

FCC FACT SHEET*

Modification of U.S. Market Access for O3b Limited

Order and Declaratory Ruling - IBFS File Nos. SAT-MOD-20160624-00060, SAT-AMD-20161115-00116, SAT-AMD-20170301-00026, and SAT-AMD-20171109-00154

Background: O3b seeks to modify its grant of U.S. market access for its non-geostationary orbit (NGSO) constellation by adding 26 NGSO satellites using previously approved frequencies as well as adding additional frequencies. The proposed grant would facilitate O3b's ability to provide fast, flexible, and affordable broadband connectivity in the United States.

What the Order Would Do:

- Grant O3b's request, with conditions, for a modification of its grant of U.S. market access. For all 26 additional satellites:
 - Authorize use of the previously granted FSS frequency bands, and the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands for both fixed-satellite service (FSS) and mobile-satellite service (MSS).
 - Authorize adding the 27.5-27.6 GHz and 28.4-28.6 GHz FSS frequency bands and the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands for MSS feeder links on satellites referred to as O3bI and O3bN.
 - For O3bN satellites, authorize use of the 37.5-42.0 GHz and 47.2-50.2 GHz bands.
- Defer action on O3b's request to provide FSS (Earth-to-space) in the 50.4-51.4 GHz band until the Commission addresses pending issues in the *Spectrum Frontiers Proceeding*.
- Specify conditions intended to protect or accommodate other operations, including:
 - Geostationary-orbit (GSO) satellite operations. O3b would protect GSO operations by meeting specific equivalent power-flux density (pfd) limits.
 - Non-geostationary orbit operations: O3b 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 processing rounds.
 - Terrestrial operations: O3b would ensure compliance with Commission rules and protect terrestrial operations in the requested frequency bands. In particular, O3b would protect Upper Microwave Flexible Service (UMFUS) in certain frequency bands.
 - Mobile Satellite Service and MSS feeder links: O3b would conduct MSS operations on a non-interference, non-protected basis. Its MSS feeder-link operations would be required to be coordinated with previously authorized NGSO MSS systems not included in the processing rounds.
 - Milestones: O3b would be required to be operating on all proposed frequencies within six years.

* 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 Nos. SAT-MOD-20160624-00060, SAT-AMD-20161115-00116, SAT-AMD-20170301-00026, and SAT-AMD-20171109-00154, which may be accessed via the International Bureau Filing System <http://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 § 1.200 *et seq.*

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

In the Matter of)	
)	IBFS File Nos. SAT-MOD-20160624-00060,
O3b Limited)	SAT-AMD-20161115-00116,
)	SAT-AMD-20170301-00026, and
Request for Modification of U.S. Market Access)	SAT-AMD-20171109-00154
for O3b Limited's Non-Geostationary Satellite)	
Orbit System in the Fixed-Satellite Service and in)	Call Sign S2935
the Mobile-Satellite Service.)	

ORDER AND DECLARATORY RULING*

Adopted: []

Released: []

By the Commission:

I. INTRODUCTION

1. In this Order and Declaratory Ruling, we grant O3b Limited's (O3b) request for a modification of its grant of U.S. market access and certain rule waivers, except for those parts that were not accepted for filing. O3b proposes, through a modification application and a series of amendments, to expand its grant of U.S. market access to include 26 additional non-geostationary satellite orbit (NGSO) satellites operating in the fixed-satellite service (FSS) and to operate in additional frequency bands.¹ In granting this request, we address concerns expressed by commenters seeking various conditions on the grant, and address three petitions to deny O3b's proposed operations. We also defer action on O3b's request for U.S. market access to use the 50.4-51.4 GHz band for service and gateway uplinks. Grant of O3b's request will facilitate its ability to offer "fast, flexible, and affordable" broadband connectivity in

* This document has been circulated for tentative consideration by the Commission at its June 2018 open meeting. The issues referenced in this document and the Commission's ultimate resolutions 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 publically available. The Commission'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 in the Sunshine Agenda, which is typically released a week prior to the Commission's meeting. *See* 47 CFR §§ 1.200(a), 1.1203.

¹ O3b Limited, IBFS File Nos. SAT-MOD-20160624-00060 (O3b Modification), SAT-AMD-20161115-00116 (Ka-band Amendment), SAT-AMD-20170301-00026 (V-band Amendment), and SAT-AMD-20171109-00154 (November 2017 Amendment). The additional FSS frequency bands are: 19.7-20.2 GHz, 29.5-30.0 GHz, 37.5-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz. The additional MSS feeder link frequencies are: 19.3-19.7 GHz and 29.1-29.5 GHz. The additional MSS frequencies are 19.7-20.2 GHz and 29.5-30.0 GHz. The Ka-band amendment included the 17.7-17.8 GHz band that was not accepted for filing. This band was, however, removed by O3b in its November 2017 amendment. O3b also filed an amendment requesting V-band frequencies, including the 42-42.5 GHz band that was not accepted for filing.

the United States.²

II. BACKGROUND

2. *U.S. Market Access.* O3b, which operates satellites under the authority of the United Kingdom, was initially granted U.S. market access through individual earth stations transmitting to and receiving from eight satellites in medium earth orbit (MEO).³ In January 2015, the International Bureau granted O3b's petition to consolidate its several U.S. market access grants under a single grant and to modify the grant by increasing the number of satellites from eight to twelve, all operating in MEO.⁴ On March 1, 2018, the Satellite Division granted O3b's Modification Application, in part, for U.S. market access to add four of the eight satellites to its NGSO constellation using previously authorized frequencies.⁵ The Bureau deferred action on the four remaining satellites, which the Commission now addresses in this Order.

A. O3b Applications Addressed in this Order

3. *Summary of O3b Ka-Band Modification and Amendments.* In June 2016, O3b filed a modification to its Letter of Intent (LOI) grant, requesting to add eight satellites to its NGSO FSS constellation using frequencies that had been previously authorized by the FCC.⁶ In November 2016, O3b filed an amendment to its modification application to increase the number of satellites and to use additional Ka-band frequencies.⁷

4. Specifically, O3b requests that four satellites in the modification include 19.7-20.2 GHz and 29.5-30.0 GHz as additional frequency bands.⁸ It also requests market access for up to 24 new

² O3b Modification, Narrative at 13.

³ See O3b Limited, IBFS File Nos. SES-LIC-20100723-00952 (granted Sept. 25, 2012), SES-LIC-20130124-00089 (granted June 20, 2013) and SES-LIC-20130618-00516 (granted June 24, 2015). Medium Earth Orbit (MEO) is an orbital regime that utilizes altitudes between Low-Earth Orbit and Geostationary Earth Orbit, typically around 20,200 kilometers. See *Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd 11567, 11569 (2004).

⁴ O3b Limited, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (granted Jan. 22, 2015) (O3b LOI grant). O3b was granted U.S. market access to operate in the following frequencies: 17.8-18.6 GHz, 18.8-19.3 GHz, 27.6-28.4 GHz, and 28.6-29.1 GHz.

⁵ O3b Limited IBFS File No. SAT-MOD-20160624-00060 (O3b Modification Application), granted in part and deferred in part (grant stamp March 1, 2018). O3b launched the four satellites in this partial grant on March 9, 2018. O3b's prior grants of U.S. market access are subject to the terms and conditions adopted by the Commission in this Order and Declaratory Ruling.

⁶ O3b Modification Application. On September 9, 2016, the O3b Modification was accepted for filing as part of the NGSO processing round. Policy Branch Information, Satellite Space Applications Accepted For Filing, Report No. SAT-01184 (Sept. 9, 2016). Among other waivers, O3b requested a waiver of Section 25.210(i), which was eliminated in *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713 (2015). O3b also requested a waiver of Section 25.157 which outlines a modified processing round framework for processing NGSO-like applications and market access requests. O3b Modification, Narrative at 12-13. Subsequently, however, O3b submitted an amendment to the modification "for consideration as part of the [NGSO] processing round...." See IBFS File No. SAT-AMD 20161115-00116. Consequently, we dismiss both of these waivers as moot.

⁷ O3b Limited IBFS File No. SAT-AMD-20161115-00116 (Ka-band Amendment). This application was placed on Public Notice on May 26, 2017. At the same time, a second Ku- and Ka-band processing round was initiated for the additional frequency bands requested by other applicants and petitioners. See Satellite Policy Branch Information, *Applications Accepted for Filing; 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, and 29.1-29.5 GHz Bands*, Public Notice, 32 FCC Rcd 480 (2017).

⁸ Ka-band Amendment, Narrative at 2.

satellites operating in a circular equatorial orbit, referred to as O3bN. In addition, O3b proposes to use 16 additional satellites operating in a circular inclined orbit, referred to as O3bI. For both the O3bI and O3bN satellites, O3b proposes operations in the 17.7-18.6 GHz, 18.8-20.2 GHz, and 27.5-30.0 GHz frequency bands. Subsequently, O3b filed a second amendment, requesting U.S. market access for its O3bN satellites to also use the following V-Band frequencies: 37.5-40.0 GHz, 40-42 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz.⁹

5. In November 2017, O3b filed a third amendment reducing its request for U.S. market access from 60 satellites to 42 satellites. O3b also makes minor corrections to its pending petitions, removes its request to use the 17.7-17.8 GHz band from the application, and requests that the Commission clarify that O3b's existing grant of U.S. market access permits the drifting of active satellites for the purpose of re-phasing O3b's constellation when activating a spare satellite without prior Commission approval. In this November 2017 amendment, O3b also requests U.S. market access in the 19.3-19.7 GHz and 29.1-29.5 GHz bands for the provision of MSS feeder links, and in the 19.7-20.2 GHz and 29.5-30.0 GHz bands for MSS.¹⁰

6. The following chart summarizes O3b's proposed modification and amendments for its U.S. market access addressed in this Order:

Space-to-Earth (downlink bands)

O3b Satellites 1-16	O3b Satellites 17-20	O3b Satellites 21-30 (O3bI)	O3b Satellites 31-42 (O3bN)
17.8-18.6 GHz (FSS)	17.8-18.6 GHz (FSS)	17.8-18.6 GHz (FSS)	17.8-18.6 GHz (FSS)
18.8-19.3 GHz (FSS)	18.8-19.3 GHz (FSS)	18.8-19.3 GHz (FSS)	18.8-19.3 GHz (FSS)
		19.3-19.7 GHz (MSS FL)	19.3-19.7 GHz (MSS FL)
	19.7-20.2 GHz (FSS/MSS)	19.7-20.2 GHz (FSS/MSS)	19.7-20.2 GHz (FSS/MSS)
			37.5-42.0 GHz (FSS)

⁹ This amendment was filed in response to a processing round for additional applications and petitions for NGSO-like FSS systems in the 37.5-40.0 GHz, 40-42 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz frequency bands. *Satellite Policy Branch, Boeing Application Accepted for Filing in Part, 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, 31 FCC Rcd 11957 (Nov. 1, 2016). The processing round specifically excluded the 42.0-42.5 GHz and 51.4-52.4 GHz bands given the lack of a domestic allocation in the 42.0-42.5 GHz band, and lack of an international or domestic allocation in the 51.4-52.4 GHz band. *See id.*; 47 CFR § 2.106. While O3b's V-band Amendment was placed on public notice, the Satellite Division did not accept for filing O3b's request for market access using the 42.0-42.5 GHz band. *Satellite Policy Branch Information, Space Station Applications Accepted for Filing*, Report No. SAT-01262 (Aug. 25, 2017).

¹⁰ *Satellite Policy Branch Information, Space Station Applications Accepted for Filing*, Report No. SAT-01284 (Nov. 24, 2017). O3b also requested use of the 17.7-17.8 GHz band. The Satellite Policy Branch deferred its determination on the acceptability for filing of the 17.7-17.8 GHz band because it is limited to feeder links for the broadcasting-satellite service. 47 CFR § 2.106, US271.

Earth-to-Space (uplink bands)

O3b Satellites 1-16	O3b Satellites 17-20	O3b Satellites 21-30 (O3bI)	O3b Satellites 31-42 (O3bN)
		27.5-27.6 GHz (FSS)	27.5-27.6 GHz (FSS)
27.6-28.4 GHz (FSS)	27.6-28.4 GHz (FSS)	27.6-28.4 GHz (FSS)	27.6-28.4 GHz (FSS)
		28.4-28.6 GHz (FSS)	28.4-28.6 GHz (FSS)
28.6-29.1 GHz (FSS)	28.6-29.1 GHz (FSS)	28.6-29.1 GHz (FSS)	28.6-29.1 GHz (FSS)
		29.1-29.5 GHz (MSS FL)	29.1-29.5 GHz (MSS FL)
	29.5-30.0 GHz (FSS/MSS)	29.5-30.0 GHz (FSS/MSS)	29.5-30.0 GHz (FSS/MSS)
			47.2-50.2 GHz (FSS)
			50.4-51.4GHz (FSS)

7. *Waiver Standard.* O3b seeks waivers of several of the Commission's rules. Generally, the Commission may waive any rule for good cause shown.¹¹ Waiver is appropriate where the particular facts make strict compliance inconsistent with the public interest.¹² In making this determination, we may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.¹³ Waiver is therefore appropriate if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest.¹⁴ We address O3b's specific requests for waivers below.

B. Comments and Petitions Addressing O3b's Modification Application and Amendments

8. *Ka-Band Applications.* Telesat Canada (Telesat) filed a petition to deny the O3b Ka-band applications, raising concerns related to international coordination and terrestrial sharing.¹⁵ ViaSat, Inc. (ViaSat) filed a petition to deny or impose conditions on all of the NGSO FSS Ka-band processing round applications and petitions. ViaSat asserts that the applications and petitions should be denied unless subject to specific conditions addressing interference to GSO systems and requiring operators to comply with rules adopted in the Commission's NGSO rulemaking.¹⁶ Space Norway AS (Space Norway) filed comments stating that O3b should be responsible for implementing methods for in-line interference avoidance to Space Norway's proposed system.¹⁷ Space Exploration Holdings, LLC (SpaceX) also filed comments, expressing concern that O3b's medium orbit satellites will cause interference to low-earth orbit satellite systems, such as SpaceX's proposed system, and that band splitting in certain circumstances will be burdensome and inefficient.¹⁸ Hughes Network Systems (Hughes) also filed comments expressing

¹¹ 47 CFR § 1.3.

¹² *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

¹³ *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.

¹⁴ *Northeast Cellular*, 897 F.2d at 1166.

¹⁵ Telesat Canada Petition to Deny at 3 (filed June 26, 2017).

¹⁶ ViaSat Petition to Deny at 6 (filed June 26, 2017).

¹⁷ Space Norway AS Ka-band Comments at 3-4 (filed June 26, 2017).

¹⁸ SpaceX Ka-band Comments at 3 (filed June 26, 2017).

concerns regarding sharing with other FSS Ka-band operations.¹⁹ O3b responded to the petitions and comments.²⁰

9. *V-band Amendment.* In response to O3b's V-band Amendment, SpaceX and ViaSat filed comments similar in nature to their comments regarding O3b's Ka-band amendment. In sum, SpaceX reiterates that O3b's large coverage area will complicate spectrum sharing because MEO uplink transmissions may present a significant risk of harmful interference to LEO systems, such as SpaceX's system.²¹ It states that O3b should be required to share beam pointing data with other NGSO operators to reduce the number of in-line events that must be managed.²² SpaceX also supports O3b's requests for certain waivers, including a waiver to operate in the 50.4-51.4 GHz band and waiver of the band segmentation rule.²³ ViaSat also filed general comments addressing three applications –including O3b's amendment–seeking authority to operate a NGSO FSS system using the 37.5-42 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz bands.²⁴ ViaSat requests that conditions be imposed on these proposed systems, including that NGSO V-band operations must protect GSO V-band operations, and that V-band NGSO FSS operations be subject to the outcome of future proceedings addressing these operations.²⁵ Finally, Hughes submitted general comments regarding all of the V-band applications filed in the processing round, suggesting that the Commission should base any grant of the applications upon a demonstration of compliance with interim/default EPFD limits comparable to the EPFD limits specified in Article 22 of the ITU Radio Regulations and require all of the applicants to disclose prior to any grant the technical basis and input parameters used to demonstrate compliance.²⁶ Hughes also urges the Commission to ensure meaningful spectrum sharing between future GSO and NGSO operations.²⁷

10. *November 2017 Amendment.* In response to public notice of O3b's November 2017 Amendment, Iridium Constellation LLC filed a Petition to Deny or Remove from the Processing Round.²⁸ Iridium challenges O3b's proposal to add an MSS designation to the 19.7-20.2 GHz and 29.5-30.0 GHz bands as inconsistent with the Ka-band Plan.²⁹ Thus, Iridium states that there is no basis for O3b to use the 19.3-19.7 GHz and 29.1-29.5 GHz bands for MSS feeder links. If the Commission contemplates permitting O3b to use these bands, Iridium states that O3b's amendment should be considered major and

¹⁹ Hughes Network Systems, LLC Ka-band Comments (filed June 26, 2017).

²⁰ Opposition and Response of O3b Limited (filed July 7, 2017).

²¹ SpaceX V-Band Comments at 5 (filed Oct. 23, 2017).

²² *Id.* at 3.

²³ *Id.* at 6.

²⁴ ViaSat, Inc. Consolidated V-band Comments (filed Sept. 25, 2017).

²⁵ *Id.* at 5.

²⁶ Hughes Network Systems, LLC V-band Comments at 2 (filed Sept. 25, 2017).

²⁷ *Id.* at 1.

²⁸ Iridium Constellation LLC, Petition to Deny or Remove from Processing Round (filed Dec. 26, 2017) (Iridium Petition).

²⁹ The Ka-band Plan was developed in a series of orders to designate discrete spectrum bands for specific types of systems including GSO FSS, NGSO FSS, and certain Mobile Satellite Systems. It includes the 18 GHz band plan established in *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005 (1996) and the 28 GHz Band plan established in *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands for Broadcast Satellite-Service Use*, Report and Order, 15 FCC Rcd 13430 (2000). Changes to NGSO FSS operations in the plan were recently adopted in the *NGSO FSS Report and Order*, Appendix B.

therefore removed from the processing round.³⁰ O3b responds that it will protect Iridium's operations in the 19.4-19.6 GHz and 29.1-29.3 GHz bands, and is committed to coordinating with Iridium. Regarding the 19.7-20.2 GHz and 29.5-30.0 GHz bands, O3b states that adding an MSS designation is consistent with the U.S. Table of Allocations, and requests any necessary waiver of the Ka-band Plan.³¹ O3b further states that adding this designation does not change the characteristics of its proposed plan or increase interference and therefore this proposal is not a major amendment impacting O3b's status in the processing rounds.³²

III. DISCUSSION

11. After review of the record, we conclude that grant of O3b's petition to modify its grant of U.S. market access, as amended, and accepted for filing, will serve the public interest, subject to the requirements and conditions specified herein.³³ Our public interest analysis considers the effect of the modified O3b market access proposal on competition in the United States, as well as issues of spectrum availability, eligibility requirements and operating requirements, national security, law enforcement, foreign policy, and trade.³⁴ Below, we address the various outstanding issues raised by petitioners and commenters on O3b's request to modify its market access requests and the amendments thereto. We also address O3b's waiver requests. Where appropriate, we defer matters of general applicability to the resolution of any pending or future rulemakings.

12. *ITU Coordination.* In its Petition to Deny, Telesat observes that international coordination will be required between O3b'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.³⁵ Telesat also claims that its own NGSO FSS system has ITU date priority. In response, O3b argues that it has no objection to a condition requiring ITU coordination, and that such a condition will resolve any ITU priority matters.³⁶ 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.³⁷ Accordingly, we deny Telesat's petition in so far as it reiterates Telesat's ITU filing date priority proposal. We include a condition requiring O3b, 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 O3b

³⁰ Iridium Petition at 7.

³¹ O3b Limited Opposition to Petition to Deny or Remove from Processing Round (O3b Opposition) (filed Jan. 10, 2018).

³² *Id.* at 10-11.

³³ *Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, Report and Order, 12 FCC Rcd 24094, 24106 (1997).

³⁴ *Id.* Except as otherwise discussed herein, we conclude that O3b's proposed operations satisfies these basic requirements for U.S. market access.

³⁵ Telesat Petition to Deny at 3-4; Telesat Reply (filed July 7, 2017); *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).

³⁶ Opposition and Response of O3b Limited at 3.

³⁷ *NGSO FSS Report and Order* at 7825-26, para. 50.

participated.³⁸ We recently 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 O3b is required to comply with this mechanism.³⁹ 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 O3b'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 and is not subject to Section 25.261.

13. *EPFD Analysis.* We find that O3b's EPFD demonstrations in its applications, as supplemented by a revised EPFD analysis using ITU-approved software, are sufficient to justify the requested changes to its market access grant.⁴⁰ Further, to ensure that O3b will satisfy its EPFD obligations going forward, we condition this grant on O3b receiving a favorable or "qualified favorable" finding of its EPFD demonstration from the ITU prior to initiation of service. Review by the ITU of O3b's compliance with ITU EPFD limits in the Ka-band, using methods now approved by the ITU,⁴¹ will provide assurances that O3b will comply with the Ka-band EPFD limits specified in Article 22 of the ITU Radio Regulations beyond the other technical demonstrations that O3b has already provided.

14. In addition, as a condition to this grant of U.S. market access, O3b must communicate the ITU finding to the Commission and submit the files containing the data used as input to the ITU validation software. We find such a requirement satisfies the concerns of GSO FSS operators who request verification, either by the Commission or third parties, of the complete set of input information used for the EPFD showing to the ITU. Submission of the data input files used for the ITU validation of Article 22 limits will allow such verification, either by the Commission or third-parties.

15. As we did in other recent approvals for NGSO FSS operations,⁴² we are permitting O3b to operate up to the PFD and EPFD levels specified in applicable regulations, rather than the 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 O3b's satisfaction of the ITU's EPFD assessment and the condition that O3b cooperate with other NGSO operators to meet limits for aggregate EPFD. We therefore reject ViaSat's arguments that O3b should be limited to the levels used in the EPFD demonstration in its petition and deny this portion of ViaSat's Petition to Deny.⁴³

16. *Conditions.* Below, we condition this grant of U.S. market access in response to comments and as warranted in the public interest. These conditions relate to ITU coordination, power limits, avoidance of possible interference events, future rulemakings, bond and milestone requirements, and other existing requirements in our rules and in footnotes to the Table of Frequency Allocations. We also include specific conditions related to our waiver grants. To the extent that Telesat's Petition against

³⁸ 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, para. 24(i) (2017). (*Space Norway Order*); Telesat Canada, Order and Declaratory Ruling, 32 FCC Rcd 9663, para. 27(h) (2017) (*Telesat Canada Order*).

³⁹ *NGSO FSS Report and Order* at 7825, para. 49.

⁴⁰ O3b Modification, Attachment A at A1-6, and A1-12; Ka-band Amendment, Attachment A at 13-19. See also Letter to Marlene H. Dortch from Suzanne Malloy at 4-6, Annex 1 and 2 (dated May 22, 2017) (O3b Supplemental Letter).

⁴¹ Letter from Francois Rancy, Director, ITU Radiocommunication Bureau, to Administrations of ITU Member States, "Examinations under Resolution 85 (WRC-03)" (Dec. 6, 2016), <https://www.itu.int/md/R00-CR-CIR-0414/en>.

⁴² See *OneWeb Order*, *Space Norway Order*, and *Telesat Canada Order*.

⁴³ ViaSat Petition to Deny at 5-8.

O3b's application raises the same concerns it did regarding the OneWeb application, we impose many of the same conditions on O3b as we did in the *OneWeb Order*.⁴⁴

A. O3b's Ka-band Modification Application and Related Amendment

17. We grant O3b's request to add four satellites to its grant of U.S. market access using the following frequencies that are already included in O3b's existing grant of U.S. market access: 18.8-19.3 GHz and 28.6-29.1 GHz, on a primary basis, and the 27.6-28.4 GHz and 17.8-18.6 GHz frequency bands on a secondary basis.⁴⁵ For these four satellites, we also grant U.S. market access using the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands on a secondary basis, as requested by O3b in its Ka-band Amendment.⁴⁶

B. Other Requests in O3b's Ka-band Amendment

18. In its Ka-band Amendment, O3b also seeks to add 22 satellites and additional Ka-band frequencies to its grant of U.S. market access. Twelve satellites, referred to as O3bN, will operate in a circular equatorial orbit at an altitude of 8,062 km. Ten additional satellites, referred to as O3bI, will operate in circular inclined orbit at an altitude of 8,062 km in two planes, each having five satellites.⁴⁷ We grant O3b's request to operate the new O3bN and O3bI satellites using the 17.8-18.6 GHz, 18.8-19.3 GHz, 27.6-28.4 GHz, and 28.6-29.1 GHz frequency bands.⁴⁸ We also grant O3b's request for market access in the 19.7-20.2 GHz and 29.5-30 GHz FSS frequency bands, as O3b provided technical demonstrations showing that its use of this spectrum will not cause interference to GSO FSS operations.⁴⁹ In addition, O3b states that it is willing to accept interference from GSO FSS operators in this frequency band. These operations are consistent with the Commission's Ka-band Plan that designates these frequency bands for GSO FSS operations, with NGSO FSS operations permitted on a secondary basis.⁵⁰

19. *Requests for NGSO MSS Feeder Link and MSS Frequencies.* O3b requests market access in the 19.3-19.7 GHz and 29.1-29.5 GHz bands for the provision of feeder links to an MSS space station.⁵¹ Accordingly, O3b requests that its operations in the 19.7-20.2 GHz and 29.5-30 GHz frequency bands be also conducted in the MSS, in addition to the FSS operations addressed in the previous paragraph.⁵²

20. Iridium opposes O3b's proposal to add an MSS designation in the 19.7-20.2 GHz and 29.5-30.0 GHz bands as inconsistent with the Ka-band plan, asserting that O3b's operations in these

⁴⁴ Telesat Petition to Deny at 3-4. *See also Telesat Canada Order* and *Space Norway AS Order*.

⁴⁵ In its initial market access grant, O3b's use of the 17.8-18.6 GHz band was on a non-conforming basis. Recently, the Commission added an 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. *NGSO FSS Report and Order* at 3-4. Thus, O3b's request for waivers of the U.S. Table of Allocations to allow U.S. market access by a NGSO FSS constellation in the 17.8-18.6 GHz band are moot. Stations operating in primary services are protected against interference from stations of "secondary" services. Stations operating in a secondary service cannot claim protection from harmful interference from stations of a primary service. "Co-primary" services have equal rights to operate in particular frequencies. *See* 47 C.F.R. §§ 2.104(d) and 2.105(c).

⁴⁶ Ka-band Amendment, Attachment A at 2.

⁴⁷ The O3bN and O3bI satellites are capable of operating across the entire 17.7-20.2 GHz band. However, O3b is not seeking U.S. market access for the 18.6-18.8 GHz band. Ka-Band Amendment, Narrative at 8.

⁴⁸ Ka-band Amendment, Narrative at 7-8, and O3b Supplemental Letter at 3.

⁴⁹ Ka-band Amendment, Technical Appendix at 13-22.

⁵⁰ *NGSO FSS Report and Order*, Appendix B.

⁵¹ November 2017 Amendment, Narrative at 5.

⁵² *Id.*

bands should be limited to FSS operations.⁵³ Further, Iridium states that the 19.3-19.7 GHz and 29.1-29.5 GHz bands are scarce feeder link spectrum for MSS systems and that granting O3b market access in these bands would complicate Iridium's efforts to add gateway earth stations.⁵⁴ In response, O3b states that it will protect Iridium's operations in the 19.4-19.6 GHz and 29.1-29.3 GHz bands and is committed to coordinating with Iridium. O3b also asserts that adding an MSS designation to its market access in the 19.7-20.2 and 29.5-30.0 GHz bands is consistent with the U.S. Table of Allocations and requests any necessary waiver of the Ka-band Plan.⁵⁵ O3b further states that adding the MSS designation does not change the characteristics of its proposed plan or increase interference.⁵⁶

21. For the reasons discussed below we find that it is in the public interest to grant O3b market access to provide MSS, in addition to FSS, in the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands. These bands are allocated internationally to the FSS and MSS.⁵⁷ The Commission has also adopted these frequency allocations, but has not established service rules for MSS operations in the 19.7-20.2 GHz and 29.5-30.0 GHz bands.⁵⁸ Although EPFD limits do not apply to NGSO MSS systems, we condition O3b's U.S. market access operations in the 19.7-20.2 GHz and 29.5-30.0 GHz bands on complying with the applicable EPFD limits for FSS operations, even when these operations are conducted within the MSS. This is justified because, as stated by O3b, these MSS operations have the same characteristics as its FSS operations.⁵⁹ This condition is also consistent with the default requirement adopted in the *NGSO FSS Report and Order* that NGSO systems protect GSO networks.⁶⁰ In addition, we remind O3b that its MSS operations cannot claim protection from current or future GSO FSS networks.

22. In addition, the Commission has not adopted sharing criteria between NGSO FSS and NGSO MSS systems in the 19.7-20.2 GHz and 29.5-30.0 GHz bands. O3b states that its MSS operations will have the same characteristics of the previously described FSS operations⁶¹ and that directional earth station antennas will also be used for these operations.⁶² Therefore, O3b's NGSO MSS operations would not be distinguishable from NGSO FSS operations in the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands being conducted with earth stations in motion (ESIMs). Currently, however, there are no rules allowing ESIM operations with NGSO FSS space stations. As a result, at least until such rules are developed, O3b's NGSO MSS operations in the 19.7-20.2 GHz and 29.5-30.0 GHz frequency bands in the United States must be conducted on a non-interference, non-protected basis with respect to other NGSO FSS operations in these bands. Although Iridium argues that we should deny O3b's operations as inconsistent with the Ka-band plan, given the existing MSS allocations and the fact that O3b's proposed operations have the same characteristics as those in a NGSO FSS system—a designated usage under the Ka-band plan—we find it in the public interest to grant O3b U.S. market access to operate in this band

⁵³ Iridium Petition at 4.

⁵⁴ *Id.* at 7.

⁵⁵ O3b Opposition at 8-9.

⁵⁶ *Id.* at 10-11.

⁵⁷ 47 CFR § 2.106.

⁵⁸ 47 CFR § 25.217.

⁵⁹ *See* note 65 *infra*.

⁶⁰ 47 CFR § 25.289, and *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and First Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) recon. Pending (*NGSO FSS Report and Order*).

⁶¹ November 2017 Amendment, Narrative at 5.

⁶² O3b Modification, Attachment A at A1A.

and waive the Ka-band plan to the extent necessary on our own motion.

23. With respect to O3b's request for market access in the 19.3-19.7 GHz and 29.1-29.5 GHz bands, we note that coordination will be required between O3b's NGSO MSS feeder links in these bands and any previously authorized NGSO MSS systems not included in this processing round, including the Iridium system. Until any required coordination agreement is obtained, transmissions to or from any earth station located in U.S. territory shall not be conducted. Sharing of the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands with other operators authorized within this Ku-Ka-band processing round will be subject to Section 25.261.⁶³ We do not think it is reasonable, as Iridium asserts, or in the public interest, to preclude any other users in these bands to ensure Iridium's possible future deployment of additional feeder link sites. This Order, as conditioned, addresses Iridium's concerns about O3b's operations. We therefore grant O3b's request to access these bands and accordingly deny Iridium's Petition to Deny or Remove from the Processing Round.

24. *Request for FSS Operations for Satellites 21-42 in the 27.5-27.6 GHz Band.* O3b requests that its O3bN and O3bI space stations also operate in the 27.5-27.6 GHz FSS frequencies (Earth-to-space). The 27.5-28.35 GHz band was designated by the Commission's *Ka-band First Report and Order* for the terrestrial Local Multipoint Distribution System (LMDS) on a primary basis and to FSS on a secondary basis in the United States.⁶⁴ Recently, the Commission adopted new rules to permit Upper Microwave Flexible Use Service (UMFUS) in this band.⁶⁵ The FSS (Earth-to-space) is secondary to the UMFUS except for FSS operations associated with earth stations authorized pursuant to Section 25.136. As previously noted, O3b is granted U.S. market access to operate with satellites in the 27.6-28.4 GHz band, on a secondary basis, for its currently operating space stations and seeks to add the 27.5-27.6 GHz portion of this band to its grant of market access. O3b correctly notes that its currently licensed earth stations are grandfathered under the rule, and states that its future earth station applications will "conform to the new regulatory framework" for the band.⁶⁶ Accordingly, O3b is granted U.S. market access for its O3bN and O3bI space stations in this band on a secondary basis to UMFUS.

25. *Request for FSS Operations for Satellites 21-42 in the 28.4-28.6 GHz Band.* O3b requests that its O3bN and O3bI space stations also operate in the 28.4-28.6 GHz FSS frequency band. The Commission designated the 28.35-28.6 GHz frequency band for GSO FSS on a primary basis with NGSO FSS services permitted on a secondary basis.⁶⁷ Consequently, although we grant O3b's request, we condition O3b's access to the U.S. market in the 28.4-28.6 GHz portion of this band on a non-interference basis to authorized GSO FSS systems.

⁶³ See e.g., LeoSat MA, Inc., IBFS File SAT-PDR-20161115-00112, Theia Holdings A, Inc. IBFS File No. SAT-LOA-20161115-00121, and Karousel LLC, IBFS File No. SAT-LOA-20161115-00113.

⁶⁴ *Rulemaking to Amend Parts 1, 2, 21, & 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Establish Rules & Policies for Local Multipoint Distribution Services and for Fixed Satellite Services*, First Report and Order and Fourth Notice of Proposed Rulemaking, 11 FCC Rcd 19005, 19025 (1996) (*Ka-band First Report and Order*).

⁶⁵ 47 CFR § 25.202(a).

⁶⁶ Ka-band Amendment, Narrative at 22.

⁶⁷ *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, Third Report and Order, CC Docket No. 92-297, 12 FCC Rcd 22310, 22326 (1997).

C. O3b's V-Band Amendment

26. O3b filed a further amendment proposing to add the 37.5-42.0 GHz and 47.2-50.2 GHz bands to its request for market access for the O3bN constellation.⁶⁸ Grant of this amendment, as conditioned below, is consistent with our goals in the *Spectrum Frontiers* proceeding to provide opportunities for broadband satellite service in millimeter wave spectrum while making millimeter wave bands available for fifth-generation (5G) terrestrial wireless deployment. O3b also sought market access in the 50.4-51.4 GHz band; because service and sharing rules for satellite operations in the band are under consideration in the *Spectrum Frontiers* proceeding, we defer action on O3b's request for use of this band.⁶⁹ Finally, O3b also requested a waiver of Section 2.106 to operate in these frequency bands.⁷⁰ As discussed below, the proposed operations are consistent with the U.S. Table of Frequency Allocations and with the decisions taken within the *Spectrum Frontiers* proceeding. Therefore, this waiver request is dismissed as moot.

27. *Request for FSS Operations for Satellites 31-42 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.⁷¹ This band is also allocated to FSS on a primary basis, but part 25 of the Commission's rules limits all FSS operations to communications with individually licensed earth stations.⁷² Part 25 further states that earth stations in this band must not be ubiquitously deployed and must not be used to serve individual consumers.⁷³ In addition, earth station operations in the FSS shall not claim interference protection from stations in the fixed and mobile services, except where the individually licensed earth stations are authorized under Section 25.136 of the Commission's rules.⁷⁴ Part 25 also includes PFD limits applicable to operations in 37.5-40.0 GHz.⁷⁵ Section 25.208(r) includes limits for both operations under assumed free space conditions⁷⁶ and operations during periods when the FSS system raises power to compensate for rain-fade conditions at the earth station.⁷⁷ In the *Spectrum Frontiers Second Report and Order*, the Commission found that the record did not establish conditions under which FSS could operate at a higher PFD

⁶⁸ V-band Amendment, Narrative at 7. As previously noted, O3b's request to use the 42.0-42.5 GHz band was deferred and not accepted for filing. The 42.0-42.5 GHz band is not allocated for non-Federal FSS in the United States. See Public Notice, Satellite Policy Branch Information, Space Station Applications Accepted for Filing, Report No. SAT-01262 (Aug. 25, 2017).

⁶⁹ *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, FCC 17-152 (*Spectrum Frontiers Second Report and Order*).

⁷⁰ V-band Amendment at 7.

⁷¹ 47 CFR § 2.106.

⁷² 47 CFR § 25.202(a)(1).

⁷³ *Id.*

⁷⁴ U.S. Table of Frequency Allocations, 47 CFR § 2.106, footnote NG63. Section 25.136 specifies processes for earth station applicants in the 37.5-40.0 GHz band and includes procedures to enable sharing with UMFUS. 47 CFR § 25.136.

⁷⁵ 47 CFR § 25.208(r). These limits were adopted alongside the limitations on FSS earth station operations, in implementing the Commission's soft segmentation plan for the V-band, to accommodate high density fixed service in the 37.5-40.0 GHz band and FSS in the 40-42 GHz band. *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*, Second Report and Order, 18 FCC Rcd 25428, 25439-40, paras. 23-24 (2003) (*V-band Second Report and Order*).

⁷⁶ 47 CFR § 25.208(r)(1).

⁷⁷ 47 CFR § 25.208(r)(2). See *V-band Second Report and Order*, 18 FCC Rcd at 25440-41, paras. 28-29.

consistent with terrestrial use of the band.⁷⁸ However, that Order did not delete a note to Section 25.208(r), which states that the conditions under which satellites may exceed the PFD limits for free space conditions to compensate for the effects of rain fading have not yet been defined and provides that the conditions and extent to which the free space limits can be exceeded will be the subject of a further rulemaking by the Commission.⁷⁹ We condition O3b's grant of U.S. market access in this band accordingly.

28. *Request for FSS Operations for Satellites 31-42 in the 40-42.0 GHz Band.* In the *Spectrum Frontiers* proceeding, the Commission reserved the 40-42 GHz band for FSS use.⁸⁰ Furthermore, O3b's proposed use of this band is consistent with the existing allocation.⁸¹ We therefore grant market access to O3b in this band as conditioned below.

29. *Request for FSS Operations for Satellites 31-42 in the 47.2-50.2 GHz Band.* The 47.2-48.2 GHz portion of the 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.⁸² In the *Spectrum Frontiers Second Report and Order*, we decided to limit FSS 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.⁸³ In addition, earth station operations in the FSS in the 47.2-48.2 GHz must not cause interference to stations in the fixed and mobile services, except where the individually licensed earth stations are authorized under Section 25.136 of the Commission's rules.⁸⁴ In the *Spectrum Frontiers Second Report and Order* we indicated that the 48.2-50.2 GHz portion of the band will be reserved for FSS use,

⁷⁸ *Spectrum Frontiers Second Report and Order*, paras. 214-216.

⁷⁹ 47 CFR § 25.208(r), NOTE TO PARAGRAPH (r). Although the note to paragraph (r) refers to paragraph (q)(1) this reference is apparently in error. The note should refer to paragraph (r)(1) for the PFD limits applicable to NGSO systems under assumed free space conditions. The Commission will address this apparent error in a future proceeding.

⁸⁰ *Spectrum Frontiers Second Report and Order*, at para. 192.

⁸¹ U.S. Table of Frequency Allocations, 47 CFR § 2.106.

⁸² 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 40.5-41.5 and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Bank for Wireless Services; and Allocation of Spectrum in the 37.0 -38.0 GHz and 40.0-40.5 GHz Frequency Bands for Government operations*, First Report and Order, 13 FCC Rcd 24649, 24651, para. 2 (1998) (*V-Band First Report and Order*). In 2003, the Commission noted that it was preserving the 47.2-48.2 GHz FSS uplink gateway for operations, pairing with downlink operations in the 37.5-40.0 GHz band. *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 40.5-41.5 and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Bank for Wireless Services; and Allocation of Spectrum in the 37.0 -38.0 GHz and 40.0-40.5 GHz Frequency Bands for Government Operations*, Second Report and Order, 18 FCC Rcd 25428, 25457, para. 67 (2003). The upper portion of the band, 48.2-50.2 GHz band (Earth-to-space) is identified in international footnote 5.516B for use by high-density application in the FSS in ITU Region 2. International Table of Frequency Allocations, 47 CFR 2.106, footnote 5.516B. Earth station operations in the 47.2-50.2 GHz band, including any limitations on such operations, will be addressed as part of the earth station licensing process.

⁸³ *Spectrum Frontiers Second Report and Order*, paras. 54-55.

⁸⁴ 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).

including for deployment of satellite user terminals.⁸⁵ Accordingly, we grant O3b market access in the 47.2-50.2 GHz band subject to the rules adopted in the *Spectrum Frontiers* proceeding.

30. The National Telecommunications and Information Administration (NTIA), on behalf of the National Aeronautics and Space Administration, the Department of Commerce, and the National Science Foundation, has expressed concerns about any proposed authorized out-of-band emission limits in the 50.2-50.4 GHz band that is designated for the Earth exploration-satellite service (EESS) (passive) use.⁸⁶ The NTIA indicated that these Federal agencies strongly opposed the future grant of NGSO FSS earth station licenses in the 49.7-50.2 GHz or 50.4-50.9 GHz bands operating in accordance with footnote US156 to Section 2.106 of the Commission's rules,⁸⁷ stating that out-of-band emissions from such earth stations would result in harmful interference to the operations of U.S. government assets in the adjacent 50.2-50.4 GHz band.⁸⁸ The NTIA requested that more stringent out-of-band limits be placed on such earth station operations to ensure that the Federal government's EESS operations at 50.2-50.4 GHz—particularly those aspects that are critical to its prediction of meteorological phenomena—are not compromised. The Commission acknowledges the significant concerns expressed by the NTIA and notes that this unwanted emissions issue could be considered in a future Commission action. Therefore, although we require O3b to comply with the out-of-band emission limits currently in footnote US156 to Section 2.106 of the Commission's rules for its operations in the 49.7-50.2 GHz band,⁸⁹ we also explicitly condition O3b's authorization upon compliance with any future limits applicable to unwanted emissions in this band that may be adopted, either because of modifications approved by the 2019 World Radiocommunication Conference (WRC-19), or as a result of any future Commission rulemaking, independent of any ITU deliberation.⁹⁰

31. *Sharing with GSO FSS systems.* The Commission does not currently have service rules relevant to sharing between NGSO and GSO FSS systems in the 37.5-42.0 GHz and 47.2-50.2 GHz bands that are part of O3b's market access petition. There are currently no FCC-licensed GSO FSS systems operating in these bands, although one GSO satellite application was recently granted.⁹¹ The Commission recently 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 BSS network.⁹² Accordingly, a condition to this effect will be included in the O3b grant. Article 22 of the ITU Radio Regulations contains provisions to ensure compatibility of NGSO FSS operations with

⁸⁵ *Spectrum Frontiers Second Report and Order*, para. 189.

⁸⁶ NTIA raised this concern during the coordination of certain requests to operate in portions of the V-band. See "Memorandum of Understanding between the Federal Communications Commission and the National Telecommunications and Information Administration," January 31, 2003 (MOU), available at http://apps.fcc.gov/edocs_public/attachmatch/DOC-230835A2.pdf.

⁸⁷ 47 CFR § 2.106, footnote US156. The same limits are also included in Section 25.202(j) of the Commission's rules, 47 CFR § 25.202(j).

⁸⁸ Specifically, the NTIA asserts that out-of-band emissions would degrade data collection capability, and would impact both domestic and international weather forecasting such as hurricane trajectories and the probability of tornado development.

⁸⁹ 47 CFR § 2.106, footnote US156.

⁹⁰ A possible revision to the limits applicable to unwanted emissions in the 50.2-50.4 GHz band was included in ITU Resolution 750 (Rev. WRC-15) and is being considered under WRC-19 Agenda Item 1.6.

⁹¹ Hughes Network Systems, LLC was granted authority to deploy and operate a GSO space station providing fixed-satellite service using Ka- and V-band frequencies including 40-42 GHz and 47.2-50.2 GHz bands. Hughes request to use the 50.4-51.4 GHz (Earth-to-space) bands was deferred. Hughes Network Systems Application, IBFS File No. SAT-LOA-20170621-00092 and IBFS File No. SAT-AMD-20170908-00128, grant stamped in part and deferred in part (March 20, 2018).

⁹² 47 CFR § 25.289.

GSO networks.⁹³ However, within the 37.5-51.4 GHz range there are currently no ITU EPFD limits. We note that O3b's grant of market access will be subject to modification to bring it into conformance with any rules or policies adopted by the Commission in the future. Therefore, if relevant EPFD limits or other procedures are adopted by the Commission, or to the extent applicable, by the ITU in the future, O3b's operations subject to this grant of U.S. market access must comply with those limits or procedures. These conditions address ViaSat's petition and will facilitate the development of NGSO and GSO systems in these frequencies.

32. *Request for FSS Operations for Satellites 31-42 in the 50.4-51.4 GHz Band.* O3b requests access to the U.S. market using the 50.4-51.4 GHz band for service and gateway uplinks. O3b notes that the U.S. Table of Allocations and the Commission's V-band designations include limitations on its proposed use. This band is allocated for FSS uplinks in the U.S. Table of Frequency Allocations, but in the *V-band First Report and Order*, the Commission also designated the 50.4-51.4 GHz segment for use by fixed and mobile service.⁹⁴ The Commission recently proposed authorizing fixed and mobile use under the UMFUS rules in the 50.4-51.4 GHz band in the *Spectrum Frontiers Order and Further Notice*,⁹⁵ but has not yet acted on this issue.⁹⁶ Rather than act on access to this band prematurely, we defer action until sharing between terrestrial and satellite operations in the band, as well as other uses of the band, are addressed in the context of the *Spectrum Frontiers Proceeding*.

D. O3b System Waivers

33. *Sharing with NGSO Systems and Waiver of Band-Splitting Procedure.* Until recently, Section 25.157(e) of the Commission's rules provided that "available spectrum" be "divided equally" among the applications granted as the result of a processing round.⁹⁷ O3b requested a waiver of Section 25.157(e), stating that its system can share with other NGSO FSS systems by relying on angular separation between orbital arcs, satellite diversity, and if necessary, band segmentation. In the *NGSO FSS Report and Order*, the Commission adopted rule changes that apply a spectrum sharing mechanism to all authorized NGSO FSS system that include a condition to share spectrum pursuant to Section 25.261.⁹⁸ O3b FSS operations will be subject to Section 25.261, while as discussed in paragraph 22 above, O3b's MSS operations will have to protect other NGSO FSS operations in the bands 29.5-30 GHz and 19.7-20.2 GHz. O3b's request for a waiver of Section 25.157 is therefore moot.

34. *Geographic Coverage Waiver.* O3b requests a waiver of Section 25.145, the geographic coverage rule, for the four additional satellites in its modification application (satellites 17-20), and for the O3bN (satellites 31-42). The Commission recently eliminated the international coverage requirement for NGSO FSS systems in the *NGSO FSS Report and Order*, which renders moot O3b's request for a waiver in this respect.⁹⁹ In addition, O3b's system, as amended, complies with the national coverage requirement in Section 25.145(c)(1) and therefore no waiver is required.¹⁰⁰

35. *Schedule S, Field S4(o).* As required by the Commission's rules, O3b submitted a Schedule S for its modification application, which contains certain technical information in a prescribed

⁹³ See generally ITU R.R. Article 22, Section II.

⁹⁴ *V-Band First Report and Order*, 13 FCC Rcd at 24651 (jointly referring to fixed and mobile services as "wireless service").

⁹⁵ *Spectrum Frontiers Order and Further Notice*, 31 FCC Rcd at 8158.

⁹⁶ *Spectrum Frontiers Second Report and Order*, n.35

⁹⁷ 47 CFR § 25.157(e).

⁹⁸ *NGSO FSS Report and Order*, at paras. 48-50.

⁹⁹ *NGSO FSS Report and Order* at para. 69.

¹⁰⁰ 47 CFR § 25.145(c).

format. O3b stated it could not accurately notate its number of in-orbit spares due to limitations in the form and requested a waiver of Schedule S Field 4(o).¹⁰¹ O3b provided the information within the application narrative and associated Attachment A regarding its proposed satellite configuration.¹⁰² Therefore, O3b's request for a waiver of Schedule S, Field S4(o) is granted.¹⁰³

E. Other Matters

36. *Comments.* In its comments, SpaceX suggests that the Commission consider conditions of grant that would promote efficient spectrum sharing among operators.¹⁰⁴ Hughes urges the Commission to adopt mechanisms for ensuring that aggregate EPFD limits are met by all NGSO systems authorized in the United States.¹⁰⁵ ViaSat questions the sufficiency of the EPFD limits proposed by the Commission to protect GSO systems from harmful interference and requests that each NGSO operator be held jointly and severally liable for harmful interference caused to GSO systems until the Commission adopts adequate aggregate EPFD limits and enforcement mechanisms.¹⁰⁶ Space Norway requests that O3b's grant of market access be conditioned on O3b implementation of mechanisms to avoid interference to highly elliptical orbit NGSO systems, such as that proposed by Space Norway.¹⁰⁷

37. All of these comments relate to issues of general applicability that are more appropriately addressed in the context of a rulemaking. Several of these issues were already raised in the then ongoing rulemaking proceeding concerning NGSO FSS matters¹⁰⁸ and were addressed in the *NGSO FSS Report and Order* adopted last year.¹⁰⁹ Even if we agreed with commenters that it would be appropriate to address these concerns in conditions of grant, we do not think that the record is sufficiently developed in this proceeding on any of these points to support such conditions. SpaceX asks that we consider conditions that would promote efficient use of spectrum, but provides little guidance on what precisely it thinks that the Commission should do to promote such efficiency. Similarly, Hughes and ViaSat express concerns about international EPFD limits and aggregate EPFD enforcement mechanisms, but the record is not sufficiently developed to adopt any conditions and such concerns are more appropriately addressed in the context of a rulemaking proceeding.¹¹⁰ Space Norway's request that O3b be required 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 condition grant of the O3b applications on the outcome of such rulemaking proceedings,

¹⁰¹ O3b Modification Application, Narrative at 13.

¹⁰² *Id.*, at Attachment A at A1-2.

¹⁰³ Since O3b filed its modification application, a new schedule S form was adopted which no longer contains Field S4(o). See International Bureau Announces the Launch of a New Web-Based Satellite Space Station Electronic Filing System; New "Schedule S" Goes Live on July 25, 2016, Public Notice, DA 16-831 (IB July 27, 2016).

¹⁰⁴ SpaceX Ka-Band Comments at 2.

¹⁰⁵ Hughes Ka-band Comments at 3.

¹⁰⁶ ViaSat Consolidated Petition to Deny at 10.

¹⁰⁷ Space Norway Ka-Band Comments at 4.

¹⁰⁸ *NGSO FSS NPRM* at 13656-58.

¹⁰⁹ See generally *NGSO FSS Report and Order*.

¹¹⁰ The Commission recently decided to retain the international EPFD limits for the Ka-band and rejected ViaSat's concerns regarding the sufficiency of international EPFD limits, finding that adopting the international limits will harmonize our rules with international regulations and provide greater certainty for NGSO FSS operators. *NGSO FSS Report and Order* at para. 35. ("While we recognize that these limits were not developed with the most advanced modern GSO networks in mind, ViaSat has not proposed any new EPFD limits, and it would not be advisable to remain without Ka-band EPFD limits in our rules pending such deliberations.")

as well as the recent *NGSO FSS Report and Order*.¹¹¹ We note that, as with the *OneWeb Order*, grant of the O3b Petition will not prejudice any decision, including a contrary action, in any pending or future rulemaking proceedings.¹¹² Rather, decisions of general applicability in such proceedings will be based on the totality of comments and proposals in those proceedings.

38. *Section 25.116*. In its November 2017 Amendment, O3b seeks to reduce the number of satellites and seeks U.S. market access in the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands¹¹³ for the provision of MSS feeder links and in the 19.7-20.2 GHz and 29.5-30 GHz¹¹⁴ frequency bands for the provision of MSS. O3b argues that the changes proposed should not be considered a major amendment as characterized in Section 25.116.¹¹⁵ Section 25.116 (c) of the Commission's rules provides that if a major amendment to a NGSO FSS processing round application is submitted after the cut-off date, the application will be considered newly filed and will lose its status in the processing group. Generally, a "major amendment" is one that changes orbital locations, frequency bands, increases the potential for interference, or has a significant environmental impact.¹¹⁶

39. In its petition to deny, Iridium argues that O3b's November 2017 Amendment is a major amendment that should be removed from consideration under the existing processing round. Iridium argues that the addition of MSS feeder links in the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands changes its operations in these bands from a non-conforming use, not included in the U.S. Table of Allocations, to a primary use of the bands. Iridium asserts that a change from a non-conforming use to a primary use constitutes an increased risk of interference to authorized operators, but cites to no authority for this proposition. Iridium's argument appears to be that having additional co-primary operators in these bands will increase the number of parties with which Iridium may need to coordinate if it seeks to add MSS feeder link locations in the future. Section 25.116, however, is intended to address major amendments affecting other NGSO systems under consideration in the processing round.¹¹⁷ It is not intended to remove an application from consideration in a processing round where the amendment affects parties outside of the processing round. Moreover, O3b's request to modify its application to change its operations from non-conforming to conforming would not adversely affect other participants in the processing round, because in either case co-frequency operations with respect to all other participants in the processing round would be subject to the sharing rules in Section 25.261. Finally, although a

¹¹¹ We note that this condition also addresses several comments that requested that any grant of market access to O3b be conditioned on compliance with certain pending and future rulemakings. See *ViaSat Petition to Deny* at 9-10; *Spire Comments* at 5; *SpaceX Comments* at 5; *Hughes Comments* at 3.

¹¹² See, e.g., *Spectrum Frontiers Report and Order, and Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rcd 6373, 6377 n.14 (2017).

¹¹³ These two frequency bands had already been included in the O3b Ka-band Amendment.

¹¹⁴ These two frequency bands had already been included in the O3b Modification.

¹¹⁵ November 2017 Amendment, Narrative at 8-9.

¹¹⁶ 47 CFR § 25.116(b).

¹¹⁷ When the Commission adopted Section 25.116(c), which provides that an application for an NGSO-like satellite license will be considered a newly filed application if it is subject to a major amendment after a "cut-off" date applicable to the application, 47 CFR § 25.116(c), it did so after noting that its first-come, first-served procedure for broadcast license applications included a provision that amendments to an application "that create[d] a conflict with any other application filed prior to the amendment" would cause the amended application to lose its status and be moved to the back of the processing queue. *Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order and FNPRM, 18 FCC Rcd 10760, 10814 (2003). In the *Space Station Licensing Rules Order* the Commission adopted the broadcast model for space station license modifications, finding that going forward "[m]ajor amendments will cause the license application to be moved to the end of the queue." *Id.* Thus, the purpose of the major amendments rule is to assess the effect of an amendment on applications filed as part of the same processing round.

reduction in the number of satellites may give O3b less flexibility to use satellite diversity, the number of potential interference events vis-à-vis other constellations will be reduced and, if no coordination agreement is reached with any of these constellations, the number of times those constellations will be required to reduce spectrum use will be smaller. Thus, we conclude that O3b's November 2017 amendment is not a major amendment and deny Iridium's request to remove this amendment from the Ku-Ka-band processing round.

40. *Other.* SpaceX argues that O3b's more powerful transmissions to its satellites above the geostationary orbit could pose a significant threat of interference to satellites operating in low-Earth orbit.¹¹⁸ 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.¹¹⁹ 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.

41. *Radio Astronomy.* Out-of-band signals into allocated radio astronomy bands can cause interference to radio astronomy observations. We also note that radio astronomy as a service frequently makes use of observations (passive) in bands not allocated to the radio astronomy service. This practice is a result of scientifically valuable signals being subject to the Doppler Effect and shifted in frequency outside radio astronomy-allocated bands. Although not a condition to this authorization, O3b should be aware of these facts and contact the National Science Foundation Spectrum Management Unit (esm@nsf.gov) to assist with coordination and information on radio astronomy sites. In the bands to be used by O3b, the relevant sites are the Green Bank Telescope, the Very Long Baseline Array, and the Very Large Array.¹²⁰

F. Bond

42. In the O3b Modification application, O3b requests a waiver of the bond for its 8 new satellites which "involve the same frequencies and service area."¹²¹ In amending its application, however, O3b added new frequencies to four of these eight satellites and added 22 new satellites, also using additional frequency bands.¹²² Thus, the basis for O3b's waiver has been superseded by its amendment, and O3b is required to file a bond and comply with the corresponding milestone requirement, pursuant to Sections 25.164 and 25.165, and as set forth below.¹²³

G. Milestones

43. In the *NGSO FSS Report and Order*, the Commission relaxed the NGSO milestone requirements by permitting licensees to launch only 50 percent of their authorized constellations after 6 years, with the entire constellation to be launched after 9 years.¹²⁴ Accordingly, once the new rule

¹¹⁸ SpaceX Consolidated Reply at 7-8 (filed July 14, 2016).

¹¹⁹ *NGSO FSS Report and Order* at para. 55.

¹²⁰ See 47 CFR § 2.106, footnote US131, for locations of these radio astronomy observatories.

¹²¹ O3b Modification at 9.

¹²² See e.g., *DigitalGlobe, Inc., Order and Authorization*, 20 FCC Rcd 15696 (Sat. Div., Int'l Bur. 2005) (requiring DigitalGlobe to post a bond for adding additional NGSO satellites and frequencies to its NGSO constellation).

¹²³ We note that O3b filed a bond in response to the Satellite Division's partial grant of its modification, IBFS File No. SAT-MOD-20160624-00060 (grant stamped Feb. 28, 2018) which shall cover "all additional space stations authorized by the FCC under Call Sign S2935." Letter to Marlene H. Dortch, Secretary FCC, from Suzanne Malloy, Vice President, Regulatory Affairs, O3b Limited (March 26, 2018). O3b must file a rider to the bond to the extent the terms of the bond do not comply with the milestones in this Order.

¹²⁴ *NGSO FSS Report and Order* at para. 67.

becomes effective, O3b must comply with the milestone requirements. However, not all satellites in the O3b constellation will be using the same frequency bands and the intent of the Commission when establishing the milestone requirement was to guarantee that every authorized frequency band be used within six years.¹²⁵ In view of this, we impose an additional condition that O3b must be operating on all of the proposed frequencies within six years. We note that the initial 12 O3b satellites currently in orbit, that were granted U.S. market access prior to the commencement of a processing round, will not be counted when applying the milestone requirements or the additional milestone condition described herein.

IV. CONCLUSION

44. We conclude that grant of the modification and amendments, as conditioned herein, of O3b's U.S. market access will serve the public interest by enabling O3b to pursue its goal of expanding broadband internet access to communities across the United States. The conditions in this grant supersede the conditions in O3b's prior grant of U.S. market access in IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20151115-00004 (granted Jan. 22, 2015). O3b must obtain a modification of any current earth station authorizations before communicating with the space stations authorized in this grant.

V. ORDERING CLAUSES

45. Accordingly, IT IS ORDERED, that O3b's request to modify its current grant of U.S. market access to operate 16 space stations to add 26 new space stations is GRANTED, 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 Communication Commission's rules, 47 CFR § 25.137(c), as set forth below.

46. IT IS FURTHER ORDERED that O3b's use of Ka-band frequencies are subject to the following requirements and conditions:

- a. Operations in portions of the 17.8-20.2 GHz and 27.5-30 GHz bands, including MSS operations in the 19.7-20.2 GHz and 29.5-30 GHz bands, are authorized up to the applicable power flux-density and equivalent power-flux density limits contained in Section 25.208, 47 CFR § 25.208, and Articles 21 and 22, as well as Resolution 76 of the ITU Radio Regulations.
- b. O3b must cooperate with other NGSO FSS operators in order to ensure that all authorized operations, including MSS operations in the 19.7-20.2 GHz band, jointly comport with the applicable limits for aggregate EPFD in the space-to-Earth direction (EPFD down) contained in Article 22 of the ITU Radio Regulations, as well as Resolution 76 of the ITU Radio Regulations.
- c. Operations in the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands must be coordinated with any previously authorized NGSO MSS systems not included in this Ku-Ka-band processing round. Until any required coordination agreement is obtained, transmissions to or from any earth station located in U.S. territory shall not be conducted in these frequency bands. Sharing of the 19.3-19.7 GHz and 29.1-29.5 GHz frequency bands with other authorized operators will be subject to Section 25.261.
- d. MSS operations in the 19.7-20.2 GHz and 29.5-30 GHz frequency bands shall be conducted on a non-interference, non-protected basis with respect to other FSS operations in these bands.
- e. Operations in the 27.5-28.35 GHz frequency band are secondary with respect to Upper Microwave Flexible Use Service (UMFUS) operations, except for FSS operations associated with earth stations authorized pursuant to 47 CFR § 25.136, and will comply with any determinations set forth in the *Spectrum Frontiers Proceeding* (GN Docket 14-177).
- f. Operations in the 28.35-28.6 GHz and 29.5-30 GHz frequency bands are on a secondary basis

¹²⁵ See *Amendment of the Commission's Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 12674, 10827 (2003) ("Milestones are intended to ensure service to the public in a timely manner, to prevent warehousing of scarce orbit and spectrum resources.").

with respect to GSO FSS operations.

g. Operations in the 17.8-18.3 GHz frequency band are on a secondary basis with respect to the fixed service.

h. Operations in the 17.8-18.6 GHz and 18.8-20.2 GHz frequency 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 and 18.8-20.2 GHz bands must be in accordance with any signed coordination agreement reached between O3b and U.S. Federal operators. Two weeks prior to the start of any operations in the 17.8-18.6 GHz and 18.8-20.2 GHz bands, O3b 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.

47. IT IS FURTHER ORDERED that O3b's use of the 37.5-42.0 GHz and 47.2-50.2 GHz frequency bands is subject to the following requirements and conditions:

a. 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).

b. Operations in the 40.0-42.0 GHz band are authorized up to the power-flux density limits in 47 CFR § 25.208(s) and (t).

c. In accordance with footnote US211 to 47 CFR § 2.106, O3b is urged to take all practicable steps to protect radio astronomy observations in the adjacent bands from harmful interference from its operations in the 40.0-42.0 GHz band.

d. 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."

e. Operations in the 37.5-40.0 GHz band are unprotected with respect to the fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.

f. Operations in the 47.2-48.2 GHz band must provide interference protection to the fixed and mobile services, except as authorized pursuant to 47 CFR § 25.136.

g. Operations in the 47.2-50.2 GHz band will be subject to the rules adopted in the *Spectrum Frontiers Proceeding*, GN Docket 14-177.

h. O3b's earth station emissions in the 50.2-50.4 GHz band must comport with the limits contained in ITU-R Resolution 750 (REV. WRC-15) and/or footnote US156 to Section 2.106 of the Commission's rules, 47 CFR § 2.106, footnote US156, including any future revisions of footnote US156 to Section 2.106. Such revisions may be introduced either because of modifications that may be approved by WRC-19 to Resolution 750, or as a result of a Commission rulemaking proceeding, independent of any ITU deliberation.

j. Any future grant of earth station licenses for operations with the O3b system will be subject to the following condition, unless the condition is satisfied prior to such license grant: 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.

k. Operations shall not cause harmful interference to, and shall not claim protection from GSO networks operating in the FSS and BSS, in accordance with Section 25.289. In the event that relevant EPFD limits or procedures related to sharing between GSO and NGSO networks are adopted by the Commission or the ITU, operations must be in conformance with such limits and procedures.

48. IT IS FURTHER ORDERED that prior to initiation of service, O3b must receive a

favorable or “qualified favorable” finding in accordance with Resolution 85 with respect to its compliance with applicable EPFD limits in Article 22 of the ITU Radio Regulations. O3b must communicate the ITU finding to the Commission and submit the files containing the data used as input to the ITU validation software. *See also* 47 CFR 25.146(c) upon its effective date.

49. IT IS FURTHER ORDERED that O3b must comply with the sharing of ephemeris data procedures described in new Section 25.146 of the Commission’s rules, upon its effective date. 47 CFR § 25.146(e).

50. IT IS FURTHER ORDERED that O3b 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.

51. IT IS FURTHER ORDERED that O3b’s 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 Ku-Ka-band processing round initiated in Public Notice, DA 16-804 and Public Notice, DA 17-524. Spectrum sharing between O3b’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 the U.S. territory, are governed only by the ITU Radio Regulations and are not subject to Section 25.261.

52. IT IS FURTHER ORDERED that prior to the initiation of service, O3b must obtain from the United Kingdom Space Agency an authorization for deployment and space operations under the United Kingdom Outer Space Act. O3b must file evidence in IBFS File Nos. SAT-MOD-20160624-00060, SAT-AMD-20161115-00116, SAT-AMD-20170301-00026, and SAT-AMD-20171109-00154, demonstrating grant of any such authorizations within five business days of action by the United Kingdom Space Agency. Thereafter, this grant will remain effective only to the extent that launch and space operations continue to be authorized by the United Kingdom Space Agency under the United Kingdom Outer Space Act.

53. IT IS FURTHER ORDERED that O3b’s satellite operations must be subject to direct and effective regulation by the United Kingdom concerning orbital debris mitigation.

54. IT IS FURTHER ORDERED that 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.

55. IT IS FURTHER ORDERED that communications between U.S. licensed earth stations and the O3b space stations must comply with all existing and future coordination agreements reached between the United Kingdom and other Administrations, including all coordination agreements reached between the United Kingdom and the United States. In the absence of a coordination agreement, such communications must comply with applicable provisions of ITU Radio Regulations.

56. 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)¹²⁶ or Digital Audio Radio Service (DARS) to, from, or within the United States.

57. IT IS FURTHER ORDERED that O3b’s request for a waiver of Section 2.106, to operate a NGSO system in the 37.5-42.0 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz frequency bands, is dismissed as moot.

58. IT IS FURTHER ORDERED that O3b’s request for a waiver of Section 2.106, to operate a NGSO system in the 17.8-18.6 GHz band, is dismissed as moot.

¹²⁶ 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).

59. IT IS FURTHER ORDERED that O3b's request for a waiver of Section 25.145 of the Commission's rules regarding national geographic coverage requirements for its circular equatorial orbit satellites is dismissed as moot.

60. IT IS FURTHER ORDERED that O3b's request for a waiver of Sections 25.116(b) and (c) is dismissed as moot. Based on the spectrum sharing opportunities and band splitting requirements discussed herein, O3b's request for waiver of the band segmentation provision in 47 CFR § 25.157(e) is dismissed as moot.

61. IT IS FURTHER ORDERED that a waiver of the Ka-band plan to permit MSS operations in the 19.7-20.2 GHz and 29.5-30.0 GHz band is GRANTED on our own motion for the reasons stated herein.

62. IT IS FURTHER ORDERED, that O3b's request for U.S. market access using the 50.4-51.4 GHz band for service and gateway uplinks is deferred pending Commission action in the *Spectrum Frontier's Proceeding*.

63. IT IS FURTHER ORDERED that O3b's request for a waiver of Section 25.210(i) is dismissed as moot.

64. IT IS FURTHER ORDERED that O3b's request for a waiver of the requirement to provide information in Schedule S concerning the inability to provide in-orbit spare information within the prior version of the Schedule S form is GRANTED.

65. IT IS FURTHER ORDERED that O3b's request for a waiver of Section 25.157 is dismissed as moot.

66. IT IS FURTHER ORDERED that this grant is subject to the following requirements:

a. O3b must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later than [30 days from grant], 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. O3b must launch the space stations, place them in the assigned orbits, and operate them in accordance with this grant of U.S. market access and 47 CFR § 25.164(b). O3b must launch the space stations, place them in the assigned orbits, as specified in 47 CFR § 25.164(b), no later than [MONTH XX, 2024]. The Commission recently modified Section 25.164(b) as part of the *NGSO FSS Report and Order* to offer additional flexibility.¹²⁷ When this rule change becomes effective, this condition will require O3b to launch and operate 50 percent of its satellites no later than [MONTH XX, 2024]. Accordingly, as discussed in paragraph 40, O3b's satellites must be launched and operated according to the following schedule:¹²⁸

1. Within 6 years of grant O3b must launch and operate 15 satellites in the following bands:¹²⁹ 17.8-18.6 GHz, 18.8-19.3 GHz, 27.6-28.4 GHz, and 28.6-29.1 GHz;

2. Within 6 years of grant, O3b must launch and operate 11 satellites in the following bands: 19.3-19.7 GHz, 28.4-28.6 GHz, and 29.1-29.5 GHz;

3. Within 6 years of grant, O3b must launch and operate 13 satellites in the following bands: 19.7-20.2 GHz and 29.5-30.0 GHz;

¹²⁷ *NGSO FSS Report and Order* at para. 67.

¹²⁸ We note that the sum of the number of satellites subject to conditions 67 (b)(1)-(4) exceeds the total number of satellites being addressed in this condition, as any given satellite may pertain to more than one of the four groups.

¹²⁹ O3b's 12 currently operating space stations, which were granted U.S. market access outside of a processing round, are not included in this count.

4. Within 6 years of grant O3b must launch and operate 6 satellites in the following bands: 37.5-42.0 GHz and 47.2-50.2 GHz.

c. Failure to post and maintain a surety bond will render this grant of U.S. market access null and void automatically, without further Commission action. Failure to meet the milestone requirements of 47 CFR § 25.164(b) may result in O3b's market access grant being reduced to the number of satellites in use on the milestone date. Failure to comply with the milestone requirement of 47 CFR § 25.164(b) will also result in forfeiture of O3b's surety bond. By [6 yrs + 15 days], O3b 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).

67. IT IS FURTHER ORDERED that the Petition to Deny of ViaSat, Inc. IS GRANTED to the extent that some of the conditions requested by ViaSat are imposed, as indicated herein, and is otherwise DENIED.

68. IT IS FURTHER ORDERED that the Petition to Deny filed by Telesat Canada is GRANTED to the extent that some of the conditions requested by Telesat Canada are imposed, as indicated herein, and is otherwise DENIED.

69. IT IS FURTHER ORDERED, that the Petition to Deny filed by Iridium Constellation LLC is DENIED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary