December 6, 2021

By Electronic Filing

Marlene H. Dortch, Secretary
Federal Communications Commission
45 L Street N.E.
Washington, D.C. 20554

Re: IB Docket No. 21-456, RM-11855

Dear Ms. Dortch:

On December 2 and December 3, representatives of Kuiper Systems LLC, a wholly owned subsidiary of Amazon.com Services LLC (collectively, "Amazon"), had separate teleconferences with Benjamin Arden from the Office of Commissioner Carr, William Davenport from the Office of Commissioner Starks, and Erin Boone from the Office of Commissioner Simington. Amazon was represented by Kalpak Gude, Aaron Goldberger, Jaime Hjort, and David Kaufman, as well as Jennifer Hindin of Wiley Rein LLP. On December 6, Amazon had a teleconference with Tom Sullivan, Troy Tanner, Karl Kensinger, Jennifer Gilsenan, Merissa Velez, and Clay DeCell, of the Commission's International Bureau. Amazon was represented at this meeting by Kalpak Gude, Aaron Goldberger, David Kaufman, and Alex Epshteyn, as well as Jennifer Hindin of Wiley Rein LLP. During these meetings, Amazon expressed its support for the Commission's draft notice of proposed rulemaking in the above-captioned proceeding, which proposes updates to its rules governing spectrum sharing among non-geostationary satellite orbit, fixed-satellite service ("NGSO FSS") constellations.[1]

The time is ripe to update these rules and clarify the spectrum access rights of later-round NGSO FSS systems. Much has changed since the Commission last updated its rules in 2017.[2] Among other things, the Commission has initiated a second processing round in frequencies subject to a prior processing round—including the Ku/Ka-band, in 2020,[3] and the Q/V-band, in 2021.[4] Licensing these second-round systems has provided the Commission with further experience in balancing the competing interests of earlier- and later-licensed systems.

As a later-round licensee that is quickly approaching the launch of its own NGSO FSS system,

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[1] *See Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed-Satellite Service Systems*, Order and Notice of Proposed Rulemaking (Tentative Draft No. FCC-CIRC2112-02, rel. Nov. 23, 2021) ("*Draft Order*").
[2] *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).
[3] *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).
[4] *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).

Amazon welcomes clear ground rules to guide its planning and deployment. Amazon particularly applauds the emphasis that the draft *Order and NPRM* places on issuing rules that promote development, competition, and the entry of new NGSO FSS systems.[5] Whether in space or on Earth, competition benefits consumers by promoting innovation, lowering prices, and encouraging a vibrant telecommunications network. Amazon recognizes that licensees need reasonable protection and certainty to invest in and plan for the complicated and expensive undertaking of deploying an NGSO FSS system. But without limits on that priority, the current rules risk hampering competition and placing the promise of satellite-delivered broadband in the hands of a small group of earlier-licensed incumbents.

Many of the proposals in the draft *Order and NPRM* could ensure robust competition among NGSO FSS operators, so long as the Commission applies them to new and existing licensees alike. Among other things, the draft considers sunsetting the priority rights of incumbents after a period of time, contemplates requiring that all NGSO operators coordinate in good faith regardless of process round status and share information to allow the more efficient use of spectral resources, and seeks comment on adopting clear rules of the road that would protect incumbents while fostering new entry and competition.

At its meetings, Amazon proposed targeted edits to the draft *Order and NPRM* that would further the Commission's twin goals of encouraging investment and promoting competition. These edits are included in Appendix A, below. Amazon appreciates the Commission's effort to update its rules and promote competition in the burgeoning field of satellite-delivered broadband. Please contact me with any questions.

Respectfully submitted,

/s/ Andrew Keisner
Andrew Keisner
Lead Counsel
Kuiper Systems LLC,
an Amazon subsidiary

cc: Benjamin Arden
William Davenport
Erin Boone
Tom Sullivan
Troy Tanner
Karl Kensinger
Jennifer Gilsenan
Merissa Velez
Clay DeCell

[5] *Draft Order* at ¶ 1 ("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.").

Appendix A

(Amazon's proposed edits below in **red**.)

¶ 13 (Limiting the Default Spectrum-Splitting Procedure to Systems Authorized Through the Same Processing Round).

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. 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. 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. **Are there other ways to alter this spectrum splitting mechanism that would better promote competition and incentivize coordination, such as including licensees in different processing rounds in the default procedure for spectrum splitting on an unequal basis?**

¶ 15 (Protection of Earlier-Round Systems from Later-Round Systems).

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. Indeed, the Commission's licensing of a later-round NGSO FSS system has confirmed that it must protect earlier-round systems from harmful interference. **At the same time, we believe that the interest in certainty should be balanced against the need for competition.**

¶ 21 (Level of Protection for Earlier-Round Systems).

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." 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? [Footnote: We note that the US has recently recommended the ITU adopt a single-entry metric of a 3% increase in unavailability and a 3% allowance in the reduction of the time-averaged weighted in degraded throughput, and that some evidence supports this as a reasonable value. *See* Contribution of the United States of America, Updates to Working Document Towards a Preliminary Draft New Recommendation ITU-R S.[Interference-NGSO], Document 4A/420-E (Oct. 18, 2021), https://www.itu.int/md/R19-WP4A-C-0420/en.]**

¶ 23 (Sharing Beam-Pointing Information)

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? If so, what elements should it include? For example, should NGSO FSS operators specifically be required to share all necessary technical information to perform an interference analysis, and do so in a timely fashion upon request, to meet the "good faith" coordination standard? **More generally, we 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. Could the Commission promote the efficient use of spectrum resources by encouraging the development of systems that are more efficient? How might the Commission modify its NGSO sharing rules to incentivize more flexible and efficient deployment?**

¶ 25 (Sunsetting of Protection).

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, such as 6 years, better promote competition? 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 balance the expectations of existing licensees against the goals of promoting competition?**

¶ 26 (Application of Rule Changes).

We propose to apply any rules changes adopted in this proceeding to all NGSO FSS licensees. 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. 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,~~ **S**hould 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,~~ **W**e 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?~~