Engineering Statement

1 Introduction

Intelsat License LLC ("Intelsat") seeks authority in this application to launch and operate a new satellite designated as Intelsat 40e. This satellite will operate at the 91.0° W.L. (269.0° E.L.) orbital location and will be collocated with Galaxy 17 (Call Sign S2715), which is currently operating at 91.0° W.L.

The characteristics of the Intelsat 40e 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 this Engineering Statement.

2 Spacecraft Overview

Intelsat 40e is capable of operating in the Ku- and Ka-band frequencies listed in the table below.

Direction	Frequency
Uplink	14000-14500 MHz
	27500-28600 MHz[2]
	28600-29100 MHz[3]
	29250-30000 MHz[4]

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

[2] Intelsat is aware that the 27.5-28.35 GHz band is secondary for geostationary satellite orbit ("GSO") Fixed Satellite Services ("FSS") and is subject to Section 25.136. *See* 47 C.F.R. § 25.202(a)(1)(i).

[3] Intelsat is aware that GSO FSS is secondary to non-geostationary satellite ("NGSO") FSS in the 28.6-29.1 GHz frequency band. *See* 47 C.F.R. § 2.106, NG165.

[4] The 29.25-29.50 GHz band is allocated to mobile-satellite service ("MSS") feeder links and FSS on a co-primary basis. Earth station uplink operation in this band will require coordination with the incumbent MSS feeder link operators. *See* 47 C.F.R. § 2.106, NG535A.

Direction	Frequency
Downlink	10825-10950 MHz
	10950-11200 MHz
	11200-11450 MHz
	11450-11700 MHz
	11700-11950 MHz
	11950-12200 MHz
	17800-18800 MHz[5]
	18800-19300 MHz[6]
	19300-19400 MHz
	19600-19700 MHz
	19700-20200 MHz

The spacecraft provides the following coverage:

Frequency band	Beam	Coverage
Ku-band	Fixed	North America including Alaska and Hawaii; Central America; and Caribbean
Ka-band	Fixed	United States

2.1 Spacecraft Characteristics

Intelsat 40e is a Maxar FS 1300-140, three-axis stabilized spacecraft that has a rectangular outer body structure. Intelsat 40e utilizes two deployable solar array wings and deployable and non-deployable antennas.

The Intelsat 40e spacecraft is composed of the following subsystems:

1) Thermal;
2) Power;

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[5] Intelsat is aware that the band 17.8-18.3 GHz is primary for fixed services and secondary for FSS. *See* 47 C.F.R. § 2.106, US334.

[6] Intelsat is aware that the 18.8-19.3 GHz frequencies are primary for NGSO FSS and secondary for GSO FSS. *See* 47 C.F.R. § 2.106, NG165.

3) Attitude Control;
4) Propulsion;
5) Telemetry, Command, and Ranging ("TC&R");
6) Uplink Power Control ("ULPC"); and
7) Communications.

These subsystems 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 useful life. The spacecraft design incorporates redundancy in each of the various subsystems to avoid single point failures.

The structural design of Intelsat 40e provides mechanical support for all subsystems. The structure supports the communication antennas, solar arrays, and thrusters. It also provides a stable platform for preserving the alignment of critical elements of the spacecraft.

2.2 Communication Subsystem

Intelsat 40e provides active communication channels at Ku- and Ka-band frequencies. The Ku- and Ka-band payloads employ channels having bandwidths of 81 MHz, 108 MHz and 216 MHz. The Intelsat 40e frequency and polarization plan is provided in Schedule S.

Intelsat 40e utilizes forty-two Ku-band spot-beams and three Ka-band gateway beams. All of the Ku-band spot beams have identical technical characteristics, and thus the coverage contours and performance characteristics are identical. The characteristics of a representative Ku-band spot beam is provided in Schedule S. The latitude and longitude at the maximum gain point on the Earth's surface for each of the Ku-band spot beams are provided in Exhibit 1. The coverage contours and performance characteristics for each of the Ka-band gateway beams is provided in Schedule S. Exhibit 2 provides the beam polarizations and associated GXT file names and Exhibits 3 and 4 provide the beam parameters for the Intelsat 40e uplink and downlink beams, respectively.

All Ku- and Ka-band communication subsystems are interconnected, which allows connectivity using different frequency combinations in the uplink and downlink between the user and gateway beams.

2.3 Telemetry, Command, and Ranging Subsystem

The TC&R subsystem provides 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.

Intelsat 40e is equipped with a tunable command receiver where the center frequency is selectable via ground command in 100 kHz steps within the 14000-14030 MHz frequency range.

The Intelsat 40e telemetry is transmitted through telemetry channels centered at fixed frequencies of 10950.75 MHz, 10951.25 MHz, 10951.75, and 10952.25 MHz with 100 kHz tunable center frequency at 10952.25 MHz that has an allocated band width of 10934.95-10965.05 MHz.

The command and telemetry subsystem performance is summarized in Exhibit 5 and in Schedule S. The beams used for orbital maneuvers and on-station emergencies as well as the on-station beams have 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, pursuant to Section 25.114(c)(4)(vi)(A), contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S.

2.4 Uplink Power Control Subsystem

Intelsat 40e utilizes three Ku-band and one Ka-band channel for ULPC. The coverage patterns of the ULPC beams have 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, pursuant to Section 25.114(c)(4)(vi)(A), contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S. The Intelsat 40e ULPC subsystem performance is summarized in Exhibit 6.

2.5 Satellite Station-Keeping

The spacecraft 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 accounting for all error sources (i.e., attitude perturbations, thermal distortions, misalignments, orbital tolerances, and thruster perturbations, etc.).

3 Services

Intelsat 40e is a general-purpose communications satellite that has been designed to support various services offered within Intelsat's satellite system. Depending upon the needs of the users, the transponders on Intelsat 40e can accommodate television, radio, voice, and data communications. Typical communication services include:

a) compressed digital video;

b) high speed digital data; and

c) digital single channel per carrier data channels.

4 Power Flux Density

The power flux density ("PFD") limits for space stations operating in the 10950-11200 MHz, 11450-11700 MHz, 17700-19700 MHz, and 18600-18800 MHz bands are specified in Section 25.208. The PFD limits for the 10700-10950 MHz and 11200-11450 MHz frequency bands are specified in No. 21.16 of the International Telecommunication Union ("ITU") Radio Regulations. The maximum PFD levels for the Intelsat 40e downlink transmissions were calculated and the results, provided in Schedule S, demonstrate that Intelsat 40e meets the relevant PFD levels.

5 Emission Compliance

The satellite was designed to be compliant with Section 25.202(e), which requires that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency. Intelsat 40e is designed to be compliant with the provisions of this rule.

Intelsat will comply with the provisions of Section 25.202(f) with regard to Intelsat 40e emissions.

6 Orbital Location

Intelsat requests that it be assigned the 91.0° W.L. orbital location for Intelsat 40e. This location satisfies Intelsat 40e's requirements for optimizing coverage, elevation angles, and service availability. Additionally, the location also ensures that the maximum operational, economic, and public interest benefits will be derived.

7 ITU Filings

Intelsat 40e's operations in the frequencies 14000-14500 MHz, 11700-11950 MHz and 11950-12200 MHz will use the Administration of the United States' ITU filings USASAT-24K, USASAT-9A, USASAT-35N and USASAT-60E.

Intelsat 40e's operations in the frequencies 10.95-11.2 GHz, 11.45-11.7 GHz, 27500-29100 MHz, 29250-30000 MHz, 17800-19400 MHz, and 19600-20200 MHz will use the Administration of the Germany's ITU filing ODYSSEY-91W.

Intelsat 40e's operations in the frequencies 10700-10950 MHz and 11200-11450 MHz will use the Administration of the Germany's ITU filing ODYSSEY FSS-91W.

Intelsat requests that the United States state its non-objection to the use of the ODYSSEY-91W and ODYSSEY FSS-91W German filings[7] for operation of the Intelsat 40e satellite in the frequency band indicated above, in accordance with ITU Circular Letter CR/333.

8 Coordination Statement and Certifications

The downlink equivalent isotropically radiated power ("EIRP") density of the satellite's transmissions in the conventional and extended Ku-band will not exceed 14 dBW/4kHz for digital transmissions or 17 dBW/4kHz for analog transmissions, and associated uplink transmissions will not exceed the applicable EIRP density envelopes in Sections 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 40e at 91.0° W.L. Intelsat will internally coordinate the Ku-band operations of Galaxy 17 and Intelsat 40e.

With respect to proposed operation in the 10700-10950 MHz (space-to-Earth), and/or 11200-11450 MHz (space-to-Earth) bands, the proposed operation takes into account the applicable requirements of Appendix 30B of the ITU Radio Regulations. Further, compatibility with other U.S. ITU filings under Appendix 30B is assured because there are no other U.S. ITU filings under Appendix 30B within at least 10° of 91.0° W.L.

The downlink EIRP density of Intelsat 40e's transmissions in the conventional Ka-band will not exceed a PFD at the Earth's surface in excess of -118 dBW/m^2/MHz and the

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[7] The ODYSSEY-91W and ODYSSEY FSS-91W filings are held by Intelsat Kommunikations GmbH, a wholly-owned indirect subsidiary of Intelsat S.A. Intelsat License LLC is also a wholly-owned indirect subsidiary of Intelsat S.A.

associated uplink operation will not exceed applicable EIRP density envelopes in Section 25.218(i) 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 40e at 91.0° W.L. [8]

Intelsat 40e will also operate in frequency bands not addressed above; however, there are no FCC-authorized space stations located within two degrees of 91.0° W.L. that operate in these bands. To address these bands Section 9 provides an interference analysis demonstrating compatibility with a hypothetical co-frequency space station two degrees away with the same receiving and transmitting characteristics as the proposed space station.

9 Interference Analysis

The compatibility of the proposed Intelsat 40e emissions in the 17800-18300 MHz, 19200-19400 MHz, 19600-19700 MHz, 27500-28350 MHz, and 29000-29100 MHz bands with adjacent satellites located at 89.0° W.L. and 93.0° W.L. was analyzed. The interference analysis was conducted for a representative carrier in each beam type.

Other assumptions made for the interference analysis were as follows:

a) In the plane of the geostationary satellite orbit, all transmitting and receiving earth station antennas have off-axis co-polar gains that are compliant with the limits specified in Section 25.209(a).
b) All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
c) Rain attenuation predictions are derived using Recommendation ITU-R P.618.
d) Increase in noise temperature of the receiving earth station due to rain is taken into account.
e) For the cases where the transponder operates in a multi-carrier mode, the effects due to intermodulation interference are taken into account.

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[8] DBSD-G1 is located at 92.85° W.L. and its operations in conventional Ka-band are prohibited from (1) causing more interference to U.S. services being provided by any authorized, two-degree compliant system, and (2) claiming protection from U.S. services provided by a two-degree spacing compliant satellite. *See New ICO Satellite Services G.P. Application to Modify 2 GHz MSS Spectrum Reservation*, File No. SAT-MOD-20070919-00129, Condition 1 (stamp grant issued Apr. 2, 2008).

All assumptions and the results of the analysis are provided in Exhibit 6. Each of the link budgets demonstrate positive link margin for the representative carrier in the presence of an identical carrier operating via a satellite two degrees away.

10 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.

10.1 Spacecraft Hardware Design

Intelsat 40e is designed such that no debris will be released during normal operations. Intelsat has assessed the probability of collision with meteoroids and other debris. In order to limit the effects of such unlikely collisions critical components are located inside the protective body of the satellite and are properly shielded. The satellite does not use any subsystems for end-of-life disposal that are not used for normal operations.

10.2 Minimizing Accidental Explosions

Intelsat has assessed the probability of accidental explosions during and after completion of mission operations. The spacecraft is designed in a manner to minimize the potential for such explosions. Propellant tanks and thrusters are 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.

10.3 Safe Flight Profiles

Intelsat has assessed and limited 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 40e will be co-located with Galaxy 17 at 91.0° W.L. and Intelsat will ensure that sufficient spatial separation is achieved between these two satellites using orbit eccentricity and inclination offsets and thus minimize the risk of collision. 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 40e. Intelsat is also not aware of any system with an overlapping station-keeping volume with Intelsat 40e that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

10.4 Post Mission Disposal

At the end of the mission, Intelsat will dispose of the spacecraft by moving it to an altitude of at least 270 kilometers above the geostationary arc. Intelsat has reserved a minimum of 12 kilograms of propellant for that purpose.

In calculating the disposal orbit, Intelsat has used simplifying assumptions as permitted under the Commission's Orbital Debris Report and Order.[9] The effective area to mass ratio (Cr*A/M) of the Intelsat 40e spacecraft is 0.027 m^2/kg, resulting in a minimum perigee disposal altitude under the Inter-Agency Space Debris Coordination Committee formula of 267.2 kilometers above the geostationary arc. Accordingly, the Intelsat 40e planned disposal orbit complies with the FCC's rules.

The reserved propellant figure was determined by the requirements to reach the desired decommission altitude.

11 TC&R Control Earth Stations

Intelsat will conduct TC&R operations through earth stations at one or more of the following teleports: Napa, California; Hagerstown, Maryland; and Ellenwood, Georgia. Additionally, Intelsat is capable of remotely controlling Intelsat 40e from its facilities in McLean, Virginia or Long Beach, California.

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[9] *Mitigation of Orbital Debris*, Second Report and Order, 19 FCC Rcd 11567 (2004).

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/	April 13, 2020
Giselle Creeser Intelsat Director, Spectrum Policy & Engineering	Date

EXHIBIT 1
Ku-band Spot Beam Locations

Beam Designation	Longitude (°E)	Latitude (°N)	Beam Designation	Longitude (°E)	Latitude (°N)
Spot 1	-79.87	6.40	Spot 22	-66.67	35.69
Spot 2	-58.15	13.30	Spot 23	-76.90	35.29
Spot 3	-67.39	13.11	Spot 24	-86.37	35.10
Spot 4	-75.68	12.98	Spot 25	-95.63	35.10
Spot 5	-83.45	12.91	Spot 26	-105.10	35.29
Spot 6	-91.00	12.88	Spot 27	-115.33	35.69
Spot 7	-98.55	12.91	Spot 28	-127.28	36.40
Spot 8	-61.53	20.19	Spot 29	-53.95	46.42
Spot 9	-70.73	19.92	Spot 30	-68.20	45.39
Spot 10	-79.11	19.76	Spot 31	-80.03	44.88
Spot 11	-87.08	19.68	Spot 32	-91.00	44.72
Spot 12	-94.92	19.68	Spot 33	-101.97	44.88
Spot 13	-102.89	19.76	Spot 34	-113.80	45.39
Spot 14	-111.27	19.92	Spot 35	-128.05	46.42
Spot 15	-64.36	27.53	Spot 36	-41.96	61.53
Spot 16	-73.86	27.20	Spot 37	-66.98	58.88
Spot 17	-82.59	27.02	Spot 38	-83.46	58.03
Spot 18	-91.00	26.96	Spot 39	-98.54	58.03
Spot 19	-99.41	27.02	Spot 40	-115.02	58.88
Spot 20	-108.14	27.20	Spot 41	-140.04	61.53
Spot 21	-117.64	27.53	Spot 42	-157.85	21.30

EXHIBIT 2
Beam Polarizations and GXT File Names

	Schedule S Beam GXT File Names							
	Linear Polarization				Circular Polarization			
Beam Description	**Uplink (H-Pol.)**	**Uplink (V-Pol.)**	**Downlink (H-Pol.)**	**Downlink (V-Pol.)**	**Uplink (LHCP)**	**Uplink (RHCP)**	**Downlink (LHCP)**	**Downlink (RHCP)**
Ku-Band Beams								
42 Ku User beams	KUHU	KUVU	KUHD	KUVD	----	----	----	----
ULPC1	----	----	----	----	----	----	----	CLRD*
ULPC2	----	----	----	----	----	----	----	GLRD*
ULPC3	----	----	----	----	----	----	----	KLRD*
Telemetry 1	----	----	----	----	----	----	----	TGRD*
Telemetry 2	----	----	----	----	----	----	----	TPRD*
Telemetry 3	----	----	----	----	----	----	----	THRD*
Telemetry 4**	----	----	----	----	----	----	----	TMRD*
Command 1**	----	----	----	----	CMLD*	----	----	----
Command 2**	----	----	----	----	CPLU*	----	----	----
Command 3**	----	----	----	----	CHLU*	----	----	----
Ka-Band Beams								
Ka Gateway1	----	----	----	----	A1LU A1LK	A1RU A1RK	A1LD A1LE	A1RD A1RE
Ka Gateway 2	----	----	----	----	A2LU A2LK	A2RU A2RK	A2LD A2LE	A2RD A2RE
Ka Gateway 3	----	----	----	----	A3LU A3LK	A3RU A3RK	A3LD A3LE	A3RD A3RE
ULPC4	----	----	ALHD*	----	----	----	----	----

** GXT files are not provided for the indicated beams because their -8 dB gain contours extend beyond the edge of the Earth.*

*** Tunable in 100kHz*

EXHIBIT 3
COMMUNICATION SUBSYSTEM UPLINK BEAM PARAMETERS

Beam Name	Ku-band	Ku-band	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed
Schedule S Beam ID	KUHU	KUVU	A1RU	A1LU	A1RK	A1LK
Frequency Band (MHz)	14000-14500		27500-29100		29250-30000	
Polarization	Horizontal	Vertical	RHCP	LHCP	RHCP	LHCP
G/T (dB/K)	15.92	15.2	20.97	20.97	20.97	20.97
Minimum SFD-- (dBW/m^2)	-105	-105	-101.9	-101.9	-101.9	-101.9
Maximum SFD-- (dBW/m^2)	-85	-85	-74.0	-74.0	-74.0	-74.0

Beam Name	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed	Ka-band Fixed
Schedule S Beam ID	A2RU	A2LU	A2RK	A2LK	A3RU	A3LU	A3RK	A3LK
Frequency Band (MHz)	27500-29100		29250- 30000		27500-29100		29250-30000	
Polarization	RHCP	LHCP	RHCP	LHCP	RHCP	LHCP	RHCP	LHCP
G/T (dB/K)	20.97	20.97	20.97	20.97	20.97	20.97	20.97	20.97
Minimum SFD-- (dBW/m^2)	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9	-101.9
Maximum SFD-- (dBW/m^2)	-74.0	-74.0	-74.0	-74.0	-74.0	-74.0	-74.0	-74.0

Note: *RHCP: Right Hand Circular Polarization, LHCP: Left Hand Circular Polarization*

EXHIBIT 4
COMMUNICATION SUBSYSTEM DOWNLINK BEAM PARAMETERS

Beam Name	Ku-band Fixed	Ku-band Fixed
Schedule S Beam ID	KUHD	KUVD
Frequency Band (MHz)	10825-12200	
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

Beam Name	Ka-band Fixed 1	Ka-band Fixed 1	Ka-band Fixed 1	Ka-band Fixed 1	Ka-band Fixed 2	Ka-band Fixed 2
Schedule S Beam ID	A1LD	A1RD	A1LE	A1RE	A2LD	A2RD
Frequency Band (MHz)	17800-19400		19600.0-20200		17800-19400	
Polarization	LHCP	RHCP	LHCP	RHCP	LHCP	RHCP
Maximum Beam Peak EIRP (dBW)	60.5	60.5	60.3	60.3	61.4	61.4
Maximum Beam Peak EIRP Density (dBW/4kHz)	16.2	16.2	16.0	16.0	17.1	17.1
Maximum Beam Peak EIRP Density (dBW/Hz)	-19.8	-19.8	-20.0	-20.0	-18.9	-18.9

Beam Name	Ka-band 2	Ka-band 2	Ka-band 3	Ka-band 3	Ka-band 3	Ka-band 3
Schedule S Beam ID	A2LE	A2RE	A3LD	A3RD	A3LE	A3RE
Frequency Band (MHz)	19600.0-20200		17800-19400		19600.0-20200	
Polarization	LHCP	RHCP	LHCP	RHCP	LHCP	RHCP
Maximum Beam Peak EIRP (dBW)	61.4	61.4	58.0	58.0	58.6	58.6
Maximum Beam Peak EIRP Density (dBW/4kHz)	17.1	17.1	13.7	13.7	14.3	14.3
Maximum Beam Peak EIRP Density (dBW/Hz)	-18.9	-18.9	-22.3	-22.3	-21.7	-21.7

Note: *RHCP - Right Hand Circular Polarization, LHCP - Left Hand Circular Polarization*

EXHIBIT 5
TC&R SUBSYSTEM CHARACTERISTICS

Beam Name	Command Global Tunable 1	Command Global Tunable 2	Command Global Tunable 3
Schedule S Beam ID	CMLD	CPLU	CHLU
Center Frequencies (MHz)	14000.5*	14003*	14000.5*
Allocated bandwidth	14000-14030	14000-14030	14000-14030
Command Carrier Bandwidth (MHz)	1.0	1.0	1.0
Polarization	LCHP	LHCP	LHCP
Peak Flux Density at Command Threshold (dBW/m^2-Hz)	-96.9	-96.9	-96.9

* Tunable in 100 kHz steps

Beam Name	Telemetry Global Fixed	Telemetry Global Fixed	Telemetry Global Fixed	Telemetry Global Tunable
Schedule S Beam ID	TGRD	TPRD	THRD	TMRD
Frequencies (MHz)	10950.25	10951.75	10951.25	10952.25*
Polarization	RHCP	RHCP	RHCP	RHCP
Maximum Channel EIRP (dBW)	10.5	10.5	10.5	10.5
Maximum Beam Peak EIRP Density (dBW/4kHz)	-10.5	-10.5	-10.5	-10.5
Maximum Beam Peak EIRP Density (dBW/Hz)	-46.5	-46.5	-46.5	-46.5

* Tunable in 100 kHz steps (10934.95-10965.05 MHz)

Beam Name	ULPC 1 Ku band Global	ULPC 2 Ku band Global	ULPC3 Ku band Global	ULPC4 Ka-band Global
Schedule S Beam ID	CLRD	GLRD	KLRD	ALHD
Frequencies (MHz)	10950.25	11700.5	12199.5	20199.0
Polarization	RHCP	RHCP	RHCP	Horizontal
Maximum Channel EIRP (dBW)	14	14	14	16.5
Maximum Beam Peak EIRP Density (dBW/4kHz)	6.0	6.0	6.0	8.5
Maximum Beam Peak EIRP Density (dBW/Hz)	-30	-30	-30	-27.5

Note: *RHCP: Right Hand Circular Polarization, LHCP: Left Hand Circular Polarization*

EXHIBIT 6
Interference Analysis
Effect of Satellites at 89°W.L. and 93°W.L. on Intelsat 40e
Beams: A1LU, A1RU, A2LU, A2RU, A3LU and A3RU

UPLINK BEAM INFORMATION				
Uplink Beam Name	A1LU, A1RU, A2LU, A2RU, A3LUand A3RU	A1LU, A1RU, A2LU, A2RU, A3LU and A3RU	A1LU, A1RU, A2LU, A2RU, A3LUand A3RU	A1LU, A1RU, A2LU, A2RU, A3LUand A3RU
Uplink Frequency (MHz)	27500-28350 & 29000-29100	27500-28350 & 29000-29100	27500-28350 & 29000-29100	27500-28350 & 29000-29100
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Uplink Contour G/T (dB/K)	19.0	19.0	19.0	19.0
Uplink SFD (dBW/m²)	-89.6	-89.6	-89.6	-89.6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	A1LD, A1RD, A2LD, A2RD A3LD and A3RD	A1LD, A1RD, A2LD, A2RD A3LD and A3RD	A1LD, A1RD, A2LD, A2RD A3LD and A3RD	A1LD, A1RD, A2LD, A2RD A3LD and A3RD
Downlink Frequency (MHz)	17800-18300, 19200-19400, & 19600-19700	17800-18300, 19200-19400, & 19600-19700	17800-18300, 19200-19400, & 19600-19700	17800-18300, 19200-19400, & 19600-19700
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-3.0	-3.0	-3.0	-3.0
Downlink Contour EIRP (dBW)	60.5	60.5	60.5	60.5
Rain Rate (mm/hr)	48.2	48.2	48.2	48.2
ADJACENT SATELLITE				
Orbital Locations	89°W,93°W	89°W,93°W	89°W,93°W	89°W,93°W
Uplink Power Density (dBW/Hz)	-57.0	-57.0	-57.0	-57.0
Downlink EIRP Density (dBWHz)	-16.0	-16.0	-16.0	-16.0
CARRIER INFORMATION				
Emission Designation	36M0G7W	8M25G7W	1M73G7W	382KG7W
Information Rate (kbps)	36860.0	8448.0	1024.0	256.0
Carrier Modulation	QPSK	QPSK	BPSK	BPSK

Code Rate	0.8	0.8	0.5	0.5
Occupied Bandwidth (kHz)	26665	6111	1284	273
Allocated Bandwidth (kHz)	36000	8251	1733	382
Minimum C/N (dB)	7.30	7.30	1.80	1.20
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	55.8	55.8	55.8	55.8
Earth Station Elevation Angle	20.0	20.0	20.0	20.0
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	0.97	0.97	0.60	0.60
Earth Station Gain (dBi)	44.5	44.5	40.3	40.3
Earth Station G/T (dB/K)	22.7	22.7	18.5	18.5
Earth Station Elevation Angle	20.0	20.0	20.0	20.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	32.1	32.1	20	20
C/N Downlink (dB)	25.0	25.0	19.8	20.5
C/I Other links (Co-channel & IM)	16.0	16.0	16.0	16.0
C/I Uplink Adjacent Satellites (dB)	34.3	34.3	22.3	22.3
C/I Downlink Adjacent Satellites (dB)	19.5	19.5	15.3	15.3
C/(N+I) Composite (dB)	12.8	12.8	9.3	9.4
Required System Margin (dB)	1.0	1.0	1.0	1.0
Minimum Required C/N (dB)	7.3	7.3	7.3	7.3
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-57.0	-57.0	-57.0	-57.0
Downlink EIRP Density at Beam Peak	-16.0	-16.0	-16.0	-16.0