Engineering Statement

1 Introduction

Intelsat License LLC, as debtor in possession ("Intelsat"), seeks authority in this application to launch and operate the Intelsat 85 satellite at the 85.0° W.L orbital location. The characteristics of the satellite, as well as its compliance with the various provisions of Part 25 of the Federal Communications Commission's ("FCC" or "Commission") rules,[1] are provided in the remainder of this Engineering Statement.

2 Spacecraft Overview

Intelsat 85 will have the capability to operate in the frequencies listed in the table below.

Direction	Frequency
Uplink	14000-14500 MHz
	28400-28600 MHz
	29500-30000 MHz
Downlink	11700-12200 MHz
	18600-18800 MHz
	19700-20200 MHz

The spacecraft will provide the following coverage:

Frequency Band	Beam	Coverage
Ku-Band	Steerable	Contiguous United States; Central America; and Caribbean
Ka-Band	Steerable	Contiguous United States; Central America; and Caribbean

2.1 Spacecraft Characteristics

Intelsat has not selected a satellite manufacturer for Intelsat 85. When a manufacturer is selected Intelsat will provide any required additional information to the Commission.

Intelsat 85 satellite will be composed of the following subsystems:

- Thermal;

[1] Unless otherwise stated, all references to rule sections in this document refer to sections in Title 47 of the Code of Federal Regulations.

- Power;
- Attitude Control;
- Propulsion;
- Telemetry, Command and Ranging ("TC&R");
- Uplink Power Control ("ULPC"); and
- Communications.

These subsystems will maintain the correct position and attitude of the spacecraft; ensure that all internal units are maintained within the required temperature range; and ensure that the spacecraft can be commanded and controlled with a high level of reliability from launch to the end of its useful life. Additionally, the spacecraft design will incorporate redundancy for all the various subsystems in order to avoid single-point failures.

The structural design of Intelsat 85 will provide mechanical support for all subsystems. The structure will support the communication antennas, solar arrays, and thrusters. It will also provide a stable platform for preserving the alignment of critical elements of the spacecraft.

2.2 Communication Subsystem

The Intelsat 85 will utilize active communication channels at Ku-band and Ka-band frequencies. Exhibits 1 and 2 provides the beam parameters for the Ku- and Ka-band uplink and downlink beams, respectively, and Exhibit 3 provides the Schedule S beam designations. The Ku- and Ka-band frequencies, polarization, channel plans, coverage contours, and performance characteristics are provided in the Schedule S.

2.3 Telemetry, Command, and Ranging Subsystem

The TC&R subsystem will provide the following functions:

1) acquisition, processing and transmission of spacecraft telemetry data;
2) reception and retransmission of ground station generated ranging signals; and
3) reception, processing and distribution of telecommands.

Consistent with Section 25.202(g), the Intelsat 85 satellite will operate its TC&R signals in frequencies within the uplink and downlink Ku- or Ka-band spectrum. Intelsat will update the Commission once it has selected the TC&R frequencies for Intelsat 85. Since the TC&R frequencies have not yet been identified, the TC&R information is omitted from the Schedule S.

2.3.1 TC&R Control Earth Stations

Intelsat will be able to conduct TC&R operations through earth stations at one or more of the following teleports: Napa, California; Hagerstown, Maryland; Fillmore, California; Riverside, California; Castle Rock, Colorado; Brewster, Washington; Andover, Maine; and Ellenwood, Georgia. Additionally, Intelsat will be capable of remotely controlling Intelsat 85 from its facilities in McLean, Virginia and Long Beach, California.

2.4 Uplink Power Control Subsystem

The ULPC subsystem for Intelsat 85 has not been finalized. However, Intelsat's current plans for Intelsat 85 include ULPC beams with gain contours that vary by less than 8 dB across the

surface of the Earth, and accordingly the gain at 8 dB below the peak falls beyond the edge of the Earth. Therefore, consistent with Section 25.114(c)(4)(vi)(A), the associated GXT files have not been included in Schedule S. Once finalized, Intelsat will provide a summary of the Intelsat 85 ULPC subsystem performance, and if necessary, any associated GXT files.

2.5 Satellite Station-Keeping

The satellite will be maintained within 0.05° of its nominal longitudinal position in the east-west direction in compliance with Section 25.210(j).

The attitude of the spacecraft will be maintained with accuracy consistent with the achievement of the specified communications performance, after taking into account all error sources (i.e., attitude perturbations, thermal distortions, misalignments, orbital tolerances, and thruster perturbations, etc.).

3 Services

Intelsat 85 will be a general-purpose communications satellite and will be designed to support various services offered within the Intelsat satellite system. The transponders on Intelsat 85 will be able provide a range of communications services, including compressed digital video, high speed digital data, and digital single channel per carrier data channels.

4 Power Flux Density

The power flux density limits for space stations operating in the Ku- and Ka-bands are specified in Section 25.208. As shown in Schedule S, the Intelsat 85 transmissions do not exceed these limits.

5 Emission Compliance

Section 25.202(e) requires that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency. The Intelsat 85 design will be compliant with this rule.

Intelsat 85's emissions will comply with the provisions of Section 25.202(f).

6 Orbital Location

Intelsat requests that Intelsat 85 be assigned the 85.0° W.L. orbital location.

7 Coordination Statement and Certifications

The downlink effective isotropic radiated power ("EIRP") density of the satellite's transmissions in the conventional Ku-band will not exceed 14 dBW/4kHz for digital transmissions or 17 dBW/4kHz for analog transmissions. In Ka-band, Intelsat 85 will not generate a power flux density level at the Earth's surface in excess of −118 dBW/m^2/MHz.

The associated uplink transmissions will not exceed the applicable EIRP density envelope in Section 25.218 unless the non-routine uplink and/or downlink operation is coordinated with operators of authorized co-frequency space stations at assigned locations within six degrees of Intelsat 85 at 85.0° W.L.

8 Orbital Debris Mitigation Plan

Intelsat is proactive in ensuring safe operation and disposal of this and all spacecraft under its control. The four elements of debris mitigation are addressed below.

8.1 Spacecraft Hardware Design

Intelsat 85 will be designed such that no debris will be released during normal operations. Intelsat will assess the probability of collision with meteoroids and small debris. In order to limit the effects of such unlikely collisions critical satellite components will be located inside the protective body of the satellite and are properly shielded. The satellite will not use any subsystems for end-of-life disposal that are not used for normal operations.

8.2 Minimizing Accidental Explosions

Intelsat will assess the probability of accidental explosions during and after completion of mission operations. The satellite will be designed in a manner to minimize the potential for such explosions. Propellant tanks and thrusters will be isolated using redundant valves and electrical power systems are shielded in accordance with standard industry practices. At the completion of the mission and upon disposal of the spacecraft, Intelsat will ensure the removal of all stored energy on the spacecraft by depleting all propellant tanks, venting all pressurized systems and by leaving the batteries in a permanent discharge state.

8.3 Safe Flight Profiles

Intelsat will assess and limit the probability of the space station becoming a source of debris as a result of collisions with large debris or other operational space stations.

Intelsat is not aware of any other FCC licensed system, or any other system applied for and under consideration by the FCC, having an overlapping station-keeping volume with Intelsat 85. Intelsat is also not aware of any system with an overlapping station-keeping volume with the satellite that is the subject of an International Telecommunications Union filing and that is either in orbit or progressing towards launch.

8.4 Post Mission Disposal

At the end of the mission, Intelsat will dispose of the spacecraft by moving it to an altitude that meets the Inter-Agency Space Debris Coordination Committee minimum perigee disposal altitude. Intelsat will inform the Commission of the altitude and show compliance with its rules after a satellite manufacturer has been selected and the relevant parts of the design have finalized.

Certification Statement

I hereby certify that I am a technically qualified person and am familiar with Part 25 of the Commission's rules. The contents of this engineering statement were prepared by me or under my direct supervision and to the best of my knowledge are complete and accurate.

/s/ Giselle Creeser	7 December 2021
Giselle Creeser Intelsat US LLC Director, Spectrum Policy and Engineering *on behalf of Intelsat License LLC*	Date

EXHIBIT 1

COMMUNICATION SUBSYSTEM UPLINK BEAM PARAMETERS

Beam Name	Ka-band	Ka-band	Ka-band	Ka-band
Schedule S Beam ID	KARU	KALU	K1RU	K1LU
Frequency Band (MHz)	28400-28600	28400-28600	29500-30000	29500-30000
Polarization	RCHP	LHCP	RCHP	LHCP
G/T (dB/K)	20	20	20	20
Minimum SFD-- (dBW/m^2)	-101	-101	-101	-101
Maximum SFD-- (dBW/m^2)	-74	-74	-74	-74

Beam Name	Ku-band	Ku-band
Schedule S Beam ID	KUHU	KUVU
Frequency Band (MHz)	14000-14500	14000-14500
Polarization	Horizontal	Vertical
G/T (dB/K)	15.92	15.92
Minimum SFD-- (dBW/m^2)	-105	-105
Maximum SFD-- (dBW/m^2)	-85	-85

EXHIBIT 2

COMMUNICATION SUBSYSTEM DOWNLINK BEAM PARAMETERS

Beam Name	Ka-band	Ka-band	Ka-band	Ka-band
Schedule S Beam ID	KALD	KARD	K1LD	K1RD
Frequency Band (MHz)	18600-18800	18600-18800	19700-30000	19700-30000
Polarization	LHCP	RCHP	LHCP	RCHP
Maximum Beam Peak EIRP (dBW)	60.5	60.5	60.5	60.5
Maximum Beam Peak EIRP Density (dBW/4kHz)	16.5	16.5	16.5	16.5
Maximum Beam Peak EIRP Density (dBW/Hz)	-19.5	-19.5	-19.5	-19.5

Beam Name	Ku-band	Ku-band
Schedule S Beam ID	KUHD	KUVD
Frequency Band (MHz)	11700-12200	11700-12200
Polarization	Horizontal	Vertical
Maximum Beam Peak EIRP (dBW)	60.8	60.8
Maximum Beam Peak EIRP Density (dBW/4kHz)	16.5	16.5
Maximum Beam Peak EIRP Density (dBW/Hz)	-19.5	-19.5

Exhibit 3
BEAM POLARIZATIONS AND GXT FILE NAMES

	Schedule S Beam Names							
	Linear Polarization				Circular Polarization			
Beam Designation	**Uplink**	**Uplink**	**Downlink**	**Downlink**	**Uplink**	**Uplink**	**Downlink**	**Downlink**
	(H-Pol.)	**(V-Pol.)**	**(H-Pol.)**	**(V-Pol.)**	**(LHCP)**	**(RHCP)**	**(LHCP)**	**(RHCP)**
Ku- band Beams								
Ku-band	KUHU	KUVU	KUHD	KUVD	----	----	----	----
Ka-band Beams								
Ka-band	----	----	----	----	KALU K1LU	KARU K1RU	KALD K1LD	KARD K1RD