

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

In the Matter of)	
)	
Facilitating the Communications of Earth Stations)	IB Docket No. 18-315
in Motion with Non-Geostationary Orbit Space)	
Stations)	

NOTICE OF PROPOSED RULEMAKING

Adopted: November 15, 2018

Released: November 16, 2018

By the Commission: Chairman Pai and Commissioners O’Rielly and Rosenworcel issuing separate statements.

Comment Date: (45 days after date of publication in the Federal Register).

Reply Comment Date: (75 days after date of publication in the Federal Register).

I. INTRODUCTION

1. In this Notice of Proposed Rulemaking (Notice), we intend to facilitate the continued deployment of Earth Stations in Motion (ESIMs) by considering the expansion of the scope of our rules governing ESIMs operations to cover communications with non-geostationary orbit (NGSO) satellites operating in the fixed-satellite service (FSS). The changes addressed in this Notice complement recent actions taken by the Commission to simplify its rules for ESIMs operations with geostationary orbit (GSO) satellites¹ and address the provision of service by NGSO FSS systems.² This proceeding is designed to promote innovative and flexible use of satellite technology, as well as regulatory equity between GSO and NGSO FSS systems.

II. BACKGROUND

2. The term “ESIMs” is the collective designation for three types of earth stations that the Commission authorizes to transmit while in motion: Earth Stations on Vessels (ESVs), Vehicle-Mounted Earth Stations (VMESs), and Earth Stations Aboard Aircraft (ESAAs).³ ESIMs enable the provision of very high data rate broadband communications to mobile platforms that often cannot be served using other communications technologies. ESIMs are used to deliver broadband to ships, vehicles, trains, and

¹ *Amendment of Parts 2 and 25 of the Commission’s Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed-Satellite Service*, Report and Order and Further Notice of Proposed Rulemaking, FCC 18-138 (rel. Sept. 27, 2018) (*ESIMs Report and Order* or *ESIMs Further Notice*).

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

³ *ESIMs Report and Order* at para. 10 (adopting the definition of ESIMs as “a term that collectively designates ESV, VMES, and ESAA earth stations...”). Broadly stated, ESV refers to earth stations that communicate with a satellite while located on boats or cruise ships, whereas VMES and ESAA refers to earth stations that communicate with satellites while located on land-based vehicles or aircraft, respectively.

aircraft using the same frequency bands, hardware, satellites, transponder beams, and control stations used to serve earth stations at fixed locations.

3. In 2017, the Commission proposed rules to unify the regulatory framework for ESIMs communicating with GSO space stations, which at the time was contained in three separate rule sections addressing ESVs, VMESs, and ESAAs.⁴ Each of these rule sections included technical and operational rules, as well as application rules.⁵ Except for a few platform-specific exceptions, the rules that governed ESIMs operations and licensing were very similar. Accordingly, the Commission proposed to consolidate and streamline its existing rules governing ESIMs through the elimination of duplicative rule provisions.⁶ The Commission also proposed to expand the bands available for ESIMs from the conventional C- and the conventional Ku-bands and portions of the extended Ku-band permitted under the existing rule to also include the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz frequency bands.⁷

4. The Commission recently adopted the majority of these proposals for consolidation and streamlining of the Commission's rules governing ESIMs, as well as for the extension of ESIMs rules to cover operations in the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz frequency bands.⁸ These changes, however, were limited to ESIMs communicating with GSO FSS systems. At the outset of the rulemaking proceeding in 2017, the Commission noted the interest of NGSO FSS system operators in extending the rules governing ESIMs operations to include communications with NGSO FSS systems, but observed that there was an open proceeding at that time to address the licensing and service rules for NGSO FSS systems.⁹ Accordingly, the Commission declined to propose rules for ESIMs communicating with NGSO FSS system until after the conclusion of its review of the service rules in the NGSO FSS proceeding.¹⁰

5. In September 2017, the Commission completed review of these rules and adopted the *NGSO FSS Report and Order*, which updated many of the rules and policies governing NGSO FSS systems.¹¹ Specifically, the Commission updated certain frequency allocations in the Ka-band, as well as made changes to power limits and service rules, to facilitate these emerging NGSO FSS systems.¹² However, the *NGSO FSS Report and Order* did not consider or adopt rules addressing the operation of ESIMs in NGSO FSS systems.

⁴ *Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed-Satellite Service*, Notice of Proposed Rulemaking, 32 FCC Rcd 4239 (2017) (*ESIMs NPRM*).

⁵ These rules were codified in Sections 25.221 and 25.222 (ESVs), 25.226 (VMESs), and 25.227 (ESAAs) of the Commission's rules. 47 CFR §§ 25.221, 25.222, 25.226, and 25.227.

⁶ *ESIMs NPRM*, 32 FCC Rcd at 4242, para. 7.

⁷ *ESIMs NPRM*, 32 FCC Rcd at 4240, para. 2. These frequency bands make up the conventional Ka-band. The conventional C-band refers to the 3700-4200 MHz (space-to-Earth) and 5925-6425 MHz (Earth-to-space) FSS frequency bands. The conventional Ku-band refers to the 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 (Earth-to-space) FSS frequency bands, and the extended Ku-band refers to the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 13.75-14.0 GHz (Earth-to-space) FSS frequency bands. 47 CFR § 25.103.

⁸ See generally *ESIMs Report and Order*, *supra* note 1.

⁹ *ESIMs NPRM*, 32 FCC Rcd at 4240, n.4.

¹⁰ *Id.*

¹¹ See generally *NGSO FSS Report and Order*, *supra* note 2.

¹² *Id.*

III. DISCUSSION

6. We believe that now is the appropriate time to seek comment on rules governing ESIMs communicating with NGSO FSS systems. Currently, there is only one NGSO FSS system - O3b Limited (O3b) - communicating with earth stations in the United States,¹³ and communications between O3b and ESVs have already been authorized, although on a non-protected non-interference basis given that no rules allowing such communications exist.¹⁴ However, given the large number of applications for NGSO FSS systems that intend to provide service to earth stations at fixed locations as well as to ESIMs, it is important that the possibility of having rules for NGSO FSS ESIMs operations be considered. A regulatory framework covering such communications would provide certainty for both NGSO FSS operators and their customers. In addition, comments in response to the *ESIMs NPRM* expressed concern that delaying consideration and adoption of rules governing communications between ESIMs and NGSO FSS systems could place U.S. customers at a disadvantage when other countries are moving ahead on these matters.¹⁵ Commenters in response to the *ESIMs NPRM* state that antenna manufacturers, ESIM operators, and ultimately U.S. consumers would all benefit from development of Commission rules that define operating parameters for communications between ESIMs and both NGSO and GSO satellites.¹⁶ In addition, commenters note the advantages of allowing communications between ESIMs and NGSO FSS systems, such as robust and uninterrupted coverage of polar regions where international air traffic is increasingly concentrated and which are not adequately covered by GSO satellites.¹⁷ We agree with commenters that the time is ripe to evaluate whether the Commission should implement rules for ESIMs communicating with NGSO FSS systems.

7. Accordingly, we seek comment on whether to establish a regulatory framework for ESIMs communications with NGSO FSS systems that would be analogous to that which currently exists for ESIMs communicating with GSO FSS systems. First, we seek comment on allowing ESIMs to communicate with NGSO FSS systems in many of the same conventional Ku-band, extended Ku-band, and Ka-band frequencies that were discussed in the *ESIMs Report and Order* and *Further Notice*,¹⁸ with the exception of the frequency bands 18.6-18.8 GHz and 29.25-29.5 GHz.¹⁹ Second, we seek comment on extending blanket earth station licensing, which is available to ESIMs communicating with GSO FSS

¹³ O3b was initially granted access to the U.S. market in 2012. Several previous grants have been recently consolidated into a single grant. *O3b Limited*, Order and Declaratory Ruling, FCC 18-70, 2018 WL 3046987 (June 4, 2018).

¹⁴ O3b Limited Radio Station Authorization, IBFS File No. SES-LIC-20130528-00455 (granted May 13, 2014) (providing blanket earth station license for communications with 100 maritime vessels).

¹⁵ See SES and O3b Comments at 4 and SES and O3b Reply Comments at 1-3, IB Docket No. 17-95 (filed Aug. 1, 2017 and Aug. 30, 2017 respectively). Specifically, SES and O3b point to the European Electronic Communications Committee (ECC) and European Telecommunications Standards Institute (ETSI) which have completed extensive technical analyses to define rules and standards for mobile terminals using Ka-band NGSO FSS systems. SES and O3b Comments at 4-5. SES and O3b state that the ECC has also begun studies to develop appropriate regulations for NGSO ESIMs operating in the 10.7–14.5 GHz band. *Id.*

¹⁶ SES and O3b Comments at 4 and SES and O3b Reply Comments at 1-3, IB Docket No. 17-95 (filed Aug. 1, 2017 and Aug. 30, 2017 respectively).

¹⁷ Boeing Reply Comments at 2, IB Docket No. 17-95 (filed Aug. 30, 2017).

¹⁸ See *ESIMs Report and Order* and *Further Notice* at Appendix F (proposing frequencies available for ESIMs in a revision to Section 25.202(a)(10)).

¹⁹ FSS operation in the 18.6-18.8 GHz band is limited to communications with GSO space stations. 47 CFR § 2.106 NG164. Transmissions to NGSO space stations in the 29.25-29.5 GHz frequency band are limited to feeder links to MSS space stations. See *NGSO FSS Report and Order*, 32 FCC Rcd at Appendix B.

systems, to ESIMs communicating with NGSO FSS systems. Finally, we seek comment on revisions to specific provisions in our rules to implement these changes.²⁰

8. *Frequency Bands for NGSO FSS ESIMs and Associated Rule Changes.*²¹ We seek comment on, to the extent feasible, allowing ESIMs to communicate with NGSO FSS systems in the Ku- and Ka-bands where the Commission's rules allow ESIM communications with GSO FSS space stations, with the exception of the frequency bands 18.6-18.8 GHz and 29.25-29.5 GHz.

9. We propose to allow ESIMs to communicate with NGSO FSS systems on a primary basis in the following frequency bands: 11.7-12.2 GHz (space-to-Earth); 14.0-14.5 GHz (Earth-to-space); 18.3-18.6 GHz (space-to-Earth); 19.7-20.2 GHz (space-to-Earth); 28.35-28.6 GHz (Earth-to-space); and 29.5-30.0 GHz (Earth-to-space). There are no allocations to terrestrial services in any of these bands. Accordingly, we seek comment on adding paragraph (c) to footnote NG527A to indicate that ESIMs can operate with NGSO FSS space stations in these six frequency bands provided that such operations do not cause harmful interference to, or claim protection from, GSO FSS networks.²² There is also a secondary allocation to the Space Research service in the band 14-14.2 GHz. In order to ensure compatibility between NGSO ESIM and Space Research operations, we seek comment on modifying 47 CFR § 25.228(j)(1) to extend to NGSO FSS systems conditions that currently apply to ESIM operation with GSO FSS space stations.

10. We also propose to allow ESIMs to communicate with NGSO FSS systems on a primary basis in the 18.8-19.3 GHz (space-to-Earth), and the 28.6-29.1 GHz (Earth-to-space) frequency bands. In these bands, there are no terrestrial allocations and GSO FSS operations are secondary with respect to NGSO FSS. Accordingly, we seek comment on adding paragraph (e) to footnote NG527A to indicate that ESIMs can operate both with a GSO FSS space station and with NGSO FSS systems in these two frequency bands. Also, in these bands, GSO FSS operations must not cause harmful interference to, or claim protection from, NGSO FSS networks.

11. We seek comment on allowing ESIMs to receive signals from NGSO FSS space stations in the 10.7-11.7 GHz (space-to-Earth) frequency bands, on an unprotected basis, with respect to transmissions from non-Federal fixed service (FS) stations.²³ FSS and FS are co-primary in these frequency bands and receive terrestrial stations will be protected by imposing on space station transmissions the appropriate power-flux density limits.²⁴ Accordingly, we seek comment on revising paragraph (a) of footnote NG527A to indicate that ESIMs can operate on a non-protected basis with regard to non-Federal fixed service in this frequency band, both with a GSO FSS space station and with

²⁰ We do not address the operations of traditional NGSO satellite constellations offering mobile-satellite service (MSS), such as those operated by Iridium LLC, Globalstar, Inc., or ORBCOMM License Corp.

²¹ All changes to the footnotes to the U.S. Table of Frequency Allocations and to the Commission's rules on which we seek comment are set forth in Appendix A. We note that some of these rule provisions are also the subject of a separate further notice of proposed rulemaking that seeks comment on expanding frequencies available to ESIMs communicating with GSO FSS systems. See ESIMs Further Notice at paras. 90-91. Since that proceeding concerning ESIMs communications with GSO FSS systems is ongoing simultaneously with this proceeding, the proposed rules contained in Appendix A consolidate the changes considered in both proceedings. We do not seek comment in this proceeding, however, on rule changes contained in Appendix A that relate solely to ESIMs communications with GSO FSS space stations. Such comments should be filed in IB Docket No. 17-95.

²² 47 CFR § 25.289

²³ The 10.7-11.7 GHz frequency band is used by a diverse group of FS licensees to provide primarily fixed point-to-point microwave services.

²⁴ 47 CFR § 25.146(a)(1).

NGSO FSS systems. Also, in this band, NGSO FSS operations must not cause harmful interference to, or claim protection from, GSO FSS networks.²⁵

12. Similarly, we seek comment on allowing ESIMs to receive signals from NGSO FSS space stations in the 19.3-19.4 GHz (space-to-Earth) and 19.6-19.7 GHz (space-to-Earth) frequency bands, on an unprotected basis, with respect to transmissions from non-Federal fixed service stations.²⁶ FSS and FS are co-primary in these frequency bands and receive terrestrial stations will be protected by imposing on space station transmissions the appropriate power-flux density limits.²⁷ Accordingly, we seek comment on adding paragraph (f) to footnote NG527A to indicate that ESIMs can operate with NGSO FSS systems in these two frequency bands on a non-protected basis with regard to non-Federal fixed service. Also, in these frequency bands, NGSO FSS operations must not cause harmful interference to, or claim protection from, GSO FSS networks.²⁸

13. We seek comment on allowing ESIMs to receive signals from NGSO FSS systems on a secondary basis in the 17.8-18.3 GHz (space-to-Earth) frequency band. This frequency band is allocated to the FS on a primary basis and, given the FSS secondary status, ESIM receive earth stations will not be entitled to protection. Protection of terrestrial operations in this band will be ensured by imposing on space station transmissions the appropriate power-flux density limits.²⁹ Accordingly, we seek comment on adding paragraph (d) to footnote NG527A to indicate that ESIMs can operate on a non-protected basis with regard to non-Federal fixed service in this frequency band, both with a GSO FSS space station and with NGSO FSS systems. Also, in this band, NGSO FSS operations must not cause harmful interference to, or claim protection from, GSO FSS networks.³⁰

14. We will not consider allowing ESIMs to communicate with NGSO FSS systems in bands where communications with NGSO FSS space stations are not permitted under the U.S. Table of Frequency Allocations because we believe the reasons for such limitations are also valid for ESIMs operating with NGSO FSS systems.³¹ Specifically, we would not allow NGSO FSS ESIMs to operate in the 18.6-18.8 GHz (space-to-Earth) and 29.25-29.5 GHz (Earth-to-space) frequency bands.

15. *Blanket Licensing.* We seek comment on permitting blanket earth station licensing of ESIMs operating with NGSO FSS systems. Such blanket licensing would further maximize efficient spectrum use for the increased provision of broadband access and additional flexibility for FSS systems in bands where blanket licensing is already available for earth stations operating at fixed locations. We believe that blanket licensing is appropriate given that ESIMs' communications with NGSO FSS systems would be limited to frequency bands in which NGSO FSS systems have a primary status, or have been found to be able to operate on a secondary or non-conforming basis, without causing interference to primary users of those bands. We seek comment on extending blanket licensing to ESIMs operating with NGSO FSS space stations.

16. *Other Rule Revisions.* In the paragraphs below, we address other changes to our rules, in addition to those discussed above in connection with the frequency bands being proposed for NGSO FSS

²⁵ 47 CFR § 25.289.

²⁶ The 19.3-19.4 GHz and 19.6-19.7 GHz frequency bands are used by a diverse group of FS licensees to provide primarily fixed point-to-point microwave services.

²⁷ 47 CFR § 25.146(a)(1).

²⁸ 47 CFR § 25.289.

²⁹ 47 CFR § 25.146(a)(1).

³⁰ 47 CFR § 25.289.

³¹ See *supra*, n.19; see also Letter from Scott Blake Harris, Counsel to Iridium Communications, Inc., to Marlene H. Dortch, Secretary, FCC, IB Docket No. 18-315 (filed Nov. 8, 2018).

ESIM operation. We seek comment on these changes, and on any others necessary to implement the ESIM NGSO FSS operation described here.

17. First, we seek comment on amending the list of frequencies available to ESIMs in Sections 25.202(a)(8), (a)(10), and (a)(11) to reflect these changes.³²

18. Second, we seek comment on changes to Part 25 of the Commission's rules governing satellite communications to allow ESIM NGSO FSS operation as described above. Specifically, Sections 25.115(l)-(n) contain requirements in paragraphs (1), (2), and (3)(i) that pertain to the two-degree spacing rules³³ for ESIMs communicating with GSO FSS space stations, which are not applicable to NGSO systems. The requirements in paragraphs (3)(ii)-(iv) of this section, however, are also appropriate for ESIMs operating in NGSO FSS systems. We seek comment on adding a new paragraph (o) to Section 25.115 to codify these requirements for ESIMs that communicate with NGSO FSS space stations. We also seek comment on changing the cross-references contained in the information requirements for earth station applications set forth in Section 25.115 for earth stations communicating with GSO and NGSO FSS space stations.

19. Third, Section 25.228 contains requirements in paragraphs (a), (b), (c), that codify the two-degree spacing requirements for ESIMs communicating with GSO FSS satellite networks, but are not specifically worded to apply only to such ESIMs. We seek comment on stating that these paragraphs apply only to ESIMs communicating with GSO FSS satellite networks. The requirements in the remaining paragraphs of Section 25.228 are equally applicable for ESIMs communicating with GSO FSS systems and NGSO FSS systems, and therefore we do not consider any changes to them. Paragraph (j) of Section 25.228 is explicitly limited to ESIMs transmitting to GSO FSS satellites, and we seek comment on revising the language of the rule to apply to Ku-band ESIMs communicating with NGSO FSS space stations as well.

20. Fourth, consistent with these changes, we would amend our definitions of ESV, VMES, and ESAA in Section 25.103, which restrict communications to "geostationary-orbit FSS space stations."³⁴ Pursuant to what was described above, communications between ESVs, VMESs, and ESAAs would also be permitted in NGSO FSS systems. Accordingly, we seek comment on removing the word "geostationary-orbit" from these definitions.

21. Finally, the Commission's Ka-band Plan has a secondary designation for NGSO-FSS in the 29.5-30.0 GHz band, as described in the *NGSO FSS Order*.³⁵ The licensing provisions in Section 25.115(f) adopted in the *NGSO FSS Order*, however, inadvertently omitted the 29.5-30.0 GHz band. We propose to take this opportunity to extend the provisions of Section 25.115(f) to the 29.5-30.0 GHz band and seek comment on this proposal.

22. *Other.* We recognize that NGSO ESIM operations add a level of complexity in that both earth stations and space stations will be moving while communicating, and transitioning communications from one satellite to another will often be required. We do not believe that these operational characteristics necessitate additional requirements on ESIM communications with NGSO FSS space stations beyond what we have considered here because such operations are already being conducted. For example, O3b successfully provides broadband services to ESVs using an NGSO FSS constellation that was granted market access by the Commission through a waiver of the Table of Frequency Allocations

³² See Proposed Rules at Appendix A.

³³ "Two-degree spacing" refers to angular separation in the GSO arc between adjacent co-frequency space stations. See *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713, 14747, para. 92 (2015).

³⁴ 47 CFR § 25.103.

³⁵ *NGSO FSS Report and Order*, 32 FCC Rcd at 7813, para. 9.

and Ka-band Plan.³⁶ In addition, several of the NGSO FSS constellations recently authorized or granted market access to the United States by the Commission intend to use earth stations in motion.³⁷ For instance, OneWeb has recently joined an alliance of companies in the aviation sector focused on the provision of broadband communications to airplanes.³⁸ We invite comments on this conclusion, but also seek comment on the level of complexity that communications with ESIMs would introduce to the coordination between multiple NGSO FSS constellations under the Commission's rules and the potential for in-line interference as compared to that associated with the coordination between NGSO FSS constellations if communications were limited to fixed earth stations.³⁹

23. We do not think there will be significant costs associated with these changes and we invite comments that will help estimate costs and benefits of the rule changes. In addition, we seek comment on whether there are any other issues regarding the framework discussed for NGSO ESIMs operations that we should consider. We also seek comment on any possible effects ESIMs communicating with NGSO FSS space stations may have on existing or future services in these bands or adjacent frequency bands. For example, we note that the Commission has an open proceeding exploring additional uses of "mid-band spectrum," including bands considered for ESIM communication with NGSO FSS systems.⁴⁰

IV. PROCEDURAL MATTERS

24. *Ex Parte Presentations.* We will treat this proceeding as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.⁴¹ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt,

³⁶ See <https://licensing.fcc.gov/myibfs/displayLicense.do?filingKey=-267470>

³⁷ Except for O3b, no specific grant for the operation of earth stations in motion has been granted, but several NGSO FSS applications express this intention.

³⁸ See "Airbus, Delta, OneWeb, Sprint, Airtel Announce the Formation of Seamless Air Alliance Enabling Airlines to Empower Passengers with Seamless In-Cabin Connectivity Experience" (Feb. 26, 2018), available at <https://www.prnewswire.com/news-releases/airbus-delta-oneweb-sprint-airtel-announce-the-formation-of-seamless-air-alliance-enabling-airlines-to-empower-passengers-with-seamless-in-cabin-connectivity-experience-675121143.html>.

³⁹ See 47 CFR § 25.261.

⁴⁰ See Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, Notice of Inquiry, 32 FCC Rcd 6373 (2017) (Mid-band Proceeding).

⁴¹ 47 CFR §§ 1.1200 *et seq.*

searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

25. *Initial Regulatory Flexibility Analysis.* As required by the Regulatory Flexibility Act of 1980, as amended (RFA),⁴² the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) for this Notice, of the possible significant economic impact on small entities of the policies and rules addressed in this document. The IRFA is set forth as Appendix B. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments on the Notice provided on or before the dates indicated on the first page of this Notice and must have a separate and distinct heading designating them as responses to the IRFA. The RFA⁴³ requires that a regulatory flexibility analysis be prepared for rulemaking proceedings unless the agency certifies that “the rule will not have a significant economic impact on a substantial number of small entities.”⁴⁴ The RFA generally defines the term “small entity” as referring to any “small business,” “small organization,” or “small governmental jurisdiction.”⁴⁵ The term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁴⁶ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁴⁷ A small organization is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”⁴⁸ “Small governmental jurisdiction” generally means governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000.⁴⁹

26. *Paperwork Reduction Act.* This document contains proposed new and modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law No. 104-13. If the Commission adopts any modified information collection requirements, it will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public, OMB and other federal agencies to comment on the proposed information collection requirements contained in this document, as required by the PRA. In addition, pursuant to the Small Business Paperwork Relief Act of 2002,⁵⁰ we seek specific comment on how we might “further reduce the information collection burden for small business concerns with fewer than 25 employees.”⁵¹

⁴² 5 U.S.C. § 603.

⁴³ The RFA, *see* 5 U.S.C. § 601 *et seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

⁴⁴ 5 U.S.C. § 605(b).

⁴⁵ 5 U.S.C. § 601(6).

⁴⁶ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after the opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.” 5 U.S.C. § 601(3).

⁴⁷ Small Business Act, 15 U.S.C. § 632 (1996).

⁴⁸ 5 U.S.C. § 601(4).

⁴⁹ 5 U.S.C. § 601(5).

⁵⁰ Pub. L. No. 107-198.

⁵¹ 44 U.S.C. § 3506(c)(4).

27. *Filing of Comments and Reply Comments.* Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. When filing comments or reply comments, please reference **IB Docket No. 18-315**. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://www.fcc.gov/cgb/ecfs/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

V. ORDERING CLAUSES

28. Accordingly, IT IS ORDERED, pursuant to Sections 4(i), 7(a), 303(c), 303(f), 303(g), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 303(c), 303(f), 303(g), 303(r), that this Notice of Proposed Rulemaking in IB Docket No. 18-315 IS ADOPTED.

29. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center shall send a copy of this Notice of Proposed Rulemaking, including the initial regulatory flexibility act analysis, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with Section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. § 601, *et seq.* (1981).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A
Proposed Rules⁵²

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2 and 25 as follows:

**PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;
GENERAL RULES AND REGULATIONS**

1. The authority citation for part 2 continues to read as follows:

Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

In the list of non-Federal Government (NG) Footnotes, footnoteNG527A is revised.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

* * * * *

NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

* * * * *

NG527A Earth Stations in Motion (ESIMs), as regulated under 47 CFR part 25, are an application of the fixed-satellite service (FSS) and the following provisions shall apply:

(a) In the 10.7-11.7 GHz band, ESIMs may be authorized for the reception of FSS emissions from both geostationary and non-geostationary satellites, subject to the conditions that these earth stations may not claim protection from transmissions of non-Federal stations in the fixed service and that non-geostationary-satellite systems not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

* * *

(c) In the bands 11.7-12.2 GHz (space-to-Earth), 14.0-14.5 GHz (Earth-to-space), 18.3-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space), and 29.5-30.0 GHz (Earth-to-space), ESIMs may be authorized to communicate with non-geostationary satellites, subject to the condition that non-geostationary-satellite systems may not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

(d) In the band 17.8-18.3 GHz (space-to-Earth), ESIMs may be authorized for the reception of FSS emissions from geostationary satellites on a secondary basis. In this band, ESIMs may also be authorized for the reception of FSS emissions from non-geostationary-satellites on a secondary basis, subject to the condition that non-geostationary-satellite systems not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

⁵² The rules included in this Appendix, on which we seek comment, include changes proposed in the Further Notice of Proposed Rulemaking concerning ESIMs communicating with GSO FSS space stations. To the extent commenters wish to file comments that relate solely to ESIMs communicating with GSO FSS space stations, these comments should be filed in IB Docket No. 17-95.

(e) In the bands 18.8-19.3 GHz and 28.6-29.1 GHz, ESIMs may be authorized to communicate with both geostationary and non-geostationary satellites, subject to the condition that geostationary-satellite networks may not cause unacceptable interference to, or claim protection from, non-geostationary satellite systems in the fixed-satellite service.

(f) In the 19.3-19.4 GHz, and 19.6-19.7 GHz bands, ESIMs may be authorized for the reception of FSS emissions from non-geostationary satellites, subject to the conditions that these earth stations may not claim protection from transmissions of non-Federal stations in the fixed service and not cause unacceptable interference to, or claim protection from, geostationary-satellite networks.

* * * * *

PART 25 – SATELLITE COMMUNICATIONS

The Federal Communications Commission proposes to amend title 47, part 25 of the Code of Federal Regulations as follows:

3. The authority citation for part 25 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless otherwise noted.

4. In § 25.103, revise the definitions of Earth Station on Vessel, Earth Stations Aboard Aircraft, and Vehicle-Mounted Earth Station as shown below.

§ 25.103 Definitions.

* * * * *

Earth Station Aboard Aircraft (ESAA). An earth station operating aboard an aircraft that receives from and transmits to Fixed-Satellite Service space stations.

* * * * *

Earth Station on Vessel (ESV). An earth station onboard a craft designed for traveling on water, receiving from and transmitting to Fixed-Satellite Service space stations.

* * * * *

Vehicle-Mounted Earth Station (VMES). An earth station, operating from a motorized vehicle that travels primarily on land, that receives from and transmits to Fixed-Satellite Service space stations and operates within the United States.

5. In § 25.115, revise paragraph (f) and add paragraph (o) to read as follows:

* * * * *

(f) NGSO FSS earth stations in 10.7-30.0 GHz. (1) An application for an NGSO FSS earth station license in the 10.7-30.0 GHz band must include the certification described in §25.146(a)(2). (2) Individual or blanket license applications may be filed for operation in the 10.7-12.7 GHz, 14-14.5 GHz, 17.8-18.6 GHz, 18.8-19.4 GHz, 19.6-20.2 GHz, 28.35-29.1 GHz, or 29.5-30.0 GHz bands; however, blanket licensing in the 10.7-11.7 GHz, 17.8-18.3 GHz, 19.3-19.4 GHz, and 19.6-19.7 GHz bands is on an unprotected basis with respect to current and future systems operating in the fixed service. (3) Individual license applications only may be filed for operation in the 12.75-13.15 GHz, 13.2125-13.25 GHz, 13.75-14 GHz, or 27.5-28.35 GHz bands.

* * * * *

(o) The requirements in this paragraph apply to applications for ESIMs operation with NGSO satellites in the Fixed-Satellite Service, in addition to the requirements in paragraphs (a)(1), (a)(5), (e)(2), and (i) of this section:

- (1) An exhibit describing the geographic area(s) in which the ESIMs will operate.
- (2) The point of contact information referred to in § 25.228(e)(2), (f), or (g)(1) as appropriate.
- (3) Applicants for ESIMs that will exceed the guidelines in § 1.1310 of this chapter for radio frequency radiation exposure must provide, with their environmental assessment, a plan for mitigation of radiation exposure to the extent required to meet those guidelines.

6. In § 25.202, revise paragraphs (a)(10) to read as follows and remove and reserve paragraph (a)(8) and (a)(11):

§ 25.202 Frequencies, frequency tolerance, and emission limits.

(a) * * *

* * * * *

(a)(8) [Reserved]

* * *

(a)(10)

* * *

(ii) The following frequencies are available for use by Earth Stations in Motion (ESIMs) communicating with NGSO FSS space stations, subject to the provisions in § 2.106 of this chapter:

10.7-11.7 GHz (space-to-Earth)
 11.7-12.2 GHz (space-to-Earth)
 14.0-14.5 GHz (Earth-to-space)
 17.8-18.3 GHz (space-to-Earth)
 18.3-18.6 GHz (space-to-Earth)
 18.8-19.3 GHz (space-to-Earth)
 19.3-19.4 GHz (space-to-Earth)
 19.6-19.7 GHz (space-to-Earth)
 19.7-20.2 GHz (space-to-Earth)
 28.35-28.6 GHz (Earth-to-space)
 28.6-29.1 GHz (Earth-to-space)
 29.5-30.0 GHz (Earth-to-space)

(a)(11) [Reserved]

7. Amend section 25.228 by revising the introductory text of paragraph (j) to read as follows:

§ 25.228 Operating and coordination requirements for earth stations in motion (ESIMs).

- (a) GSO FSS ESIM transmissions must comport with the applicable e.i.r.p. density limits in § 25.218, unless coordinated pursuant to the requirements in § 25.220.
- (b) Each GSO FSS ESIM must be self-monitoring and, should a condition occur that would cause the ESIM to exceed its authorized off-axis e.i.r.p. density limits, the ESIM must automatically cease transmissions within 100 milliseconds, and not resume transmissions until the condition that caused the ESIM to exceed those limits is corrected.
- (c) Each GSO FSS ESIM must be monitored and controlled by a network control and monitoring center (NCMC) or equivalent facility. Each ESIM must comply with a “disable transmission” command from the NCMC within 100 milliseconds of receiving the command. In addition, the NCMC must monitor the operation of each ESIM in its network, and transmit a “disable transmission” command to any ESIM that operates in such a way as to exceed the authorized off-axis e.i.r.p. density limit for that ESIM or for all ESIMs that simultaneously transmit on the same frequency to the same target satellite receiving beam. The NCMC must not allow the ESIM(s) under its control to resume transmissions until the condition that caused the ESIM(s) to exceed the authorized e.i.r.p. density limits is corrected.

* * *

- (j) The following requirements govern all ESIMs transmitting to GSO or non-GSO satellites in the Fixed-Satellite Service in the 14.0-14.5 GHz band.

* * * * *

APPENDIX B**Initial Regulatory Flexibility Analysis**

As required by the Regulatory Flexibility Act (RFA),⁵³ the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this Notice. We request written public comments on this IRFA. Commenters must identify their comments as responses to the IRFA and must file the comments by the deadlines for comments on the Notice provided above in Section V.B. The Commission will send a copy of the Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.⁵⁴ In addition, the Notice and IRFA (or summaries thereof) will be published in the Federal Register.⁵⁵

A. Need for, and Objectives of, the Proposed Rules

The Notice of Proposed Rulemaking proposes to allow ESIMs to communicate with NGSO FSS space stations in the Ku- and Ka-bands.

B. Legal Basis

The proposed action is authorized under Sections 4(i), 7(a), 10, 303, 308(b), and 316 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 160, 303, 308(b), 316.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules May Apply

The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules, if adopted.⁵⁶ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁵⁷ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁵⁸ A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁵⁹

Satellite Telecommunications. This category comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting

⁵³ See 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et seq.*, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

⁵⁴ See 5 U.S.C. § 603(a).

⁵⁵ *Id.*

⁵⁶ 5 U.S.C. § 603(b)(3).

⁵⁷ 5 U.S.C. § 601(6).

⁵⁸ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

⁵⁹ Small Business Act, 15 U.S.C. § 632 (1996).

industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.”⁶⁰ The category has a small business size standard of \$32.5 million or less in average annual receipts, under SBA rules.⁶¹ For this category, Census Bureau data for 2012 show that there were a total of 333 firms that operated for the entire year.⁶² Of this total, 299 firms had annual receipts of less than \$25 million.⁶³ Consequently, we estimate that the majority of satellite telecommunications providers are small entities.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

The NPRM proposes to allow ESIMs to communicate with NGSO FSS space stations in the Ku- and Ka-bands. This would reduce paperwork costs for such satellite operators who would no longer need to file separate application materials for these systems. Operators will also no longer need to request waivers for operations that would be covered under specific regulations.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rules for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”⁶⁴

The NPRM proposes to allow ESIMs to communicate with NGSO FSS space stations in the Ku- and Ka-bands. This would reduce the economic and other impacts for these service providers by reducing the regulatory burden. Specifically, providers would no longer have to file applications that are outside of the standard rule provisions. However, the Commission invites comment on this change and any alternatives.

F. Federal Rules that May Duplicate, Overlap, or Conflict With the Proposed Rules

None.

⁶⁰ U.S. Census Bureau, 2012 NAICS Definitions, “517410 Satellite Telecommunications”; <http://www.census.gov/naics/2007/def/ND517410.HTM>.

⁶¹ 13 C.F.R. § 121.201, NAICS code 517410.

⁶² U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2012, NAICS code 517410 http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2012_US_51SSSZ4&prodTtype=table.

⁶³ *Id.*

⁶⁴ 5 U.S.C. § 603(c)(1)-(c)(4).

**STATEMENT OF
CHAIRMAN AJIT PAI**

Re: *Facilitating the Communications of Earth Stations in Motion with Non-Geostationary Orbit Space Stations*, IB Docket No. 18-315.

Willie Nelson famously couldn't wait to get on the road again, goin' places that he'd never been, seein' things that he may never see again. That's true for millions of Americans today, with the twist that when they hit the road, they want to be connected. Connectivity is essential to communicating, navigating, and ensuring safety on the nation's roads and railways, airspace and waterways.

As you may recall, earth stations in motion—or ESIMs—provide essential high-speed broadband connectivity on aircraft, ships, trains, and vehicles (maybe even musicians' tour buses). For obvious reasons, users on the go are often among the hardest to serve with traditional wireline and wireless networks. Earlier this fall, we streamlined our regulations for these licensees by combining separate regulations for different categories of ESIMs and expanding the satellite frequencies through which they can communicate with geosynchronous satellites.

But geosynchronous satellites aren't the only communications units in space. As today's Space Month agenda demonstrates, non-geosynchronous orbit satellites (NGSOs) are becoming increasingly important in the marketplace, too. So today, we propose to allow ESIMs to communicate with NGSOs in the conventional Ku-band, extended Ku-band, and Ka-bands—frequencies in which ESIMs are already allowed to communicate with geostationary satellites. We hope this proposal will help ESIMs make it easier for consumers on the move to capitalize on cutting-edge satellite technologies.

Many thanks to the excellent staff that contributed to this item, including Jose Albuquerque, Paul Blais, Stephen Duall, Jennifer Gilson, Kathryn Medley, Cindy Spiers, Tom Sullivan, and Troy Tanner from the International Bureau; Jamison Prime and Nick Oros from the Office of Engineering and Technology; Mathew Pearl, Paul Powell, and Becky Schwartz from the Wireless Telecommunications Bureau; and Deborah Broderson and David Horowitz from the Office of General Counsel. Because of your efforts, perhaps more Americans won't be able to wait to get on the road again.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *Facilitating the Communications of Earth Stations in Motion with Non-Geostationary Orbit Space Stations*, IB Docket No. 18-315.

Almost two months ago, the Commission adopted rules to permit Earth Stations in Motion, commonly referred to as just ESIMs, to communicate with geostationary satellites, or GSOs. Now, the Commission takes the next step by considering whether our ESIMs rules should be expanded to allow communications with non-geostationary orbit satellites, or NGSOs.

As a firm proponent of technology neutrality, I applaud today's efforts to start a proceeding to consider allowing ESIMs to operate in concert with the growing number of NGSO constellations. However, with thousands of NGSO satellites connecting to thousands of moving objects, whether they be planes, ships or cars, these operations are likely to be more than a bit challenging. All parties must be engaged on these complexities to ensure that these systems are used to benefit American consumers and industry. I especially want to make sure that we consider how all these connections can exist without one system causing harmful interference to another within the same band. For this reason, I appreciate that the item now solicits information, at my request, about the potential for in-line interference, created by NGSO systems communicating with ESIMs.

I approve.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL**

Re: *Facilitating the Communications of Earth Stations in Motion with Non-Geostationary Orbit Space Stations*, IB Docket No. 18-315.

The future belongs to the connected. If we want to realize its possibilities for everyone, everywhere, we need to think boldly about how we can put broadband in the ground, in the skies, and even beaming down from space. To make this happen, today we begin a rulemaking to explore the potential for non-geostationary satellite systems to offer broadband communications on vehicles, ships, and planes. This effort follows on the heels of related rulemaking to examine the possibilities of earth stations in motion communicating with geostationary satellite systems. It has my full support.