Exhibit A
Technical Annex

1. Introduction

This application requests authority for Viasat, Inc. to operate six types of mobile earth station antennas (the "Terminals") in the mobile-satellite services ("MSS"). As discussed in the legal narrative, the Terminals would communicate with geostationary orbit ("GSO") satellites on the ISAT List, including INMARSAT 4F3 and INMARSAT 3F5, and SkyTerra-1 satellite in the 1525-1559 MHz and 1626.5-1660.5 MHz band segments ("1.5/1.6 GHz" band). The Terminals are low-power narrowband devices that would operate under the specifications for Internet of Things ("IoT") on non-terrestrial networks ("NTN").

2. The Terminals

The Terminals include six different antenna types. Three antennas (NTN-Patch-1, NTN-Patch-2, NTN-PEANLP-1) are associated with specific manufacturers and models described in Schedule B and are currently available in the market. The other three antennas (NTN-Class-1, NTN-Class-2, and NTN-Class-3) reflect the operational parameters that classes of additional antennas would be designed to meet. Multiple models and manufacturers would fall into each such class, and no specific models or manufacturers are associated with these classes at present. Any specific antennas operated under any such "class" type would fall within the associated technical envelope as described in this application.[1]

3. Technical Parameters of Operations

The Terminals' emissions would be compliant with the 3rd Generation Partnership Project ("3GPP") Release 17 Narrowband Internet of Things Non-Terrestrial Network ("NB-IoT NTN") standard for satellite IoT access. The Terminals would transmit in the 1626.5-1660.5 MHz band and receive in the 1525-1559 MHz band. These frequency bands are designated as band n255 in the 3GPP specification.[2]

The emissions' physical layer parameters outlined in ETSI TS 136.211 Release 17 define the NB-IoT NTN Narrowband Physical Uplink Shared Channel ("NPUSCH") as a single-tone carrier with 3.75 kHz sub-carrier spacing using a π/2 Binary Phase Shift Keying ("π/2BPSK") modulation (375KG1D). The same 3GPP standard also defines the channel structures, timing advance, and Doppler pre-compensation adaptations required for GSO satellite links.

NB-IoT NTN uplink emissions are controlled by the network scheduler. The Terminals are not capable of initiating uplink transmissions under NPUSCH without a receive signal from the network. In this way, all transmissions are controlled by the network, whether under a scheduling scheme or under a cease transmission command.

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[1] The Commission has previously licensed MSS terminals using such a "class"-based authorization approach. *See*, *e.g.*, Skylo Technologies, Inc, Call Sign E210107, ICFS File No. SES-MFS-20230901-02046 (granted May 16, 2024) (authorizing the operation of MSS mobile earth station antennas on a blanket basis without specifying manufacturer and model number); GUSA Licensee LLC, Call Sign E970381, ICFS File No. SES-RWL-20240822-01846 (granted Dec. 2, 2024) (same).

[2] *See* ETSI TS 138.101-5.

The maximum input power to any of the Terminals operating on the network under this standard is defined under the user equipment ("UE") power class 3 standard, 23 dBm.[3] The maximum EIRP for each antenna type included in Schedule B is shown in the table below.

Antenna	Maximum Input Power (dBm)	Maximum Gain (dBi)	Radiation Pattern	Maximum EIRP
NTN-Patch-1	23.0	4.5	Hemispherical	27.5 dBm, -2.5 dBW
NTN-Patch-2	23.0	4.0	Hemispherical	27.0 dBm, -3.0 dBW
NTN-PEANLP-1	23.0	11.0	Directional 50° Beamwidth	34.0 dBm, 4.0 dBW
NTN-Class-1	23.0	0 - 5	Hemispherical	28.0 dBm, -2.0 dBW
NTN-Class-2	23.0	5 - 10	Beamwidth 70° - 120°	33.0 dBm, 3.0 dBW
NTN-Class-3	23.0	10 - 15	Beamwidth 30° - 70°	38.0 dBm, 8.0 dBW

The NB-IoT NTN Narrowband Physical Downlink Shared Channel ("NPDSCH") specified in n ETSI TS 136 211 V17.1.0 is a 15 kHz carrier (15K0G1D) using quadrature-phase shift keying ("QPSK") or Quadrature Amplitude Modulation ("QAM"), specifically 16QAM.

4. Compliance with Part 25 Technical Rules

The Terminals would be operated in a way that conforms to the relevant parts of Part 25 of the Commission's rules, including Sections 25.287 and 25.216 for MSS operations in the 1.5/1.6 GHz band, and the out-of-band emissions requirements in Section 25.202(f).[4] In addition, all operations will comply with existing and any future coordination agreements for operations in the 1.5/1.6 GHz band.

4.1. Compliance with requirements pertaining to operations of mobile stations in 1.5/1.6 GHz band (47 C.F.R. §§ 25.115(d), 25.287)

The Terminals would operate across the 1.5/1.6 GHz band and have been designed to comply with the specifications of Section 25.287 of the Commission's rules to provide priority and preemptive access to maritime distress and safety communications. The table below details compliance with applicable sections of the rule.

[3] *Id.*

[4] 47 C.F.R. §§ 25.287, 25.216, 25.202(f). The Terminals would also comply with analogous rules in the Commission's recently adopted Part 100 once those rules go into effect.

47 C.F.R. § 25.287	Compliance	Description
(a)(1)	Yes	Viasat's satellite network assigns a priority to the Terminals which gives precedence to maritime distress and safety communications.
(a)(2)	N/A	The Terminals will not be used for GMDSS.
(a)(3)	Yes	Each Terminal is assigned a unique identification number that will be transmitted upon any attempt to gain access to the system.
(a)(4)	Yes	Each Terminal, once connected to the system, will be under the control of a land earth station which limits access and assigns channels.
(a)(5)	Yes	Each Terminal will continuously monitor a separate signaling channel or signaling within the communications channel.[5]
(a)(6)	Yes	Each Terminal will automatically inhibit its transmissions if it is not correctly receiving separate signaling channel or signaling within the communications channel from its associated land earth station.
(a)(7)	Yes	Each Terminal will automatically inhibit its transmissions on any or all channels upon receiving a channel-shut-off command on a signaling or communications channel it is receiving from its associated land earth station.
(a)(8)	N/A	The Terminals will not be used for GMDSS.
(b)(1)	Yes	Viasat's satellite network assigns a priority to land earth station transmissions which gives precedence to maritime distress and safety communications.
(b)(2)	Yes	Land earth stations in Viasat's satellite network recognize the priority of calls to and from the Terminals and make channel assignments that give precedence to maritime distress and safety communications.
(b)(3)	Yes	The land earth station will be capable of receiving the Terminal identification number when transmitted and verifying that it is an authorized user of the system to prohibit unauthorized access.
(b)(4)	Yes	The land earth station will be capable of transmitting channel assignment commands to the Terminals.
(b)(5)	N/A	Signals are continuously monitored while device is in wake mode.
(b)(6)	N/A	Signals are continuously monitored while device is in wake mode.

[5] The NB-IoT NTN protocol supports power saving modes where the Terminals "sleep" and "wake" during scheduled paging windows or when timers for tracking the terminals expire. The signaling channel is continuously monitored while the Terminals are in any such "wake" modes.

(b)(7)	Yes	The land earth station will automatically inhibit transmissions to a Terminal to which it is not transmitting in a signaling channel or signaling within the communications channel.
(b)(8)	Yes	The land earth station will be capable of transmitting channel-shut-off commands to Terminals on signaling or communications channels.
(b)(9)	N/A	The Terminals will not be used for GMDSS.
(b)(10)	N/A	The Terminals will not be used for GMDSS.

4.2. Compliance with limits on emissions for protection of aeronautical radionavigation-satellite services (47 C.F.R. § 25.216)

The Terminals would operate in accordance with the limits on emissions for protection of aeronautical radionavigation-satellite services in applicable portions of Section 25.216 of the Commission's rules.

47 C.F.R. § 25.216	Compliance	Description
(a)	N/A	Only applies to terminals in service prior to 2002.
(b)	N/A	Only applies to terminals in service prior to 2002.
(c)	Yes	The EIRP density of emissions from Terminal uplinks will not exceed −70 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The EIRP of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed −80 dBW, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band.
(d)	N/A	Only applies to terminals in service prior to 2002.
(e)	N/A	Only applies to frequency bands not requested in this application
(f)	Yes	The power density of emissions from Terminal uplinks will be suppressed to an extent determined by linear interpolation from −70 dBW/MHz at 1605 MHz to −10 dBW/MHz at 1610 MHz.
(g)	N/A	Only applies to frequency bands not requested in this application
(h)	Yes	The power density of emissions from Terminal uplinks will be suppressed to an extent determined by linear interpolation from −70 dBW/MHz at 1605 MHz to −46 dBW/MHz at 1610 MHz, averaged over any 2 millisecond active transmission interval. The EIRP of discrete emissions of less than 700 Hz bandwidth from such stations will not exceed a level determined by linear interpolation from −80 dBW at 1605 MHz to −56 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.
(i)	Yes	The EIRP density of carrier-off state emissions from the Terminal uplinks shall not exceed −80 dBW/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.
(j)	Yes	A Root-Mean-Square detector will be used for all power density measurements.