.

59. IT IS FURTHER ORDERED that the request for waivers of sections 25.210(i), and 25.217(b)(1) ARE GRANTED.

60. IT IS FURTHER ORDERED that the request for waiver of the requirement to complete certain aspects or fields of Schedule S is GRANTED for the reasons set forth herein.

61. IT IS FURTHER ORDERED that the Petitions to Deny of Telesat Canada, IS DENIED, the Petition to Deny of Inmarsat IS DENIED IN PART and DISMISSED AS MOOT IN PART and the Petition to Dismiss or Defer of Hughes, is DENIED IN PART and DISMISSED IN PART, for the reasons set forth herein.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary