

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Kuiper Systems LLC

Application to Amend Pending Application
for Authority to Launch and Operate a Non-
Geostationary Satellite Orbit System in V-
band, Ku-band, Ka-band, and 17 GHz Band
Frequencies (Call Sign S3105)

SAT-AMD-_____

SAT-LOA-20211104-00145

**APPLICATION TO AMEND PENDING APPLICATION FOR AUTHORITY TO
LAUNCH AND OPERATE A NON-GEOSTATIONARY SATELLITE ORBIT SYSTEM
IN V-BAND, KU-BAND, KA-BAND, AND 17 GHZ BAND FREQUENCIES**

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TABLE OF CONTENTS

I.	INTRODUCTION AND SUMMARY.....	1
II.	BACKGROUND	3
III.	AMENDED ORBITAL PARAMETERS.	5
IV.	USE OF THE AMENDED FREQUENCIES WILL FACILITATE DEPLOYMENT OF THE KUIPER SYSTEMS AND SERVE THE PUBLIC INTEREST.	6
A.	Frequency Amendments.....	6
B.	Good Cause Exists for Amazon’s Requested Waivers of the Table of Frequency Allocations.	9
1.	18.6 – 18.8 GHz	9
2.	19.4 – 19.6 GHz	10
3.	20.2 – 21.2 GHz and 30.0 – 31.0 GHz.....	10
4.	51.4 – 52.4 GHz	11
C.	Good Cause Exists for Amazon’s Requested Waivers of the Processing Round Rules.	11
D.	Waiver of the Commission’s Processing Round Framework for Amazon’s Use of the 17 GHz Band Would Serve the Public Interest.....	12
V.	FLEXIBLE USE OF FREQUENCIES.	13
VI.	THE COMMISSION SHOULD WAIVE ITS PFD DOWNLINK LIMITS FOR AMAZON’S TT&C FREQUENCIES.	14
VII.	LIMITED WAIVER OF THE COMMISSION’S EPFD LIMIT RULES WILL ENHANCE AMAZON’S OPERATIONS IN THE U.S.	15
VIII.	CONCLUSION	17

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APPLICATION FOR AMENDMENT

I. INTRODUCTION AND SUMMARY

Kuiper Systems LLC, a wholly owned subsidiary of Amazon.com Services LLC (collectively “Amazon”), and pursuant to Section 25.116 of the Federal Communications Commission’s (“FCC” or “Commission”) rules,¹ hereby files to amend (the “Amendment”) the above-captioned application for V-band and Ku-band frequencies under Call Sign S3105 (the “V-band Application”). The V-band Application requested authority for payloads on three systems: Amazon’s first-generation non-geostationary satellite orbit (“NGSO”) fixed-satellite service (“FSS”) and mobile-satellite service (“MSS”) constellation (the “Gen 1 Kuiper System”);² Amazon’s second-generation NGSO FSS constellation (the “Gen 2 Kuiper System”); and

¹ 47 C.F.R. §§ 1.3, 25.116.

² Amazon’s original application for V-band authority referred to this system as the “Kuiper-Ka System”; however, given the addition of Ka-band frequencies to the second-generation system in this Amendment, Amazon refers to it here as the “Gen 1 Kuiper System.” *See* Application of Kuiper Systems LLC for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in V-band and Ku-band Frequencies, ICFS File No. SAT-LOA-20211104-00145, Technical Appendix, at 2-3 (filed Nov. 4, 2021) (“V-band Application”).

Amazon's NGSO FSS polar constellation, which extends service to consumers above 56°N and below 56°S (the "Polar Kuiper System") (collectively, the "Kuiper Systems"). With this Amendment, Amazon now seeks to update the V-band Application in order to reflect Amazon's work towards optimizing its constellation design since 2021, as well as Commission rules promulgated in the interim.

First, as provided in Table 1, Amazon seeks to update the orbital parameters for the Gen 1 Kuiper System to align with its current Ka-band Commission authorization, and reconfigure the orbital parameters for the Gen 2 Kuiper System and the Polar Kuiper System. Pursuant to this request, Amazon proposes to decrease by 38 the total number of satellites in its three systems. *Second*, as described fully in Tables 2 and 3 below, Amazon seeks to adjust frequency assignments for its satellites by requesting: (1) use of the 17.3-17.8 GHz frequencies (the "17 GHz Band") for all three systems, and waiver of the Commission's processing round framework for the 17 GHz Band; (2) to add Ka-band frequencies for the Gen 2 Kuiper System and the Polar Kuiper System; and (3) waiver of the Table of Frequency Allocations to add certain additional V-band and Ka-band frequencies to the Gen 2 Kuiper System and the Polar Kuiper System. *Finally*, Amazon requests certain limited waivers, for the Gen 1 Kuiper System domestic downlink operations in the 17 GHz Band, and for the Gen 2 Kuiper System and Polar Kuiper System domestic downlink operations in the Ka-band, of: (1) the Commission's equivalent power flux density ("EPFD")³ limits; and (2) the Commission's power flux density ("PFD") limits.

³ Amazon has filed this amendment request electronically as an attachment to FCC Form 312. *See* 47 C.F.R. § 25.116(e). Moreover, because it is impracticable to submit complete beam and orbital parameter data for the Amendment using the Schedule S system, Amazon requests waiver of Section 25.114(a)(1) of the Commission's rules. *See* 47 C.F.R. § 25.114(a)(1). Instead, Amazon attaches a database with complete information required on Schedule S for inclusion in the record of this application. All other information previously provided to the Commission remains unchanged and is incorporated by reference. *See generally* V-band Application.

Fast and reliable broadband connectivity is increasingly important for learning, employment, entrepreneurship, communication, and economic growth, and Amazon is committed to ensuring that businesses and consumers both in the U.S. and worldwide have access to affordable and reliable services. Since committing to invest over 10 billion dollars in the Kuiper Systems, Amazon has made significant strides toward deployment, including the successful launch and operation of test satellites validating its system design, continued expansion of its terrestrial infrastructure, and unveiling innovative customer terminals (“CTs”) that will offer high performance in small form factors and at affordable price points. Amazon’s Kuiper Systems will provide high-throughput broadband connectivity services not only to enterprise and consumer end users, but also for aircraft, maritime vessels, and land vehicles. Grant of this Amendment serves the public interest, as it will facilitate expeditious deployment and allow Amazon to provide competitive, next-generation services to customers around the world, including in unserved and underserved areas.⁴

II. BACKGROUND

On July 30, 2020, the Commission authorized Amazon to deploy the Gen 1 Kuiper System, a 3,236-satellite NGSO constellation, to provide service using certain FSS and MSS Ka-band frequencies.⁵ There, and as part of subsequent modification grants, the Commission determined

⁴ To the extent that processing certain of the Amendment’s requests separately would be more expedient, Amazon does not object to piecemeal, partial grants of authority. *See, e.g., Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 37 FCC Rcd 14882 (2022) (authorizing launch and operation of up to 7,500 satellites and deferring request for remaining satellites).

⁵ *See generally 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) (“*Gen 1 Kuiper System Authorization*”).

that Amazon’s Gen 1 Kuiper System would expand the availability of high-speed broadband, thus serving the public interest.⁶

On November 4, 2021, Amazon filed an application for 7,774 satellites to provide service using certain FSS V-band and Ku-band frequencies (“V-band Application”).⁷ There, Amazon explained that the requested satellites would supplement the Gen 1 Kuiper System by placing V-band payloads on the satellites already licensed under the *Gen 1 Kuiper System Authorization* and by launching additional satellites that would hold V-band and Ku-band payloads for the remainder of the 7,774 satellites, which comprised the Gen 2 Kuiper System and the Polar Kuiper System.⁸

In 2024, the Commission granted Amazon’s modification of the *Gen 1 Kuiper System Authorization* to alter orbital parameters and slightly decrease the total number of satellites in the Gen 1 Kuiper System from 3,236 to 3,232.⁹

⁶ *Id.* ¶ 3 (“We conclude that grant of Kuiper’s application would advance the public interest by authorizing a system designed to increase the availability of high-speed broadband service to consumers, government, and businesses.”); *see also Kuiper Systems LLC, Request for Modification of the Authorization for the Kuiper NGSO Satellite System*, Order and Authorization, 38 FCC Rcd 1112 (SB 2023); *see Kuiper Systems LLC, Request for Modification of the Authorization for the Kuiper NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 2180 (2024) (the “Orbital Modification Grant”).

⁷ *See* V-band Application.

⁸ *Id.* at 5. The Commission approved a similar plan in its grant of SpaceX’s application to modify the authorization for its V-band constellation, allowing SpaceX to modify its V-band plans to deploy V-band operations into its Starlink Gen2 system, rather than a separate V-band system. *See* Space Exploration Holdings, LLC Application for Modification of Authorization for the SpaceX V-band NGSO Satellite System, Stamp Grant, ICFS File No. SAT-MOD-20230322-00062 (granted Oct. 13, 2023).

⁹ *See* Application of Kuiper Systems LLC for Modification of Authorization for the Kuiper System, ICFS File No. SAT-MOD-20230228-00043, at 3 (filed Feb. 28, 2023) (“Orbital Modification Application”).

III. AMENDED ORBITAL PARAMETERS.

Each of the three Kuiper Systems will have distinct physical characteristics and follow unique deployment schedules. In turn, the three Kuiper Systems will offer differing services to customers that vary in performance, range, and/or geographic coverage. In this Amendment, Amazon seeks to update the physical characteristics for the systems set forth in the V-band Application, as outlined in Table 1, below. In addition, for the portion of the V-band Application that supplements the Gen 1 Kuiper System with additional payloads, Amazon now updates the orbital parameters to conform with the currently authorized orbital parameters of the Gen 1 Kuiper System.

Table 1. Kuiper V-Band Satellite Amended Orbital Parameters

Original Parameters			Amended Parameters		
Altitude (km)	Inclination (deg)	Total Satellites	Altitude (km)	Inclination (deg)	Total Satellites
Gen 1 Kuiper System ¹⁰					
590	30	-	590	30	2
590	33	784	590	33	782
610	42	1296	610	42	1292
630	51.9	1156	630	51.9	1156
Total Satellites		3236	Total Satellites		3232
Gen 2 Kuiper System					
590	33	784	590	33	780
610	42	1296	610	42	1280
630	51.9	1156	630	51.9	1152
Total Satellites		3236	Total Satellites		3212
Polar Kuiper System					
600	82	-	600	82	152
620	66	-	620	66	800

¹⁰ The “original parameters” reflect those requested in the V-band Application, and the “amended parameters” reflect the parameters as amended to accord with the Orbital Modification Grant.

640	72	652	640	72	-
650	80	650	650	80	340
<i>Total Satellites</i>		1302	<i>Total Satellites</i>		1292

The total number of satellites across the three systems remains lower than originally proposed in the V-band Application. As such, like the Orbital Modification, these alterations to the orbital parameters do not increase interference and thus have no bearing on processing round status.¹¹

IV. USE OF THE AMENDED FREQUENCIES WILL FACILITATE DEPLOYMENT OF THE KUIPER SYSTEMS AND SERVE THE PUBLIC INTEREST.

A. Frequency Amendments.

This Amendment seeks to make changes to the frequencies sought in the V-band Application, as outlined in Tables 2 and 3, below. First, following the Commission’s recent Order permitting use of the 17 GHz Band by NGSO FSS systems,¹² Amazon seeks to add the 17 GHz Band frequencies to the Gen 1 Kuiper System, the Gen 2 Kuiper System, and the Polar Kuiper System. Second, Amazon seeks to add Ka-band frequencies for the Gen 2 Kuiper System and the Polar Kuiper System, including requesting waiver to add 18.6-18.8 GHz, 19.4-19.6 GHz, 20.2-21.2 GHz, and 30.0-31.0 GHz. Third, pursuant to waiver, Amazon seeks to add the V-band frequencies 51.4-52.4 GHz to the Gen 1 Kuiper System, Gen 2 Kuiper System, and Polar Kuiper System. These frequency amendments are reflected in Tables 2-3 below.

¹¹ See *Orbital Modification Grant* ¶ 7 (“Though Kuiper proposes to redistribute satellites in its constellation, the redistribution will be within previously authorized orbital planes. Moreover, the frequency use, beam footprints, power flux density and equivalent power flux density levels, minimum antenna elevation angles, equivalent isotropic radiated power (EIRP) levels, and service area associated with its constellation will remain unchanged from the parameters previously authorized.”).

¹² *Amendment of Parts 2 and 25 of the Commission’s Rules to Enable NGSO Fixed-Satellite Service (Space-to-Earth) Operations in the 17.3-17.8 GHz Band*, Report and Order, IB Docket No. 22-273, FCC 24-97 (rel. Sept. 27, 2024) (“17 GHz Order”).

Table 2. Gen 1 Kuiper System Frequencies

Direction of Transmission	Frequency Band	Original Frequencies	Amended Frequencies
Space-to-Earth	17 GHz Band	<i>17.7 – 17.8 GHz (non-U.S. only)</i>	17.3 – 17.8 GHz
Space-to-Earth	Ka-band	17.8 – 18.6 GHz 18.8 – 20.2 GHz	Same
Space-to-Earth	V-band	37.5 – 42.0 GHz ¹³ <i>42.0 – 42.5 GHz (non-U.S. only)</i>	Same
Earth-to-space	Ka-band	27.5 – 30.0 GHz	Same
Earth-to-space	V-band	47.2 – 50.2 GHz ¹⁴ 50.4 – 51.4 GHz ¹⁵	Same plus: 51.4 – 52.4 GHz

Table 3. Gen 2 Kuiper System and Polar Kuiper System Frequencies

Direction of Transmission	Frequency Band	Original Frequencies	Amended Frequencies
Space-to-Earth	Ku-band	10.7 – 12.7 GHz	Same
Space-to-Earth	17 GHz Band		17.3 – 17.8 GHz
Space-to-Earth	Ka-band		17.8 – 18.6 GHz 18.6 – 18.8 GHz 18.8 – 20.2 GHz 20.2 – 21.2 GHz
Space-to-Earth	V-band	37.5 – 42.0 GHz ¹⁶ <i>42.0 – 42.5 GHz (non-U.S. only)</i>	Same

¹³ Per 47 C.F.R. § 25.202(a)(1)(ii), use of the 37.5 – 40 GHz band for Fixed-Satellite Service downlinks is limited to individually licensed earth stations, and earth stations licensed in this band must not be ubiquitously deployed and must not be used to serve individual consumers. The Kuiper-V System will comply with these conditions. This band also includes a TT&C downlink at 40.0 – 40.1 GHz.

¹⁴ Per 47 C.F.R. § 25.136(d), use of the 47.2 – 48.2 GHz band is limited to individually licensed earth stations. The Kuiper-V System will comply with this condition. This band also includes a TT&C uplink at 47.2 – 47.3 GHz.

¹⁵ Per 47 C.F.R. § 25.136(e), use of the 50.4 – 51.4 GHz band is limited to individually licensed earth stations. The Kuiper-V System will comply with this condition.

¹⁶ Per 47 C.F.R. § 25.202(a)(1)(ii), use of the 37.5 – 40 GHz band for Fixed-Satellite Service downlinks is limited to individually licensed earth stations, and earth stations licensed in this band must not be ubiquitously deployed and must not be used to serve individual consumers. The Kuiper-V System will comply with these conditions. This band also includes a TT&C downlink at 40.0 – 40.1 GHz.

Earth-to-space	Ku-band	12.75 – 13.25 GHz 14.0 – 14.5 GHz	Same
Earth-to-space	Ka-band		27.5 – 30.0 GHz ¹⁷ 30.0 – 31.0 GHz
Earth-to-space	V-band	47.2 – 50.2 GHz ¹⁸ 50.4 – 51.4 GHz ¹⁹	Same plus: 51.4 – 52.4 GHz

Amazon recognizes that under FCC Rule 25.157(c), its request to add Ka-band frequencies to the Gen 2 Kuiper System and Polar Kuiper System, as well as 17 GHz Band frequencies to all three systems, qualifies as a lead application and may be included in a new processing round.²⁰ This proposed amendment, however, not only maintains the parameters of the Ka-band authorization for the Gen 1 Kuiper System, but also only affects the V-band and Ku-band portion of the Kuiper-V System by seeking a minor orbital reconfiguration.²¹ As a result, the existing Ka-band authorization of the Gen 1 Kuiper System and the pending V-band and Ku-band addition to all three systems should remain in their existing processing rounds. For its request to operate in the 18.6-18.8 GHz, 19.4-19.6 GHz, 20.2-21.2 GHz, 30.0-31.0 GHz, and 51.4-52.4 GHz bands, Amazon requests a waiver of Rule 25.157(c) as set forth in Section III.C.

¹⁷ Amazon recognizes that Iridium LLC is currently licensed and operating MSS feeder links in the 29.1 – 29.3 GHz uplink band. Amazon’s gateway links will employ a combination of site diversity and angular avoidance of inline interference events to ensure protection of Iridium gateway links. *See Gen 1 Kuiper System Authorization* ¶ 25. Amazon also acknowledges that grant will be conditioned upon coordination in these bands with any previously granted NGSO MSS systems included in previous processing rounds. *See id.*

¹⁸ Per 47 C.F.R. § 25.136(d), use of the 47.2 – 48.2 GHz band is limited to individually licensed earth stations. The Kuiper-V System will comply with this condition. This band also includes a TT&C uplink at 47.2 – 47.3 GHz.

¹⁹ Per 47 C.F.R. § 25.136(e), use of the 50.4 – 51.4 GHz band is limited to individually licensed earth stations. The Kuiper-V System will comply with this condition.

²⁰ *See* 47 C.F.R. § 25.157(c)(2).

²¹ *See generally* Orbital Modification Application.

B. Good Cause Exists for Amazon’s Requested Waivers of the Table of Frequency Allocations.

Amazon respectfully requests waiver, to the extent necessary, of the U.S. Table of Frequency Allocations for several of the frequency bands requested above. The Commission may waive any of its rules if there is “good cause” to do so.²² Waiver is appropriate where “special circumstances warrant a deviation from the general rule and such deviation will serve the public interest” better than strict adherence to the rule.²³ Generally, the Commission will grant a waiver of its rules if the relief requested would not undermine the policy objective of the rule in question and would otherwise serve the public interest.²⁴ The Commission may also consider potential hardship or policy implementation factors as part of its review.²⁵ Here, waiver would serve the public interest by enabling Amazon to better serve its customers’ needs without increasing the risk of harmful interference. Specific frequency bands are set forth below.

1. 18.6 – 18.8 GHz

The 18.6 – 18.8 GHz band is allocated internationally in all three International Telecommunication Union (“ITU”) regions for FSS on a co-primary basis; domestically, nonfederal use is currently limited to geostationary satellites (“GSOs”).²⁶ The flexible design of the Gen 2 Kuiper System and the Polar Kuiper System enables coexistence with co-frequency NGSO and GSO operations. The Kuiper Systems are equipped in multiple ways to mitigate interference, both proactively and reactively, including to systems operating in the Earth

²² See 47 C.F.R. § 1.3; *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164 (D.C. Cir. 1990); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

²³ *Northeast Cellular*, 897 F.2d at 1166.

²⁴ *WAIT Radio*, 418 F.2d at 1157.

²⁵ *Id.* at 1159.

²⁶ See 47 C.F.R. § 2.106 n.NG164.

Exploration Satellite Service (“EESS”) and the Space Research Service (“SRS”). Amazon will coordinate with other operational systems authorized in the 18.6 – 18.8 GHz band inside the United States. Until such agreements are reached, Amazon agrees to operate on a non-interference, non-protection basis in the 18.6 – 18.8 GHz band inside the United States.

2. 19.4 – 19.6 GHz

The 19.4 – 19.6 GHz band is allocated internationally in all three ITU regions for FSS on a co-primary basis; domestically, nonfederal use of the band by FSS is limited to feeder links for NGSO MSS systems.²⁷ Amazon recognizes that other operators are currently licensed and operating MSS feeder links in the band. Amazon seeks use of the band for FSS operations that are not limited to feeder links; Amazon’s links will employ a combination of site diversity and angular avoidance of inline interference events to ensure protection of incumbent gateway links.²⁸

3. 20.2 – 21.2 GHz and 30.0 – 31.0 GHz.

The 20.2 – 21.2 GHz and 30.0 – 31.0 GHz bands are allocated internationally in all three ITU regions for FSS and MSS on a co-primary basis; domestically, the band is limited to federal use.²⁹ Amazon seeks to operate in this band internationally in accordance with the International Table. Amazon also seeks to operate in the band domestically to the extent that it successfully coordinates with federal users. Such coordination would ensure that any Amazon operations in the band would not cause harmful interference to federal operations while at the same time allowing Amazon to make further use of frequency diversity to address potential interference and coordination issues.

²⁷ *Id.* n. NG166.

²⁸ *See Gen 1 Kuiper System Authorization* ¶ 25.

²⁹ *See* 47 C.F.R. § 2.106.

4. 51.4 – 52.4 GHz

The 51.4 – 52.4 GHz is allocated internationally in all three ITU regions for FSS on a co-primary basis and is currently limited to GSO use; domestically, the band is allocated for Fixed Service and Mobile Service.³⁰ However, the United States’ World Radiocommunication Conference (“WRC”) Advisory Committee has recommended that the United States support WRC-27 Agenda Item 1.3, which would consider studies to use the band for NGSO FSS operations with gateway earth stations.³¹ Waiver would be consistent with this position. The Kuiper Systems have operational flexibility to both proactively and reactively mitigate harmful interference to other co-frequency systems operating in all V-band uplink frequency bands, including the 51.4 – 52.4 GHz band. Amazon will coordinate with other operational systems authorized to operate in the 51.4 – 52.4 GHz band inside the United States. Until such agreements are reached, Amazon agrees to operate on a non-interference, non-protection basis in the 51.4 – 52.4 GHz band inside the United States.

C. Good Cause Exists for Amazon’s Requested Waivers of the Processing Round Rules.

Amazon also requests waiver of the NGSO processing round framework under Section 25.157(c) for its requests for use of the 18.6-18.8 GHz, 19.4-19.6 GHz, 20.2-21.2 GHz, 30.0-31.0 GHz, and 51.4-52.4 GHz bands.³² Because Amazon’s operations in these bands would be non-conforming uses, Amazon requests such use on a non-interference basis.³³ Consistent with

³⁰ See *id.* n.5.555C.

³¹ See *Office of International Affairs Seeks Comment on Recommendations Approved by the World Radiocommunication Conference Advisory Committee*, Public Notice, OIA Docket No. 24-30, DA 24-774, Attachment A (rel. Aug. 6, 2024).

³² 47 C.F.R. § 25.157(c).

³³ See, e.g., *Fugro-Chance, Inc.*, Order and Authorization, 10 FCC Rcd 2860 (1995) (“We have, however, permitted non-conforming uses when there is little potential for interference into any

Commission precedent, use of these bands would not preclude additional entry into the bands, and no processing round is needed.³⁴

D. Waiver of the Commission’s Processing Round Framework for Amazon’s Use of the 17 GHz Band Would Serve the Public Interest.

In addition to waiving the processing round framework under Section 25.157(c) of its rules for the requested non-conforming uses, Amazon asks that the Commission waive the framework for Amazon’s requested operations in the 17 GHz Band. The allocations in this band have been recently revised to allow NGSO operations as part of the co-primary FSS allocation, and in doing so, the Commission found that “NGSO FSS can share the 17 GHz band in an efficient and effective manner with GSO FSS, broadcasting-satellite service (BSS), and incumbent terrestrial fixed service without causing harmful interference.”³⁵ The Commission further stated that this allocation “provides a contiguous 1300 MHz of spectrum for NGSO FSS downlink operations, allowing for technologically innovative and enhanced satellite services to the benefit of American consumers.”³⁶

To most effectively realize these benefits, the Commission should waive its processing round framework for the 17 GHz Band, a framework which is designed to “prevent one applicant from unreasonably precluding additional entry by other operators in the requested frequency band.”³⁷ Indeed, the Commission has waived the processing round requirements where the

service authorized under the Table of Frequency allocations and when the non-conforming operator accepts any interference from authorized services.”).

³⁴ See, e.g., *Myriota Pty. Ltd.*, Order and Declaratory Ruling, 35 FCC Rcd 5475 ¶ 3 (IB 2020) (“The purpose of the processing round procedure is to prevent one applicant from unreasonably precluding additional entry by other operators in the requested frequency band.”).

³⁵ See *17 GHz Order* ¶ 1.

³⁶ *Id.*

³⁷ *Myriota Pty. Ltd.*, Order and Declaratory Ruling, 35 FCC Rcd 5475 ¶ 3 (IB 2020).

operations “would not create new spectrum conflicts with other operators and . . . it was more efficient to authorize the requested operations with conditions than to initiate a processing round for those frequencies.”³⁸ Here, only one other NGSO FSS operator has requested access to the 17 GHz Band since the allocation was added.³⁹ By processing these existing applications rather than commencing a lengthy processing round, the Commission will increase efficiency, expedite the provision of additional benefits to American consumers, and serve the public interest.

V. FLEXIBLE USE OF FREQUENCIES.

To maximize the spectral efficiency of its systems, Amazon requests authorization to make flexible use of its authorized frequencies as well as the frequencies requested herein.⁴⁰ Amazon requests such flexibility in two primary ways: by retaining the ability to provide both FSS and MSS services in the frequency bands where both services have allocations, and by requesting to use all frequencies for communications with both gateway earth stations and other earth stations. In both cases, such flexibility will allow Amazon to provide more adaptable and efficient services to its customers without increasing the risk of harmful interference.

Amazon requests the authority to provide both FSS and MSS services in the following bands: (1) 19.7-21.2 GHz (space-to-Earth) and 29.5-31.0 GHz (Earth-to-space) on the Gen 2 Kuiper System and Polar Kuiper System; and (2) 40-40.5 GHz (space-to-Earth) and 50.4-51.4

³⁸ *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 39 FCC Rcd 2159 ¶ 11 (SB/WTB/OET 2024) (“*SpaceX E-band Grant*”).

³⁹ See *Space Exploration Holdings, LLC, Amendment of Application for the SpaceX Gen2 NGSO Satellite System*, ICFS File No. SAT-AMD-20241017-00028 (filed Oct. 17, 2024). See also *SpaceX E-band Grant* ¶ 13 (noting that “only one other satellite operator . . . has requested authority to operate in the [requested band]”).

⁴⁰ As described in further detail in the technical appendices attached hereto, Amazon also requests the flexibility to use variable channel sizes other than the simple set specified in the Schedule S Attachment.

GHz (Earth-to-space) for all three Kuiper Systems. FSS and MSS operations in the identified bands will share the same technical characteristics and the requested flexibility will therefore not have deleterious effects on other operators. The Commission authorized such flexible use in the 19.7-20.2 GHz and 29.5-30.0 GHz bands for the Gen 1 Kuiper System, and such flexible use would serve the public interest in the instant case for the same reasons.⁴¹ Additionally, Amazon requests authority to operate on all requested frequencies with both gateway earth stations and other classes of earth stations. As in the case of frequency flexibility, such operational flexibility will allow Amazon to serve its customers wherever and however users may need and support Amazon's mission to provide reliable high-speed broadband to its enterprise, consumer, and government customers.

VI. THE COMMISSION SHOULD WAIVE ITS PFD DOWNLINK LIMITS FOR AMAZON'S TT&C FREQUENCIES.

Amazon requests waiver of Section 25.146(a)(1) of the Commission's rules for its downlink for tracking, telemetry, and control ("TT&C") operations for the Gen 2 Kuiper System and the Polar Kuiper System. Section 25.146(a)(1) requires that an NGSO FSS applicant certify that it will comply with relevant power flux-density ("PFD") limits,⁴² and is designed to protect terrestrial services, earth exploration-satellite services (passive), and space research services

⁴¹ See *Gen 1 Kuiper System Authorization* ¶ 23 ("[G]iven the existing MSS allocations and the fact that Kuiper's proposed NGSO MSS operations have the same characteristics as those in an NGSO FSS system . . . we find it in the public interest to grant Kuiper authority to operate as an NGSO MSS system with conditions in this band and waive the Ka-band plan to the extent necessary. This action ensures the most efficient and effective sharing of spectrum while providing Kuiper the regulatory flexibility it seeks to provide both FSS and MSS.").

⁴² 47 C.F.R. § 25.146(a)(1).

(passive).⁴³ In adopting these limits, the Commission noted it would “rely on [its] waiver policy to address, on a case-by-case basis,” whether these limits should be modified for particular systems.⁴⁴ In this case, such waiver is justified. Amazon’s Kuiper Systems use a small proportion of their satellites for TT&C operations, and as such, the ITU methodology for calculating PFD does not accurately reflect the requested operations of the Gen 2 Kuiper System and the Polar Kuiper System using TT&C frequencies. Waiving this rule would therefore not subject any protected services to harmful interference.⁴⁵

VII. LIMITED WAIVER OF THE COMMISSION’S EPFD LIMIT RULES WILL ENHANCE AMAZON’S OPERATIONS IN THE U.S.

Sections 25.146(a)(2) and (c) of the Commission’s rules require an NGSO FSS applicant to: (1) certify that it will comply with any applicable EPFD limits in Article 22 and Resolution 76 of the ITU Radio Regulations; and (2) receive a “favorable” or “qualified favorable” finding by the ITU Radiocommunication Bureau with respect to such compliance prior to initiating service.⁴⁶ Amazon seeks limited waiver of these rules for its 17 GHz Band downlink operations for all three systems, as well as its Ka-band downlink operations for the Gen 2 Kuiper System and the Polar Kuiper System.

⁴³ See *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Notice of Proposed Rulemaking, 32 FCC Rcd 7809 ¶¶ 28-30 (2017).

⁴⁴ *Id.* ¶ 30.

⁴⁵ See, e.g., *Space Exploration Holdings, LLC, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 37 FCC Rcd 14882 ¶ 24 (2022) (waiving PFD limits because operator satisfied a license condition requiring “technical showing demonstrating that its operation will protect an FS station with the characteristics described in Recommendation ITU-R SF.1483”).

⁴⁶ 47 C.F.R. §§ 25.146(a)(2), (c).

As described in Section IV.B above, under Section 1.3 of the rules, the Commission has authority to waive its rules “for good cause shown.”⁴⁷ Here, the Commission has good cause to grant the requested waiver. As Amazon has described in its filings in other proceedings⁴⁸ and as SpaceX explains in its pending Petition for Rulemaking seeking to update these rules,⁴⁹ the ITU’s EPFD limits are decades old, overprotect GSO incumbents, and do not reflect current satellite technology. The United States has recognized as much in its international advocacy and standards work, acknowledging that “the ability to operate and provide services from today’s operational and planned non-GSO systems are *significantly penalized* when subjected to the [EPFD] limits based on the designs from the time period from before 2000.”⁵⁰ Fortunately, the ITU Radio Regulations also specify that EPFD limits “may be exceeded on the territory of any country whose administration has so agreed,”⁵¹ and therefore a waiver here would be fully consistent with the United States’ international obligations.

Given that current EPFD limits both overprotect GSOs *and* “significantly penalize[]” NGSO operations, Amazon requests a limited waiver of Section 25.146(a)(2) and (c) for, within the territory of the United States: (1) use of the 17 GHz Band for the Gen 1 Kuiper System; and (2) use of the Ka-bands, including the 17 GHz Band, for the Gen 2 Kuiper System and Polar Kuiper System.⁵² Amazon applies this waiver request to the Ka-band frequencies covered by the V-band

⁴⁷ *Id.* § 1.3; *WAT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

⁴⁸ See Comments of Kuiper Systems LLC, RM-11990 (filed Nov. 1, 2024); Reply Comments of Kuiper Systems LLC, RM-11990 (filed Nov. 18, 2024).

⁴⁹ Petition for Rulemaking of Space Exploration Holdings, LLC, RM-11990 (filed Aug. 9, 2024).

⁵⁰ United States of America, *Working Document Towards a Preliminary Draft New Report [Article 22 EPFD Limit Studies]*, Document 4A/84-E, at 4 (Apr. 19, 2024) (emphasis added).

⁵¹ ITU Radio Regs. § 22.5CA.

⁵² Amazon certifies that it will comply with the EPFD uplink and inter-satellite limits globally and with the EPFD downlink limits outside the United States, except to the extent other administrations

Application, as amended here. Such a waiver would serve the public interest by allowing Amazon to provide more efficient and better-quality service to U.S. customers, improving its ability to close the digital divide. Moreover, as demonstrated in the attached technical analyses, Amazon's proposed operations under the requested waiver will not cause harmful interference to GSO operations in the relevant frequency bands.

VIII. CONCLUSION

Based on the foregoing, Amazon respectfully requests that the Commission grant its request to amend the V-band Application to alter certain frequencies, revise orbital parameters to reduce the number of satellites, and waive certain of the Commission's PFD and EPFD limits. To provide for expeditious processing, Amazon does not object to the Commission processing its application for each generation NGSO system separately.

Respectfully submitted,

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have agreed to higher limits as allowed for under the ITU's Radio Regulations. To the extent such operations exceeding EPFD downlink limits outside the United States requires a waiver, Amazon requests such a waiver for the same reasons as enumerated herein.