

Kuiper Systems LLC

Application for Special Temporary Authority

Narrative Statement

Pursuant to Sections 5.51, 5.54(a)(1), and 5.61 of the rules¹ of the Federal Communications Commission (“Commission”), Kuiper Systems LLC, a wholly owned subsidiary of Amazon.com Services LLC (“Amazon.com” or “Amazon”), hereby respectfully requests Special Temporary Authority (“STA”) to operate in the 29.5-30.0 GHz band for a period of 2 months to conduct in-orbit transponder measurements within the permitted scope of services specified in Section 5.3 (e), (h), (j), and (k).² In support of its request, Amazon provides the following additional information required by Section 5.61:

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

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(2) Explanation of why an experimental license is needed.

In partnership with Lincoln Labs at the Massachusetts Institute of Technology (“Lincoln Labs”), Amazon seeks to conduct In-Orbit Tests (“IOT”) of its satellite transponders on its already authorized non-geostationary low-earth orbit (“LEO”) prototype satellites³ (the “Prototype Satellites”). Amazon seeks authorization to transmit a constant-power, variable bandwidth measurement signal or a continuous wave (“CW”) alignment signal from Lincoln Labs’ IOT earth station located in Boston, Massachusetts⁴ to the Prototype Satellites and downlink the same signal from the Prototype Satellites to the same location. Although the testing will be done in partnership with Lincoln Labs, Amazon will retain operational control and stop-buzzer authority. The measurements will form a vital part of Amazon’s Kuiper program to develop high-speed, innovative, satellite-delivered services to unserved and underserved customers worldwide. Accordingly, grant of the requested experimental authority would serve the public interest, convenience, and necessity.

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

Amazon proposes to transmit to and receive a test waveform from its Prototype Satellites in a transponder loopback test for the purpose of characterizing their transponders.

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

² *Id.* §§ 5.3(e), (h), (j)-(k).

³ See ELS File No. 0108-EX-CM-2023 (granted Sept. 1, 2023) (“Prototype Satellite Grant”).

⁴ See ICFS File No. SES-LIC-20180425-00410, Call Sign E180118 (granted July 3, 2018).

(4) Station and Equipment types and Emission Characteristics

The experiment will transmit test signals from the station location using equipment and signal characteristics specified in Table 1. Satellite beam pointing provides sufficient angular separation with Geostationary Orbit (“GSO”) earth stations such that the experiment complies with ITU Radio Regulations Article 22 Downlink Equivalent Power Flux Density (“EPFD↓”) limits.

The IOT Earth station transmit beam always points away from the GSO arc such that the experiment complies with Radio Regulations Article 22 Uplink EPFD (“EPFD↑”) limits. Amazon recognizes that experimental operations must not cause harmful interference to authorized facilities, and will maintain a 24/7 “stop-buzzer” contact to address any complaint of interference and cease operations.

Table 1. Transmitters’ location, equipment specifications, signal characteristics, and pointing direction.

Transmitter	IOT Earth Station ⁵	Prototype Satellite ⁶
Station type	Fixed	Mobile ⁷
Location (DMS)	42° 27' 29.0" N, 71° 15' 58.0" W	Circular LEO, inclination 30°
AMSL (m)	80	NA
Antenna diameter (m)	6.3	-
AGL (m)	14	Nominal altitude 470,000
Building Height (m)	16	NA
Equipment qty	1	2
Manufacturer	General Dynamics	Amazon
Model number	N/A (Custom system)	
EIRP (dBW/kW)	69 (7943)	36 (3.98)
Frequency (GHz)	29.5-30.0	19.6-20.1
Emission designator	50M0G7W, 500MG7W, 1H00N0N	
Modulation types	Phase modulation (BPSK/QPSK), Amplitude modulation (APSK), Continuous Wave (CW)	
Frequency tolerance (ppm)	±10	±10
Gain (dBi)	63.4 at 29.75 GHz	35 dBi at 19.8 GHz
3 dB Beamwidth (°)	0.11	2.8
Pointing azimuth/elevation (°)	0 - 360 / 5 - 10	Centered on IOT Earth station

The altitude if the Prototype Satellites license is 590 km and with a perigee altitude of 350 km towards the end of mission life⁸.

(5) Time and dates of proposed operation

Amazon seeks an STA for 2 months, commencing no later than June 30, 2024. The experiment will be carried out for short periods when a satellite is visible (typically 1 to maximally 4 contact passes a day) and will last for typically 2 to maximally 4 minutes for each contact pass.

⁵ Uplink transmissions.

⁶ Downlink transmissions.

⁷ Operational under ELS Call Sign WM2XKY.

⁸ Prototype Satellite Grant, *supra*.

(6) Radiofrequency (“RF”) exposure compliance

Amazon’s IOT antennas are located on private property on a rooftop with controlled access preventing any exposure risk to the general population. Occupational workers will be properly trained on how to limit their exposure levels. In addition, signs will be installed to provide information on exposure risks.