Kuiper Systems LLC
Application for Special Temporary Authority
Narrative Statement

Pursuant to Sections 5.51, 5.54(a)(2), and 5.61 of the rules[1] of the Federal Communications Commission ("FCC" or "Commission"), Kuiper Systems LLC ("Amazon") hereby respectfully requests experimental special temporary authority to operate one satellite, KuiperSat-2, using Ka-band frequencies in non-geostationary orbit at an orbital altitude of 470 km for a period of six months.

In support of its request, Amazon provides the following information required by Section 5.61:

(1) Name, address, phone number (also email address and facsimile number, if available) of the applicant.

Stop Buzzer Contact   *FCC Contact*
KuiperSat Operations   Catherine Kuersten
Kuipersat-ops@amazon.com   ckuersten@amazon.com
703-691-5360

(2) Explanation of why an STA is needed.

Amazon currently holds experimental authority from the Commission to launch and operate two satellites, KuiperSat-1 and KuiperSat2, using Ka-band frequencies for testing and demonstration purposes (the "Experimental License, as modified").[2] The Commission also granted Amazon the authority to operate customer terminal units as well as telemetry, tracking, and control ("TT&C") and gateway earth stations to communicate with the satellites, and to provide launch and early orbit phase ("LEOP") services for the satellites,[3] as well as for special temporary authority for in-orbit testing during the deorbit process in partnership with Lincoln Labs at the Massachusetts Institute of Technology (the "MIT STA").[4]

Amazon now requests STA to operate the KuiperSat2 for six months at an intermediate orbital altitude during the deorbit process. In its original application, Amazon requested authority for a 590 km nominal orbital altitude with a +/- 9 km orbital tolerance, and noted that at the end of mission life, the KuiperSats would reduce perigee altitude to 350 km.[5] Amazon requests STA to

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[1] 47 C.F.R. §§ 5.51, 5.54(a)(2), 5.61.

[2] *See* ELS File No. 0956-EX-CN-2021, Call Sign WM2XKY (granted June 9, 2022) (the "June License"); ELS File No. 0234-EX-CM-2022, Call Sign WM2XKY (granted Dec. 5, 2022); ELS File No. 0108-EX-CM-2023, Call Sign WM2XKY (granted Sept. 1, 2023) ("Second Modification"); ELS File No. 0187-EX-CR-2024, Call Sign WM2XKY (granted Mar. 11, 2024).

[3] *See id.*

[4] *See* ELS File No. 1148-EX-ST-2024 (granted July 1, 2024) ("MIT STA").

[5] *See* ELS File No. 0956-EX-CN-2021, Narrative, at 41-42 (filed Nov. 1, 2021). *See also* MIT STA, Narrative, at 2 (noting a current nominal altitude of 470 km). Amazon subsequently

pause its current deorbit maneuvers at its current nominal altitude of 470 km to perform further testing. Amazon announced in May 2024 that it was actively deorbiting the KuiperSats, and the Commission has already granted Amazon authority for the KuiperSats to continue testing at 470 km as part of the MIT STA.[6]

Any information not included in this Narrative and Appendices—including but not limited to operational frequencies, emissions, maximum power levels, and antenna designs—remains unchanged from the Experimental License, as modified.

Amazon seeks to commence testing as soon as possible, by October 25, 2024.

(3) Description of the operation to be conducted and its purpose.

Amazon proposes to operate the KuiperSat2 at 470 km in conjunction with the earth stations it has existing experimental authority to communicate with, in Brady, TX; McAllen, TX; and Kapolei, HI (taken together, the "Experimental System"). Testing of the KuiperSats is an important step toward Amazon's goal of delivering high-capacity, low-latency broadband communications services to tens of millions of unserved and underserved consumers and businesses through the deployment of Amazon's constellation licensed under Part 25 of the Commission's rules (the "Kuiper System"). Licensed by the Commission on July 30, 2020, the Kuiper System will comprise 3,232 satellites at altitudes of 590 km, 610 km, and 630 km.[7] Amazon's constellation will use frequencies in the Ka-band to provide Fixed-Satellite Services ("FSS") and Mobile-Satellite Services ("MSS") to customers globally.

Ultimately, expeditious testing of the KuiperSats will enable faster deployment of the Kuiper System, accelerating Amazon's efforts to close the digital divide in the United States and globally through the delivery of low-latency, high-speed broadband connectivity. It will also accelerate Amazon's efforts to bring connectivity to customers with the Kuiper System, enabling growth in local economies, improving access to government services, and supporting public safety and disaster relief communications.

(4) Time and dates of proposed operation.

Amazon requests special temporary authority for a 180-day period and seeks to commence testing October 20, 2024.

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sought modification to the authorization to include a 500 km injection altitude followed by orbit raising to 590 km. *See* ELS File No. 0234-EX-CM-2022 (filed Oct. 10, 2022).

[6] *See* MIT STA.

[7] *See* ICFS File No. SAT-LOA-20190704-00057 (granted July 30, 2020); ICFS File No. SAT-MOD-20211207-00186 (granted Feb. 8, 2023); ICFS File No. SAT-MOD-20230228-00043 (granted Mar. 8, 2024); ICFS File No. SAT-AMD-20230613-00140 (granted Mar. 8, 2024); ICFS File No. SAT-MOD-20230201-00013 (granted Apr. 5, 2024); ICFS File No. SAT-MOD-20210806-00095 (granted Apr. 22, 2024); ICFS File No. SAT-AMD-20230329-00067 (granted Apr. 22, 2024).

(5) Description of the location(s) and, if applicable, geographical coordinates of the proposed operation.

Amazon proposes to operate the KuiperSats at 470 km in non-geostationary orbit together with earth stations in Brady, TX (31°1'20" N, 99°13'8" W); McAllen, TX (26°9'9" N, 98°16'39" W); and Kapolei, HI (21°20'10" N, 158°5'20" W), consistent with Experimental License, as modified. In Brady, Texas, Amazon will operate four customer terminals, which will operate as portable terminals from fixed locations within a 200 km radius from the geographic center point;[8] a single, 2.4-meter gateway Earth station antenna;[9] and one 2.4-meter TT&C Earth station antenna.[10] In McAllen, Texas, Amazon will operate four customer terminals, which will operate as portable terminals from fixed locations within a 200 km radius from the geographic center point. In Kapolei, Hawaii, Amazon will operate one TT&C earth station.

Amazon will also continue to communicate with international TT&C earth stations located in Mauritius.[11]

(6) Equipment to be used, including name of manufacturer, model and number of units.

Manufacturer	Model Number	Number of units
Amazon	n/a (CT 1 ES)	4
Amazon	n/a (CT 2 ES)	4
Cobham	Tracker 2400	3
Amazon	n/a (SC GW)	6
Amazon	n/a (SC User 1)	2
Amazon	n/a (SC User 2)	2
Amazon	n/a (SC TTC)	6
Near Space Launch	n/a (SC L-Band)	2

(7) Experimental frequencies, emissions and power characteristics

Space-to-Earth Frequency Use							
Operational Use	Frequency Range (GHz)	Output Power (W)	ERP (W)	Mean/ Peak	Frequency Tolerance (%)	Emission Designator	Modulating Signal
User Links	17.8-18.2	1.9	9179.91	Peak	0.002	100MD7W	OFDM

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[8] Elevation angles for connectivity between the KuiperSats and customer terminals will be greater than or equal to 35 degrees.

[9] Elevation angles for connectivity between the KuiperSats and the gateway Earth station will be greater than or equal to 20 degrees.

[10] Elevation angles for connectivity between the KuiperSats and the TT&C Earth station will be greater than or equal to 5 degrees.

[11] *See* Second Modification.

Operational Use	Frequency Range (GHz)	Output Power (W)	ERP (W)	Mean/Peak	Frequency Tolerance (%)	Emission Designator	Modulating Signal
	18.2-18.6	1.9	9179.91	Mean	0.002	100MD7W	OFDM
Gateway Links	19.6-20.1	2.0	2432.37	Mean	0.002	480MD7W	SC-OFDM
TT&C Link	19.3-19.4	2.82	6.1	Mean	0.002	2M50D7W	SC-OFDM
TT&C Beacon (LEOP and Backup)	19.3-19.4	2.82	6.1	Mean	0.002	1K00N0N	None

Earth-to-Space Frequency Use

Operational Use	Frequency Range (GHz)	Output Power (W)	ERP (W)	Mean/Peak	Frequency Tolerance (%)	Emission Designator	Modulating Signal
User Links	28.6-29.1	1.7	24572.48	Mean	0.001	16M0D7W	SC-OFDM
		5	6080.93	Mean	0.001	16M0D7W	SC-OFDM
Gateway Links	29.5-30.0	8.28	1037600.89	Peak	0.001	480MM7D	SC-OFDM
TT&C Link	27.5-27.6	18.4	2089554.9	Peak	0.001	2M50D7W	SC-OFDM

Space-to-Space Frequency Use

Operational Use	Frequency Range (GHz)	Output Power (W)	ERP (W)	Mean/Peak	Frequency Tolerance (%)	Emission Designator	Modulating Signal
Position Telemetry (LEOP and Backup)	1.615-1.6175	0.08	0.12	Mean	0.001	2M50G1D	BPSK

(8) Width of the beam in degrees at the half power point.

Antenna Type	Antenna/Beam Type	Manufacturer	Beamwidth (degrees)
Earth Station	Gateway	Cobham	0.3
Earth Station	TT&C	Cobham	0.3
Earth Station	Customer terminal #1	Amazon	1.2
Earth Station	Customer terminal #2	Amazon	3.3
Satellite	Gateway	Amazon	2.8
Satellite	User	Amazon	1.8
Satellite	TT&C	Amazon	102.0
Satellite	L-Band	NearSpace Launch	100.0

(9) Interference protection.

The Experimental System will comply with all applicable Commission rules and ITU Radio Regulations, including with respect to interference protection for co-frequency operators. As demonstrated in the attached Appendices, the difference in orbital parameters from the Experimental License, as modified, causes no increase to the interference environment.

First, as detailed in Appendix A to this Narrative, the Experimental System is designed to co-exist with terrestrial fixed service ("FS") operations. To prevent harmful interference to FS operations, the KuiperSat downlink emission levels will comply with all applicable FCC and ITU PFD limits.

Second, as detailed in Appendix B to this Narrative, the Experimental System is designed to protect geostationary ("GSO") FSS operations in compliance with all applicable limits in Article 22 of the ITU Radio Regulations.

Third, as set forth in Kuiper's initial application for the June License, the Experimental System will protect all authorized NGSO systems from harmful interference. The Experimental Kuiper System is designed to prevent harmful interference to other NGSO systems by limiting the number of in-line events that will occur. This STA does not increase the risk of harmful interference.

Fourth, the Experimental System is designed to prevent harmful interference to local co-frequency Upper Microwave Flexible Use Service ("UMFUS") systems. Amazon has identified local UMFUS licensees and has initiated coordination of its use of the band with them. Consistent with the June License, the design and operation of the Modified Experimental System makes the probability of harmful interference to local UMFUS systems very low. Because the RF parameters of the Experimental System, including associated ground antennas, remain unchanged, this modification does not increase the risk of harmful interference to UMFUS systems. In addition, as this modification proposes no changes to the uplink parameters, Amazon understands that no updated coordination report or UMFUS analysis is necessary.