

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

In the Matter of	)	
	)	
Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems	)	IB Docket No. 21-456
	)	
Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems	)	RM-11855
	)	
	)	

**ORDER AND NOTICE OF PROPOSED RULEMAKING**

**Adopted: December 14, 2021**

**Released: December 15, 2021**

**Comment Date: [60 days after date of Publication in the Federal Register]**

**Reply Comment Date: [90 days after date of Publication in the Federal Register]**

By the Commission: Chairwoman Rosenworcel and Commissioners Starks and Simington issuing separate statements.

**I. INTRODUCTION**

1. In this Order and Notice of Proposed Rulemaking, we build upon Commission efforts to update rules governing a new generation of non-geostationary satellite orbit, fixed-satellite service (NGSO FSS) systems.<sup>1</sup> In the Order, we grant in part a petition for rulemaking filed by Space Exploration Holdings, LLC (SpaceX).<sup>2</sup> In the Notice of Proposed Rulemaking, we seek comment on further revisions to the spectrum sharing requirements among NGSO FSS systems. We propose that the Commission's existing spectrum sharing mechanism for NGSO FSS systems will be limited to those systems approved in the same processing round. We also propose to adopt a rule providing that later-round NGSO FSS systems will have to protect earlier-round systems, and invite comment on how to define such protection. In addition, we seek comment on whether to sunset, after a period of time, the interference protection afforded to an NGSO FSS system because of its processing round status. This rulemaking will continue to facilitate the deployment of NGSO FSS systems capable of providing

<sup>1</sup> See *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order, 32 FCC Rcd 7809 (2017) (*NGSO FSS Report and Order*), *pets. for recon. pending*.

<sup>2</sup> SpaceX Petition for Rulemaking, Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems, RM-11855, (filed Apr. 30, 2020) (SpaceX Petition). The proposals in the SpaceX Petition related to spectrum-selection priority among NGSO FSS systems when the sharing mechanism is triggered are not addressed in this NPRM and remain pending. See *id.* at 13-17; 47 CFR § 25.261(c)(1). Accordingly, we also defer action on the Theia Opposition, and a portion of the OneWeb Opposition, related to these SpaceX proposals. See *Theia Opposition*; *OneWeb Opposition* at 2-7. We also note that Kuiper Systems LLC, a wholly owned subsidiary of Amazon.com Services LLC, has filed a petition for rulemaking requesting that the Commission consider revisions to section 25.117 of the Commission's rules regarding modification applications in the context of NGSO FSS processing rounds. See *Kuiper Systems LLC, Petition for Rulemaking*, RM-11861 (filed July 9, 2020). Although this petition also relates to NGSO FSS processing round procedures, we decline to address those proposals – which are specific to modification applications – at this time.

broadband and other services on a global basis, and will promote competition among NGSO FSS system proponents, including the market entry of new competitors.<sup>3</sup>

## II. BACKGROUND

2. In recent years, the Commission has received an unprecedented number of applications for NGSO space station licenses,<sup>4</sup> including for NGSO FSS systems. Traveling closer to the Earth than a traditional GSO satellite, low- and medium-orbit NGSO FSS satellite constellations are capable of providing broadband services to industry, enterprise, and residential customers with lower latency and wider coverage than was previously available via satellite.

3. *Processing Round Procedure Overview.* Applications for NGSO FSS system licenses are considered in groups based on filing date, under a processing round procedure. Pursuant to the Commission's rules, a license application for "NGSO-like"<sup>5</sup> satellite operation, including operation of an NGSO FSS system, that satisfies the acceptability for filing requirements<sup>6</sup> is reviewed to determine whether it is a "competing application" or a "lead application."<sup>7</sup> A competing application is one filed in response to a public notice initiating a processing round.<sup>8</sup> Any other application is a lead application.<sup>9</sup> Competing applications are placed on public notice to provide interested parties an opportunity to file pleadings in response to the application.<sup>10</sup> Lead applications are also placed on public notice.<sup>11</sup> The public notice for a lead application initiates a processing round, establishes a cut-off date for competing NGSO-like satellite system applications, and provides interested parties an opportunity to file pleadings in response to the application.<sup>12</sup>

4. The Commission reviews each application in the processing round and all the pleadings filed in response to each application.<sup>13</sup> Based upon this review and consideration of such other matters as it may officially notice, the Commission will grant all the applications for which the Commission finds that the applicant is legally, technically, and otherwise qualified, that the proposed facilities and

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<sup>3</sup> See generally Executive Order No. 14036, Promoting Competition in the American Economy, 86 FR 36987 (July 9, 2021) ("The heads of all agencies shall consider using their authorities to further the policies set forth in section 1 of this order, with particular attention to: (i) the influence of their respective regulations, particularly any licensing regulations, on concentration and competition in the industries under their jurisdiction; and..."). Executive Order at 86 FR 36991.

<sup>4</sup> See *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 4156, 4158, para. 3 (2020).

<sup>5</sup> The term "NGSO-like satellite operation" is defined as: (1) Operation of any NGSO satellite system; and (2) Operation of a geostationary satellite orbit, mobile-satellite service satellite to communicate with earth stations with non-directional antennas. 47 CFR § 25.157(a).

<sup>6</sup> 47 CFR § 25.112.

<sup>7</sup> 47 CFR §§ 25.156(d)(1), 25.157(c). A non-U.S.-licensed NGSO-like satellite system seeking to serve the United States can be considered contemporaneously with other U.S. NGSO-like satellite systems pursuant to this procedure and considered before later-filed applications of other U.S. satellite system operators if the non-U.S.-licensed satellite system: (1) Is in orbit and operating; (2) has a license from another administration; or (3) has been submitted for coordination to the International Telecommunication Union. 47 CFR § 25.137(c). This procedure does not apply to applications for authority to operate certain replacement space stations. 47 CFR § 25.157(b)(1).

<sup>8</sup> 47 CFR § 25.157(c).

<sup>9</sup> *Id.*

<sup>10</sup> 47 CFR § 25.157(c)(1).

<sup>11</sup> 47 CFR § 25.157(c)(2).

<sup>12</sup> *Id.*

<sup>13</sup> 47 CFR § 25.157(d).

operations comply with all applicable rules, regulations, and policies, and that grant of the application will serve the public interest, convenience and necessity.<sup>14</sup> The Commission will deny the other applications.<sup>15</sup>

5. *NGSO FSS System Spectrum Sharing Overview.* The Commission has adopted rules for spectrum sharing among NGSO FSS systems.<sup>16</sup> NGSO FSS space station applications granted with a condition to abide by these sharing rules are exempt from frequency band segmentation procedures that otherwise apply to applications for NGSO-like satellite operation.<sup>17</sup> Instead, NGSO FSS operators must coordinate with one another in good faith the use of commonly authorized frequencies.<sup>18</sup> Absent a coordination agreement between two or more NGSO FSS satellite systems, a default spectrum-splitting procedure applies.<sup>19</sup>

6. Under the default spectrum-splitting procedure, whenever the increase in system noise temperature of an earth station receiver, or a space station receiver for a satellite with on-board processing, of either system,  $\Delta T/T$ , exceeds 6 percent due to interference from emissions originating in the other system in a commonly authorized frequency band, such frequency band will be divided among the affected satellite networks in accordance with the following: (1) Each of  $n$  (number of) satellite networks involved must select  $1/n$  of the assigned spectrum available in each of these frequency bands; (2) the affected station(s) of the respective satellite systems may operate in only the selected ( $1/n$ ) spectrum associated with its satellite system while the  $\Delta T/T$  of 6 percent threshold is exceeded; and (3) all affected station(s) may resume operations throughout the assigned frequency bands once the threshold is no longer exceeded.<sup>20</sup> The spectrum selection order for each satellite network is determined by the date that the first space station in each satellite system is launched and capable of operating in the frequency band under consideration.<sup>21</sup>

7. In the *NGSO FSS Report and Order*, the Commission stated that it will “initially limit” sharing under the  $\Delta T/T$  of 6 percent threshold to qualified applicants in a processing round.<sup>22</sup> The Commission explained that treatment of later applicants must necessarily be case-by-case based on the situation at the time, and considering both the need to protect existing expectations and investments and provide for additional entry as well as any comments filed by incumbent operators and reasoning presented by the new applicant.<sup>23</sup>

8. *Petition for Rulemaking.* On April 30, 2020, SpaceX filed a petition for rulemaking to revise and clarify the Commission’s spectrum sharing rules for NGSO FSS systems.<sup>24</sup> SpaceX proposes that the Commission codify protection rights for NGSO FSS systems from those systems authorized

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<sup>14</sup> 47 CFR § 25.156(a).

<sup>15</sup> See 47 CFR § 25.157(d).

<sup>16</sup> 47 CFR § 25.261. These sharing rules apply to NGSO FSS operation with earth stations with directional antennas anywhere in the world under a Commission license, or in the United States under a grant of U.S. market access. 47 CFR § 25.261(a).

<sup>17</sup> 47 CFR § 25.157(b)(2), (e), (f), (g).

<sup>18</sup> 47 CFR § 25.261(b).

<sup>19</sup> 47 CFR § 25.261(c).

<sup>20</sup> *Id.*

<sup>21</sup> 47 CFR § 25.261(c)(1); see also *Ku-band NGSO FSS Service Rules Order*, 17 FCC Rcd at 7857, para. 53 & n.77 (“A[n NGSO FSS] system is deemed operational when at least one of its satellites reaches its intended orbit and initiates transmission and reception of radio signals.”)

<sup>22</sup> *NGSO FSS Report and Order*, 32 FCC Rcd 7809, 7829, para. 61.

<sup>23</sup> *Id.*

<sup>24</sup> See SpaceX Petition, RM-11855.

through a later processing round.<sup>25</sup> The SpaceX Petition was placed on public notice on May 14, 2020, and oppositions, comments, and reply comments were filed.<sup>26</sup>

### III. DISCUSSION

9. After review of the SpaceX Petition and the comments and opposition filed, we conclude that the record on the Petition discloses sufficient reasons to justify the institution of a rulemaking proceeding seeking further comment on such a proposal.<sup>27</sup> Indeed, the Petition raises fundamental issues affecting the spectrum access rights of NGSO FSS systems. When the Commission recently considered and revised several important elements of NGSO FSS licensing,<sup>28</sup> it left to “case-by-case” evaluations how NGSO FSS applications filed after a processing round would be treated.<sup>29</sup> Since then, the Commission has initiated second NGSO FSS processing rounds in frequency bands subject to a prior processing round<sup>30</sup> and gained further experience implementing a case-by-case approach to NGSO FSS applications filed after a relevant processing round.<sup>31</sup> The time is ripe to consider updating the Commission’s rules concerning these issues.

10. We therefore initiate a notice of proposed rulemaking to consider revisions to the treatment of NGSO FSS systems authorized through different processing rounds. We also seek comment on the application of any rule changes in this proceeding to existing licensees, grantees, applicants, and market access petitioners. Further consideration of these issues is appropriate because of the strong interest shown not only in multiple NGSO FSS applications, but also in the comments on the Petition. Given the Commission’s 2017 rulemaking on NGSO FSS issues and the ideas already submitted in response to the petition for rulemaking, we believe that proceeding with a notice of proposed rulemaking at this stage will allow for fulsome comment of the issues without forcing the delay associated with an initial notice of inquiry.<sup>32</sup>

11. In its Petition, SpaceX requests that the Commission revise or clarify the spectrum sharing obligations that apply among co-frequency NGSO FSS systems authorized through different processing rounds. SpaceX proposes that the default spectrum-splitting procedure be expressly limited to those NGSO FSS systems authorized within the same processing round.<sup>33</sup> Among systems authorized through different processing rounds, SpaceX proposes that later-round NGSO FSS systems protect earlier-round systems up to a specified interference-to-noise (I/N) level to be developed and adopted by

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<sup>25</sup> SpaceX also proposes the Commission clarify or revise the spectrum selection priority among NGSO FSS systems authorized through the same processing round. *See* SpaceX Petition at 13-17. Unless otherwise referenced in this NPRM, this portion of the SpaceX Petition is not addressed in this NPRM and remains pending.

<sup>26</sup> *Consumer & Governmental Affairs Bureau Reference Information Center Petition for Rulemaking Filed*, Public Notice, Report No. 3148 (May 14, 2020); *see also* Appendix C (List of Commenters).

<sup>27</sup> *See* 47 CFR § 1.407.

<sup>28</sup> *See NGSO FSS Report and Order*, 32 FCC Rcd 7809.

<sup>29</sup> *See id.*, 32 FCC Rcd at 7829, para. 61.

<sup>30</sup> *See Cut-off Established for Additional NGSO FSS Applications or Petitions for Operations in the 10.7-12.7 GHz, 12.75-13.25 GHz, 13.8-14.5 GHz, 17.7-18.6 GHz, 18.8-20.2 GHz, and 27.5-30 GHz Bands*, Public Notice, DA 20-325 (IB Sat. Div. 2020); *Cut-off Established for Additional NGSO-like Satellite Systems in the 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz Bands*, Public Notice, DA 21-941 (IB Sat. Div. 2021).

<sup>31</sup> *See Kuiper Systems, LLC, Application for Authority to Deploy and Operate a Ka-band Non-Geostationary Satellite Orbit System*, Order and Authorization, 35 FCC Rcd 8324 (2020).

<sup>32</sup> *But see* Kuiper Comments, RM-11855, at 1, Kuiper Reply, RM-11855, at 7-8 (advocating a notice of inquiry); Theia Opposition, RM-11855, at 7-8 (advocating a notice of inquiry if the Commission pursues a rulemaking in response to the SpaceX Petition); Kepler Reply, RM-11855, at 2, 4 (supporting a notice of inquiry).

<sup>33</sup> *See* SpaceX Petition, RM-11855, at 11, Exh. A; 47 CFR § 25.261(c).

the Commission, but that this protection should sunset after a period of time.<sup>34</sup> SpaceX also argues that sharing of beam-pointing information should be explicitly required among NGSO FSS operators to facilitate interference analyses.<sup>35</sup> We address and invite comment on these proposals, and also seek comment on alternative proposals raised in the comments, below.

**A. Limiting the Default Spectrum-Splitting Procedure to Systems Authorized Through the Same Processing Round**

12. While the Commission stated in the *NGSO FSS Report and Order* that it will “initially limit” the spectrum-splitting procedure to qualified NGSO FSS applicants in a processing round,<sup>36</sup> there is no such limitation in the relevant rule text.<sup>37</sup> SpaceX contends that NGSO FSS operators have planned, invested, and begun deploying based on their assessment of the specific characteristics of other participants in their processing round, and that these characteristics allow licensees to estimate the amount of spectrum likely to be available during a situation governed by the spectrum-splitting procedure.<sup>38</sup> To provide greater certainty to NGSO FSS operators as to their future sharing environment, SpaceX proposes that the Commission adopt a rule providing that the existing spectrum-splitting procedure applies only to NGSO FSS systems authorized within the same processing round.<sup>39</sup>

13. This proposal is consistent with Commission licensing decisions. In each recent NGSO FSS system license and grant of market access, the requirement to apply the default spectrum-splitting procedure has been limited to among NGSO FSS systems filed within the same processing round.<sup>40</sup> We believe that adopting a rule limiting the existing spectrum-splitting procedure to only NGSO FSS systems authorized within the same processing round will provide greater clarity and regulatory certainty to NGSO FSS system licensees and market access recipients, and therefore propose to adopt it. We invite comment on this proposal. This approach, if adopted, would eliminate the “case-by-case” consideration of how to treat later applicants relative to approved systems, which the Commission previously explained would take into account various factors, including the potential for additional entry.<sup>41</sup> We seek comment on how limiting the existing spectrum-splitting procedure to NGSO FSS systems authorized within the same processing round will impact later applicants, including the potential for additional entry.

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<sup>34</sup> See SpaceX Petition, RM-11855, at 11-13.

<sup>35</sup> See *id.* at 12.

<sup>36</sup> *NGSO FSS Report and Order*, 32 FCC Rcd 7809, 7829, para. 61.

<sup>37</sup> See SpaceX Petition, RM-11855, at 8; 47 CFR § 25.261(c).

<sup>38</sup> See SpaceX Petition, RM-11855, at 11.

<sup>39</sup> See SpaceX Petition, RM-11855, at Exh. A (proposed revisions to section 25.261(c)(1)). No commenter opposes this proposal. See generally, e.g., O3b Comments, RM-11855, at 7 (arguing “the Commission can no longer reasonably maintain a case-by-case approach but must instead establish uniform, even-handed procedures defining the responsibilities and rights of later round applicants versus the first round participants”).

<sup>40</sup> See, e.g., *WorldVu Satellites Limited, Debtor-in-Possession, Petition for Declaratory Ruling Granting Access to the U.S. Market for the OneWeb Non-Geostationary Satellite Orbit Fixed-Satellite Service V-Band System*, Order and Declaratory Ruling, 35 FCC Rcd 10150, 10160, para. 30m (2020); *Kuiper Systems, LLC, Application for Authority to Deploy and Operate a Ka-band Non-Geostationary Satellite Orbit System*, Order and Authorization, 35 FCC Rcd 8324, 8344, para. 59b (2020); *ViaSat, Inc., Petition for Declaratory Ruling Granting Access for a Non-U.S.-Licensed Non-Geostationary Orbit Satellite Network*, Order and Declaratory Ruling, 35 FCC Rcd 4324, 4342-43, para. 54 (2020); *The Boeing Company, Application for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service*, Order and Authorization, FCC 21-115, para. 52 (2021).

<sup>41</sup> *NGSO FSS Report and Order*, 32 FCC Rcd 7809, 7829, para. 61 (explaining that the case-by-case approach would consider: (1) “the situation at the time”; (2) “the need to protect existing expectations and investments”; (3) the need to “provide for additional entry”; and (4) “any comments filed by incumbent operators and reasoning presented by the new applicant”).

## B. Protection of Earlier-Round Systems from Later-Round Systems

14. For an NGSO FSS licensee to invest potentially billions of dollars in a new system, SpaceX argues it must have some certainty that its spectrum rights will be maintained as later-filed NGSO FSS applications are considered.<sup>42</sup> SpaceX therefore proposes that NGSO FSS systems filed in a later processing round be required to protect NGSO FSS systems authorized through an earlier processing round.<sup>43</sup>

15. We believe that adopting this principle in our rules would clarify the rights and obligations of NGSO FSS system grantees. The protection of an NGSO FSS system from systems authorized through a subsequent processing round goes to the heart of the stability of interference environment the Commission intended to create through use of the processing round procedure.<sup>44</sup> Indeed, the Commission's licensing of a later-round NGSO FSS system has confirmed that it must protect earlier-round systems from harmful interference.<sup>45</sup>

16. We therefore propose to adopt a rule that NGSO FSS licensees and market access recipients are entitled to protection from NGSO FSS systems authorized through later processing rounds. Specifically, we propose to adopt a rule providing that, prior to commencing operations, an NGSO FSS licensee or market access recipient must either certify that it has completed a coordination agreement with any operational NGSO FSS system licensed or granted U.S. market access in an earlier processing round, or demonstrate that it will not cause harmful interference to any such system with which coordination has not been completed. We also discuss below alternative, specific protection criteria that could be developed for this rule. Notwithstanding a requirement to protect earlier-round NGSO FSS systems, we expect that coordination among NGSO FSS operators, including those authorized through different processing rounds, offers the best opportunity for efficient spectrum sharing.<sup>46</sup> Accordingly, we also propose to adopt a rule providing that the good-faith coordination requirement applies among all NGSO FSS grantees, including those authorized through different processing rounds. We invite comment on these proposals, including on the burdens associated with any technical demonstrations of compatibility. In particular, we invite comment on how best to establish the protection of authorized NGSO FSS systems under deployment while encouraging competition and new entrants into the market.

## C. Level of Protection for Earlier-Round Systems

17. To quantify the level to which a later-round NGSO FSS system would have to protect an earlier-round system, SpaceX recommends the Commission develop and adopt an appropriate interference-to-noise (I/N) limit.<sup>47</sup> While not proposing a specific I/N value, SpaceX suggests that such a

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<sup>42</sup> See SpaceX Petition, RM-11855, at 11.

<sup>43</sup> See *id.* at 11-12; see also, e.g., Kepler Comments, RM-11855, at 7, Karousel Comments, RM-11855, at 9, Telesat Comments, RM-11855, at 5, and ViaSat Comments, RM-11855, at 3 (all supporting protection of earlier-round NGSO FSS grantees from later-round grantees). No commenter opposed this principle.

<sup>44</sup> See *NGSO FSS Report and Order*, 32 FCC Rcd at 7829, para. 61 (“The purpose of the recent processing rounds was to establish a sharing environment among NGSO systems, to provide a measure of certainty in lieu of adopting an open-ended requirement to accommodate all future applicants.”).

<sup>45</sup> See *Kuiper Systems, LLC Application for Authority to Deploy and Operate a Ka-band Non-Geostationary Satellite Orbit System*, Order and Authorization, 35 FCC Rcd 8324, 8344, para. 59a (2020) (requiring that, prior to operation of the Kuiper NGSO FSS system, Kuiper certify that it has completed coordination with operational systems licensed or granted U.S. market access through an earlier processing round, or demonstrate that it will not cause harmful interference to such systems). While the modification of an NGSO FSS system may affect its sharing rights with respect to same-round and later-round systems, we do not address in this rulemaking the types of NGSO FSS system modifications that can be made without altering the system's processing round status and sharing obligations.

<sup>46</sup> See *NGSO FSS Report and Order*, 32 FCC Rcd at 7825, para. 48.

<sup>47</sup> SpaceX Petition, RM-11855, at 12.

limit incorporate a standard reference antenna mask and standard noise temperature.<sup>48</sup> Applicants in a later processing round would be required to demonstrate that their proposed systems could comply with the I/N limit based on a probabilistic analysis.<sup>49</sup> In addition, such an I/N limit could specify a percentage of time during which the limit may be exceeded.<sup>50</sup>

18. Beyond the initial difficulty of developing such an I/N limit for protection of NGSO FSS systems, commenters raise potential shortcomings of an I/N approach. Because the I/N limit would reflect generic NGSO system parameters and not the parameters of the NGSO system to be protected, it could provide insufficient protection to an NGSO system with especially sensitive antennas.<sup>51</sup> Adoption of an I/N limit could also discourage coordination if either the earlier-round licensee or later-round licensee preferred to operate within the I/N limit rather than a negotiated alternative.<sup>52</sup> Requiring applicants to perform interference analyses for the potentially thousands of satellites authorized through previous processing rounds, many of which may never be launched, could also place undue burdens on new entrants, especially those with limited resources.<sup>53</sup>

19. Commenters propose alternatives to an I/N limit that would provide for the protection of earlier-round NGSO FSS systems from later-round systems. ViaSat suggests the use of network performance degradation as an interference criterion.<sup>54</sup> AST recommends the Commission consider an approach that is harmonized with Recommendation ITU-R S.1323-2<sup>55</sup> or RR No. 22.5L of the ITU Radio Regulations, which use for a protection criterion the increase of the percentage of the time allowance for the carrier-to-noise (C/N) value associated with the shortest percentage of time specified in the short-term performance objective of the system to be protected.<sup>56</sup> O3b proposes that NGSO FSS systems authorized through different processing rounds make use of the existing spectrum-splitting mechanism, but that the earlier-round system be entitled to use 75% of the available spectrum and the later-round system be entitled to use 25% of the available spectrum, instead of the equal split applicable to NGSO FSS systems authorized through the same processing round.<sup>57</sup>

20. We believe that quantifying a level of protection for earlier-round systems would clarify the rights and obligations of NGSO FSS licensees in different processing rounds. We invite specific comment on what an appropriate I/N limit would be to protect NGSO FSS systems, what an appropriate percentage of time would be during which the I/N limit may be exceeded, and what the standard reference antenna mask and noise temperature should be in developing an appropriate I/N value or other criteria. In addition, we invite comment on the alternative proposals above and on any other appropriate means to ensure protection of earlier-round NGSO FSS systems from later-round systems, while allowing meaningful new entry and encouraging operator-to-operator coordination as the first resort.

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<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> See AST Comments, RM-11855, at 4.

<sup>51</sup> See ViaSat Comments, RM-11855, at 3-4; see also Karousel Comments, RM-11855, at 9 (opposing a “one size fits all” interference protection criteria).

<sup>52</sup> See O3b Comments, RM-11855, at 6-9.

<sup>53</sup> See Kepler Comments, RM-11855, at 8-9; Kuiper Comments, RM-11855, at 5.

<sup>54</sup> ViaSat Reply, RM-11855, at 2-4.

<sup>55</sup> See Recommendation ITU-R S.1323-2, Maximum permissible levels of interference in a satellite network (GSO/FSS; non-GSO/FSS; non-GSO/MSS feeder links) in the fixed-satellite service caused by other codirectional FSS networks below 30 GHz, <https://www.itu.int/rec/R-REC-S.1323-2-200209-I>.

<sup>56</sup> AST Comments, RM-11855, at 4.

<sup>57</sup> See O3b Comments, RM-11855, at 8, Attachment.

21. In particular, we invite comment on whether to adopt criteria based upon the percentage of degraded throughput experienced by the NGSO FSS system. Considering the degraded throughput may be appropriate because most, if not all, modern NGSO systems will use adaptive coding and modulation (ACM) to allow maintaining a satellite connection in spite of signal degradation, but at lower throughput rates. Such criteria could be developed consistent with Recommendation ITU-R S.2131-0, “Method for the determination of performance objectives for satellite hypothetical reference digital paths using adaptive coding and modulation.”<sup>58</sup> That recommendation suggests that satellite systems using ACM should be designed to meet performance objectives stated as either the packet error ratio or the spectral efficiency (bit/s/Hz) as a function of C/N. While this Recommendation does not provide specific values for the percentage of degraded throughput that should not be exceeded, we invite comment on establishing a limit under such a criteria. We also seek comment on specific values and on the suitability of this approach in general, including on the burdens of computing any limit that may be adopted under the alternatives set forth above. Should a degraded throughput analysis consider unavailability as well?<sup>59</sup>

#### **D. Sharing Beam-Pointing Information**

22. The Commission’s rules require NGSO FSS operators to coordinate in good faith the use of commonly authorized frequencies.<sup>60</sup> Beyond this general requirement, SpaceX proposes that earlier-round NGSO FSS system operators be specifically required to share data on their beam locations with later-round NGSO FSS system operators to facilitate analysis of and compliance with its proposed I/N metric.<sup>61</sup> SpaceX argues that confidentiality or non-disclosure agreements could ensure that data is not used by competitors for any purpose other than avoiding interference, such as marketing.<sup>62</sup> Several commenters raise concerns that a requirement to share beam data may be inefficient, impractical, or overly competitively sensitive in certain cases.<sup>63</sup> One commenter also suggests the Commission adopt broader information sharing requirements for operator-to-operator coordination.<sup>64</sup>

23. We believe that information sharing among NGSO FSS operators is essential to their efficient use of spectrum. Beyond our existing, flexible, good-faith coordination requirement, we invite comment on whether to specify sharing of certain types of information, such as beam-pointing information, that may be necessary for the implementation of any spectrum-sharing solution or protection criteria between NGSO FSS systems. Such information sharing requirements could involve NGSO FSS systems authorized through the same processing round or different processing rounds. We also seek comment on any practical concerns associated with such information sharing, and how best to address any associated, potential, competitive harms. For example, should the Commission adopt rules or mechanisms, for example, a protective order, to facilitate the sharing of the information? More broadly, should we add a definition of “good faith” coordination in our rules?<sup>65</sup> If so, what elements should it include? For example, should NGSO FSS operators specifically be required to share all necessary

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<sup>58</sup> See Recommendation ITU-R S.2131-0, <https://www.itu.int/rec/R-REC-S.2131-0-201909-I>.

<sup>59</sup> See, e.g., Updates to Working Document towards a Preliminary Draft New Recommendation ITU-R S.[Interference-NGSO], Contribution to WP 4A from the United States of America, Document 4A/420, at 3 (“Unavailability is calculated by a comparison of the convolution results of propagation fade and interference to the short-term performance objectives associated with the lowest C/N of the victim performance requirements.”) (Oct. 18, 2021).

<sup>60</sup> 47 CFR § 25.261(b).

<sup>61</sup> SpaceX Petition, RM-11855, at 12.

<sup>62</sup> See *id.*

<sup>63</sup> See, e.g., ViaSat Comments, RM-11855, at 3; O3b Comments, RM-11855, at 17; Telesat Reply, RM-11855, at 7; see also OneWeb Opposition, RM-11855, at 12.

<sup>64</sup> See Kuiper Comments, RM-11855, at 4-6, Annex.

<sup>65</sup> 47 CFR § 25.261(b).



technical information to perform an interference analysis, and do so in a timely fashion upon request, to meet the “good faith” coordination standard? We also seek comment on how the Commission might encourage NGSO FSS operators to build and deploy systems capable of sharing beam-pointing data and enabling other methods of spectrum sharing through coordination. How could the Commission encourage the development and deployment of systems that are more spectrally efficient? How might the Commission modify its NGSO sharing rules to incentivize flexible and efficient deployment?<sup>66</sup>

#### **E. Sunsetting of Protection**

24. SpaceX proposes that the protection of earlier-round systems from later-round systems sunset after a period of time.<sup>67</sup> SpaceX argues that a sunsetting provision would encourage earlier-round licensees to coordinate with later-round licensees, and avoid entrenching incumbents and stymieing future innovation.<sup>68</sup> One commenter similarly argues that processing rounds may be “condensed” and protections sunset over time.<sup>69</sup> Sunsetting could occur, for example, six years after licensing to coincide with the first NGSO system deployment milestone,<sup>70</sup> ten years after licensing,<sup>71</sup> or fifteen years after licensing.<sup>72</sup> Other commenters argue that any sunsetting provision would be arbitrary,<sup>73</sup> premature,<sup>74</sup> or unnecessary given the Commission’s existing good-faith coordination requirement.<sup>75</sup>

25. We invite comment on sunsetting of protections applied to NGSO FSS systems, including the timing of such sunsetting. In particular, we seek comment on whether sunsetting protection for NGSO FSS systems under deployment would unduly disrupt their operations. Should we consider sunsetting protections for an NGSO FSS system before the expiration of its 15-year license term? Would a shorter sunset period better promote competition? If so, when should the trigger/start date for sunsetting begin? At the date of the license grant, the beginning of the license period, or some other time? Should we expect that advances in technology for second-generation NGSO FSS systems will make sharing with new entrants easier? Or, conversely, would allowing new entrants to take advantage of technological enhancements in incumbent systems dull the incentives for incumbents to invest in such upgrades? What protection should apply to an NGSO FSS system after any sunsetting? How would sunsetting of protections affect the willingness to invest in NGSO FSS system development, and the likelihood of robust services being deployed to the public by such systems? Would a sunsetting provision promote competition, including the market entry of new competitors? Are there other ways to fashion a sunsetting provision that would maintain the reasonable expectations of earlier licensees and at the same time further the goal of promoting competition?

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<sup>66</sup> See, e.g., SpaceX Petition, RM-11855, at 13-15.

<sup>67</sup> SpaceX Petition, RM-11855, at 13; see also AST Comments, RM-11855, at 2-3 (supporting sunsetting of protection for earlier-round licensees).

<sup>68</sup> See SpaceX Petition, RM-11855, at 13; see also AST Comments, RM-11855, at 3.

<sup>69</sup> Kuiper Comments, RM-11855, at 7-8; but see Kepler Reply, RM-11855, at 3 (opposing “condensing” processing rounds). Kuiper also suggests reduced spectrum rights for “serial” NGSO FSS applicants. See Kuiper Comments, RM-11855, at 9.

<sup>70</sup> See Amazon Comments, RM-11855, at 8.

<sup>71</sup> See SpaceX Petition, RM-11855, at 13.

<sup>72</sup> See Kepler Comments, RM-11855, at 7-8.

<sup>73</sup> See Telesat Comments, RM-11855, at 7-8.

<sup>74</sup> See OneWeb Opposition, RM-11855, at 12.

<sup>75</sup> See Telesat Comments, RM-11855, at 8.

## F. Application of Rule Changes

26. NGSO FSS systems and system proposals currently have a variety of Commission approval statuses, including pending applications for new systems and authorizations for systems that were filed for in a previous processing round. Because of the large investments already made and planned for these novel and ambitious systems, we seek comment on whether to apply all, or some, of the rule changes adopted in this proceeding, including changes to the good-faith coordination requirement, only to new license applications, license modification applications, application amendments, and market access petitions filed after the new rules go into effect. Maintaining the expectations of current licensees, market access recipients, applicants, and market access petitioners may serve the public interest by providing regulatory stability upon which these systems may continue to develop.<sup>76</sup> However, we invite comment on whether applying rule changes to existing grantees or pending applicants would advance competition and encourage new entry into the market. If we did apply new rules to existing grants or pending applications, should we allow the grantees and applicants a period of time to request modification of their authorizations or to amend their applications before the new rule changes take effect? To the extent that we apply the revised rules to existing grants or pending applications, we seek comment on the costs and benefits of applying the rule changes to existing grantees or pending applicants that are part of already-closed processing rounds. How would this affect expectations of existing grantees or applicants who have filed by specific deadlines to gain entry into a particular processing round? If we decide not to apply new rules to existing grantees, what impact, if any, would that have on existing grant conditions already incorporated into NGSO FSS system authorizations, including those grants conditioned on compliance with rules or policies adopted by the Commission in the future?

## G. Digital Equity and Inclusion

27. Finally, the Commission, as part of its continuing effort to advance digital equity for all,<sup>77</sup> including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations<sup>78</sup> and benefits (if any) that may be associated with the proposals and issues discussed herein. Specifically, we seek comment on how our proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

## IV. PROCEDURAL MATTERS

28. *Ex Parte Presentations.* The proceeding this Notice initiates shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.<sup>79</sup> 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

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<sup>76</sup> See AST Comments at 3 (suggesting grandfathering of NGSO FSS applications filed before the SpaceX Petition).

<sup>77</sup> Section 1 of the Communications Act of 1934 as amended provides that the FCC "regulat[es] interstate and foreign commerce in communication by wire and radio so as to make [such service] available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex." 47 U.S.C. § 151.

<sup>78</sup> The term "equity" is used here consistent with Executive Order 13985 as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. See Exec. Order No. 13985, 86 Fed. Reg. 7009, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (January 20, 2021).

<sup>79</sup> 47 CFR § 1.1200 *et seq.*

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 section 1.1206(b). In proceedings governed by section 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, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

29. *Filing 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. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

- *Electronic Filers.* Comments may be filed electronically using the Internet by accessing the ECFS: <http://apps.fcc.gov/ecfs>.
- *Paper Filers.* Parties who choose to file by paper must file an original and one copy of each filing.
  - Filings can be sent 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.
  - 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 45 L Street NE Washington, DC 20554.
  - Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020). <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.
- *Persons 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](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

30. *Initial Regulatory Flexibility Analysis.* As required by the Regulatory Flexibility Act,<sup>80</sup> the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities of the proposals addressed in this Notice. The IRFA is set forth in Appendix A. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines for comments on the Notice, and they should

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<sup>80</sup> See 5 U.S.C. § 603.

have a separate and distinct heading designating them as responses to the IRFA. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Notice, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with the Regulatory Flexibility Act.<sup>81</sup>

31. *Paperwork Reduction Act.* This document does not contain proposed information collection requirements subject to the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, therefore, it does not contain any proposed information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4).

## V. ORDERING CLAUSES

32. Accordingly, IT IS ORDERED, pursuant to section 1.407 of the Commission's rules, 47 CFR § 1.407, that the petition for rulemaking filed by Space Exploration Holdings, LLC, Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems, RM-11855, IS GRANTED IN PART AND DEFERRED IN PART, the opposition filed by WorldVu Satellites Limited IS DENIED IN PART AND DEFERRED IN PART, and the opposition filed by Theia Holdings A, Inc. IS DEFERRED.

33. IT IS FURTHER ORDERED, pursuant to Sections 4(i), 7(a), 303, 308(b), and 316 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 157(a), 303, 308(b), 316, that this Notice of Proposed Rulemaking IS ADOPTED.

34. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center will send a copy of this Order and Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility 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.*

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch  
Secretary

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<sup>81</sup> *See* 5 U.S.C. § 603(a).

**APPENDIX A**  
**Proposed Rule Changes**

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

PART 25 – SATELLITE COMMUNICATIONS

1. 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.

2. Amend § 25.261 by revising paragraph (b), revising the first sentence in paragraph (c)(1), and adding paragraph (d) to read as follows:

§25.261 Sharing among NGSO FSS space stations.

\* \* \* \* \*

(b) *Coordination*. NGSO FSS licensees and market access recipients must coordinate in good faith the use of commonly authorized frequencies regardless of their processing round status, unless otherwise provided by the Commission.

(c) \* \* \*

(1) Each of n (number of) satellite networks involved that were licensed or granted market access through the same processing round must select 1/n of the assigned spectrum available in each of these frequency bands. \* \* \*

(d) *Protection of earlier-round systems*. Prior to commencing operations, an NGSO FSS licensee or market access recipient must either certify that it has completed a coordination agreement with any operational NGSO FSS system licensed or granted U.S. market access in an earlier processing round, or demonstrate that it will not cause harmful interference to any such system with which coordination has not been completed.

\* \* \* \* \*

**APPENDIX B****Initial Regulatory Flexibility Analysis**

As required by the Regulatory Flexibility Act (RFA),<sup>82</sup> 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 provided on the first page of the Notice and as instructed above in paragraph 29. The Commission will send a copy of the Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.<sup>83</sup> In addition, the Notice and IRFA (or summaries thereof) will be published in the Federal Register.<sup>84</sup>

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

In recent years, the Commission has received an unprecedented number of applications for non-geostationary satellite orbit (NGSO) space station licenses,<sup>85</sup> including for NGSO fixed-satellite service (FSS) systems. Traveling closer to the Earth than a traditional GSO satellite, low- and medium-orbit NGSO FSS satellite constellations are capable of providing broadband services to industry, enterprise, and residential customers with lower latency and wider coverage than was previously available via satellite. This rulemaking will continue to facilitate the deployment of NGSO FSS systems capable of providing broadband and other services on a global basis, and will promote competition among NGSO FSS system proponents, including the market entry of new competitors.<sup>86</sup>

The Notice of Proposed Rulemaking (NPRM) seeks comment on proposed revisions to the Commission's rules governing the treatment of NGSO FSS systems filed in different processing rounds. In particular, the NPRM proposes that the Commission's existing spectrum sharing mechanism for NGSO FSS systems will be limited to those systems approved in the same processing round. The NPRM also proposes to adopt a rule providing that later-round NGSO FSS systems will have to protect earlier-round systems, and invites comment on how to define such protection. In addition, the NPRM seeks comment on whether to sunset, after a period of time, the interference protection afforded to an NGSO FSS system because of its processing round status.

**B. Legal Basis**

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

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<sup>82</sup> 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).

<sup>83</sup> See 5 U.S.C. § 603(a).

<sup>84</sup> *Id.*

<sup>85</sup> See *Mitigation of Orbital Debris in the New Space Age*, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 4156, 4158, para. 3 (2020).

<sup>86</sup> See *generally* Executive Order No. 14036, Promoting Competition in the American Economy, 86 FR 36987 (July 9, 2021) (“The heads of all agencies shall consider using their authorities to further the policies set forth in section 1 of this order, with particular attention to: (i) the influence of their respective regulations, particularly any licensing regulations, on concentration and competition in the industries under their jurisdiction; and...”). Executive Order at 86 FR 36991.

### C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will 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.<sup>87</sup> The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."<sup>88</sup> In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.<sup>89</sup> 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).<sup>90</sup>

**Satellite Telecommunications.** This category comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."<sup>91</sup> Satellite telecommunications service providers include satellite and earth station operators. The category has a small business size standard of \$35 million or less in average annual receipts, under SBA rules.<sup>92</sup> For this category, U.S. Census Bureau data for 2012 show that there were a total of 333 firms that operated for the entire year.<sup>93</sup> Of this total, 299 firms had annual receipts of less than \$25 million.<sup>94</sup> 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 invites comment on potential changes to the spectrum sharing requirements among NGSO FSS satellite systems. Because of the costs involved in developing and deploying an NGSO FSS satellite constellation, we anticipate that few NGSO FSS operators affected by this rulemaking would qualify under the definition of "small entity."

### 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

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<sup>87</sup> 5 U.S.C. § 603(b)(3)

<sup>88</sup> 5 U.S.C. § 601(6).

<sup>89</sup> 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).

<sup>90</sup> Small Business Act, 15 U.S.C. § 632 (1996).

<sup>91</sup> See U.S. Census Bureau, *2017 NAICS Definition, "517410 Satellite Telecommunications,"* <https://www.census.gov/naics/?input=517410&year=2017&details=517410>.

<sup>92</sup> See 13 CFR § 121.201, NAICS Code 517410.

<sup>93</sup> See U.S. Census Bureau, *2012 Economic Census of the United States*, Table ID: EC1251SSSZ4, *Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the U.S.: 2012*, NAICS Code 517410, <https://data.census.gov/cedsci/table?text=EC1251SSSZ4&n=517410&tid=ECNSIZE2012.EC1251SSSZ4&hidePreview=false&vintage=2012>.

<sup>94</sup> *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

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.”<sup>95</sup>

The NPRM invites comment on different means to protect NGSO FSS systems licensed through the Commission’s processing round framework, including, as one option, whether those NGSO FSS systems authorized through a later processing round should be required to submit technical demonstrations that they will not interfere with NGSO FSS systems authorized through an earlier processing round. The NPRM invites specific comment on the burdens associated with such submissions, and also seeks comment on alternative means of protection of NGSO FSS systems.

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

None.

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<sup>95</sup> 5 U.S.C. § 603(c)(1)-(c)(4).



**APPENDIX C**  
**List of Commenters**

**Comments in RM-11855**

AST&Science LLC (AST)  
Karousel LLC (Karousel)  
Kepler Communications Inc. (Kepler)  
Kuiper Systems LLC (Kuiper)  
O3b Limited (O3b)  
Telesat Canada (Telesat)  
Theia Holdings A, Inc. (Theia)  
Viasat, Inc. (Viasat)  
WorldVu Satellites Limited (OneWeb)

**Reply Comments in RM-11855**

Kepler  
Kuiper  
OneWeb  
O3b  
Space Exploration Holdings, LLC (SpaceX)  
Telesat  
ViaSat

**Ex Parte Filings in RM-11855**

SpaceX (filed July 8, 2020)  
Kepler (filed July 22, 2020)  
Kuiper (filed July 27, 2020)  
Kuiper (filed Sept. 2, 2020)  
Telesat (filed Dec. 9, 2020)  
Kuiper (filed Dec. 10, 2020)  
SpaceX (filed Jan. 22, 2021)  
Kuiper (filed Apr. 2, 2021)  
Kuiper (filed Dec. 6, 2021)  
SpaceX (filed Dec. 6, 2021)  
O3b (filed Dec. 7, 2021)

**STATEMENT OF  
CHAIRWOMAN JESSICA ROSENWORCEL**

Re: *Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems*, IB Docket No. 21-456; *Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems*, RM-11855.

For more than half a century, space-driven technologies have been responsible for a lot of improvements in our daily life. That includes everything from robotics that support new surgical capabilities to lithium-ion batteries that power electric cars to cameras that make panoramic photography a snap. Looking back, it is clear the first space age was an incredible source of innovation.

Now a new space age beckons. It means more satellites, more possibilities for exploration, and more opportunities for entrepreneurial activity in our skies. Already we are seeing rockets for space tourism and new constellations that can expand broadband to the furthest reaches of the globe.

To help usher in this new era, the Federal Communications Commission will need to make changes. We're already on our way. In April, for the first time in history, the FCC allocated spectrum specifically to support commercial space launch operations. In November, we cleared the way for two new low-Earth orbiting constellations that will bring broadband and internet of things services to consumers, businesses, and government customers in the United States and globally. And in August, we initiated a new V-band processing round that has resulted in proposals from nine constellations for nearly 38,000 new satellites that will offer global broadband.

Today, we are taking note of the significant increase in innovative low-Earth orbit satellite systems seeking to offer broadband with higher speeds and lower latencies. This is exciting! But the rush to develop these new space opportunities requires new rules that keep competition and innovation front of mind. Because despite the revolutionary activity in our skies, the regulatory frameworks we rely on to shape these efforts are dated. They were built for an era when heading to space was strictly for government superpowers. They did not imagine a world where space entrepreneurship and competition could take hold.

So in this rulemaking we take a hard look at our satellite rules. We want to make sure they create a level playing field for new competitors. We start by reviewing our processing round rules for non-geosynchronous satellites in low-Earth orbit. Right now, these rules grant a first-mover advantage to satellite companies through a spectrum priority. That can be a good thing, especially if it provides early entrants the certainty they need to invest in costly and risky satellite deployments. But it is not a good thing if it shuts out competitors from even entering the space. So we ask if the FCC should sunset that first-mover advantage after some time, so that our rules reward investment while also creating the opportunity for new entrants to achieve a level playing field. To further support competition, we also propose rules to improve spectrum sharing and communication between satellite operators.

With this rulemaking, we are just getting started. Because we also need to speed the processing of applications to keep pace with all the innovation headed our way. On top of that, the demands of these new constellations will require the FCC to coordinate more closely than ever before with our federal partners with interest in this area.

That's a lot. But count me as excited. There's work to do to support this new space age—now let's get to it.

Thank you to the agency staff who worked on this rulemaking, including Clay DeCell, Jennifer Gilsean, Karl Kensinger, Kathryn Medley, Thomas Sullivan, Troy Tanner, and Merissa Velez from the International Bureau; David Konczal and Bill Richardson from the Office of General Counsel; Patrick Brogan, Catherine Matraves, Virginia Metallo, Marilyn Simon, and Emily Talaga from the Office of Economics and Analytics; and Maura McGowan from the Office of Communications Business Opportunities.

**STATEMENT OF  
COMMISSIONER GEOFFREY STARKS**

Re: *Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems*, IB Docket No. 21-456; *Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems*, RM-11855.

The last few years have seen a transformation of the American space sector. So far this year, the United States has launched nearly 50 missions to place satellites in Earth orbit or deep space. Satellite imaging and sensing companies are helping governments, commercial actors and other organizations assess how our planet is experiencing conditions ranging from climate change to the spread of COVID-19. And non-geostationary satellite orbit fixed-satellite service (NGSO FSS) systems are beginning to bridge the digital divide in the United States and around the world.

Commission policies must keep pace with these changes so we can encourage innovation while preserving a level playing field between incumbents and new entrants. That's why the Commission updated its NGSO rules in 2017, for the first time in more than a decade.

Since then, the Commission has received an unprecedented number of applications for NGSO space station licenses, including NGSO FSS systems of previously unimaginable size. These next-generation satellite systems aim to provide broadband service to the most difficult to reach Americans at latency and speeds superior to any preexisting satellite broadband options. But because these systems must share spectrum with other satellite operators, they and other innovative NGSO systems present new challenges for our spectrum sharing policy.

It is therefore appropriate to consider further updates to our rules to protect the significant investments reflected in these and other systems, while also preserving opportunities for new entrants and systems. Given the rapidly changing character of this sector and the finite nature of spectrum, I am particularly interested in how we might encourage satellite operators to adopt spectrally efficient technologies that will ensure the very best and highest use of spectrum. I'm therefore grateful to my colleagues for accepting my edits seeking comment on incorporating spectral efficiency incentives into our spectrum sharing policy.

Thank you to the International Bureau staff for their hard work on this item.

**STATEMENT OF  
COMMISSIONER NATHAN SIMINGTON**

Re: *Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems, IB Docket No. 21-456; Revision of Section 25.261 of the Commission's Rules to Increase Certainty in Spectrum Sharing Obligations Among Non-Geostationary Orbit Fixed-Satellite Service Systems, RM-11855.*

The Order and NPRM we adopt today will provide the Commission with a fulsome record to enable it to modify the NGSO spectrum sharing rules in a way that better addresses the realities of the blossoming NGSO market and to eliminate rules that may foster conflict among licensees. The item demonstrates a willingness to aid U.S. competition in an intrinsically global satellite marketplace and to make certain that outdated policies do not stand in the way of companies that wish to license their systems in the U.S.A.

I'm pleased to vote to support this item and express my gratitude to the staff of IB for all of their diligent work.