Engineering Statement

1 Introduction

Intelsat License LLC ("Intelsat") seeks authority in this application to operate the satellite designated as Intelsat 904 from 45.1° E.L.

The characteristics of the Intelsat 904 spacecraft, as well as its compliance with the various provisions of Part 25 of the Federal Communication Commission's ("FCC or "Commission") rules, are provided in the remainder of this Engineering Statement, which updates the beam gain contours. In all other respects, the characteristics of Intelsat 904 are the same as those described in SAT-MOD-20011221-00140.

2 Spacecraft Overview

Intelsat 904 is a Space Systems Loral FS1300 spacecraft that is capable of operating in the C-band and Ku-band frequencies listed below.

Direction	Frequency
Uplink	5850 – 6425 MHz
	14000 – 14500 MHz
Downlink	3625 – 4200 MHz
	10950 – 11200 MHz
	11450 – 11700 MHz

The spacecraft provides the following coverage:

Beam	Coverage
Sri Lanka	Sri Lanka
Europe	Central Europe
West Hemi	Africa and Europe
East Hemi	India, Thailand, China
Northwest	Western Europe
Southwest	Southern Africa
Middle East	Middle East
Southeast	Malaysia
Northeast	India, Thailand, Sumatra
East	Malaysia, India, Thailand, Sumatra
Global	Global

2.1 Spacecraft Characteristics

Intelsat 904 is a Space Systems Loral FS-1300 three-axis stabilized type spacecraft that has a rectangular outer body structure. Intelsat 904 utilizes two deployable solar array wings and a number of deployable and non-deployable antennas.

The Intelsat 904 spacecraft is composed of the following subsystems:

- Thermal
- Power
- Attitude Control
- Propulsion
- Telemetry, Command and Ranging
- Uplink Power Control
- 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 its useful life. The spacecraft design incorporates redundancy in all of the various subsystems in order to avoid single-point failures.

The structural design of Intelsat 904 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 904 provides active communication channels at C-band frequencies, each having a bandwidth of 36 MHz or 72 MHz, and Ku-band frequencies each having a bandwidth of 36 MHz, 72 MHz, or 77 MHz. The Intelsat 904 frequencies, polarization, and channel plan are provided in the Schedule S.

The coverage contours and performance characteristics of all Intelsat 904 beams except for the global beams are provided in the Schedule S. The global 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) of the FCC's rules, contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S. Exhibits 1 and 2 provide the beam parameters for the Intelsat 904 uplink and downlink beams, respectively.

2.3 Telemetry, Command and Ranging Subsystem

The telemetry, command and ranging ("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.

The Intelsat 904 command and telemetry channel frequencies are shown in Exhibit 3. The coverage patterns of the command and telemetry 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) of the FCC's rules, contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S. The Intelsat 904 command and telemetry subsystem performance is summarized in Exhibit 3.

2.4 Uplink Power Control Subsystem

Intelsat 904 utilizes two Ku-band channels for uplink power control ("ULPC"), antenna tracking, and ranging. 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) of the FCC's rules, contours for these beams are not required to be provided and the associated GXT files have not been included in Schedule S. The Intelsat 904 ULPC frequencies and subsystem performance are summarized in Exhibit 3.

2.5 Satellite Station-Keeping

The spacecraft will be maintained within 0.05° of its nominal longitudinal position in the east-west direction. Accordingly, it will be in compliance with Section 25.210(j) of the Commission's rules.

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 904 is a general purpose communications satellite and has been designed to support various services offered within the Intelsat satellite system. Depending upon the needs of the users, the transponders on Intelsat 904 can accommodate television, radio, voice, and data communications. Typical communication services include:

a) Compressed digital video

b) High speed digital data

c) Digital single channel per carrier ("SCPC") data channels

Emission designators and allocated bandwidths for representative communication carriers are provided in Schedule S.

4 Power Flux Density

The power flux density ("PFD") limits for space stations operating in the 3650 – 4200 MHz, 10950 – 11200 MHz, and 11450 -11700 MHz bands are specified in Section 25.208 of the Commission's rules. The power flux density ("PFD") limits for space stations operating in the 3625 – 3650 MHz are specified in No. 21.16 of the ITU Radio Regulations.

The maximum PFD levels for the Intelsat 904 transmissions were calculated for the 3625 – 4200 MHz, 10950 – 11200 MHz, and 11450 -11700 MHz bands. The results are provided in Schedule S and show that the downlink power flux density levels of the Intelsat 904 carriers do not exceed the limits specified in Section 25.208 of the Commission's rules or the limits specified in No. 21.16 of the ITU Radio Regulations.

5 Emission Compliance

Section 25.202(e) of the Commission's rules requires that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency. Intelsat 904 is designed to be compliant with the provisions of this rule.

Intelsat will comply with the provisions of Section 25.202(f) of the Commission's rules with regard to Intelsat 904 emissions.

6 Orbital Location

Intelsat requests that it be assigned the 45.1° E.L. orbital location for Intelsat 904. The 45.1° E.L. location satisfies Intelsat 904 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 Coordination with Co-frequency Space Stations

In 2015, the Commission modified the interference analysis requirements and adopted routine limits on the power density of downlink transmissions.[1] The Intelsat 904 transmissions in C-band will comply with the levels contained in Sections 25.212(c) and (d) and Section 25.140(a)(3)(i) and (ii) of the Commission's rules, as modified pursuant to the 2015 Part 25 Streamlining Order, unless higher levels are coordinated with affected adjacent satellite operators within ±6°. As of the time of filing this application, these rules are not yet effective. To the extent necessary, Intelsat seeks waiver of existing Section 25.140(a). The same public interest rationales for modification of Section 25.140(a) justify a waiver of the rule in this case.[2]

The impact of the Intelsat 904 Ku-band emissions on hypothetical adjacent satellites located at 43.1° E.L. and 47.1º E.L. was analyzed.[3] The interference analysis was conducted for a number of representative carriers at Ku-band frequencies. It was assumed that there were hypothetical

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[1] *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, Second Report and Order, 30 FCC Rcd 14713, 14755 (2015) ("2015 Part 25 Streamlining Order").

[2] *Id*. at 14754-55. *See also* Application to Launch and Operate Intelsat 33e, a Replacement Satellite With New Frequencies, File No. SAT-LOA-20150327-00016, Stamp Grant, ¶ 6 (Feb. 25, 2016) (waiving Section 25.210(i)(1)'s cross-polarization requirement based on modified Part 25 rules adopted in 2015 Part 25 Streamlining Order).

[3] At the time of submission of this application, there are no satellites located at 43.1° E.L. or 47.1° E.L. The use of satellites at other locations in the interference analysis would be inconsistent with a two-degree orbital separation environment and policy.

satellites having the same operating characteristics as Intelsat 904 at the 43.1° E.L. and 47.1° E.L. orbital locations.

For the satellite located at 43.1º E.L., it was assumed that the adjacent satellites were Intelsat 904, located at 45.1º E.L., and a hypothetical satellite having the same operating characteristics as Intelsat 904 located at 41.1º E.L. For the satellite located at 47.1º E.L., it was assumed that the adjacent satellites were Intelsat 904, located at 45.1º E.L., and a hypothetical satellite having the same operating characteristics as Intelsat 904 located at 49.1º E.L. The resulting interference analyses are included as Exhibits 4 and 5.

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) of the FCC rules.
b) All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
c) At Ku-band frequencies rain attenuation predictions are derived using Recommendation ITU-R P.618.
d) At Ku-band frequencies, 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.

All assumptions and the results of the analysis are documented in Exhibits 5 & 6. The Intelsat 904 transmissions will comply with the levels contained in Sections 25.212(c) and (d) and Section 25.138 of the Commission's rules, as applicable, unless higher levels are coordinated with affected adjacent satellite operators within ±6°.

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

The spacecraft is designed such that no debris will be released during normal operations. Intelsat has assessed the probability of collision with meteoroids and other small debris (<1 cm diameter) and has taken the following steps to limit the effects of such collisions: (1) critical spacecraft components are located inside the protective body of the spacecraft and properly shielded; and (2) all spacecraft subsystems have redundant components to ensure no single-point failures. The spacecraft does not use any subsystems for end-of-life disposal that are not used for normal operations.

8.2 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.

8.3 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. Subject to receipt of FCC approval, Intelsat 904 will first be drifted to 45.0 E.L. and will temporarily be operated co-located with Intelsat 12 until completion of traffic transition.[4] After traffic transition and subject to receipt of FCC approval, Intelsat 904 will be relocated to 45.1°E.L. Once relocated to 45.1° E.L., Intelsat 904 will not be located at an orbital location that has an overlapping station-keeping volume with another satellite.

During the relocation of Intelsat 904, Intelsat will take all the necessary steps to coordinate the move internally to minimize the risk of collision or interference between Intelsat 904 and Intelsat 12. Intelsat is not aware of any other FCC licensed system, or any other system applied for and under consideration by the FCC, that will have an overlapping station-keeping volume with Intelsat 904. Intelsat is also not aware of any system with an overlapping station-keeping volume with Intelsat 904 that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

8.4 Post Mission Disposal

At the end of the mission, Intelsat intends to dispose of the spacecraft by moving it to an altitude of at least 150 kilometers above the geostationary arc. Intelsat has reserved 52.8 kilograms of fuel for this purpose. In its *Second Report and Order* in IB Docket 02-54, Mitigation of Orbital Debris,[5] the FCC declared that satellites launched prior to March 18, 2002, such as the Intelsat 904 satellite, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the planned disposal orbit for Intelsat 904, as revised, complies with the FCC's rules.

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[4] Request for Special Temporary Authority to Drift Intelsat 904 to, and Operate at, 45.0° E.L. and 45.1° E.L.; Call Sign: S2408; File No. SAT-STA-20160722-00065 (filed July 22, 2016).

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

The reserved fuel figure was determined by the spacecraft manufacturer and provided for in the propellant budget. This figure was calculated taking into account the expected mass of the satellite at the end of life and the required delta-velocity to achieve the desired orbit. The fuel gauging uncertainty has been taken into account in these calculations.

9 TC&R Control Earth Stations

Intelsat will conduct TC&R operations through one or more of the following earth stations: Fuchsstadt, Germany; Hartebeeshoek, South Africa; Mingenew, Australia; Kumsan, South Korea; or Fucino, Italy. Additionally, Intelsat is capable of remotely controlling Intelsat 904 from its facilities in McLean, VA or in Long Beach, CA.

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/ Alan Yates	August 5, 2016
Alan Yates Intelsat Senior Manager, Spectrum Engineering	Date

EXHIBIT 1

COMMUNICATION SUBSYSTEM UPLINK BEAM PARAMETERS

Beam Name	C-Band Global	C-Band Global	C-Band Hemi	C-Band Hemi	C-Band Spot
Schedule S Beam ID	CGRU	CGLU	WHLU	EHLU	NWRU
Frequency Band (MHz)	6300 - 6425	6300 - 6425	5850 - 6300	5850 - 6300	5850 - 6300
Polarization	RHCP	LHCP	LHCP	LHCP	RHCP
G/T (dB/K)	-6.3	-5.6	-2.6	1.6	5.4
Minimum SFD-- (dBW/m^2)	-91.5	-92.0	-92.4	-93.4	-92.0
Maximum SFD-- (dBW/m^2)	-69.5	-70.0	-70.4	-71.4	-70.0

Beam Name	C-Band Spot	C-Band Spot	C-Band Spot	C-Band Spot	C-Band Spot
Schedule S Beam ID	SWRU	MERU	SERU	NERU	CERU
Frequency Band (MHz)	5850 - 6300	5850 - 6300	5850 - 6300	5850 - 6300	5850 - 6300
Polarization	RHCP	RHCP	RHCP	RHCP	RHCP
G/T (dB/K)	0.9	1.9	3.3	3.7	0.2
Minimum SFD-- (dBW/m^2)	-92.7	-92.8	-92.8	-93.2	-92.7
Maximum SFD-- (dBW/m^2)	-70.7	-70.8	-70.8	-71.2	-70.7

Beam Name	Ku-Band Spot	Ku-Band Spot
Schedule S Beam ID	S1HU	S2VU
Frequency Band (MHz)	**14000 - 14500**	**14000 - 14500**
Polarization	Horizontal	Vertical
G/T (dB/K)	8.7	8.7
Minimum SFD-- (dBW/m^2)	-92.0	-92.6
Maximum SFD-- (dBW/m2)	-74.0	-74.6

EXHIBIT 2

COMMUNICATION SUBSYSTEM DOWNLINK BEAM PARAMETERS

Beam Name	C-Band Global	C-Band Global	C-Band Hemi	C-Band Hemi	C-Band Spot
Schedule S Beam ID	CGLD	CGRD	WHRD	EHRD	NWLD
Frequency Band (MHz)	4075 - 4200	4075 - 4200	3625 - 4075	3625 - 4075	3625 - 4075
Polarization	LHCP	RHCP	RHCP	RHCP	LHCP
Maximum Beam Peak EIRP (dBW)	35.7	35.3	41.0	45.3	41.6
Maximum Beam Peak EIRP Density (dBW/4kHz)	-3.9	-4.3	-1.6	2.7	-1.0

Beam Name	C-Band Spot	C-Band Spot	C-Band Spot	C-Band Spot	C-Band Spot
Schedule S Beam ID	SWLD	MELD	SELD	NELD	CELD
Frequency Band (MHz)	3625 - 4075	3625 - 4075	3625 - 4075	3625 - 4075	3625 - 4075
Polarization	LHCP	LHCP	LHCP	LHCP	LHCP
Maximum Beam Peak EIRP (dBW)	42.2	43.8	43.6	47.7	44.8
Maximum Beam Peak EIRP Density (dBW/4kHz)	-0.4	1.2	1.0	5.1	2.2

Beam Name	Ku-Band Spot	Ku-Band Spot
Schedule S Beam ID	SIVD	S2HD
Frequency Band (MHz)	10900 - 11700	10900 - 11700
Polarization	Vertical	Horizontal
Maximum Beam Peak EIRP (dBW)	53.1	53.8
Maximum Beam Peak EIRP Density (dBW/4kHz)	13.5	14.2

EXHIBIT 3

TC&R SUBSYSTEM CHARACTERISTICS

Beam Name	Command Global	Command Bicone
Schedule S Beam ID	CMDG	CMDB
Frequencies (MHz)	6173.7	6176.3
Polarization	LHCP	LHCP
Peak Flux Density at Command Threshold (dBW/m^2-Hz)	-90	-90

Beam Name	Telemetry Global	Telemetry Bicone	ULPC	ULPC
Schedule S Beam ID	TLMG	TLMB	UPKC	UPCV
Frequencies (MHz)	3947.5 & 3952.0	3948.0 & 3952.5	11198.0 & 11452.0	3950.0
Polarization	RHCP	RHCP	RHCP	Vertical
Maximum Channel EIRP (dBW)	8.0	8.0	11.0	8.0
Maximum Beam Peak EIRP Density (dBW/4kHz)	-6.0	-6.0	-3.0	0.0

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

EXHIBIT 4
Beam Polarizations and GXT File Names

	Schedule S Beam Names							
	Linear Polarization				Circular Polarization			
Beam Designation	**Uplink (H-Pol.)**	**Uplink (V-Pol.)**	**Downlink (H-Pol.)**	**Downlink (V-Pol.)**	**Uplink (LHCP)**	**Uplink (RHCP)**	**Downlink (LHCP)**	**Downlink (RHCP)**
C-Band Beams								
Global Beam	----	----	----	----	CGLU*	CGRU*	CGLD*	CGRD*
West Hemi	----	----	----	----	WHLU	----	WHRD	----
East Hemi	----	----	----	----	EHLU	----	EHRD	----
Northwest	----	----	----	----	----	NWRU	NWLD	----
Southwest	----	----	----	----	----	SWRU	SWLD	----
Middle East	----	----	----	----	----	MERU	MELD	----
Southeast	----	----	----	----	----	SERU	SELD	----
Northeast	----	----	----	----	----	NERU	NELD	----
East	----	----	----	----	----	CERU	CELD	----
Telemetry Global	----	----	----	----	----	----	----	TLMG*
Telemetry Bicone	----	----	----	----	----	----	----	TLMB*
Command Global	----	----	----	----	CMDG*	----	----	----
Command Bicone	----	----	----	----	CMDB*	----	----	----
C-band ULPC	----	----	----	UPCV*	----	----	----	----
Ku-Band Beams								
Sri Lanka	S1HU	----	S1VD	----	----	----	----	----
Central Europe	----	S2VU	----	S2HD	----	----	----	----
Ku-band ULPC	----	----	----	----	----	----	----	UPKC*

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

EXHIBIT 5

HYPOTHETICAL 43.1°E.L. SATELLITE INTERFERENCE ANALYSIS

UPLINK BEAM INFORMATION				
Uplink Beam Name	**S1HU / S2VU**	**S1HU / S2VU**	**S1HU / S2VU**	**S1HU / S2VU**
Uplink Frequency (MHz)	**14475**	**14475**	**14475**	**14475**
Uplink Beam Polarization	**H / V**	**H / V**	**H / V**	**H / V**
Uplink Beam Peak G/T (dB/K)	**8.7**	**8.7**	**8.7**	**8.7**
Uplink Beam Peak SFD (dBW/m2)	**-92.6**	**-92.6**	**-92.6**	**-92.6**
Uplink Relative Contour Level (dB)	**-8.0**	**-8.0**	**-8.0**	**-8.0**
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	**S1VD / S2HD**	**S1VD / S2HD**	**S1VD / S2HD**	**S1VD / S2HD**
Downlink Frequency (MHz)	**11675**	**11675**	**11675**	**11675**
Downlink Beam Polarization	**V / H**	**V / H**	**V / H**	**V / H**
Downlink Beam Peak EIRP (dBW)	**53.1**	**53.1**	**53.1**	**53.1**
Downlink Relative Contour Level (dB)	**-6.0**	**-6.0**	**-6.0**	**-6.0**
ADJACENT SATELLITE 1				
Satellite Name	**Intelsat 904**			
Orbital Location	**45.1 E.L.**	**45.1 E.L.**	**45.1 E.L.**	**45.1 E.L.**
Uplink Power Density (dBW/Hz)	**-45.0**	**-45.0**	**-45.0**	**-45.0**
Beam Peak Downlink EIRP Density (dBW/Hz)	**-21.5**	**-21.5**	**-21.5**	**-21.5**
ADJACENT SATELLITE 2				
Satellite Name	**Hypothetical 41.1 E.L.**			
Orbital Location	**41.1 E.L.**	**41.1 E.L.**	**41.1 E.L.**	**41.1 E.L.**
Uplink Power Density (dBW/Hz)	**-45.0**	**-45**	**-45.0**	**-45.0**
Beam Peak Downlink EIRP Density (dBW/Hz)	**-21.5**	**-21.5**	**-21.5**	**-21.5**
CARRIER INFORMATION				
Carrier ID	**36M0G7W**	**8M25G7W**	**1M73G7W**	**338KG7W**
Carrier Modulation	**QPSK**	**QPSK**	**QPSK**	**QPSK**
Information Rate(kbps)	**36860**	**8448**	**1284**	**273**
Code Rate	**3/4x188/204**	**3/4**	**1/2**	**1/2**
Occupied Bandwidth(kHz)	**26664.7**	**6111.3**	**1283.5**	**281.4**
Allocated Bandwidth(kHz)	**36000**	**8250.5**	**1733**	**338**
Minimum C/N, Rain (dB)	**7.3**	**7.3**	**1.8**	**1.2**
UPLINK EARTH STATION				
Earth Station Diameter (meters)	**6.5**	**4.0**	**4.0**	**2.4**
Earth Station Gain (dBi)	**57.4**	**57.4**	**48.7**	**48.7**
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	**4.0**	**4.0**	**4.0**	**2.4**
Earth Station Gain (dBi)	**51.4**	**51.4**	**51.4**	**47.0**
Earth Station G/T (dB/K)	**29.0**	**29.0**	**29.0**	**25.0**
COMPOSITE LINK PERFORMANCE				
C/N Thermal Uplink (dB)	**21.3**	**22.2**	**18.0**	**19.6**
Uplink Interference C/I (dB)	**---**	**---**	**---**	**---**
Uplink Adjacent Satellite C/I (dB)	**13.2**	**14.0**	**9.8**	**11.4**
Intermodulation C/IM (dB)	**----**	**36.1**	**22.3**	**35.0**
Downlink Thermal C/N (dB)	**19.2**	**19.5**	**14.8**	**12.8**
Downlink Interference C/I (dB)	**999.0**	**28.2**	**20.6**	**25.3**
Downlink Adjacent Satellite C/I (dB)	**16.7**	**17.4**	**12.7**	**10.3**
Subtotal C/N (dB)	**10.5**	**11.1**	**6.5**	**6.3**
Antenna Mispointing and Other Losses (dB)	**0.3**	**0.3**	**0.3**	**0.3**
Total C/N (dB)	**10.2**	**10.8**	**6.2**	**6.0**
Minimum Required C/N (dB)	**7.3**	**7.3**	**1.8**	**1.2**
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	**-57.5**	**-52.5**	**-52.3**	**-50.7**
Downlink EIRP Density At Beam Peak (dBW/Hz)	**-26.6**	**-26.1**	**-30.6**	**-28.6**

EXHIBIT 6

HYPOTHETICAL 47.1°E.L. SATELLITE INTERFERENCE ANALYSIS

UPLINK BEAM INFORMATION				
Uplink Beam Name	**S1HU / S2VU**	**S1HU / S2VU**	**S1HU / S2VU**	**S1HU / S2VU**
Uplink Frequency (MHz)	**14475**	**14475**	**14475**	**14475**
Uplink Beam Polarization	**H / V**	**H / V**	**H / V**	**H / V**
Uplink Beam Peak G/T (dB/K)	**8.7**	**8.7**	**8.7**	**8.7**
Uplink Beam Peak SFD (dBW/m2)	**-92.6**	**-92.6**	**-92.6**	**-92.6**
Uplink Relative Contour Level (dB)	**-8.0**	**-8.0**	**-8.0**	**-8.0**
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	**S1VD / S2HD**	**S1VD / S2HD**	**S1VD / S2HD**	**S1VD / S2HD**
Downlink Frequency (MHz)	**11675**	**11675**	**11675**	**11675**
Downlink Beam Polarization	**V / H**	**V / H**	**V / H**	**V / H**
Downlink Beam Peak EIRP (dBW)	**53.1**	**53.1**	**53.1**	**53.1**
Downlink Relative Contour Level (dB)	**-6.0**	**-6.0**	**-6.0**	**-6.0**
ADJACENT SATELLITE 1				
Satellite Name	**Intelsat 904**			
Orbital Location	**45.1 E.L.**	**45.1 E.L.**	**45.1 E.L.**	**45.1 E.L.**
Uplink Power Density (dBW/Hz)	**-45.0**	**-45.0**	**-45.0**	**-45.0**
Beam Peak Downlink EIRP Density (dBW/Hz)	**-21.5**	**-21.5**	**-21.5**	**-21.5**
ADJACENT SATELLITE 2				
Satellite Name	**Hypothetical 49.1 E.L.**			
Orbital Location	**49.1 E.L.**	**49.1 E.L.**	**49.1 E.L.**	**49.1 E.L.**
Uplink Power Density (dBW/Hz)	**-45.0**	**-45**	**-45.0**	**-45.0**
Beam Peak Downlink EIRP Density (dBW/Hz)	**-21.5**	**-21.5**	**-21.5**	**-21.5**
CARRIER INFORMATION				
Carrier ID	**36M0G7W**	**8M25G7W**	**1M73G7W**	**338KG7W**
Carrier Modulation	**QPSK**	**QPSK**	**QPSK**	**QPSK**
Information Rate(kbps)	**36860**	**8448**	**1284**	**273**
Code Rate	**3/4x188/204**	**3/4**	**1/2**	**1/2**
Occupied Bandwidth(kHz)	**26664.7**	**6111.3**	**1283.5**	**281.4**
Allocated Bandwidth(kHz)	**36000**	**8250.5**	**1733**	**338**
Minimum C/N, Rain (dB)	**7.3**	**7.3**	**1.8**	**1.2**
UPLINK EARTH STATION				
Earth Station Diameter (meters)	**6.5**	**4.0**	**4.0**	**2.4**
Earth Station Gain (dBi)	**57.4**	**57.4**	**48.7**	**48.7**
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	**4.0**	**4.0**	**4.0**	**2.4**
Earth Station Gain (dBi)	**51.4**	**51.4**	**51.4**	**47.0**
Earth Station G/T (dB/K)	**29.0**	**29.0**	**29.0**	**25.0**
COMPOSITE LINK PERFORMANCE				
C/N Thermal Uplink (dB)	**21.3**	**22.2**	**18.0**	**19.6**
Uplink Interference C/I (dB)	**---**	**---**	**---**	**---**
Uplink Adjacent Satellite C/I (dB)	**13.2**	**14.0**	**9.8**	**11.4**
Intermodulation C/IM (dB)	**----**	**36.1**	**22.3**	**35.0**
Downlink Thermal C/N (dB)	**19.2**	**19.5**	**14.8**	**12.8**
Downlink Interference C/I (dB)	**999.0**	**28.2**	**20.6**	**25.3**
Downlink Adjacent Satellite C/I (dB)	**16.7**	**17.4**	**12.7**	**10.3**
Subtotal C/N (dB)	**10.5**	**11.1**	**6.5**	**6.3**
Antenna Mispointing and Other Losses (dB)	**0.3**	**0.3**	**0.3**	**0.3**
Total C/N (dB)	**10.2**	**10.8**	**6.2**	**6.0**
Minimum Required C/N (dB)	**7.3**	**7.3**	**1.8**	**1.2**
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	**-57.5**	**-52.5**	**-52.3**	**-50.7**
Downlink EIRP Density At Beam Peak (dBW/Hz)	**-26.6**	**-26.1**	**-30.6**	**-28.6**