

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

In the Matter of)
SPACE NORWAY AS) IBFS File No. SAT-PDR-20161115-00111
Petition for a Declaratory Ruling Granting Access) Call Sign S2978
to the U.S. Market for the Arctic Satellite)
Broadband Mission)

ORDER AND DECLARATORY RULING

Adopted: November 2, 2017

Released: November 3, 2017

By the Commission:

I. INTRODUCTION

1. In this Order and Declaratory Ruling, we grant the request of Space Norway AS (Space Norway) for certain rule waivers and a declaratory ruling concerning the conditions under which it will be permitted to access the U.S. market using two satellites authorized by Norway. In granting this request, we address concerns expressed by commenters seeking various conditions on the grant and partially deny two Petitions to Deny. This grant of market access for a non-geostationary-satellite orbit, fixed-satellite service (NGSO FSS) system helps to advance the Commission’s mandate “to make available, so far as possible, to all the people of the United States . . . rapid, efficient, Nation-wide, and world-wide” communication services by serving the unserved and underserved Arctic region.

II. BACKGROUND

2. Petition. On November 15, 2016, Space Norway filed a petition for declaratory ruling seeking access to the U.S. market for a proposed NGSO FSS satellite system, including service to Alaska. The proposed Arctic Satellite Broadband Mission (ASBM) system consists of two satellites in

1 Space Norway AS, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the Arctic Satellite Broadband Mission, IBFS File No. SAT-PDR-20161115-00111 (filed Nov. 15, 2016) (Space Norway Petition). Although the Space Norway Petition was originally filed as IBFS File No. SAT-LOI-20161115-00111, the Commission made an administrative change to the IBFS file number from a Letter of Intent (LOI) to a Petition for Declaratory Ruling (PDR) to reflect the nature of Space Norway’s request.

2 47 U.S.C. § 151; Space Norway Petition at 12-14.

3 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 addition to the present Petition, Space Norway must file and the Commission must approve

(continued....)

one orbital plane, inclined at 63.4 degrees, with an orbit having an approximate altitude at apogee of 43,509 kilometers and at perigee of 8,089 kilometers. The satellites will operate in the 10.7-12.7 GHz (space-to-Earth), 14.0-14.5 GHz (Earth-to-space), 19.7-20.2 GHz (space-to-Earth) and 29.5-30.0 GHz (Earth-to-space) frequency bands, and are licensed by Norway⁴ In its Petition, Space Norway sought certain waivers of the Commission's rules.⁵

3. *Processing Round.* On July 15, 2016, the Commission accepted for filing the petition for declaratory ruling of WorldVu Satellites Limited, d/b/a OneWeb (OneWeb).⁶ At the same time that the Commission accepted OneWeb's Petition for filing, it initiated a processing round for additional NGSO-like applications and petitions in the frequency bands requested by OneWeb.⁷ The processing round closed on November 15, 2016. Eleven additional applications and petitions were filed for NGSO-like satellite systems, including the petition filed by Space Norway.⁸ On May 26, 2017, Space Norway's Petition was accepted for filing, and, at the same time, a second processing round was initiated for the additional frequency bands requested by Space Norway and other applicants and petitioners.⁹ The second processing round closed on July 26, 2017 with two additional applications received.¹⁰ Each of these applicants and petitioners proposes an NGSO FSS system that, if approved, would have the same status and would have the same rights as other participants in the same processing round in case any division of frequencies is required to avoid mutual interference.¹¹ On June 22, 2017, the Commission adopted an Order granting, with conditions, the OneWeb Petition (*OneWeb Order*).¹²

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corresponding earth station applications before Space Norway may provide its proposed services in the United States.

⁴ Space Norway's system would also utilize the 18.2-19.2 GHz (space-to-Earth) and 28.0-29.0 GHz (Earth-to-space) Ka-band frequencies for telemetry, tracking and command operations outside the United States. Space Norway is not requesting U.S. market access for these bands.

⁵ See *infra* paras. 15, 20. In addition, we address, on our own motion, certain waivers of our rules. See *infra* paras. 16-19.

⁶ *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, 31 FCC Rcd 7666 (IB 2016).

⁷ *Id.*; see also 47 CFR § 25.157(a) (defining "NGSO-like satellite operation" as operation of any NGSO satellite system, and operation of a geostationary-satellite orbit, mobile-satellite service satellite to communicate with earth stations with non-directional antennas).

⁸ See IBFS File Nos. SAT-MOD-20160624-00060 and SAT-AMD-20161115-00116 (O3b Limited); SAT-PDR-20161115-00108 (Telesat Canada); SAT-LOA-20161115-00109 (The Boeing Company); SAT-PDR-20161115-00112 (LeoSat MA, Inc.); SAT-LOA-20161115-00113 (Karousel LLC); SAT-PDR-20161115-00114 (Kepler Communications Inc.); SAT-LOA-20161115-00117 (Audacy Corporation); SAT-LOA-20161115-00118 (Space Exploration Holdings, LLC (SpaceX)); SAT-PDR-20161115-00120 (ViaSat, Inc.); SAT-LOA-20161115-00121 (Theia Holdings A, Inc.).

⁹ *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, DA 17-524 (IB rel. May 26, 2017). The application of Kepler Communications Inc. was accepted for filing in a subsequent public notice. See Satellite Policy Branch Information: Space Station Applications Accepted for Filing, Public Notice, Report No. SAT-01259 (IB rel. Aug. 11, 2017).

¹⁰ See IBFS File Nos. SAT-LOA-20170726-00110 (Space Exploration Holdings, LLC); SAT-LOI-20170726-00111 (New Spectrum Satellite, Ltd).

¹¹ See *infra* paras. 18-19.

¹² *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 (2017) (*OneWeb Order*).

4. *Comments.* Telesat Canada (Telesat) and ViaSat, Inc. (ViaSat) filed petitions to deny Space Norway's Petition, based on concerns related to international coordination and protection of GSO operations, respectively.¹³ Space Exploration Technologies Corp. (SpaceX) filed comments expressing concerns regarding sharing spectrum with Space Norway's operations.¹⁴ Relatedly, several parties oppose Space Norway's request that the other NGSO FSS systems protect Space Norway's system as if it were a geostationary system.¹⁵ Other parties filed comments expressing concerns regarding all NGSO FSS applicants' compliance with single-entry and aggregate equivalent power-flux density (EPFD) limits in ITU Article 22 of the ITU Radio Regulations.¹⁶ SES and O3b requested that any grant to Space Norway be subject to the same conditions that were placed on the grant of U.S. market access for the O3b NGSO FSS system.¹⁷ Spire Global (Spire) requested that Space Norway provide more information on its orbital debris mitigation plans including how it would avoid collisions with or operational impacts on Spire's NGSO system during deorbit of the Space Norway satellites.¹⁸ Space Norway opposed the petitions to deny and responded to the comments.¹⁹

III. DISCUSSION

5. After review of the record we conclude that grant of the Space Norway Petition will serve the public interest, subject to the requirements and conditions specified herein.²⁰ Our public interest analysis considers the effect of the proposed ASBM system on competition in the United States, as well as issues of spectrum availability, eligibility requirements, operating requirements, national security, law enforcement, foreign policy, and trade.²¹ Below, we address the various outstanding issues raised by commenters on the Petition. We also address Space Norway's waiver requests as well as other waivers which we consider on our own motion. Where appropriate, we defer matters of general applicability to ongoing or potential future rulemakings.

¹³ See generally Telesat Canada (Telesat) Petition to Deny (filed June 26, 2017); ViaSat, Inc. (ViaSat) Petition to Deny or Impose Conditions (filed June 26, 2017).

¹⁴ See generally Space Exploration Technologies Corp. (SpaceX) Comments (filed June 26, 2017); see also SES S.A. and O3b Limited (SES and O3b) Comments at 6-7 (filed June 26, 2017) (stating that it "... urged the Commission to reject arguments that ITU priority should determine sharing status among NGSO systems authorized to serve the U.S. market").

¹⁵ Audacy Corporation (Audacy) Opposition and Response at 7-8 (arguing, in response to Space Norway's comments, that there will be no harmful interference between its system and Space Norway's system due to geographic separation as well as the earth station and satellite diversity provided through Audacy's inter-satellite links); LeoSat MA, Inc. (LeoSat) Opposition and Response at 15-16 (filed July 7, 2017); SpaceX Comments at 2; SpaceX Reply at 7 (filed July 14, 2017); Telesat Petition to Deny at 2-3; Telesat Reply at 7. See also Theia Holdings A, Inc. (Theia) Response at 32 (filed July 7, 2017) (stating that this issue should be addressed in relevant rulemaking proceedings not individual applications); Letter from William M. Wiltshire, Counsel to SpaceX, to Marlene H. Dortch, FCC (filed Oct. 6, 2017) (reiterating its opposition to give Space Norway special protection).

¹⁶ Hughes Network Systems, LLC (Hughes) Comments at 2-3 (filed June 26, 2017); LeoSat Opposition and Response at 11-15; SES and O3b Comments at 3-6; SES and O3b Reply at 1-4 (filed July 14, 2017); see generally ViaSat Petition to Deny or Impose Conditions; ViaSat Reply (filed July 14, 2017).

¹⁷ SES and O3b Comments at 7-10.

¹⁸ See generally Spire Global Comments (filed June 26, 2017). Spire also requested that Space Norway's grant be conditioned on submission of a final orbital debris plan and on compliance with the outcome of future rulemakings. *Id.* at 5.

¹⁹ See generally, Space Norway Opposition and Response (filed July 7, 2017).

²⁰ 1997 Report and Order, 12 FCC Rcd at 24106, para. 29.

²¹ *Id.* Except as otherwise discussed herein, we conclude that the Space Norway Petition satisfies these basic requirements for U.S. market access.

6. *ITU Coordination.* In its Petition to Deny, Telesat observes that international coordination will be required between the ASBM system and its own NGSO FSS system.²² Telesat argues that, at a minimum, any grant to Space Norway should be conditioned upon compliance with this international obligation. Space Norway agrees that international coordination will be required,²³ therefore, we have included a coordination condition below as a requirement of the grant, resolving Telesat's concerns and thereby eliminating them as a basis for denying Space Norway's Petition.²⁴ We recently declined to adopt Telesat's proposal to award priority according to ITU filing dates,²⁵ and we deny Telesat's petition in so far as it reiterates Telesat's ITU filing date priority proposal.

7. *EPFD Limits.* We find that Space Norway's demonstrations in its Petition and associated filings are sufficient to justify this grant of market access. However, to ensure that Space Norway will satisfy its EPFD obligations going forward, we condition this grant on Space Norway receiving a favorable or "qualified favorable" finding of its EPFD demonstration from the ITU prior to initiation of service.²⁶ Review by the ITU of Space Norway's compliance with ITU EPFD limits in the Ka-band, using methods now approved by the ITU,²⁷ will provide assurances that Space Norway will comply with the Ka-band EPFD limits specified in Article 22 of the Radio Regulations beyond the other technical demonstrations that Norway has already provided.

8. In addition, as a condition to this grant of U.S. market access, Space Norway must communicate the ITU finding to the Commission and submit the files containing the data used as input to the ITU validation software.²⁸ 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

²² See generally Telesat Petition to Deny; Telesat Reply (filed July 14, 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).

²³ See Space Norway Response at 2-7. See also Letter from Phillip L. Spector, Attorney for Space Norway AS, to Marlene H. Dorch, FCC (filed Sept. 19, 2017) (supporting the Commission's proposal in the NGSO FSS rulemaking to coordinate in good faith).

²⁴ Compliance with ITU coordination procedures is a requirement of the ITU Radio Regulations, which hold the force of treaty to which the United States is a party. Such compliance is a typical condition of both U.S. space station licenses and grants of U.S. market access. See 47 CFR § 25.111(b); see, e.g., *Inmarsat Mobile Networks, Inc., Application to Operate a Fixed-Satellite Service Gateway Earth Station Facility in Lino Lakes, Minnesota with the Inmarsat-5 F2 Space Station*, Order and Authorization and Declaratory Ruling, 30 FCC Rcd. 2770, 2784, para. 41c (IB 2015).

²⁵ *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, FCC 17-122, para. 50 (Sept. 27, 2017) (*NGSO FSS Order* or *NGSO FSS FNPRM*). The rules adopted in this proceeding will go into effect 30 days after publication of the Report and Order in the Federal Register, except that those amendments which contain new and modified information collection requirements that require approval by the Office of Management and Budget under the Paperwork Reduction Act will become effective after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

²⁶ As in the *OneWeb Order*, we also require that Space Norway provide a showing of compliance with a different set of EPFD limits 90 days prior to the initiation of service.

²⁷ 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>.

²⁸ *Id.* If the files have already been submitted to the Commission and do not need any update, then Space Norway need not resubmit these files.

information used for the EPFD showing to the ITU.²⁹ 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.

9. As in the *OneWeb Order*, we are permitting Space Norway to operate up to the power flux-density and EPFD levels specified in applicable regulations, rather than the specific demonstrations in its application. We find this flexibility is warranted given the preliminary nature of the system design, the fact that this grant is conditioned on Space Norway's satisfaction of the ITU's EPFD assessment, and the condition that Space Norway cooperate with other NGSO operators to meet limits for aggregate EPFD. We therefore reject ViaSat's arguments that Space Norway should be limited to the levels used in the EPFD demonstration in its application.³⁰

10. *Orbital Debris*. An applicant for a space station authorization 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.³¹ Space Norway included an orbital debris mitigation plan in its application.³² Thereafter, the International Bureau's Satellite Division (Division) sent a letter to Space Norway requesting additional information regarding its orbital debris mitigation plan.³³ On May 5, 2017, Space Norway responded to the Division's questions, but also stated that it could not provide definitive responses to all of the orbital debris mitigation questions because it had not yet selected a satellite manufacturer to assist with the design, development, and manufacture of the ASBM system.³⁴ On June 26, 2017, Spire filed comments in response to the Public Notice accepting for filing Space Norway's Petition. Spire argues that: (1) more information is needed regarding Space Norway's post-mission disposal plans through atmospheric re-entry so that existing operators can assess the risk by Space Norway's system; (2) systems without final designs, including Space Norway's system, should be required, through a grant condition, to submit an updated orbital debris mitigation plan once its system design is finalized; and (3) the Commission should condition Space Norway's grant of market access on the outcome of future rulemakings.³⁵ Space Norway responded that it provided additional information in its May 5 Letter regarding orbital debris mitigation, but was willing to provide any additional information that the Commission needs.³⁶

11. Space Norway indicates that its debris mitigation plan is a preliminary assessment pending the final constellation design.³⁷ Accordingly, we condition grant of the Space Norway Petition on Space Norway presenting and the Commission granting a modification of this market access grant to

²⁹ See, e.g., Letter from Susan H. Crandall, Associate General Counsel, Intelsat Corporation, to Marlene H. Dortch, Secretary, FCC, IB Docket No. 16-408 (filed Sept. 15, 2017) (stressing the importance of EPFD limits specified in Article 22 to protect GSO satellites from harmful interference from NGSO systems).

³⁰ ViaSat Petition to Deny at 5-8.

³¹ *Mitigation of Orbital Debris*, 19 FCC Rcd 11567, 11619; 47 CFR § 25.114(d)(14).

³² See Space Norway Petition Attach. A, Technical Information to Supplement Schedule S, at 13-18.

³³ See Letter from Jose P. Albuquerque, Chief, Satellite Division, International Bureau, FCC, to Birger A. Johansen, Space Norway AS (Mar. 10, 2017) (March 10 Letter).

³⁴ See Letter from Phillip L. Spector and Lafayette Greenfield, Attorneys for Space Norway AS, to Jose P. Albuquerque, Chief, Satellite Division, International Bureau, FCC (filed May 5, 2017) (May 5 Letter). We note that, on March 29, 2017, Space Norway requested an extension of the deadline to respond to the March 10 Letter, which the Satellite Division granted on April 6, 2017. See Letter from Phillip L. Spector and Lafayette Greenfield, Attorneys for Space Norway AS, to Jose P. Albuquerque, Chief, Satellite Division, International Bureau, FCC (filed Mar. 29, 2017).

³⁵ Spire Global Comments at 2-5.

³⁶ Space Norway Response at 12.

³⁷ See generally May 5 Letter (stating that Space Norway cannot at this time provide definitive responses to all questions regarding space orbital debris mitigation posed by the FCC because its satellites have yet to be designed).

include a final orbital debris mitigation plan.³⁸ This modification should provide, among other things: (1) with regard to assessing and limiting the probability of accidental explosions during and after completion of mission operations, the volume, pressure and mass of xenon remain at end-of-mission, as well as the volume and burst pressure of the tanks; (2) with regard to the accuracy with which the parameters of the satellite orbit will be maintained, the accuracy or orbital tolerance with which the orbit will be maintained including the apogee, perigee, inclination, and the right ascension of the ascending node; and (3) with regard to the re-entry phase, an analysis of the extent to which circularization of satellite orbits can be expected.

12. *Matters Broadly Applicable to NGSO FSS Applications.* As discussed above, certain parties³⁹ oppose Space Norway's proposal that the Commission should require low Earth orbit (LEO) and medium Earth orbit (MEO) NGSO systems to protect certain high Earth orbit (HEO) systems such as the ASBM system.⁴⁰ In addition, SpaceX argues that the ASBM system design makes inefficient use of spectrum and will hinder shared spectrum use by other NGSO operators.⁴¹ ViaSat argues that the Space Norway and other pending NGSO FSS applications, if granted, will interfere with its GSO system because the EPFD limits the Commission has proposed for the Ka-band are inadequate, and requests that the Commission deny those applications or impose its requested conditions.⁴² Hughes urges the Commission to adopt mechanisms for ensuring that aggregate EPFD limits are met by all NGSO systems authorized in the United States.⁴³

13. All of these comments raise issues of general applicability that are more appropriately addressed in the context of a rulemaking proceeding. Several of these issues were raised in an ongoing rulemaking proceeding concerning NGSO FSS matters,⁴⁴ and addressed in a Report and Order adopted on September 26, 2017.⁴⁵ 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

³⁸ The International Bureau has previously required applicants to file a modification application including updated orbital debris mitigation information in some instances. *See Northrop Grumman Space & Mission Systems Corp., Order and Authorization*, 24 FCC Rcd 2330, 2363-64, para. 102 (IB 2009) (Northrop Grumman Order); *ContactMEO Communications, LLC, Order and Authorization*, 21 FCC Rcd 4035, 4052-53, para. 47 (IB 2006).

³⁹ *See supra*, para. 4.

⁴⁰ Response of Space Norway AS to Comments and Opposition to Petitions to Deny at 3-4 (filed July 7, 2017) (Space Norway Response). According to Space Norway, the ASBM system “. . . can co-exist with other lower orbit NGSO systems in the same manner as can GSO systems, with the same protection levels and mechanisms.” *Id.* at 5 (citing *Comments of Space Norway AS*, IB Docket No. 16-408, at 10-11 (filed Feb. 27, 2017)). *See also id.* at 7-10 (explaining that, for spectrum sharing between the ASBM system and SpaceX's system, the situation would be similar to one between GSO satellites and large LEO constellations).

⁴¹ SpaceX Comments at 2-6, 9-10. SpaceX further states, that, at a minimum, the Commission should condition Space Norway's application on compliance with the outcome of the NGSO rulemaking proceeding. *Id.* at 10.

⁴² *See generally*, ViaSat Petition to Deny or Impose Conditions.

⁴³ Hughes Comments at 3; letter from Brennan T. Price, Senior Principal Engineer, Regulatory Affairs, EchoStar Corporation, to Marlene H. Dortch, Secretary, FCC (filed Aug. 2, 2017). *See also* SES S.A. and O3b Comments at 5-6 (stating that the Commission should be prepared to step in as needed in order to provide a solution to constrain aggregate EPFD levels).

⁴⁴ *See generally*, *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651 (2016) (NGSO FSS NPRM).

⁴⁵ *See generally*, *NGSO FSS Order*. The rules adopted in that proceeding will go into effect 30 days after publication of the Report and Order in the Federal Register, except that those amendments which contain new and modified information collection requirements that require approval by the Office of Management and Budget under the Paperwork Reduction Act will become effective after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

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 at this time, and such concerns are more appropriately addressed in the context of a rulemaking proceeding.⁴⁶ Space Norway's request for a condition requiring other NGSO FSS applicants to protect the Space Norway NGSO system as though it were a GSO space station is not based on any precedent and essentially requests that the Commission reevaluate its licensing procedures with regard to an entire class of NGSO systems, *i.e.* those with highly-elliptical orbits. As indicated above, we defer consideration of broadly applicable matters to that proceeding and other future rulemakings, and we condition grant of the Space Norway Petition on the outcome of any rulemaking proceedings, including our most recent NGSO FSS decision.⁴⁷ We note that, as with the *OneWeb Order*, grant of the Space Norway Petition will not prejudice any decision, including a contrary action, in any pending or future rulemaking proceeding.⁴⁸ Rather, decisions of general applicability in such proceedings will be based on the totality of comments and proposals in those proceedings.⁴⁹ In any event, Space Norway will not receive any special exemptions to determinations made in these rulemakings based solely on this grant, should Space Norway choose to accept it.⁵⁰

14. *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 in-line interference, orbital debris mitigation, 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 the Space Norway Petition raises the same concerns as OneWeb, we impose substantially identical conditions on Space Norway as we did in the *OneWeb Order*. In their comments, SES and O3b ask that we impose on any grant for the ASBM system the same conditions that were imposed on O3b's NGSO FSS constellation.⁵¹ As in the *OneWeb Order*, we do so below, with one exception. O3b's grant of market access and earth station authorizations permit continued communications with the O3b constellation even

⁴⁶ Recently, we considered ViaSat's concerns regarding the sufficiency of existing international EPFD limits and found that the 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. *NGSO FSS Order* at 12-13, para. 35.

⁴⁷ Thus, we decline to grant the ViaSat Petition to Deny or Impose Conditions, with the exception of its request to condition the grant on the outcome of rulemaking proceedings, including the NGSO FSS rulemaking proceeding.

⁴⁸ See, e.g., *NGSO FSS Order; Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rec 8014 (2016) (Spectrum Frontiers R&O and FNPRM); *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, Notice of Inquiry, 32 FCC Rec. 6373, 6377 n.14 (2017) (Mid-Band NOI); *Petition of MVDDS 5G Coalition for Rulemaking to Permit Use of the 12.2-12.7 GHz Band for Two-Way Mobile Broadband Service*, RM-11768, Public Notice, Consumer and Governmental Affairs Bureau Reference Information Center Petition for Rulemaking Filed, Report No. 3042, (CGB, May 9, 2016); see also *OneWeb Order*, 32 FCC Rcd 5369.

⁴⁹ To the extent that commenters believe that these generally applicable concerns are not already addressed by ongoing rulemakings, we remind commenters that they have the option to file petitions for rulemaking with the Commission.

⁵⁰ Space Norway may petition for reconsideration of this grant to seek deferral of any of its conditions until after the Commission has made a determination on the relevant issues in the pending NGSO FSS rulemaking. See 47 CFR § 1.106(c)(2).

⁵¹ SES and O3b Comments at 8-10. Specifically, SES and O3b requested that the Commission include, from the O3b Grant, Conditions 2-10 and Condition 12 for all Ku-/Ka-band NGSO grants and Conditions 1, 11 and 15 for U.S. market access Ku-/Ka-band NGSO grants. *Id.* See also *O3b Limited*, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (grant stamp dated Jan. 22, 2015).

if O3b makes certain adjustments to its constellation configuration.⁵² Space Norway has not requested such a condition, and, in any event, it is unclear from the record whether such a condition is appropriate for Space Norway's constellation configuration. Accordingly, we do not include such a condition below.⁵³

15. *Waiver Standard.* Space Norway seeks waivers of several of the Commission's rules. Generally, the Commission may waive any rule for good cause shown.⁵⁴ Waiver is appropriate where the particular facts make strict compliance inconsistent with the public interest.⁵⁵ In making this determination, we may take into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.⁵⁶ Waiver is therefore appropriate if special circumstances warrant a deviation from the general rule and such deviation will serve the public interest.⁵⁷ The Commission may also waive any rule on its own motion.⁵⁸ Below, we address Space Norway's request for rule waivers and we waive certain rules on our own motion.⁵⁹

16. *Waivers for 19.7-20.2 GHz.* Space Norway proposed operations require a waiver of the Commission's Ka-band Plan for market access in the 19.7-20.2 GHz frequency band.⁶⁰ The 19.7-20.2 GHz frequency band is allocated to the fixed-satellite service and mobile-satellite service (space-to-Earth) on a primary basis;⁶¹ however, the Commission's Ka-band Plan designates this band for the use by the GSO FSS, rather than NGSO FSS, systems.⁶² In its petition, Space Norway provided technical demonstrations to show that it will comply with international EPFD limits designed to protect GSO

⁵² *Id.* at Condition 11.

⁵³ To the extent that O3b is concerned about the status of its current and future operations relative to other NGSO systems, we note that, as a participant in the processing rounds, such concerns will be addressed when the Commission acts on O3b's pending petition. *See O3b Limited*, IBFS File Nos. SAT-AMD-20161115-00116 and SAT-MOD-20160624-00060.

⁵⁴ 47 CFR § 1.3.

⁵⁵ *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

⁵⁶ *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.

⁵⁷ *Northeast Cellular*, 897 F.2d at 1166.

⁵⁸ 47 CFR § 1.3.

⁵⁹ Space Norway requests waivers of the geographic coverage requirements in sections 25.145(c) and 25.146(i) of the Commission's rules. Space Norway Petition at 12. On our own motion, we address waivers of the Commission's Ka-band Plan for operations in the 19.7-20.2 GHz frequency band and the band-splitting procedure in section 25.157(e) of the Commission's rules. We also dismiss without prejudice Space Norway's request for waiver of section 25.202(a)(1), n.6, restricting use of the 10.7-11.7 GHz band by NGSO FSS systems to operations with gateway earth stations, as this matter should be considered in connection with such an earth station application. *See* Space Norway Petition at 10-11.

⁶⁰ *See 2000 18 GHz Band Order*, 15 FCC Rcd 13443-44, para. 28 (removing secondary NGSO FSS allocation in the 19.7-20.2 GHz frequency band).

⁶¹ 47 CFR § 2.106.

⁶² *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, Report and Order, 15 FCC Rcd 13430, 13443-44, para. 28 (2000).

networks in the 19.7-20.2 GHz band set forth in Article 22 of the ITU Radio Regulations.⁶³ In addition, Space Norway states that it will not cause harmful interference to GSO FSS operators.⁶⁴

17. In light of Space Norway's technical demonstrations, and its willingness to protect GSO operations, we find good cause to grant, on our own motion, a waiver of the Commission's Ka-band Plan in this frequency band. This finding is similar to waivers previously granted for NGSO operations in the 19.7-20.2 GHz frequency band⁶⁵ and is also consistent with the proposal that the Commission recently adopted to allow NGSO FSS operations in this band on a secondary basis, subject to certain power limits.⁶⁶ Space Norway provided technical demonstrations of how it will protect primary GSO FSS operations. Grant of this waiver will not undermine the purpose of the Ka-band Plan, which is to ensure that primary users of the 19.7-20.2 GHz band are not constrained. We therefore conclude that a waiver is justified until such time as the change to the Commission's Ka-band Plan becomes effective. We grant this waiver for Space Norway's non-conforming operations in this band on condition that Space Norway will not claim protection from harmful interference in this band and remind Space Norway that it undertakes these operations at its own risk.

18. *Waiver of Band-Splitting Procedure.* Space Norway seeks to operate in the United States throughout the 10.7-12.7 GHz, 14-14.5 GHz, 19.7-20.2 GHz, and 29.5-30 GHz frequency bands. In frequencies that include some of these bands, specifically the 10.7-12.7 GHz and 14.0-14.5 GHz bands, the Commission has adopted rules and policies to allow shared use of frequencies among NGSO FSS systems by avoidance of in-line interference events.⁶⁷ In other bands, section 25.157(e) of the Commission's rules provides for "available spectrum" to be "divided equally" among the applications granted as the result of a processing round.⁶⁸ This rule presumes that NGSO operators cannot use the same frequencies without causing harmful interference to each other, and therefore must be assigned discrete segments of the requested band. Below, we address a waiver, on our own motion, of section 25.157(e) to permit Space Norway to share the 19.7-20.2 GHz and 29.5-30 GHz bands with other NGSO FSS operators through avoidance of in-line interference events, rather than by assignment of only a portion of these bands.

19. Based on our technical review of the Space Norway Petition and of other applications and petitions that were submitted in the processing rounds, we conclude that sharing will be possible between the ASBM system, OneWeb, and other proposed NGSO FSS systems in all of the bands requested by Space Norway. The ASBM space stations will utilize steerable user beams while the earth stations that will communicate with the satellites in the constellation will have directional antennas.⁶⁹ This directionality, which permits avoidance of in-line interference with other NGSO FSS systems in the 10.7-12.7 GHz and 14-14.5 GHz bands, also permits avoidance of in-line interference in the 19.7-20.2 GHz and 29.5-30 GHz bands. Thus, because Space Norway's particular system design enables sharing by avoiding in-line interference events in all requested bands, division of available spectrum would be

⁶³ Space Norway Petition, Annex 3, Demonstration of EPFD Compliance in Ka-band, at 41, 45-49.

⁶⁴ Space Norway Petition at 5-6.

⁶⁵ See, e.g., *Northrop Grumman Order*, 24 FCC Rcd. at 2353-55 (permitting NGSO operations in the 19.7-20.2 GHz frequency band due to, *inter alia*, demonstrated compliance with ITU EPFD limits and the non-interference basis of such operations).

⁶⁶ *NGSO FSS Order* at 5, paras. 9-10.

⁶⁷ 47 CFR § 25.261; *The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ka-band*, Report and Order, 18 FCC Rcd 14708, 14714, para. 18 (2003); *The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-band*, Report and Order, 17 FCC Rcd 7841, 7850, para. 27 (2002).

⁶⁸ 47 CFR § 25.157(e).

⁶⁹ Space Norway Petition at 2.

unnecessarily restrictive. Grant of a waiver in this instance will not undermine the purpose of section 25.157(e) since we recently adopted changes to the Commission's rules that will apply a spectrum sharing mechanism to all NGSO FSS systems that have sharing capabilities (e.g., directional earth station antennas), regardless of the frequency bands used.⁷⁰ Because these changes are not yet effective, we grant a waiver of section 25.157(e) consistent with the Commission's grant of a similar waiver in the *OneWeb Order*.⁷¹

20. *Geographic Coverage Requirements.* Space Norway requests a waiver of geographic coverage requirements in sections 25.145(c) and 25.146(i)(1), (2) of the Commission's rules because the ASBM system's coverage area is limited to the pan-Arctic region above 55 degrees north latitude.⁷² Sections 25.145(c) and 25.146(i) require FSS⁷³ systems using certain Ka- and Ku-band frequencies, respectively, to provide service coverage to (i) all locations as far north as 70 degrees latitude and as far south as 55 degrees latitude for at least 75% of every 24 hour period and (ii) on a continuous basis throughout the fifty states, Puerto Rico and the U.S. Virgin Islands. We find that a grant of these waivers will serve the public interest. With respect to the national coverage requirement, we note that Space Norway intends to provide reliable connectivity service to the unserved and underserved population in Alaska, thereby helping to promote the Commission's goal to ensure reliable communications connectivity in every state.⁷⁴ We also recognize that several of the other NGSO FSS applicants intend to provide communications coverage to all U.S. states and territories, thereby mitigating concerns about Space Norway's lack of coverage to other regions of the United States.⁷⁵ Further, the Commission has previously granted a waiver of the geographic coverage requirements for another NGSO FSS system, the O3b Limited system, due to its particular system design.⁷⁶ Space Norway states that the ASBM system is designed to provide pan-Arctic coverage above 55 degrees North latitude and, therefore, does not have the technical capability to provide a wider range of geographic coverage that would allow it to meet either the national or international coverage requirements.⁷⁷ Relatedly, the Commission has recently eliminated the international coverage requirement,⁷⁸ recognizing that such a requirement may inhibit certain NGSO system designs.⁷⁹ Accordingly, and considering that elimination of the international requirement is not yet effective, we grant waivers of both geographic coverage requirements for the ASBM system.

21. *Other.* In the 14-14.2 GHz band, the National Aeronautics and Space Administration operates Tracking and Data Relay Satellite System facilities at three locations: Guam (latitude 13°36'55" N, longitude 144°51'22" E); White Sands, New Mexico (latitude 32°20'59" N, longitude 106°36'31" W and latitude 32°32'40" N, longitude 106°36'48" W); and Blossom Point, Maryland. For transmissions in the 14-14.2 GHz band from NGSO FSS earth stations located within 125 kilometers of these three sites, the earth station operators should take account of the NASA facilities.

⁷⁰ *NGSO FSS Order* at 18, para. 52 (applying the newly adopted spectrum sharing mechanism to NGSO FSS systems in any frequency band).

⁷¹ See *OneWeb Order*, 32 FCC Rcd at 5379, para. 29.

⁷² Space Norway Petition at 11-12; 47 CFR §§ 25.145(c), 25.146(i).

⁷³ Section 25.145 governs licensing provisions for the FSS in the 18.3-20.2 GHz and 28.35-30 GHz bands; section 25.146 governs licensing and operating rules for the NGSO FSS in the 10.7-14.5 GHz bands.

⁷⁴ See Space Norway Petition at 12.

⁷⁵ See, e.g., Space Exploration Holdings, IBFS No. SAT-LOA-20161115-00118; ViaSat, Inc., IBFS File No. SAT-PDR-20161115-00120.

⁷⁶ See *O3b Limited*, IBFS File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20151115-00004.

⁷⁷ Space Norway Petition at 11-12.

⁷⁸ 47 CFR §§ 25.145(c)(1), 25.146(i)(2).

⁷⁹ *NGSO FSS Order* at 23-24, para. 69.

IV. CONCLUSION

22. We conclude that grant of the Space Norway Petition, as conditioned herein, will serve the public interest by enabling Space Norway to pursue its goal of providing broadband Internet access to currently unserved and underserved communities in the Arctic region of the United States.

V. ORDERING CLAUSES

23. Accordingly, IT IS ORDERED, that the Petition for Declaratory Ruling filed by Space Norway, 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 in paragraphs 24-29 below.⁸⁰

24. Any future grant of earth station licenses for operations with the ASBM system will be subject to the following conditions:

- a. Communications between U.S.-licensed earth stations and ASBM space stations must comport with all existing and future space station coordination agreements reached between Norway and other administrations. In the absence of a coordination agreement, such communications must comport with applicable provisions of the ITU Radio Regulations.
- b. In the 11.7-12.2 GHz (space-to-Earth) frequency band reception is permitted for transmissions 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 47 CFR § 25.208(g), (i), and (j).
- c. In the 12.2-12.7 GHz (space-to-Earth) frequency band reception is permitted for transmissions up to the power flux-density limits in 47 CFR § 25.208(o) and Article 21 of the ITU Radio Regulations, and up to the equivalent power flux-density requirements of 47 CFR § 25.208(l).
- d. Operations in the 14.0-14.5 GHz (Earth-to-space) frequency band are permitted for levels up to the equivalent power flux-density requirements of 47 CFR § 25.208(k).
- e. In the 10.7-11.7 GHz (space-to-Earth) frequency band reception is permitted for transmissions up to the applicable power flux-density limits in 47 CFR § 25.208(b), and up to the equivalent power flux-density requirements of 47 CFR § 25.208(g), (i) and (j).
- f. Waiver of the Commission's Ka-band Plan IS GRANTED. Communications in the 19.7-20.2 GHz (space-to-Earth) frequency band are on a non-conforming basis. Such communications are on an unprotected basis and operations must immediately terminate upon notification of harmful interference. This waiver terminates upon the effective date of changes made to the Commission's Ka-band Plan adopted in FCC 17-122, which permit communications in the 19.7-20.2 GHz frequency band with NGSO FSS systems on an unprotected basis and on a secondary basis to GSO FSS operations. In addition, such communications must comport with the applicable EPFD limits and requirements in Article 22 of the ITU Radio Regulations.
- g. In the 29.5-30.0 GHz (Earth-to-space) frequency band transmissions are permitted at levels up to the applicable equivalent power flux-density requirements in Article 22 of the ITU Radio Regulations.
- h. Transmissions in the 29.5-30 GHz (Earth-to-space) frequency band are on a secondary basis with respect to GSO FSS operations.
- i. Operations must comply with the 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.

⁸⁰ Given the lack of ambiguity of these conditions, as well as the requirement that licensees abide by our rules absent a waiver, we believe it is unnecessary to include the boilerplate language requested by SES and O3b. See SES and O3b Comments at 8-9.

market access pursuant to the processing rounds initiated in Public Notices, DA 16-804 and DA 17-524.

25. Any future grant of earth station licenses for operations with the ASBM system will be subject to the following conditions, unless such conditions are satisfied prior to such license grant:

a. Space-to-Earth operations in the 19.7-20.2 GHz frequency band 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 19.7-20.2 GHz band must be in accordance with any signed coordination agreement reached between Space Norway and U.S. Federal operators. Two weeks prior to the start of any operations in the 19.7-20.2 GHz band, Space Norway 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.

b. In the 14.47-14.5 GHz band, operations are subject to footnote US342 to the U.S. Table of Frequency Allocations, 47 CFR § 2.106, and all practicable steps must be taken to protect the radio astronomy service from harmful interference.

c. In the 10.7-11.7 GHz band, operations must be coordinated with the radio astronomy observatories listed in 47 CFR § 2.106, n.US131, to achieve a mutually acceptable agreement regarding the protection of the radio telescope facilities operating in the 10.6-10.7 GHz band.

d. Prior to initiation of service, Space Norway 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. Space Norway 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.

e. At least ninety days prior to the initiation of service to the public, Space Norway must submit in File No. SAT-PDR-20161115-00111:

i. a comprehensive technical showing for its NGSO FSS system in the 10.7-12.2 GHz frequency band, in accordance with 47 CFR § 25.146(b).

ii. a technical showing for its NGSO FSS system in the 12.2-12.7 GHz frequency band, in accordance with 47 CFR § 25.146(g).

iii. a comprehensive technical showing for its NGSO FSS system in the 19.7-20.2 GHz frequency band, to demonstrate that the NGSO FSS system is expected not to operate in excess of the additional operational EPFD_{down} limits and the operational EPFD_{down} limits specified in the applicable equivalent power flux-density requirements of Article 22 of the ITU Radio Regulations.

26. Any future grant of earth station licenses for operations with the ASBM system may be withheld, subjected to additional conditions, or modified, if the following conditions are not met:

a. Space Norway must cooperate with other NGSO FSS operators in order to ensure that all authorized operations jointly comport with the applicable limits for aggregate EPFD in the space-to-Earth direction (EPFD_{down}) contained in 47 CFR § 25.208(h), (m), as well as in Resolution 76 of the ITU Radio Regulations.

b. Space Norway shall be subject to the rules regarding the sharing of ephemeris data in section 25.271 of the Commission’s rules, 47 CFR § 25.271(e), until the effective date of the changes

adopted in FCC 17-122.⁸¹ After that, Space Norway must comply with the sharing of ephemeris data procedures described in new section 25.146 of the Commission's rules, 47 CFR § 146(e).

c. Space Norway 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, Space Norway must seek and obtain the Commission's approval of a modification to this grant specifying additional details regarding orbital debris mitigation plans.

27. 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.

28. This declaratory ruling does not address the provision of any Direct-to-Home (DTH) service, Direct Broadcast Satellite Service (DBS)⁸² or Digital Audio Radio Service (DARS) to, from, or within the United States.

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

Space Norway must post a surety bond in satisfaction of 47 CFR §§ 25.165(a)(1) & (b) no later than **December 3, 2017** 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

Space Norway must launch the space stations, place them in the assigned orbits, and operate them in accordance with the station authorization no later than **November 3, 2023**, 47 CFR § 25.164(b).⁸³

This grant of U.S. market access will be null and void automatically, without further Commission action if Space Norway fails to comply with any of these requirements. Failure to comply with the milestone requirement of 47 CFR § 25.164(b) will also result in forfeiture of Space Norway's surety bond. By **November 18, 2023**, Space Norway 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).

30. IT IS FURTHER ORDERED that Space Norway's request for waiver of the geographic coverage requirements in 47 CFR §§ 25.145(c), 25.146(i) IS GRANTED.

31. IT IS FURTHER ORDERED that the request for waiver of 47 CFR § 25.202(a)(1), n.6, restricting use of the 10.7-11.7 GHz band by non-geostationary-satellite orbit (NGSO) fixed-satellite service (FSS) systems to operations with gateway earth stations, IS DISMISSED without prejudice to re-filing in connection with such an earth station application.

⁸¹ In the *NGSO FSS Order*, we extended the requirement for NGSO FSS operators to share ephemeris data to all bands in which NGSO FSS systems operate. See *NGSO FSS Order* at 18 and 20, paras. 52, 58 n.131.

⁸² 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).

⁸³ The *NGSO FSS Order* modified section 25.164(b) to offer additional flexibility and requires launch and operation of 50 percent of an authorized system within six years of grant and the remaining satellites within nine years of grant. *NGSO FSS Order* at paras. 66-67.

32. IT IS FURTHER ORDERED that the Petitions to Deny of Telesat Canada and ViaSat, Inc. ARE GRANTED to the extent that some of the conditions requested by Telesat Canada and ViaSat are imposed, as indicated herein, and are otherwise DENIED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary