

Kuiper Systems LLC
Application for Special Temporary Authority
Narrative Statement

Pursuant to Sections 5.51, 5.54(a)(2), 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 for an experimental license to operate in the 19.19-19.29 GHz band for a period of six months to conduct testing of prototype antennas. 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 STA is needed.

Amazon seeks special temporary authority to evaluate the functionality and measure the performance of a prototype earth station antenna and a low power signal radiated from and pointed at the prototype earth station from an aerial drone. Amazon seeks to commence testing as soon as possible, by November 25, 2022. To help expedite processing, Amazon has selected a test frequency by searching the Universal Licensing System database for licensed transmitters (all categories) to mitigate interference concerns and thus minimize delays if coordination is required. Evaluation of the prototype earth station is part of Amazon’s 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 fly a drone (“Aerial Reference Station”), in compliance with applicable Federal Aviation Administration (“FAA”) regulations, at a maximum altitude of 400 feet above

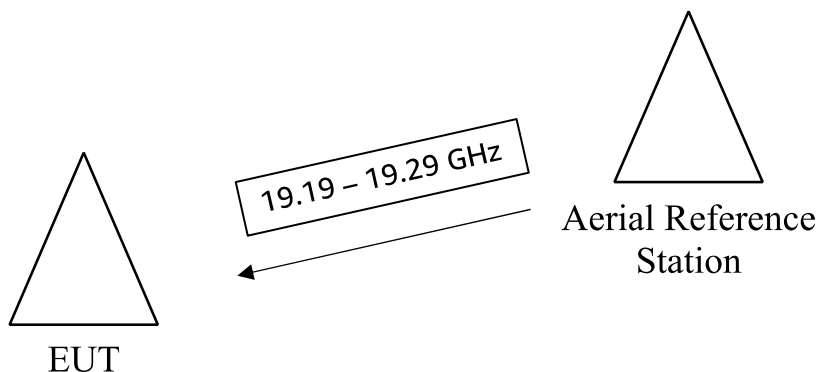
¹ 47 C.F.R. §§ 5.51, 5.54(a)(2), 5.61.

ground level (“AGL”), to measure antenna performance of a prototype earth station (“Equipment Under Test” or “EUT”).

All experimental operations will take place outdoors with coordinates listed in the table below.

Station	Coordinates	Mobile Radius
EUT	26° 9' 9" N, 98° 16' 40" W	N/A (Stationary)
Aerial Reference Station	26° 9' 9" N, 98° 16' 40" W	0.26 km

As indicated in the diagram below, Amazon’s testing will involve unidirectional transmissions from the Aerial Reference Station (transmitter) in the direction of the EUT (receiver).



The EUT will be operated in a receive-only capacity throughout the testing.

(4) Time and dates of proposed operation.

Amazon requests special temporary authority for a 180-day period and seeks to commence testing November 25, 2022. On the days of testing, Aerial Reference Station transmissions will occur sporadically during scheduled test events and will not continuously transmit.

(5) Class(es) of station (e.g., fixed, mobile, or both) and call sign of station (if applicable).

A mobile station will be used; there are no call signs associated with the station.

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

Amazon proposes to operate in Hidalgo County in Texas. The site falls within the coordinates specified in item (3), above.

Amazon recognizes that experimental operations must not cause harmful interference to authorized facilities, and, prior to commencing operations, Amazon will coordinate with any incumbent licensees as needed to ensure that Amazon’s operations do not interfere with authorized operations.

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

Aerial Reference Station Antenna:

Manufacturer	Model Number	Number of units
QuadSAT	Custom	1
Amazon	Custom	1

Aerial Reference Station Transmitter:

Manufacturer	Model Number	Number of units
QuadSAT	Custom	1
Amazon	Custom	1

(8) Frequency (or frequency bands) requested.

The requested frequency bands are summarized in the table directly below. See the diagram in item (3) for a visualization on inter-station connectivity with specific band usage.

Transmitting Station	Frequency Band(s)
Aerial Reference Station	19.19 – 19.29 GHz

(9) Minimum and maximum effective radiated power (ERP) or equivalent isotropically radiated power (EIRP).

Aerial Reference Station:

Frequency Band(s)	Minimum ERP (mW)	Minimum ERP (dBW)	Maximum ERP (mW)	Maximum ERP (dBW)
19.19 – 19.29 GHz	1.93	-27.15	193	-7.15

(10) Emission designator or describe emission (bandwidth, modulation, etc.).

Aerial Reference Station:

Frequency Band(s)	Emission Type/Designator	Frequency Stability
19.19 – 19.29 GHz	Continuous wave (0G00N0N)	10 ppm

(11) Overall height of antenna structure above the ground.

The height of the receive-only EUT will be 1.5 meters above ground. The height of the Aerial Reference Station antenna will range between 0 to 400 feet AGL, as described in (3) above.

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

Aerial Reference Station:

Antenna	Beam Width (degrees)
QuadSAT	Horizontal: 30.1 Vertical: 27.6
Amazon	Horizontal: 30.0 Vertical: 36.0

(13) Orientation in horizontal plane (degrees).

Because the transmitting station is mobile and may operate around the EUT at any azimuth, the transmitting antenna will consequently operate any azimuth angle. However, all radiated emissions from the transmitter will remain oriented toward the EUT at all possible Aerial Reference Station locations.

Antenna	Horizontal/Azimuth Range of Boresight Operation
QuadSAT	0° to 360°
Amazon	0° to 360°

(14) Orientation in vertical plane (degrees).

Because the transmitting station is mobile and may operate around the EUT at different heights, the vertical range of motion of the directional antenna will vary accordingly. However, as mentioned in (13) above, all radiated emissions from the Aerial Reference Station will remain oriented toward the EUT.

Antenna	Vertical/Elevation Range of Boresight Operation
QuadSAT	-90° to 0° (nadir to horizon)
Amazon	-90° to 0° (nadir to horizon)

(15) Radiofrequency (“RF”) exposure compliance

The Commission’s rules for RF exposure “reflect the best available information concerning safe levels of RF exposure for workers and members of the general public” and “specify methods that RF equipment operators can use to mitigate the risk of excess exposure.”² Amazon will comply with these RF exposure guidelines with respect to all antennas operated during testing, for uncontrolled (general population) and controlled (occupational) environments, as specified by Section 1.1310 of the Commission’s rules. The testing will occur in a sparsely populated area, with the launch site restricted only to authorized personnel. Transmissions will not occur in

² *Proposed Changes in the Commission’s Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*, 34 FCC Rcd 11687, paras. 2-3 (2019).

proximity to the general population. All personnel operating and maintaining the equipment will be trained on proper handling of the equipment to mitigate radiofrequency exposure. Furthermore, during testing, all transmissions will be actively controlled by Amazon personnel, who will be able to cease transmissions at any time.