Engineering Statement

1) Introduction

Intelsat License LLC ("Intelsat") seeks authority in this application to launch and operate a new satellite designated as Intelsat 34. This spacecraft will operate from 55.5° W.L and, after traffic transition, the Intelsat 805 spacecraft currently located at 55.5º W.L.[1] and the Galaxy 11 spacecraft currently located at 55.6 º W.L.[2] will be deployed to other orbital locations. The characteristics of the Intelsat 34 spacecraft as well as its compliance with the various provisions of Part 25 of the Commission's rules are provided in the remainder of this Engineering Statement.

2) Spacecraft Overview

Intelsat 34 is a Space Systems Loral 1300 series spacecraft that operates on the C-band frequencies of 5925 – 6425 MHz, 3700 – 4200 MHz; and Ku-band frequencies of 14000 – 14500 MHz, 11450 – 11700 MHz and 11700 – 12200 MHz. The spacecraft utilizes 22 C-band channels to provide service to North and South America and Europe; 18 Ku-band channels to provide service to Mexico, Central America, Brazil, the Caribbean, Europe, a portion of the United States, and the northern part of the Atlantic Ocean.

2.1) Spacecraft Characteristics

Intelsat 34 is a three-axis stabilized type spacecraft that has a rectangular outer body structure. Internally, the spacecraft is comprised of a central cylinder to which a number of panels are attached. Intelsat 34 utilizes two three-panel deployable solar array wings and three deployable antennas.

The Intelsat 34 spacecraft is comprised of the following subsystems:

1) Thermal
2) Power
3) Attitude Control
4) Propulsion
5) Telemetry, Command and Ranging ("TC&R")
6) Uplink Power Control ("ULPC")

---

[1] *See* FCC File Number: SAT-MOD-20020919-00178.

[2] Galaxy 11 is licensed to operate at 55.5° W.L. (FCC File Number: SAT-MOD-20101102-00229). Intelsat has a pending application to relocate and operate Galaxy 11 at 44.8° W.L. (FCC File Number: SAT-MOD-20121018-00184). Galaxy 11 currently operates at 55.6° W.L. under Special Temporary Authority (FCC File Number: SAT-STA-20130829-00109).

7) Communication

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 each of the various subsystems in order to avoid single point failures.

The structural design of Intelsat 34 provides mechanical support for all subsystems. The structure externally supports the communication antennas, solar arrays, and the thrusters. It also provides a stable platform for preserving the alignment of critical elements of the spacecraft.

A summary of the basic spacecraft characteristics is provided in Exhibit 1. The Intelsat 34 mass and power budgets are provided in Exhibits 2 and 3, respectively.

2.2) Communication Subsystem

2.2.1) Overview

Intelsat 34 provides 22 active communication channels at C-band frequencies, and 18 active channels at Ku-band. The C-band payload employs channels having bandwidths of 36 MHz, 41 MHz and 72 MHz. The Ku-band payload employs channels having bandwidths of 36 MHz and 72 MHz. The Intelsat 34 frequency and polarization plans are provided in Exhibits 4A and 4B.

At C-band, the Intelsat 34 receive and transmit beams provide coverage of North and South America and Europe. At Ku-band, the spacecraft provides coverage of Mexico, Central America, Brazil, the Caribbean, Europe, a portion of the United States, and the northern part of the Atlantic Ocean.

Intelsat 34 is not compliant with Section 25.210(a)(3) of the Commission's rules that require a space station that provides domestic service using the frequency bands 3700 – 4200 MHz and 5925 – 6425 MHz bands to be capable of switching polarization upon ground command. Accordingly, Intelsat requests a waiver of the provisions of Section 25.210(a)(3). The nearest co-frequency satellites adjacent to Intelsat 34 are Intelsat 23, located

at 53º W.L., and Intelsat 21, located at 58º W.L.[3] Intelsat 23 and Intelsat 21 are licensed to Intelsat. Intelsat will internally coordinate the transmissions to/from these spacecraft and Intelsat 34 in order to ensure that excessive levels of interference are not generated. Hence, Intelsat believes that its request for a waiver of the provisions of Section 25.210(a)(3) of the rules is justified.

With respect to the use of the 11450 – 11700 MHz band, the United States Table of Frequency Allocations, contained in Section 2.106 of the Commission's rules, permits the use of this band by non-federal fixed satellite service for international systems only (see note NG 104). Accordingly, for earth stations in the United States receiving in the 11450 – 11700 MHz band, the associated uplink earth station will be located outside of United States.

Footnote NG 52 also specifies that in the 11450 – 11700 MHz band, Earth Stations on Vessels, Vehicle-Mounted Earth Stations and Earth Stations Aboard Aircraft may be authorized for the reception of fixed satellite service emissions from geostationary satellites subject to the conditions that these earth stations shall not claim protection from transmissions of non-Federal stations in the fixed service. Intelsat will comply with NG 52 as it relates to space-to-Earth emissions of Intelsat 34 should communication with one or more of the aforementioned type of earth stations be required.

Intelsat 34 is compliant with the provisions of Section 25.210(a)(1) and (2). Additionally, Intelsat will ensure that the placement of analog video carriers in the 3700 – 4200 MHz is compliant with the provisions of Section 25.211(a) of the Commission's rules.

2.6.2) Antennas and Beam Coverages

Intelsat 34 utilizes one deployable C-band transmit/receive reflector antenna, and two deployable Ku-band transmit/receive reflector antennas. The coverage beams of the Intelsat 34 antennas are shown in Exhibits 5A-1 through 5A-10, in the format prescribed in Section 25.114(d)(3) of the Commission's rules.

[3] Intelsat 16 is licensed to operate at 58.1° W.L, but currently is operating under Special Temporary Authority at 79° W.L. (FCC File Number: SAT-STA-20131021-00123). Intelsat currently expects Intelsat 16 to return to 58.1° W.L.

The performance characteristics for each beam are provided in Exhibits 5A-1 through 5A-10. For the uplink beams, the SFD at any G/T contour may be determined using the following formula:

$$SFD_D = SFD_P + [(G/T)_P - (G/T)_D] + A$$

where

SFD_D: SFD at desired G/T level (dBW/m^2)
SFD_P: Minimum SFD at peak G/T (dBW/m^2)
$(G/T)_D$: Desired G/T level (dB/K)
$(G/T)_P$: Peak G/T (dB/K)
A = Transponder attenuator setting (dB), ranging from 0 to 25 dB for C-band channels, from 0 to 21 dB for the Ku-band channels.

Exhibit 6 provides a detailed calculation of the EIRP, G/T and SFD of the Intelsat 34 uplink and downlink beams.

The Intelsat 34 communication C- and Ku-band antennas will be designed to have a cross-polarization isolation such that the ratio of the on axis co-polar gain to cross-polar gain of the antenna in the assigned frequency band to be at least 30 dB within its primary coverage. Section 25.210(i)(1) of the Commission's rules requires space station antennas in the Fixed Satellite Service to be designed to meet a cross-polarization isolation of 30 dB within the primary coverage area of the antenna. Accordingly, Intelsat 34 would be compliant with the provisions of Section 25.210(i)(1) of the Commission's rules.

2.6.3) Transponder description

2.6.3.1) C-Band

The (receive) input signal is fed through an input test coupler and then to a transmit reject filter that is designed to further reject the transmit frequency band and other undesired signals and prevent the overloading of the receive section. The output of the transmit reject filter is connected to one of four redundant Low Noise Amplifiers ("LNAs"), which are arranged in a 4-for-2 redundancy ring.

From the LNA, the signal is sent to a band-pass filter and then to one of four frequency down-converters which convert the uplink frequency to the appropriate downlink frequency. The C-band frequency down-converters

are arranged in a 4-for-2 redundancy ring. For transmissions received through the horizontally polarized receive beam, the signal is sent to a directional filter prior to going to the down-converter, whereby the command carrier is extracted.

Given that the down-converter converts the received signal to the necessary frequency required for transmission, the frequency stability of the transmitted signal is due entirely to the down-converter. The Intelsat 34 C-band frequency down-converters are able to maintain over the life of the spacecraft the frequency of the transmitted (down converted) signal to within +/- 0.002% of the desired value. Accordingly, Intelsat 34 is compliant with the provisions of Section 25.202(e) of the Commission's rules.

The output of each down-converter is routed to a set of hybrids and then to a bank of Input Multiplexers ("IMUXs"). The IMUXs are filters that provide frequency band separation for each channel.

The output of each IMUX channel is connected to a corresponding Linearized Channel Amplifier / Traveling Tube Amplifier ("LCAMP/TWTA") pair through a redundancy switching network. The switching network allows for the output of each IMUX to be routed to a redundant LCAMP/TWTA should the primary unit fail.

The LCAMP/TWTAs are configured in two interconnected redundancy rings of 13-for-11. Each LCAMP/TWTA is comprised of an LCAMP that feeds a 65 Watt, conduction cooled, C-band TWTA.

The LCAMP provides high gain, and amplitude and gain expansion to compensate for the selected TWTA. The LCAMP may only be operated in the Fixed Gain Mode ("FGM"), whereby the output of the LCAMP may be adjusted by ground command from 0 to at least 25 dB in 1dB increments, and is compliant with Section 25.210(c) of the Commission's rules.

The output of each LCAMP/TWTA is then routed through a bank of switches to an Output Multiplexer ("OMUX"). The switching network allows the output of a redundant LCAMP/TWTA to be forwarded to the appropriate OMUX should the primary LCAMP/TWTA unit fail. The output of each OMUX is fed to a test coupler and the antenna feed for transmission to Earth.

2.6.3.2) Ku-Band

The output of each Ku-band (receive) antenna is divided into its polarization specific receive signal components through the use of an ortho-mode transducer ("OMT") and fed into an input test coupler and then to a transmit reject filter that is designed to reject the transmit frequency band and other undesired signals, and prevent overloading of the receive section.

The output of the transmit reject filter is connected to a Low Noise Amplifier ("LNA"). Intelsat 34 utilizes one 3-for-2 redundant and one 2-for-1 redundant Ku-band LNAs.

From the LNA, the signal is sent to a band-pass filter and then to a frequency down-converter, which converts the uplink frequency to the appropriate downlink frequency. Intelsat 34 utilizes four sets of frequency down-converters. One set, which is arranged in a 2-for-1 redundancy ring, down-converts the signal by 2550 MHz. The second set is configured in a 2-for-1 redundancy scheme and down-converts the signal by 2300 MHz. The third set is configured in a 2-for-1 redundancy ring and down-converts the signal by 2545 MHz. The fourth set is configured in a 2-for-1 redundancy ring and down-converts the signal by 2055 MHz.

Given that the down-converter converts the received signal to the necessary frequency required for transmission, the frequency stability of the transmitted signal is due entirely to the down-converter. The Intelsat 34 Ku-band frequency down-converters are able to maintain over the life of the spacecraft the frequency of the transmitted (down-converted) signal to within +/- 0.002% of the desired value. Accordingly, Intelsat 34 is compliant with the provisions of Section 25.202(e) of the Commission's rules.

The output of the down-converter is routed to an IMUX. The IMUX is a filter that provides frequency band separation for each channel. The output of each IMUX channel is connected to a corresponding LCAMP/TWTA pair. The LCAMP/TWTAs are arranged into interconnected 10-for-8 and 12-for-10 redundancy rings. Intelsat 34 utilizes 150 Watt radiation cooled Ku-band TWTAs.

The LCAMP provides high gain, and amplitude and gain expansion to compensate for the selected TWTA. The LCAMP may be operated in the Fixed Gain Mode ("FGM") or in the Automatic Level Control ("ALC") mode. In the FGM mode, the output of the LCAMP may be adjusted by

ground command from 0 to 21 dB in (nominal) 1 dB increments and is compliant with Section 25.210(c) of the Commission's rules. In the ALC mode, the LCAMP automatically adjusts its gain depending on the power level of the input signal in order to maintain a constant output power in the presence of varying uplink power. When operating in the ALC mode, the amplifier operating point may be adjusted (by ground command) over a 10 dB range with a minimum of 21 steps using a nominal 0.5 dB step size.

The output of each LCAMP/TWTA is routed to a switch bank which permits connection of the channel to the appropriate downlink beam. From the switch bank, the signal is directed to the appropriate OMUX. The output of each OMUX is fed to a receive reject filter and a test coupler. From there the signal is sent to the antenna feed for transmission to Earth.

2.7) 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.
3) Reception, processing and distribution of telecommands.

The TC&R subsystem consists of the following elements: 1) one omni-directional command antenna located on the nadir side of the spacecraft, 2) one omni-directional command antenna located on the aft side of the spacecraft, 3) one omni-directional telemetry antenna located on the nadir side of the spacecraft, 4) one omni-directional telemetry antenna located on the aft side of the spacecraft, 5) West Hemi beam transmit/receive reflector antenna, 6) three command receivers, 7) two dual frequency telemetry transmitters, 8) baseband digital data handling system, and 9) microwave components including filters, switches, couplers, isolators, cables and waveguide.

2.7.1) Antennas

The coverage patterns of the command and telemetry beams are provided in Exhibits 5B-1 through 5B-4, in the format prescribed in Section 25.114(d)(3) of the Commission's rules. When on-station, command and telemetry signals are received and transmitted through Intelsat 34's main C-

band West Hemi beam antenna. Representative on-station receive and transmit gain graphs are provided in Exhibits 5B-1 and 5B-3, respectively.

During emergencies and transfer orbit operations, command and telemetry signals are received and transmitted through the omni-directional antenna. Intelsat 34 utilizes two antennas for command and two for telemetry – one command and telemetry antenna pair located on the nadir side of the spacecraft and the other pair located on the aft side. Representative receive and transmit gain graphs for the omni-directional antenna are provided in Exhibits 5B-2 and 5B-4, respectively.

2.7.2) Command

The Intelsat 34 command subsystem performance summary is provided in Exhibit 7. Detailed calculation of the G/T and SFD for each command beam is provided in Exhibit 8.

During on-station operations, commands are sent to the spacecraft by transmission of two independent PCM/PSK signals on the frequencies of 6173.7 MHz and 6176.3 MHz. The Intelsat 34 command frequencies are not compliant with Section 25.202(g) of the Commission's rules. The Intelsat 34 command frequencies are identical to those utilized by Intelsat 805, one of the spacecraft that Intelsat 34 is replacing. The nearest co-frequency satellites adjacent to Intelsat 34 are Intelsat 21, located at 58º W.L, and Intelsat 23, located at 53º W.L. As noted above, Intelsat 16 is licensed to operate at 58.1º W.L. All three satellites are licensed to Intelsat and Intelsat will internally coordinate the transmissions to/from these spacecraft and Intelsat 34 in order to ensure that excessive levels of interference are not generated. Hence, Intelsat believes that its request for a waiver of Section 25.202(g) is justified.

When on-station the command signals are received through the main C-band West Hemi beam antenna. The coverage pattern of the West Hemi beam antenna is provided in Exhibit 5B-1. The command signals are routed to three command receivers. The receivers amplify and demodulate the signal, and convert the command signal into a digital stream. The output of the command receivers are forwarded to the Data Handling Electronics ("DHE"), where the commands are decoded and sent to the appropriate unit.

During transfer orbit and emergency operations, the operation of the command subsystem is similar to that for on-station operations, except that

the transmitted command signals are received by the omni-directional antennas.

2.7.3) Telemetry

The Intelsat 34 telemetry subsystem performance summary is provided in Exhibit 7. Detailed calculation of the EIRP for each telemetry beam is provided in Exhibit 8.

During on-station operations, telemetry is transmitted by the spacecraft on two independent, linearly polarized, PCM/PSK signals on one of two frequency pairs: 3949.0/3949.5 MHz or 3950.5/3951.0 MHz. The telemetry frequencies are not compliant with Section 25.202(g) of the Commission's rules. The Intelsat 34 telemetry frequencies are close to those utilized by Intelsat 805, one of the spacecraft that Intelsat 34 is replacing. The nearest co-frequency satellites adjacent to Intelsat 34 are Intelsat 21, located at 58º W.L., and Intelsat 23, located at 53º W.L. As noted above, Intelsat 16 is licensed to operate at 58.1º W.L. All three satellites are licensed to Intelsat and Intelsat will internally coordinate the transmissions to/from these spacecraft and Intelsat 34 in order to ensure that excessive levels of interference are not generated. Hence, Intelsat believes that its request for a waiver of Section 25.202(g) is justified.

The telemetry baseband functions are implemented in the Data Handling Electronics ("DHE"), where data from the various spacecraft units are collected, processed, multiplexed, formatted and encoded onto subcarriers. The output of the DHE is routed to the telemetry transmitters where the signal is modulated onto the main carrier frequencies.

Intelsat 34 utilizes two dual frequency transmitters. One transmitter can operate on the frequencies of 3949.0 MHz and 3949.5 MHz; and the other transmitter can operate at 3950.5 MHz and 3951.0 MHz. The telemetry transmitters are able to maintain the downlink transmit frequency to within +/- 0.002% of the desired frequency over the life of the spacecraft. Accordingly, the Intelsat 34 telemetry transmissions are compliant with the provisions of Section 25.202(e) of the Commission's rules.

Each telemetry transmitter has a low power output port and a high power output port. During emergency operations, the signal from the high power output port of each telemetry transmitter is routed to the omni-directional antennas through a switch. During on-station operations, the signal from the low power output port of the transmitter is routed to a hybrid and then to the

appropriate C-band payload OMUX for transmission back to Earth through the West Hemi transmit beam antenna.

2.7.4) Ranging

During all phases of the mission, the slant range of the spacecraft can be determined to a relatively high level of accuracy through the use of a multiple tone ranging system. The ranging tones selected are combined with the normal command data and modulated onto the command carrier and transmitted to the spacecraft. Once received by the spacecraft through the appropriate receiving antenna, the signal is routed to the command receiver where it is separated from the normal command data and routed directly to the spacecraft's telemetry transmitter. At the telemetry transmitter, the ranging signal is combined with other telemetry data and modulated onto the main telemetry carrier and transmitted to Earth through the appropriate spacecraft transmitting antenna. On the ground, the ranging tones are separated from the telemetry data, demodulated and their phase compared with that of the transmitted signal to determine the range of the satellite.

Because the ranging subsystem uses the command and telemetry subsystems, the descriptions of the operation of these two latter systems during on-station, transfer orbit and emergency conditions are applicable to the ranging subsystem as well. The performance summary of the Intelsat 34 command, telemetry, and ranging subsystems are provided in Exhibit 7.

2.8) Uplink Power Control Subsystem ("ULPC")

2.8.1 Antennas

Intelsat 34 utilizes a dedicated global horn antenna to generate the C-band global ULPC beam. Similarly, at Ku-band, a dedicated Ku-band global horn antenna is utilized to generate the Ku-band global ULPC beams. The coverage patterns of the C-band and Ku-band ULPC beams are provided in Exhibits 5C-1 through 5C-3.

2.8.2 ULPC System Description

Intelsat 34 provides two Ku-band beacons and one C-band beacon which can be used for uplink power control by customers transmitting to the spacecraft. The C-Band ULPC beacon is linearly polarized and operates on the frequency of 3700.25 MHz. The Ku-Band ULPC beacons are linearly polarized and operate on the frequencies of 11699.25 MHz and 11699.5

MHz. Detailed calculation of the EIRP for each ULPC beam is provided in Exhibit 6.

The Intelsat 34 C-band and Ku-band ULPC beacon transmitters are able to maintain the downlink transmit frequency to within +/- 0.002% of the desired frequency over the life of the spacecraft. Accordingly, Intelsat 34 ULPC transmissions are compliant with the provisions of Section 25.202(e) of the Commission's rules.

The C-band ULPC subsystem utilizes a dedicated 2-for-1 redundant transmitter to generate the beacon signal. The output signal from the ULPC transmitter is directed, in sequence, to the C-band OMUX assembly, a test coupler, and then to the C-band global horn antenna for transmission to Earth.

For the generation of each Ku-band ULPC frequency, dedicated 2-for-1 redundant transmitters are utilized. The output of each transmitter is directed to a test coupler, and then to the Ku-band beacon global horn antenna for transmission to Earth.

2.9) Satellite Station-Keeping

The spacecraft will be maintained within 0.05° of its nominal longitudinal position in the east-west direction as well as in the north-south direction. Accordingly, it is in compliance with the provisions of 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).

2.10) Satellite Useful Lifetime

The design lifetime of the satellite in orbit is 15 years. This has been determined by a conservative evaluation of the effect of the synchronous orbit environment on the solar array, the amount of fuel aboard the spacecraft, the effect of the charge-discharge cycling on the life of the battery, and the wear-out of the amplifiers and other active units. The mass allocation of propellant for spacecraft station keeping is 15 years. To enhance the probability of survival, equipment/unit redundancy is incorporated into the spacecraft design where possible. Materials and

processes have been selected so that aging or wearing effects will not adversely affect spacecraft performance over the estimated life.

2.11) Spacecraft Reliability

Intelsat 34 is designed for an operational and mission life of 15 years. Life and reliability are maximized by incorporating flight proven or flight qualified units and designs to the greatest extent possible. All subsystems and units have a minimum design life of 15 years. Redundancy concepts are applied to all critical components. All avoidable single-point failure modes have been eliminated.

The projected reliability of the C- and Ku-band payloads are 94.2% and 92.6%, respectively. The projected reliability of the bus system is 86.3%. The overall reliability of the Intelsat 34 spacecraft is projected to be 75.3%. The subsystem reliability assessments were based upon the use of failure rates, modeling assumptions from previous spacecraft programs and those specific to Intelsat 34. Failure rates for spacecraft equipment have been calculated based upon the average of beginning of life (BOL) cold and end of life (EOL) hot temperatures. Methodology of reliability calculations are consistent with industry standard practice (i.e., MIL-HDBK-217F "Reliability Prediction of Electronic Equipment") and incorporate contractor's actual on-orbit experience.

3.0) Services and Emission Designators

Intelsat 34 is to be a general purpose communications satellite and has been designed to support various services offered within Intelsat's satellite system. Depending upon the needs of the users, the transponders on Intelsat 34 can accommodate television, radio, voice or data communications. Typical types of communication services to be offered include:

a) Frequency modulated television (TV/FM)
b) Compressed digital video
c) High speed digital data
d) Digital single channel per carrier ("SCPC") data channels
e) Digital SCPC with 256 kbps and T1 data rates

Emission designators and allocated bandwidths for representative communication carriers are provided in Exhibit 9.

4.0) Power Flux Density ("PFD")

The power flux density ("PFD") limits for space stations operating in the 3700 – 4200 MHz and 11450 - 11700 MHz bands are contained in Section 25.208 of the Commission's rules. For the 11700 – 12200 MHz band, there are no PFD limits specified in the Commission's rules or the Radio Regulations for the fixed satellite service.

The maximum PFD levels for the Intelsat 34 transmissions were calculated for a number of TV/FM and/or digital carriers listed in Exhibit 9 operating in the 3700 – 4200 MHz and 11450 – 11700 MHz bands. These carriers were chosen because they generally produce high PFD levels on the Earth's surface. The PFD levels were also calculated for the Intelsat 34 telemetry and ULPC carriers. The results are provided in Exhibit 10 and show that the downlink power flux density levels of the Intelsat 34 carriers do not exceed limits specified in Sections 25.208 of the Commission's rules.

5.0) Emission Limitations

The Intelsat 34 receiver and transmitter channel filter response characteristics are provided in Exhibit 11, as required under Section 25.114 (4)(vii) of the Commission's rules.

Intelsat will comply with the provisions of Section 25.202(f) of the Commission's rules with regard to Intelsat 34 emissions.

6.0) Service Area

At C-band, the primary service area of Intelsat 34 is Europe, North and South America. At Ku-band, the primary service area is Mexico, Central America, Brazil, the Caribbean, Europe and a portion of the United States.

7.0) Orbital Location

Intelsat requests that it be assigned the 55.5° W.L. orbital location for Intelsat 34. After transfer of traffic to Intelsat 34, the Intelsat 805 and Galaxy 11 spacecraft, which currently operate from 55.5º W.L. and 55.6 º W.L. respectively, will be deployed to other orbital locations. Intelsat 34 includes the frequency band 11450 – 11700 MHz which is not on Intelsat 805 or Galaxy 11. The 55.5° W.L. location satisfies Intelsat 34 requirements for optimizing coverage, elevation angles and service availability and ensures that maximum operational, economic and public interest benefits will be derived.

8.0) Orbital Arc Limitations

Intelsat 34 is intended to provide video, audio and data services to satellite users within its coverage area. The 55.5° W.L position affords reasonable earth station angles to the region. The attractiveness of Intelsat 34 to this market would be severely diminished if service to this area is not possible.

9.0) Intelsat 34 Link Budgets and Interference Analysis

Link analysis for Intelsat 34 was conducted for a number of representative carriers, at C- and Ku-band.

At C-band, it was assumed that the nearest co-frequency satellites to Intelsat 34 were two hypothetical satellites – one located at 53.5º W.L and the other located at 57.5º W.L. The hypothetical satellites were assumed to have same operational parameters as Intelsat 34. It was further assumed that each of the hypothetical satellites utilized digital carriers having a maximum uplink power density of -38.7 dBW/Hz, as specified in Section 25.212(d) of the Commission's rules. A downlink (beam peak) EIRP density of -32 dBW/Hz was used.

At Ku-band, it was assumed that the nearest co-frequency satellites to Intelsat 34 were two hypothetical satellites – one located at 53.5º W.L and the other located at 57.5º W.L. The hypothetical satellites were assumed to have the same operational parameters as Intelsat 34. It was further assumed that each of the hypothetical satellites utilized digital carriers having a maximum uplink power density -45 dBW/Hz. The maximum downlink EIRP density of the hypothetical satellites was assumed to be -20 dBW/Hz.

Other assumptions made for the link budget analysis were as follows:

a) In the plane of the geostationary satellite orbit, all C and Ku-band transmitting and receiving earth station antennas have off-axis co-polar gains that are compliant with the limits specified in Section 25.209(a)(1) or (a)(2) of the FCC's rules, depending on the frequency band under consideration.
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 C-band frequencies, degradation due to rain is not considered, given that rain attenuation effects are insignificant at C-band.
d) At Ku-band frequencies rain attenuation predictions are derived using Recommendation ITU-R 618.

e) At Ku-band frequencies, increase in noise temperature of the receiving earth station due to rain is taken into account.
f) For the cases where the transponder operates in a multi-carrier mode, the effects due to intermodulation interference are taken into account.

As shown in 5A, the characteristics of the horizontally and vertically polarized C- and Ku-band are either identical or very similar to each other. Consequently, for the analysis the following worst-case beam performance was assumed for these Intelsat 34 beams:

Beam Name	**Aggregate Beam Designation**	**Worst-Case Beam Peak G/T (dB/K)**	**Worst-Case Beam SFD Range @ Peak G/T (dBW/m^2)**	**Worst-Case Beam EIRP (dBW)**
West Hemi (H)	West Hemi	1.0	-79.9 to -104.9	41.1
West Hemi (V)				
Brazil (H)	Brazil	8.0	-82.0 to -103.0	54.4
Brazil (V)				
NAOR	NAOR	0.6	-74.6 to -95.6	46.8

At C- and Ku-band frequencies, the impact of the TV/FM carriers from the adjacent satellites at 53.5° W.L and 57.5° W.L on the transmissions of Intelsat 34 was not considered due to the fact that TV/FM carriers are known to be high-density carriers with most of the energy contained within the near vicinity of the carrier center frequency. Operation of sensitive narrow-band carriers is typically precluded within these high power density areas of the TV/FM carrier. Accordingly, placement and operation of TV/FM carriers are normally achieved through internal coordination and/or coordination discussions with the adjacent satellite operator, whichever may be the case, rather than through C/I calculations – since the results of such calculations would show that narrow-band carriers typically could not operate on a co-frequency basis with TV/FM carriers.

As shown in Exhibits 4A and 4B, Intelsat 34 employs beam channels having varying bandwidths. In an effort to keep the number of link calculations to a manageable level, link calculations were not performed for each channel size, but rather for only one channel size. The channel size chosen for each beam was based upon the level of adjacent satellite downlink interference. As an example, if a channel having a bandwidth of 72 MHz and a channel having a bandwidth of 36 MHz have the same associated adjacent satellite downlink interfering EIRP density, then link budgets were performed only

for emissions that were transmitted through the 72 MHz channel, since power density levels would typically be smaller (uplink and downlink) in comparison to those which would be transmitted through the 36 MHz channel; and thus the impact of the adjacent satellite interference would be greater on the former. As a second example, if the level of downlink interfering EIRP density to which the 36 MHz channel was subjected was larger than that for the 72 MHz channel, and if this additional level of interference was larger than ten times the logarithmic ratio of the two channel bandwidths (i.e. 10log[72/36]), then link calculations were performed only for the emissions of the 36 MHz channel, since the impact of adjacent satellite interference is greater on emissions of this channel (in comparison to those being transmitted through the 72 MHz channel).

The results of the C-band and Ku-band analysis are shown in Exhibit 12 and demonstrate that operation of the Intelsat 34 satellite from 55.5° W.L. would permit the intended services to achieve their respective performance objectives while maintaining sufficient link margin. Additionally, the power and EIRP density levels of the carriers listed in Exhibit 12 comply with the limits contained in Sections 25.212(c) and (d) of the Commission's rules.

10.0) Adjacent Satellite Link Analysis

At C- and Ku-band, the impact of the proposed Intelsat 34 emissions on the transmissions of hypothetical adjacent satellites located at 53.5º W.L and 57.5º W.L was analyzed. It was assumed that each of these satellites had the same operating characteristics as the proposed Intelsat 34 spacecraft.

For the satellite located at 53.5º W.L, it was assumed that the adjacent satellites were Intelsat 34, located at 55.5º W.L, and a hypothetical satellite having the same operating characteristics as Intelsat 34 located at 51.5º W.L. For the satellite located at 57.5º W.L, it was assumed that the adjacent satellites were Intelsat 34, located at 55.5º W.L, and a hypothetical satellite having the same operating characteristics as Intelsat 34 located at 59.5º W.L.

The impact of Intelsat 34 emissions on the TV/FM carriers of the adjacent satellites at 53.5º W.L and 57.5º W.L was not considered for the reasons articulated in section 9.0, above. The assumptions made in section 9.0 pertaining to Earth station off-axis gain performance, Earth station cross-polarization performance and rain attenuation were also applied in the analysis.

The results of the analysis are listed in Exhibits 13 and 14. The Intelsat 34 transmissions will be limited to those levels contained in Sections 25.212(c) and (d), as applicable, unless higher levels are coordinated with affected adjacent satellite operators. In any case, pursuant to the results in Exhibits 13 and 14, the uplink power density of the Intelsat 34 digital carriers operating in the 5925 – 6425 MHz and 14000 – 14500 MHz band will not exceed -38.7 dBW/Hz and -45 dBW/Hz, respectively. Within the 3700 – 4200 MHz band the downlink EIRP density of the Intelsat 34 digital carriers will not exceed -32 dBW/Hz; and within the 11450 – 12200 MHz band the downlink EIRP density of the Intelsat 34 digital carriers will not exceed -20 dBW/Hz.

11.0) Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 34 from 55.5º W.L.

12.0) 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.

12.1) 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) critical components of spacecraft subsystems have redundancy to eliminate all avoidable single-point failures. The spacecraft does not use any subsystems for end-of-life disposal that are not used for normal operations.

12.2) 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.

12.3) 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. With the exception of Intelsat 805 during the transition of traffic period, Intelsat 34 will not be located at the same orbital location as another satellite or at an orbital location that has an overlapping station keeping volume with another satellite.

During the transition of traffic from Intelsat 805 and Galaxy 11, Intelsat will take all the necessary steps, e.g., inclination-eccentricity separation strategy and/or slight relocation of Intelsat 805, and/or Intelsat 34 (and potentially Galaxy 11), to minimize the risk of collision between the satellites.

With the exception of Intelsat 805, 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 stationkeeping volume with Intelsat 34. Intelsat is also not aware of any system with an overlapping station-keeping volume with Intelsat 34 that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

12.4) Post Mission Disposal

At the end of the mission, Intelsat intends to dispose of the spacecraft by moving it to a minimum altitude of 300 kilometers above the geostationary arc. This exceeds the minimum altitude established by the IADC formula. Intelsat has reserved 1.4 kilograms of fuel for this purpose. The reserved fuel figure was determined by the spacecraft manufacturer and provided for in the propellant budget. To calculate this figure, the “rocket equation” was used, 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.

In calculating the disposal orbit, Intelsat has used simplifying assumptions as permitted under the Commission’s Orbital Debris Report and Order. For reference, the effective area to mass ratio (Cr*A/M) of the Intelsat 34 spacecraft is 0.045 m^2/kg, resulting in a minimum perigee disposal altitude

under the IADC formula of at most 235 kilometers above the geostationary arc, which is lower than the 300 kilometer above geostationary disposal altitude specified by Intelsat in this filing. Accordingly, the Intelsat 34 planned disposal orbit complies with the FCC's rules.

13.0) TC&R Control Earth Stations

Intelsat will conduct TC&R operations through one or more of the following earth stations: Mountainside, Maryland; Castle Rock, Colorado; Riverside, California; or Fillmore, California. Additionally, Intelsat is capable of remotely controlling Intelsat 34 from its facilities in Washington D.C.

Certification Statement

I hereby certify that I am a technically qualified person and am familiar with Part 25 of the Commission's Rules and Regulations. 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/	January 10, 2014
Roya Shambayati Intelsat Director Spectrum Strategy	Date

EXHIBIT 1: SUMMARY OF SPACECRAFT CHARACTERISTICS

GENERAL	
Spacecraft Name	Intelsat 34
Orbital Location	55.5° W.L.
Spacecraft Manufacturer	Space Systems/Loral
Spacecraft Model	1300LL-122
Spacecraft Type	3-axis stabilized
Spacecraft Dimensions	
Length	24.7 meters
Width	9.5 meters
Depth	5.8 meters
Spacecraft Mass	
Mass w/o fuel	1818 kg
Mass w/ fuel	3300 kg
Spacecraft Expected Lifetime	15 years
Eclipse Capability	100%
Station-keeping	
North-South	±0.05°
East-West	±0.05°
Antenna Pointing Accuracy	0.15°
Spacecraft Reliability	75.3%
Payload Reliability	
C-Band	94.2%
Ku-Band	92.6%
Bus Reliability	86.3%
Propulsion Type	Bi-propellant, Electric
Maximum Solar Array Power	
Beginning of Life	10913 Watts
End of Life	10015 Watts
Deployed Area of Solar Array	22.4 sq. meters per wing

EXHIBIT 2: SPACECRAFT MASS BUDGET

Mass of Spacecraft without Fuel (kg)	1818
Mass of Fuel and Disposables (kg)	1482
Launch Mass (kg)	3300
Mass of Fuel, in orbit, at Beginning of Life (kg)	190

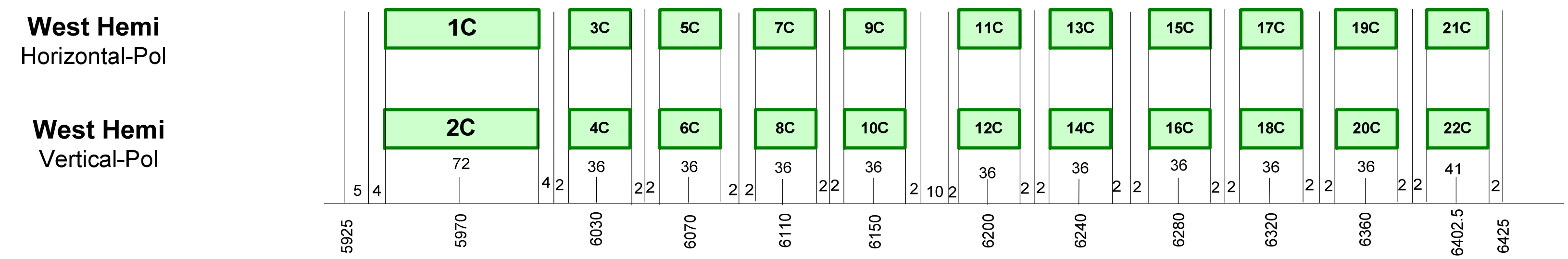
EXHIBIT 3: SPACECRAFT POWER BUDGET

	BEGINNING OF LIFE		END OF LIFE	
	AUTUMN EQUINOX	SUMMER SOLSTICE	AUTUMN EQUINOX	SUMMER SOLSTICE
PAYLOAD (WATTS)	6623	6623	6623	6623
BUS (WATTS)	1860	1199	1763	1118
TOTAL POWER (WATTS)	8483	7822	8483	7822
SOLAR ARRAY POWER (WATTS)	10913	9709	10015	9023
DEPTH OF BATTERY DISCHARGE (%)	71.2%	N/A	71.2%	N/A

EXHIBIT 4A: FREQUENCY PLAN

C-Band Frequency Plan

Uplink



Downlink

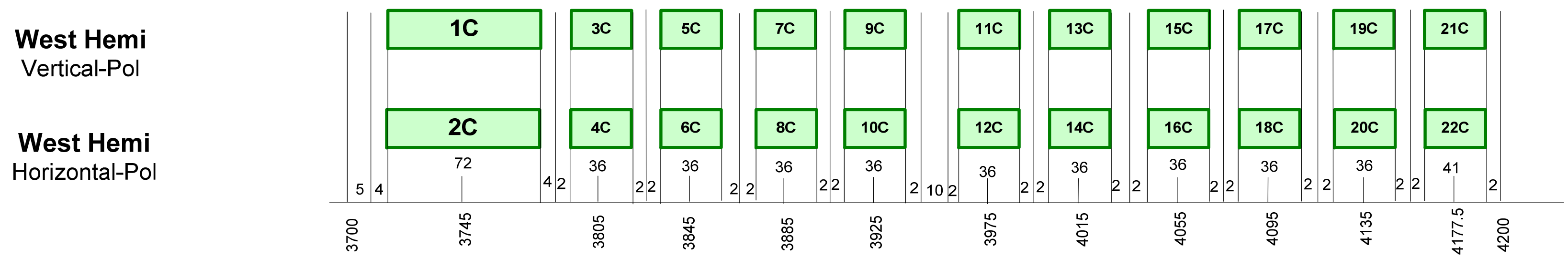
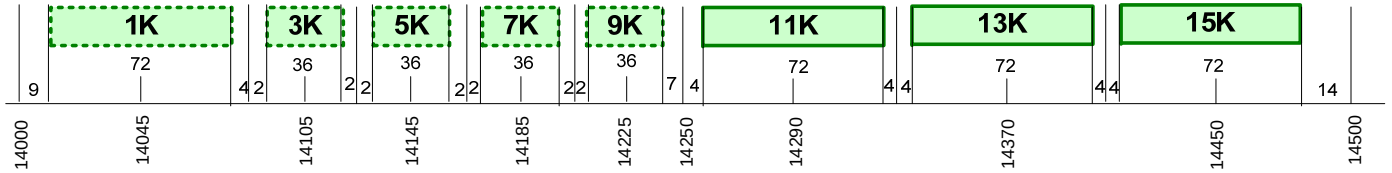


EXHIBIT 4A: FREQUENCY PLAN (continued)

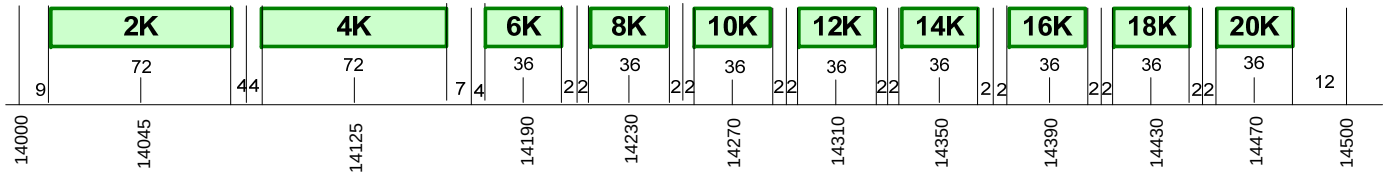
Ku-Band Uplink Frequency Plan

Uplink

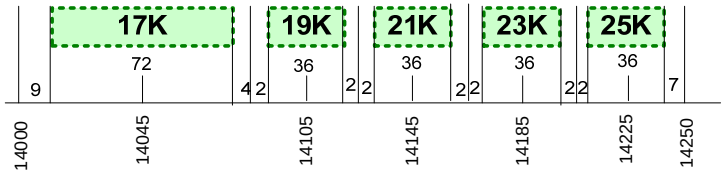
F1 Brazil
Horizontal-pol



F1 Brazil
Vertical-pol



F2 NAOR
Horizontal-pol



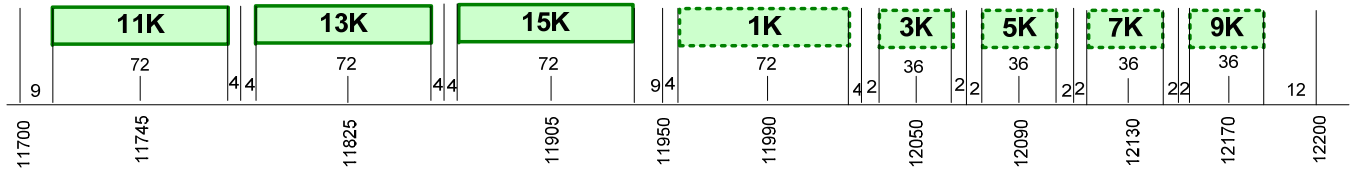
Switchable (channel by channel)

EXHIBIT 4A: FREQUENCY PLAN (continued)

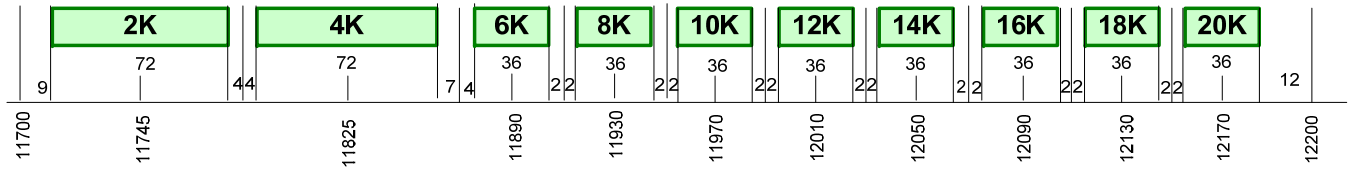
Ku-Band Downlink Frequency Plan

Downlink

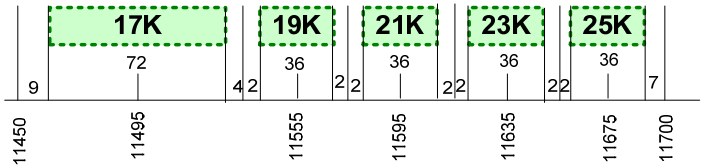
F1 Brazil
Vertical-pol



F1 Brazil
Horizontal-pol



F2 NAOR
Vertical-pol



Switchable (channel by channel)

EXHIBIT 4B: FREQUENCY ASSIGNMENTS

Uplink Transponder Designation	Uplink Beam Name	Uplink Polarization	Uplink Center Frequency (MHz)	Downlink Transponder Designation	Downlink Beam Name	Downlink Polarization	Downlink Center Frequency (MHz)	Channel Bandwidth (MHz)	Maximum Channel Gain (dB)
1C	West Hemi	Horizontal	5970	1C	West Hemi	Vertical	3745	72	129.6
3C	West Hemi	Horizontal	6030	3C	West Hemi	Vertical	3805	36	129.6
5C	West Hemi	Horizontal	6070	5C	West Hemi	Vertical	3845	36	129.6
7C	West Hemi	Horizontal	6110	7C	West Hemi	Vertical	3885	36	129.6
9C	West Hemi	Horizontal	6150	9C	West Hemi	Vertical	3925	36	129.6
11C	West Hemi	Horizontal	6200	11C	West Hemi	Vertical	3975	36	129.6
13C	West Hemi	Horizontal	6240	13C	West Hemi	Vertical	4015	36	129.6
15C	West Hemi	Horizontal	6280	15C	West Hemi	Vertical	4055	36	129.6
17C	West Hemi	Horizontal	6320	17C	West Hemi	Vertical	4095	36	129.6
19C	West Hemi	Horizontal	6360	19C	West Hemi	Vertical	4135	36	129.6
21C	West Hemi	Horizontal	6402.5	21C	West Hemi	Vertical	4177.5	41	129.6
2C	West Hemi	Vertical	5970	2C	West Hemi	Horizontal	3745	72	129.6
4C	West Hemi	Vertical	6030	4C	West Hemi	Horizontal	3805	36	129.6
6C	West Hemi	Vertical	6070	6C	West Hemi	Horizontal	3845	36	129.6
8C	West Hemi	Vertical	6110	8C	West Hemi	Horizontal	3885	36	129.6
10C	West Hemi	Vertical	6150	10C	West Hemi	Horizontal	3925	36	129.6
12C	West Hemi	Vertical	6200	12C	West Hemi	Horizontal	3975	36	129.6
14C	West Hemi	Vertical	6240	14C	West Hemi	Horizontal	4015	36	129.6
16C	West Hemi	Vertical	6280	16C	West Hemi	Horizontal	4055	36	129.6
18C	West Hemi	Vertical	6320	18C	West Hemi	Horizontal	4095	36	129.6
20C	West Hemi	Vertical	6360	20C	West Hemi	Horizontal	4135	36	129.6
22C	West Hemi	Vertical	6402.5	22C	West Hemi	Horizontal	4177.5	41	129.6
CMD1	West Hemi	Horizontal	6173.7					1.0	
CMD2	West Hemi	Horizontal	6176.3					1.0	
CMD3	Omni	Left Hand Circular	6173.7					1.0	
CMD4	Omni	Left Hand Circular	6176.3					1.0	
				TM1	West Hemi	Vertical	3949.0	0.5	
				TM2	West Hemi	Vertical	3949.5	0.5	
				TM3	West Hemi	Vertical	3950.5	0.5	
				TM4	West Hemi	Vertical	3951.0	0.5	
				TM5	Omni	Right Hand Circular	3949.0	0.5	
				TM6	Omni	Right Hand Circular	3949.5	0.5	
				TM7	Omni	Right Hand Circular	3950.5	0.5	
				TM8	Omni	Right Hand Circular	3951.0	0.5	
				UPC1	Global	Horizontal	3700.25	0.025	

EXHIBIT 4B: FREQUENCY ASSIGNMENTS (continued)

Uplink Transponder Designation	Uplink Beam Name	Uplink Polarization	Uplink Center Frequency (MHz)	Downlink Transponder Designation	Downlink Beam Name	Downlink Polarization	Downlink Center Frequency (MHz)	Channel Bandwidth (MHz)	Maximum Channel Gain (dB)
1K	Brazil	Horizontal	14045	1K	Brazil	Vertical	11990	72	129.8
3K	Brazil	Horizontal	14105	3K	Brazil	Vertical	12050	36	129.8
5K	Brazil	Horizontal	14145	5K	Brazil	Vertical	12090	36	129.8
7K	Brazil	Horizontal	14195	7K	Brazil	Vertical	12130	36	129.8
9K	Brazil	Horizontal	14225	9K	Brazil	Vertical	12170	36	129.8
11K	Brazil	Horizontal	14290	11K	Brazil	Vertical	11745	72	129.8
13K	Brazil	Horizontal	14370	13K	Brazil	Vertical	11825	72	129.8
15K	Brazil	Horizontal	14450	15K	Brazil	Vertical	11905	72	129.8
2K	Brazil	Vertical	14045	2K	Brazil	Horizontal	11745	72	129.8
4K	Brazil	Vertical	14125	4K	Brazil	Horizontal	11825	72	129.8
6K	Brazil	Vertical	14190	6K	Brazil	Horizontal	11890	36	129.8
8K	Brazil	Vertical	14230	8K	Brazil	Horizontal	11930	36	129.8
10K	Brazil	Vertical	14270	10K	Brazil	Horizontal	11970	36	129.8
12K	Brazil	Vertical	14310	12K	Brazil	Horizontal	12010	36	129.8
14K	Brazil	Vertical	14350	14K	Brazil	Horizontal	12050	36	129.8
16K	Brazil	Vertical	14390	16K	Brazil	Horizontal	12090	36	129.8
18K	Brazil	Vertical	14430	18K	Brazil	Horizontal	12130	36	129.8
20K	Brazil	Vertical	14470	20K	Brazil	Horizontal	12170	36	129.8
17K	NAOR	Horizontal	14045	17K	NAOR	Vertical	11495	72	136.3
19K	NAOR	Horizontal	14105	19K	NAOR	Vertical	11555	36	136.3
21K	NAOR	Horizontal	14145	21K	NAOR	Vertical	11595	36	136.3
23K	NAOR	Horizontal	14195	23K	NAOR	Vertical	11635	36	136.3
25K	NAOR	Horizontal	14225	25K	NAOR	Vertical	11675	36	136.3
				UPK1	Global	Vertical	11699.25	0.025	
				UPK2	Global	Horizontal	11699.5	0.025	

EXHIBIT 5A-1: WEST HEMI RECEIVE BEAM
(Schedule S Beam ID: HHUL)

Beam Polarization: Horizontal
Peak Beam Gain: 28.2 dBi
Peak Beam G/T: 1.0 dB/K
Saturated Flux Density @ Peak Beam G/T: -79.0 to -104.0 dBW/m^2

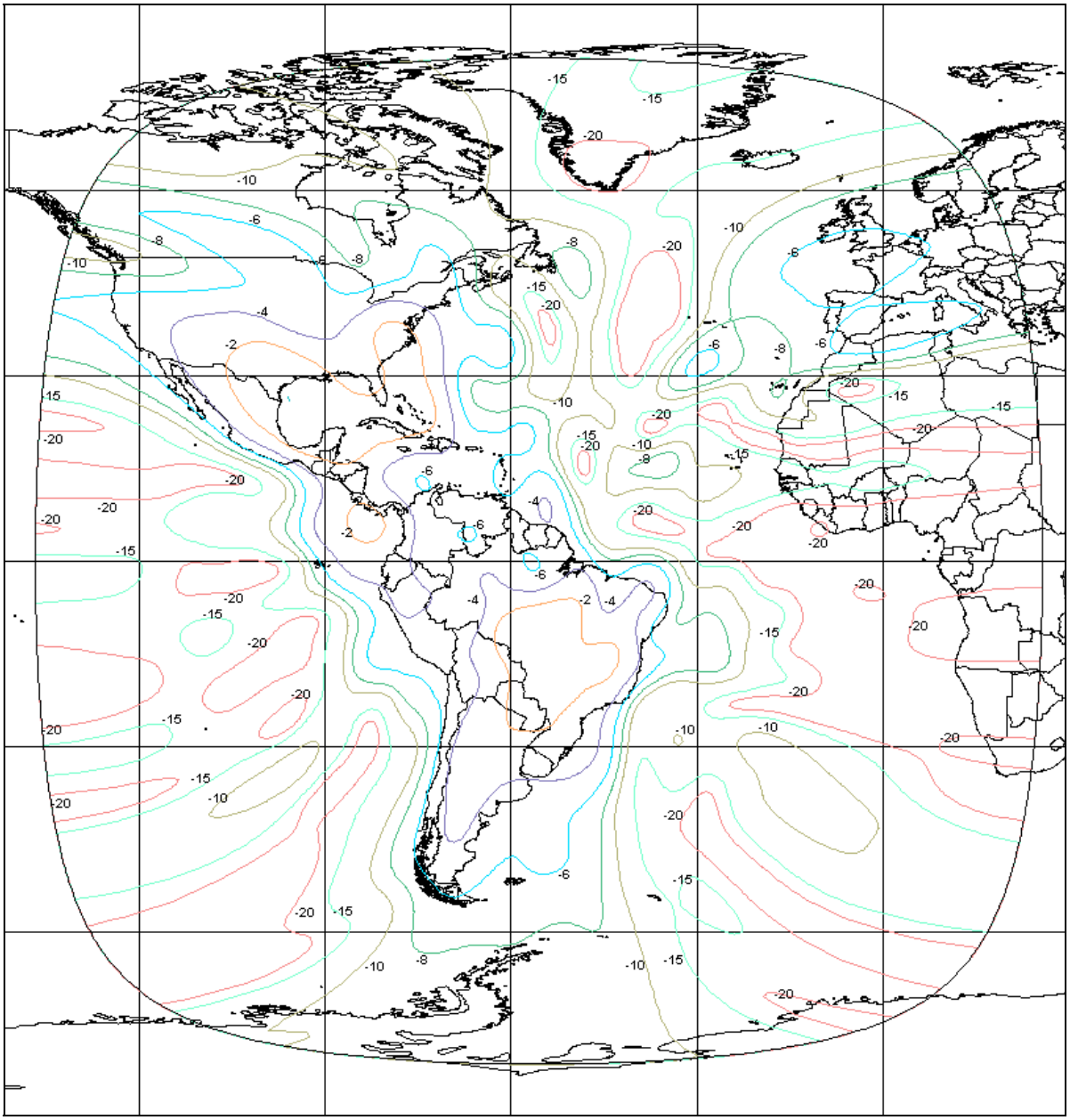


EXHIBIT 5A-2: WEST HEMI RECEIVE BEAM
(Schedule S Beam ID: HVUL)

Beam Polarization: Vertical
Peak Beam Gain: 28.2 dBi
Peak Beam G/T: 0.9 dB/K
Saturated Flux Density @ Peak Beam G/T: -79.9 to -104.9 dBW/m^2

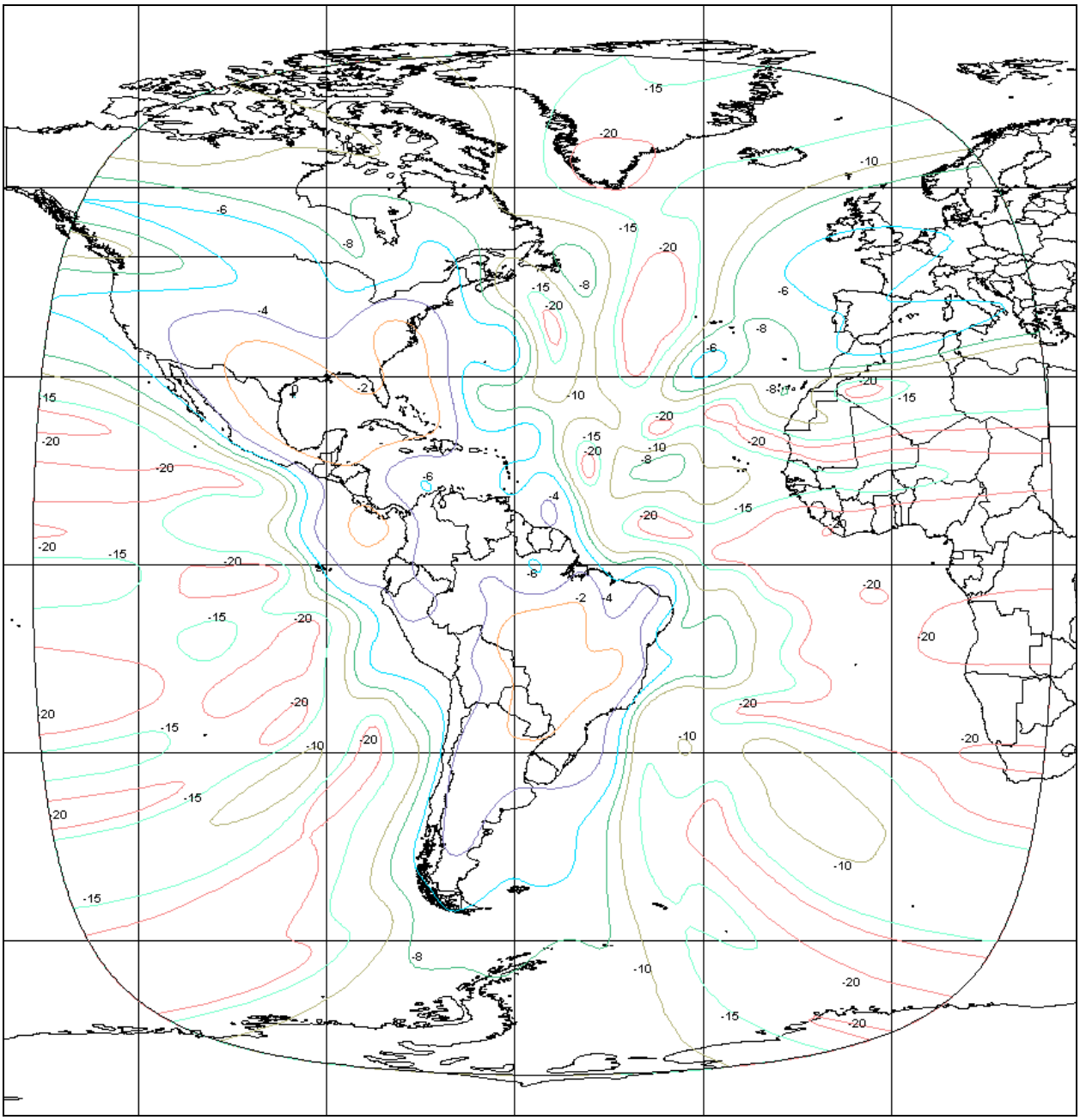


EXHIBIT 5A-3: Brazil RECEIVE BEAM
(Schedule S Beam ID: BHUL)

Beam Polarization: Horizontal
Peak Beam Gain: 36.5 dBi
Peak Beam G/T: 8.0 dB/K
Saturated Flux Density @ Peak Beam G/T: -82.0 to -103.0 dBW/m^2

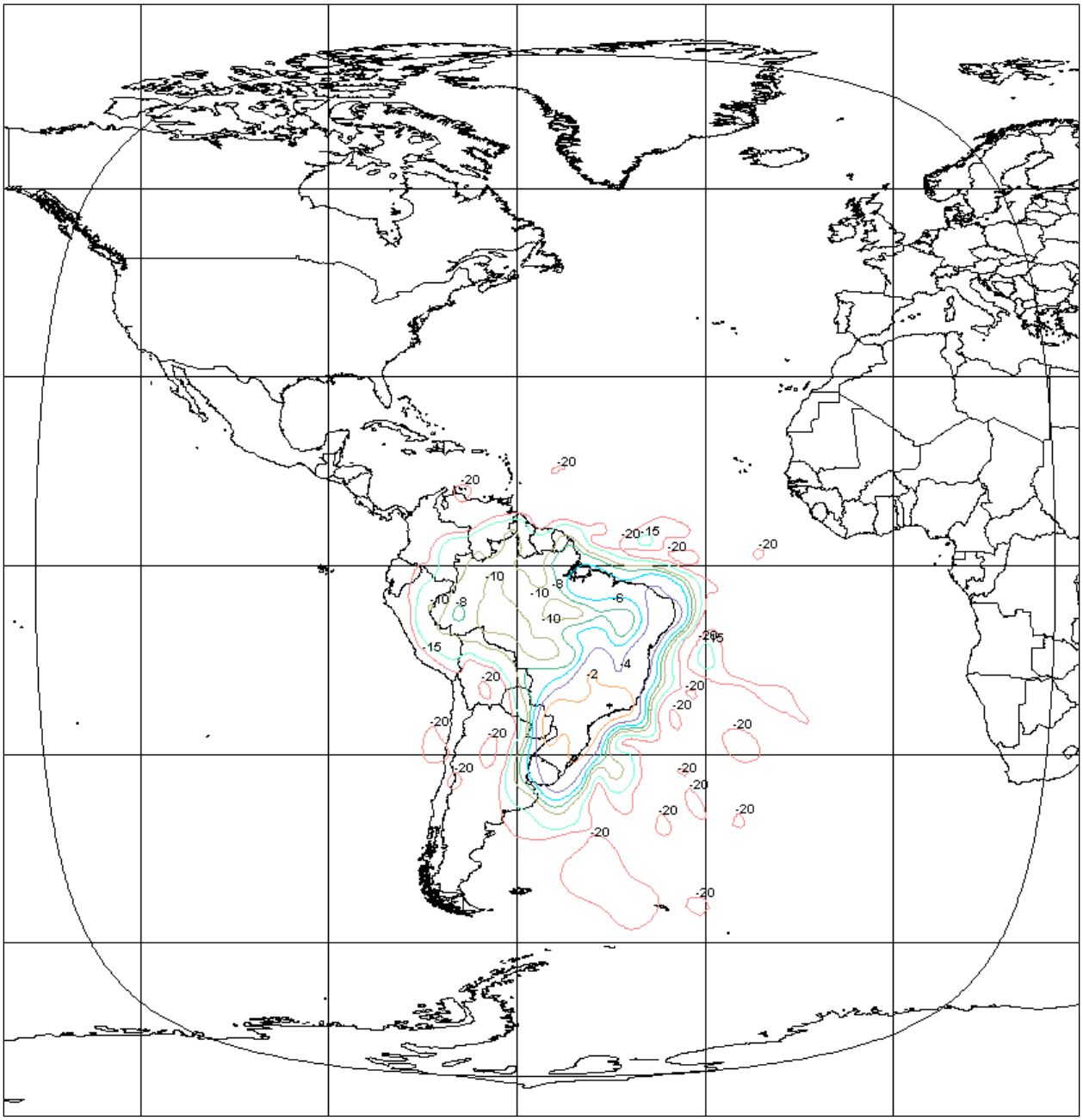


EXHIBIT 5A-4: BRAZIL RECEIVE BEAM
(Schedule S Beam ID: BVUL)

Beam Polarization: Vertical
Peak Beam Gain: 36.5 dBi
Peak Beam G/T: 8.0 dB/K
Saturated Flux Density @ Peak Beam G/T: -82.0 to -103.0 dBW/m^2

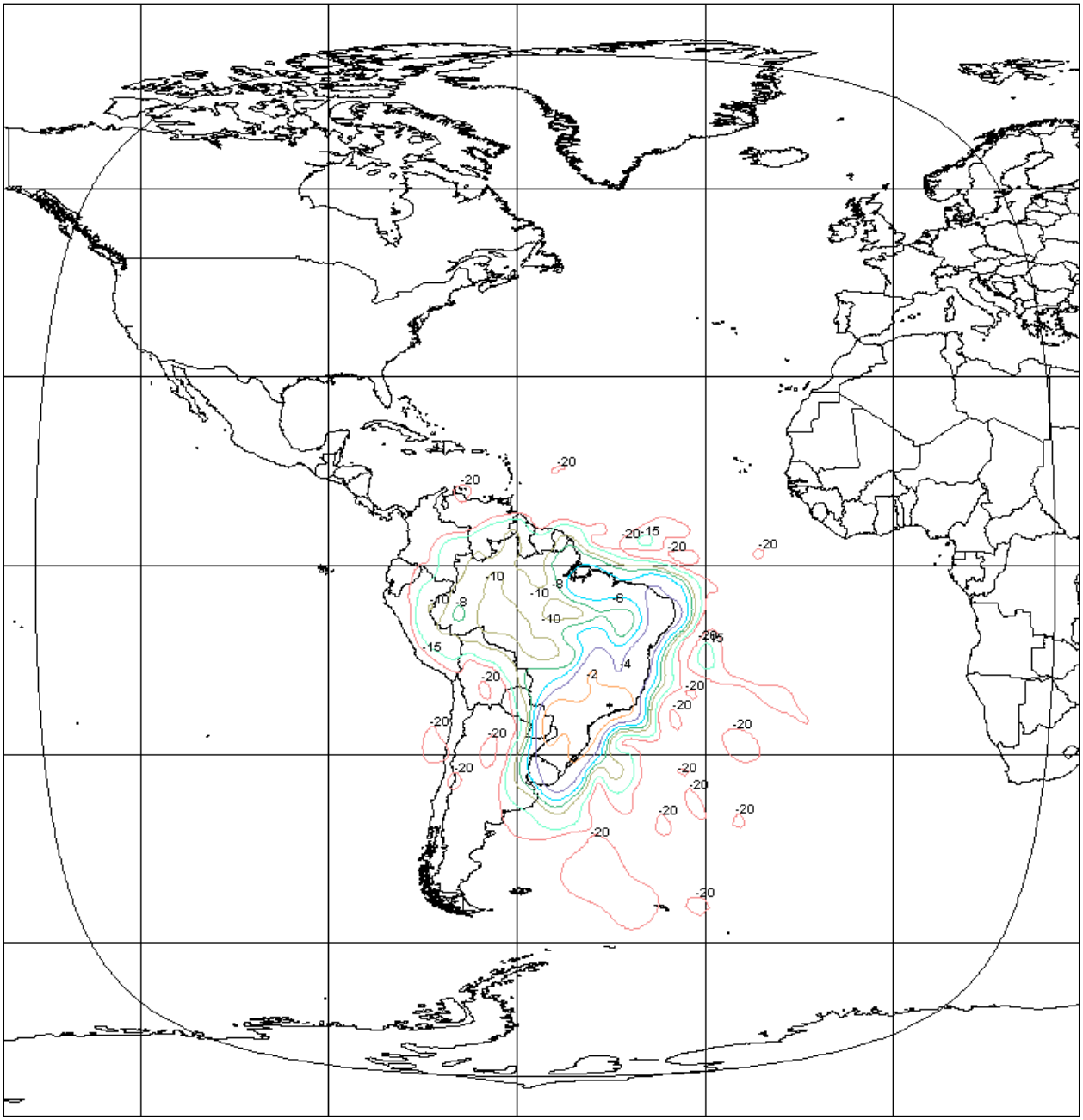


EXHIBIT 5A-5: NAOR RECEIVE BEAM
(Schedule S Beam ID: NHUL)

Beam Polarization: Horizontal
Peak Beam Gain: 28.3 dBi
Peak Beam G/T: 0.6 dB/K
Saturated Flux Density @ Peak Beam G/T: -74.6 to -95.6 dBW/m^2

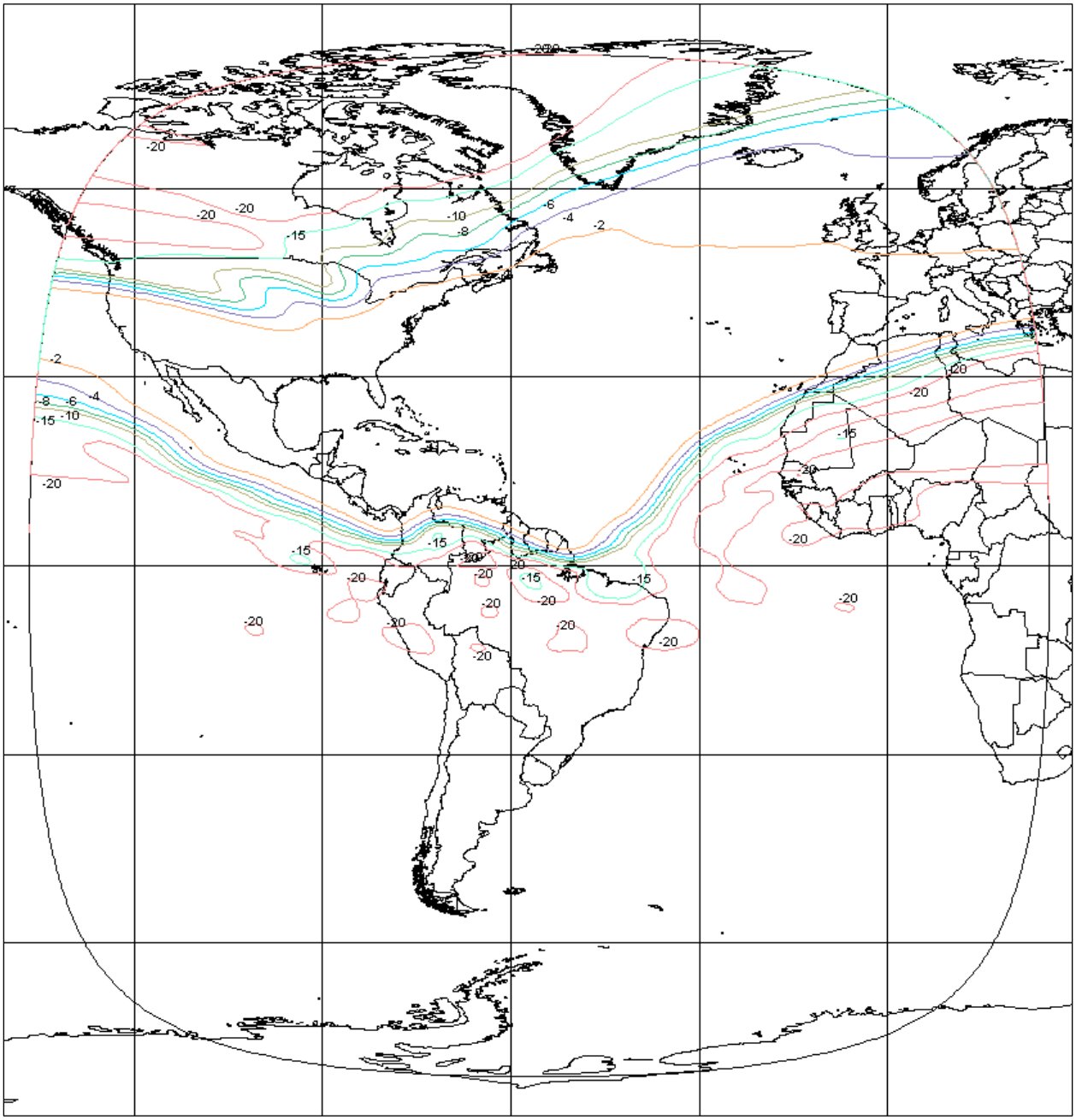


EXHIBIT 5A-6: WEST HEMI TRANSMIT BEAM
(Schedule S Beam ID: HHDL)

Beam Polarization: Horizontal
Peak Beam Gain: 25.6 dBi
Peak Beam EIRP: 41.2 dBW

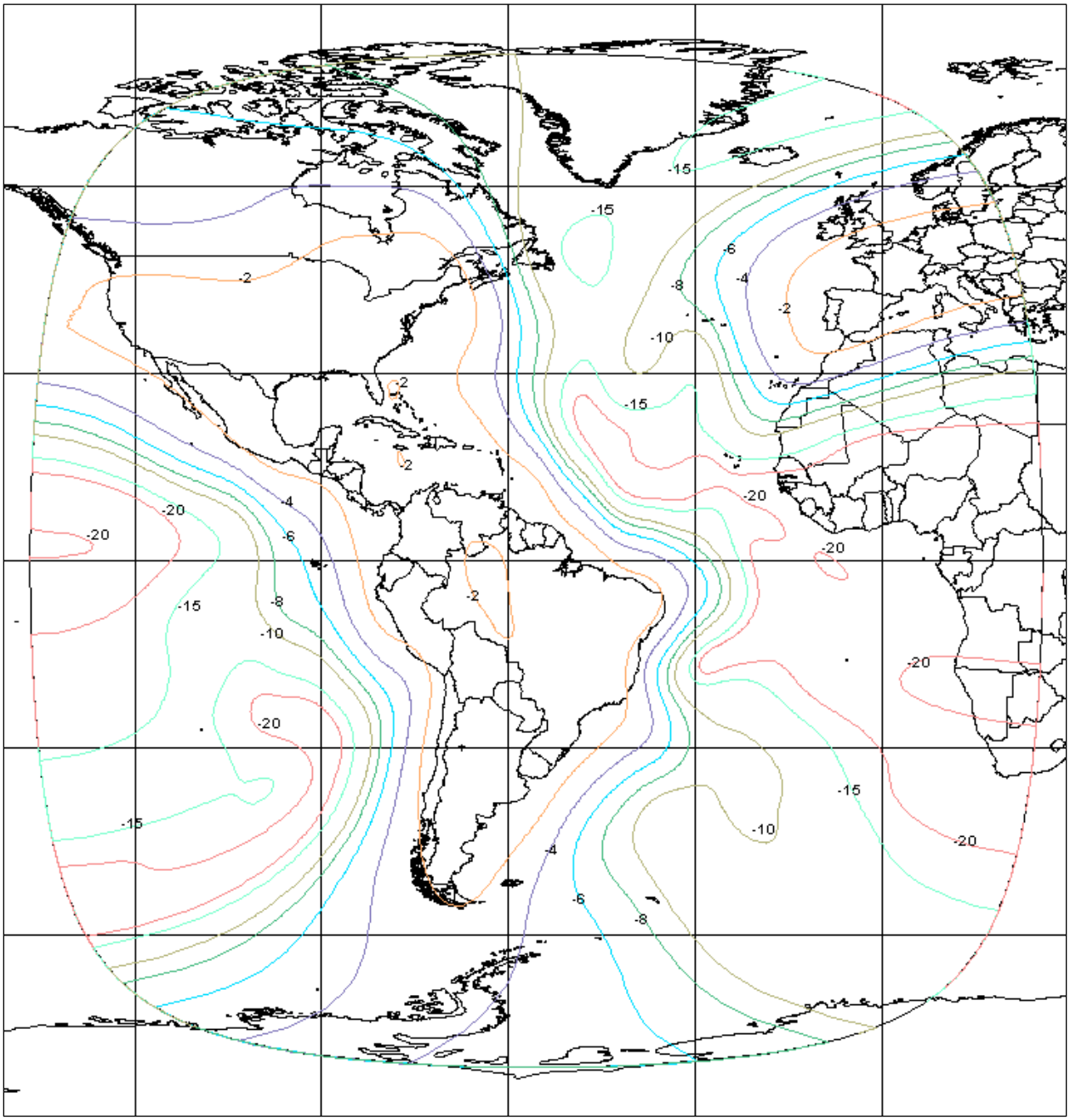


EXHIBIT 5A-7: WEST HEMI TRANSMIT BEAM
(Schedule S Beam ID: HVDL)

Beam Polarization: Vertical
Peak Beam Gain: 25.5dBi
Peak Beam EIRP: 41.1 dBW

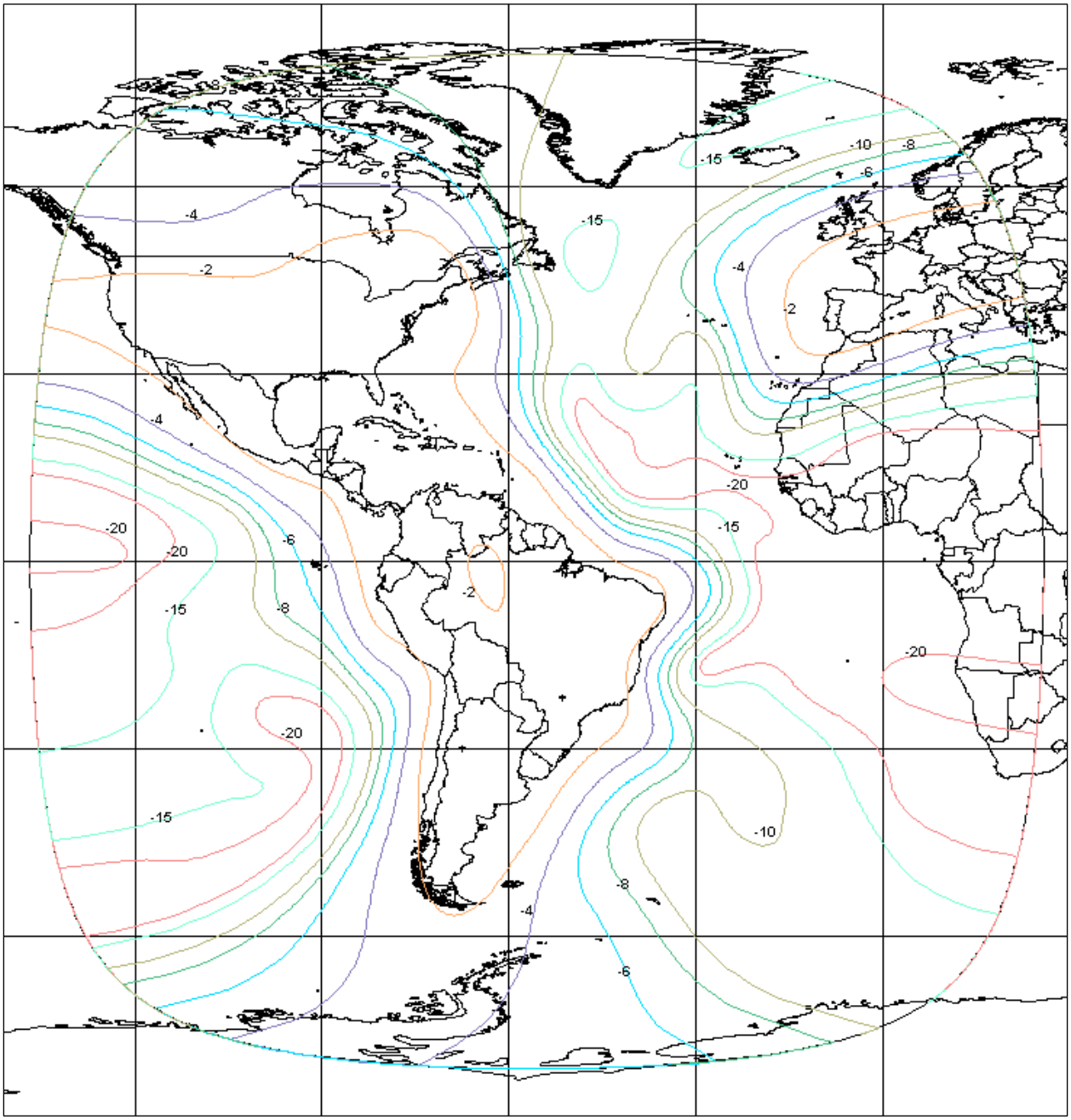


EXHIBIT 5A-8: BRAZIL TRANSMIT BEAM
(Schedule S Beam ID: BHDL)

Beam Polarization: Horizontal
Peak Beam Gain: 35.5 dBi
Peak Beam EIRP: 54.4 dBW

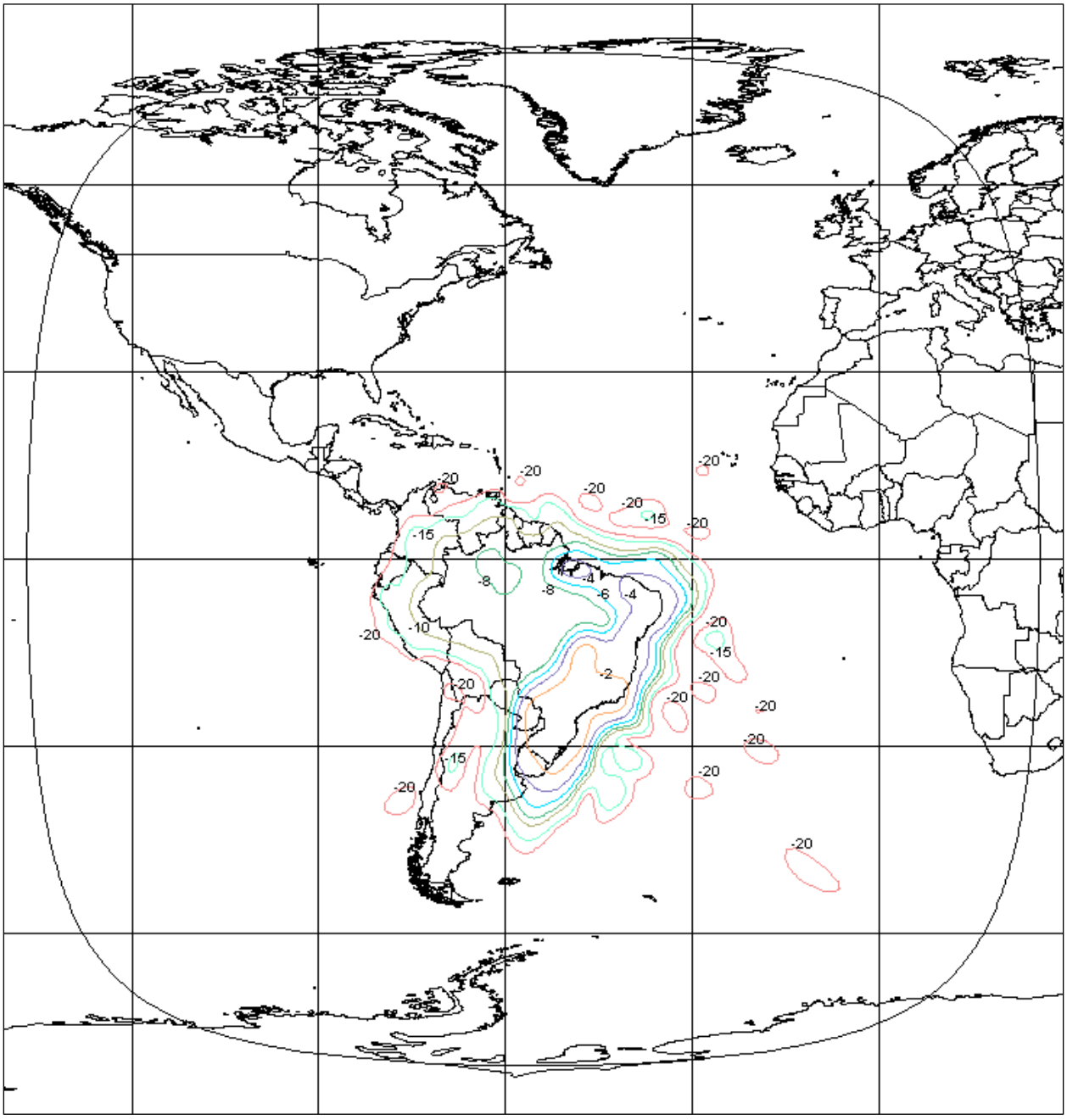


EXHIBIT 5A-9: BRAZIL TRANSMIT BEAM
(Schedule S Beam ID: BVDL)

Beam Polarization: Vertical
Peak Beam Gain: 35.5dBi
Peak Beam EIRP: 54.4 dBW

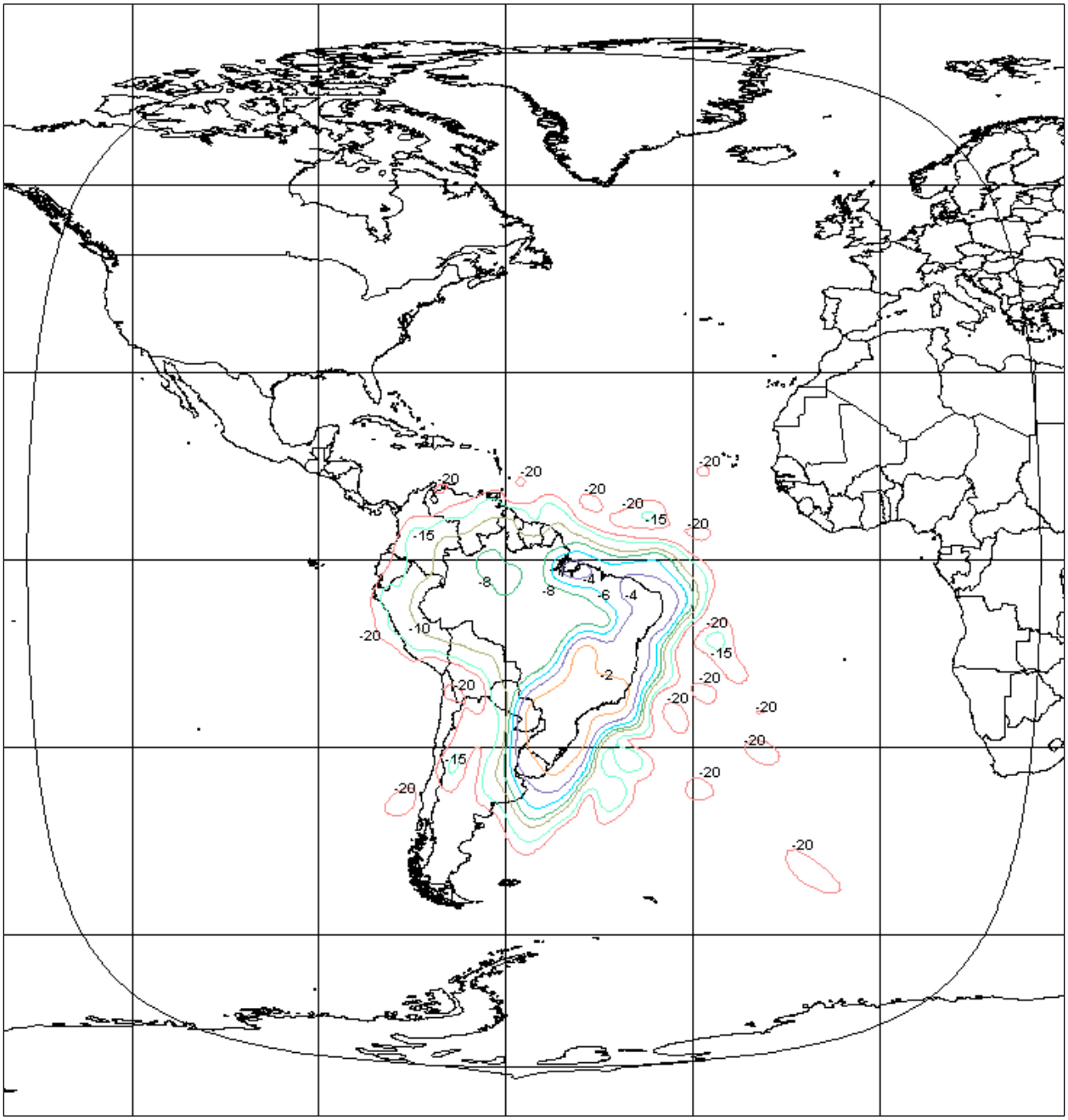


EXHIBIT 5A-10: NAOR TRANSMIT BEAM
(Schedule S Beam ID: NVDL)

Beam Polarization: Vertical
Peak Beam Gain: 28.2 dBi
Peak Beam EIRP: 46.8 dBW

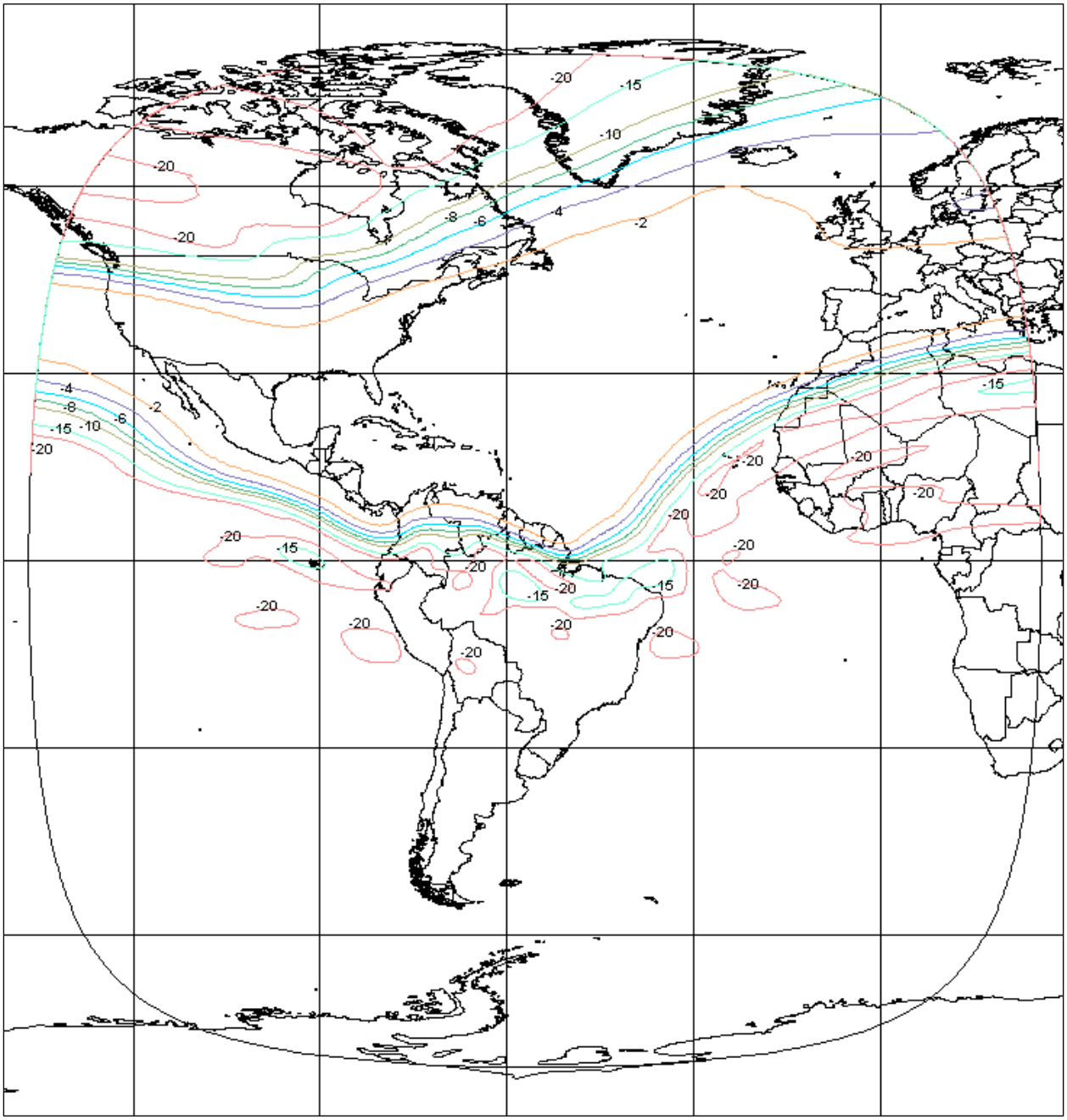


EXHIBIT 5B-1: COMMAND RECEIVE BEAM (on-station)
(Schedule S Beam ID: CMDH)

Beam Polarization: Horizontal
Peak Beam Gain: 28.2 dBi
Peak Beam G/T: -8.9 dB/K
Command Threshold Flux Density @ Peak Beam G/T: -124.4 dBW/m^2

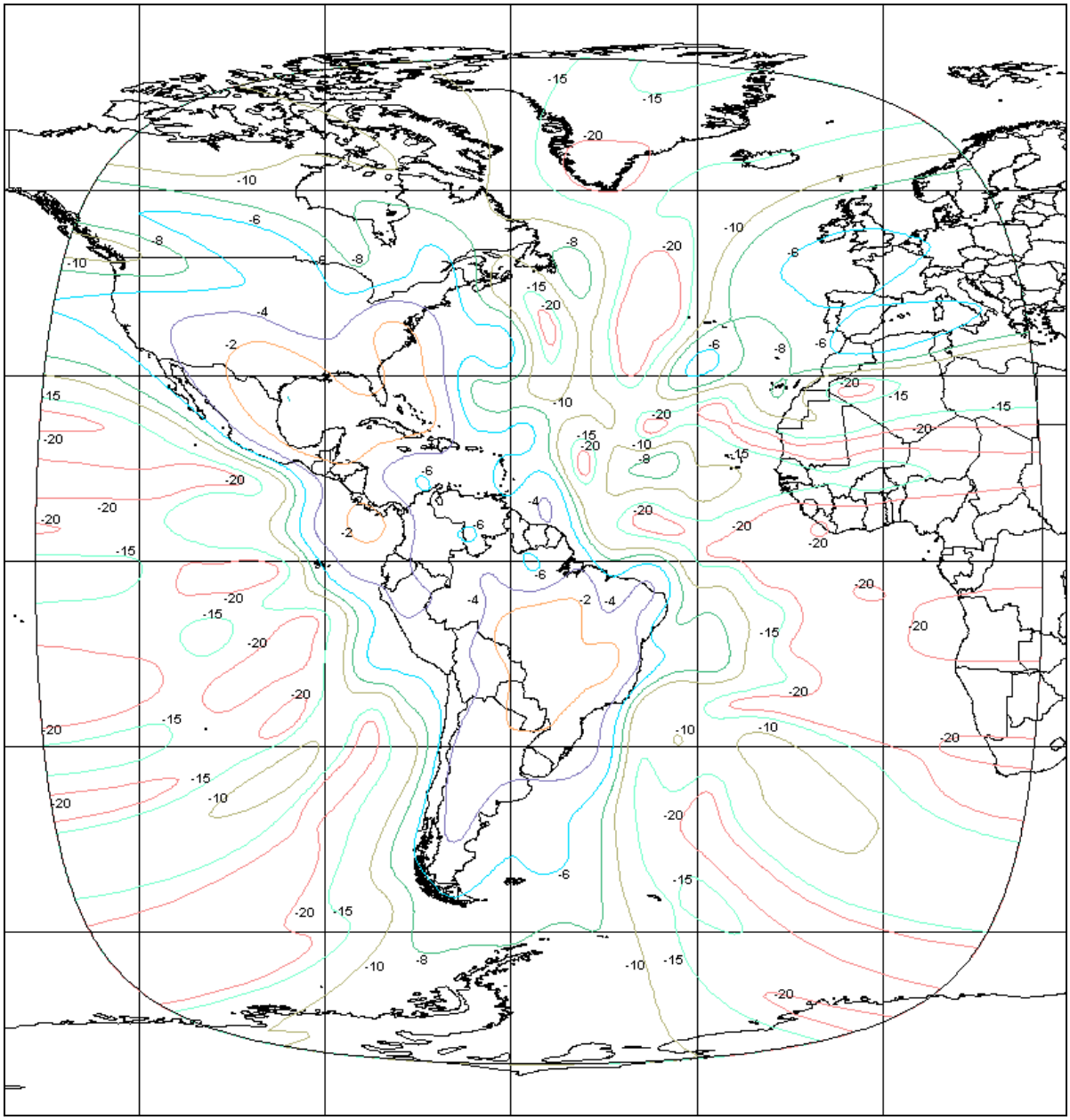


EXHIBIT 5B-2: COMMAND RECEIVE BEAM (back-up)
(Omni Antenna)
(Schedule S Beam ID: CMDB)

Beam Polarization: Left-Hand Circular
Peak Beam Gain: 2.0 dBi
Peak Beam G/T: -34.9 dB/K
Command Threshold Flux Density @ Peak Beam G/T: -96.4 dBW/m^2

EXHIBIT 5B-3: TELEMETRY TRANSMIT BEAM (on-station)
(Schedule S Beam ID: TLMV)

Beam Polarization: Vertical
Peak Beam Gain: 25.5 dBi
Peak Beam EIRP: 9.6 dBW

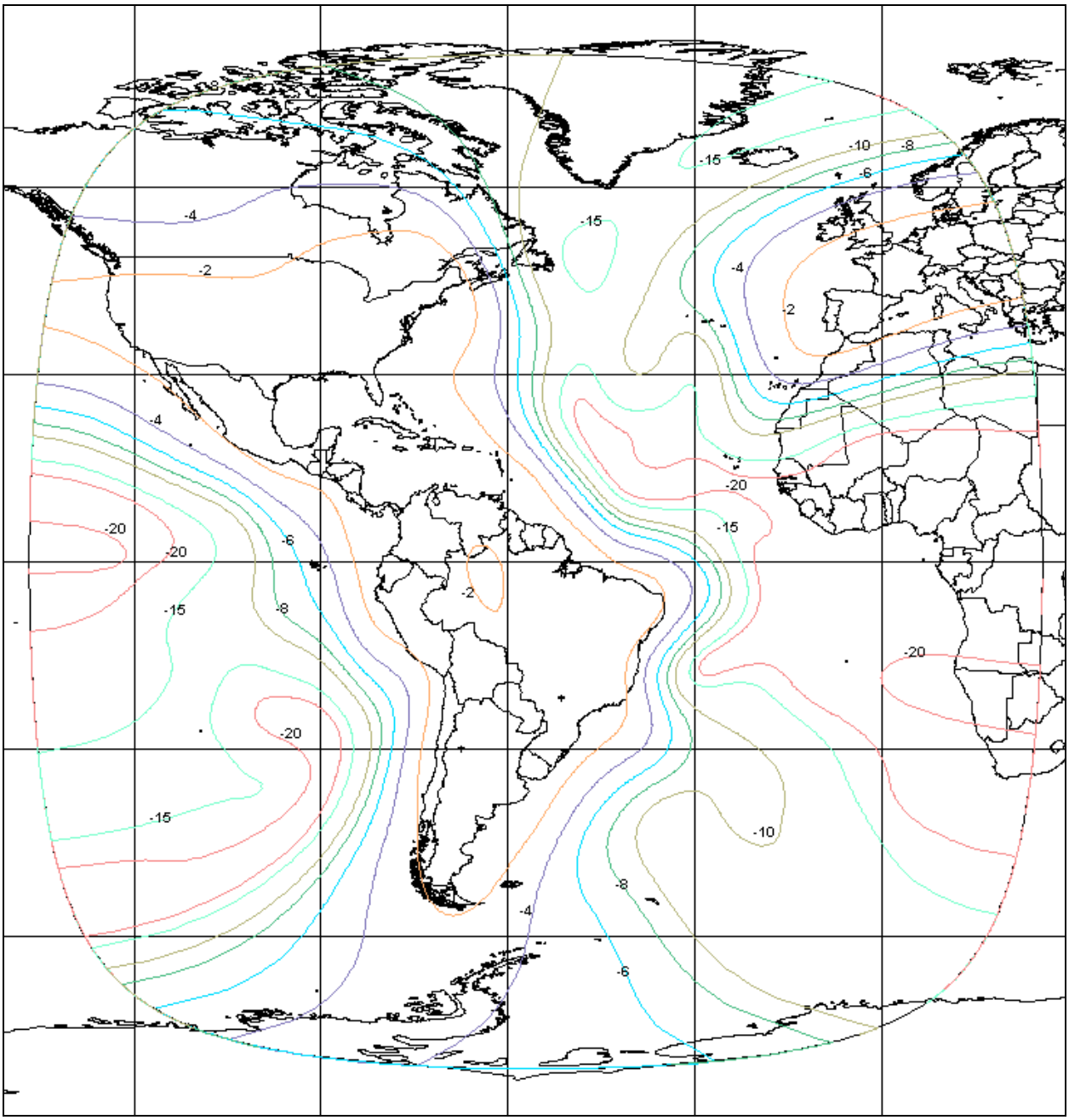


EXHIBIT 5B-4: TELEMETRY TRANSMIT BEAM (back-up)
(Omni Antenna)
(Schedule S Beam ID: TLMB)

Beam Polarization: Right-Hand Circular
Peak Beam Gain: 6.0 dBi
Peak Beam EIRP: 11.1 dBW

EXHIBIT 5C-1: C-BAND ULPC TRANSMIT BEAM
(Schedule S Beam ID: UPCH)

Beam Polarization: Horizontal
Peak Beam Gain: 24.9 dBi
Peak Beam EIRP: 15.3 dBW

EXHIBIT 5C-2: Ku-BAND ULPC TRANSMIT BEAM
(Schedule S Beam ID: UPKV)

Beam Polarization: Vertical
Peak Beam Gain: 21.5 dBi
Peak Beam EIRP: 16.5 dBW

EXHIBIT 5C-3: Ku-BAND ULPC TRANSMIT BEAM
(Schedule S Beam ID: UPKH)

Beam Polarization: Horizontal
Peak Beam Gain: 22.0dBi
Peak Beam EIRP: 17.0 dBW

EXHIBIT 6: COMMUNICATION SUBSYSTEM
EIRP AND G/T BUDGETS

Beam Name	West Hemi	West Hemi	
Frequency Band (MHz)	5925 - 6425	5925 – 6425	
Polarization	Horizontal	Vertical	
Channel Bandwidth (MHz)	36 / 41 / 72	36 / 41 / 72	
Antenna Noise Temperature (°Kelvin)	279	279	
Receiver Noise Temperature (°Kelvin)	252	252	
Total System Noise Temperature (°Kelvin)	531	531	
Total System Noise Temperature (dB/K)	27.2	27.2	
Peak Gain of Satellite Receive Antenna (dBi)	28.2	28.2	
Peak G/T (dB/K)	1.0	0.9	
Minimum SFD [G/T: Peak, Attn: 0 dB] -- (dBW/m^2)	-105.0	-104.9	
Beam Name	Brazil	Brazil	NAOR
Polarization	Horizontal	Vertical	Horizontal
Polarization	14000 - 14500	14000 – 14500	14000 – 14250
Channel Bandwidth (MHz)	36 / 72	36 / 72	36 / 72
Antenna Noise Temperature (°Kelvin)	363	363	257
Receiver Noise Temperature (°Kelvin)	345	345	332
Total System Noise Temperature (°Kelvin)	708	708	589
Total System Noise Temperature (dB/K)	28.5	28.5	27.7
Peak Gain of Satellite Receive Antenna (dBi)	36.5	36.5	28.3
Peak G/T (dB/K)	8.0	8.0	0.6
Minimum SFD [G/T: Peak, Attn: 0 dB] -- (dBW/m^2)	-103.0	-103.0	-95.6

EXHIBIT 6: COMMUNICATION SUBSYSTEM
EIRP AND G/T BUDGETS (continued)

Beam Name	West Hemi	West Hemi	
Frequency Band (MHz)	3700 – 4200	3700 – 4200	
Polarization	Horizontal	Vertical	
Channel Bandwidth (MHz)	36 / 41 / 72	36 / 41 / 72	
Maximum Power At The Output of Last Stage Amplifier (dBW)	18.1	18.1	
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	2.5	2.5	
Power Into Transmit Antenna (dBW)	15.6	15.6	
Peak Gain of Satellite Transmit Antenna (dBi)	25.6	25.5	
Maximum Downlink EIRP (dBW)	41.2	41.1	
Beam Name	Brazil	Brazil	NAOR
Frequency Band (MHz)	Horizontal	Vertical	Vertical
Polarization	11700 - 12200	11700 - 12200	11450 - 11700
Channel Bandwidth (MHz)	36 / 72	36 / 72	36 / 72
Maximum Power At The Output of Last Stage Amplifier (dBW)	21.8	21.8	21.8
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	2.9	2.9	3.2
Power Into Transmit Antenna (dBW)	18.9	18.9	18.6
Peak Gain of Satellite Transmit Antenna (dBi)	35.5	35.5	28.2
Maximum Downlink EIRP (dBW)	54.4	54.4	46.8
Beam Name	C-Band ULPC	Ku-Band ULPC	Ku-Band ULPC
Frequency Band (MHz)	3700.25	11699.25	11699.5
Polarization	Horizontal	Vertical	Horizontal
Channel Bandwidth (MHz)	0.025	0.025	0.025
Maximum Power At The Output of Last Stage Amplifier (dBW)	-4.0	-3.0	-3.0
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	5.6	2.0	2.0
Power Into Transmit Antenna (dBW)	-9.6	-5.0	-5.0
Peak Gain of Satellite Transmit Antenna (dBi)	24.9	21.5	22.0
Maximum Downlink EIRP (dBW)	15.3	16.5	17.0

EXHIBIT 7: TC&R SUBSYSTEM CHARACTERISTICS

	Spacecraft Antenna	
	West Hemi	**Omni**
Command Frequency (MHz) / Polarization (see note)		
Transfer Orbit / Emergency	n/a	6173.7 (LHCP) 6176.3 (LHCP)
On-Station	6173.7 (H) 6176.3 (H)	n/a
Command Modulation	PCM/PSK	PCM/PSK
Bandwidth of Command Carrier (kHz)		
Occupied Bandwidth	800	800
Allocated Bandwidth	1000	1000
Command Threshold (dBW/m^2)		
Beam Peak	-124.4	-96.4
Edge of Coverage	-114.4	-92.3
Command G/T (dB/K)		
Beam Peak	-8.9	-34.9
Edge of Coverage	-18.9	-39.0
Telemetry Frequency (MHz) / Polarization (see note)		
Transfer Orbit / Emergency	n/a	3949.0 (RHCP) 3949.5 (RHCP) 3950.5 (RHCP) 3951.0 (RHCP)
On-Station	3949.0 (V) 3949.5 (V) 3950.5 (V) 3951.0 (V)	n/a
Telemetry Modulation	PCM/PSK	PCM/PSK
Bandwidth of Telemetry Carrier (kHz)		
Occupied	300	300
Allocated	500	500
Telemetry EIRP		
Beam Peak	9.6	11.1
Edge of Coverage	6.2	7.0
On-Station Ranging Accuracy (meters)	30	30

Note:
H: Linear Horizontal Polarization
V: Linear Vertical Polarization
RHCP: Right Hand Circular Polarization
LHCP: Left Hand Circular Polarization

EXHIBIT 8: TC&R SUBSYSTEM EIRP and G/T BUDGETS

Operating Mode	On-Station	Back-up
Antenna Type	West Hemi	Omni
Frequency (MHz)	6173.7 / 6176.3	6173.7 / 6176.3
Polarization	Horizontal	Left-Hand Circular
Antenna Noise Temperature (°Kelvin)	279	290
Receiver Noise Temperature (°Kelvin)	4867.0	4634.9
Total System Noise Temperature (°Kelvin)	5146	4924.9
Total System Noise Temperature (dB/K)	37.1	36.9
Peak Gain of Satellite Receive Antenna (dBi)	28.2	2.0
Peak G/T (dB/K)	-8.9	-34.9
SFD Threshold at Peak G/T (dBW/m^2)	-124.4	-96.4
Operating Mode	On-Station	Back-up
Antenna Type	West Hemi	Omni
Frequency (MHz)	3949.0 3949.5 3950.5 3951.0	3949.0 3949.5 3950.5 3951.0
Polarization	Vertical	Right-Hand Circular
Maximum Power At The Output of Last Stage Amplifier (dBW)	-3.0	16.5
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	9.7	11.4
Power Into The Transmit Antenna (dBW)	-12.7	5.1
Power Into The Transmit Antenna (Watts)	0.1	3.3
Peak Gain of Satellite Transmit Antenna (dBi)	22.3	6.0
Maximum Downlink EIRP (dBW)	9.6	11.1

EXHIBIT 9: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
Analog TV/FM Carrier	36M0F3F	36000
64 kbps Carrier	100KG7W	100
256 kbps Carrier	323KG7W	323.5
512 kbps Carrier	1M45G7W	1450
6000 kbps carrier	8M78G7W	8789.5
40000 kbps Carrier	36M0G7W	36000
49150 kbps Carrier	72M0G7W	72000

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS

FREQUENCY BAND : 3700 - 4200 MHz							
West Hemi Beam (H-Pol.) - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.2	41.2	41.2	41.2	41.2	41.2	41.2
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.2	-152.1	-152.0	-151.8	-151.7	-151.6	-150.9
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.2	0.1	2.5	4.8	7.2	9.6	8.9
West Hemi Beam (H-Pol.) - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.2	41.2	41.2	41.2	41.2	41.2	41.2
Carrier Occupied Bandwidth (kHz)	26667	26667	26667	26667	26667	26667	26667
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-160.4	-160.3	-160.2	-160.1	-160.0	-159.9	-159.1
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.4	8.3	10.7	13.1	15.5	17.9	17.1
West Hemi Beam (V-Pol.) - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.1	41.1	41.1	41.1	41.1	41.1	41.1
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-152.3	-152.2	-152.1	-151.9	-151.8	-151.7	-151.0
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.3	0.2	2.6	4.9	7.3	9.7	9.0
West Hemi Beam (V-Pol.) - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.1	41.1	41.1	41.1	41.1	41.1	41.1
Carrier Occupied Bandwidth (kHz)	26667	26667	26667	26667	26667	26667	26667
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-160.5	-160.4	-160.3	-160.2	-160.1	-160.0	-159.2
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.5	8.4	10.8	13.2	15.6	18.0	17.2

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3700 - 4200 MHz							
ULPC (H-Pol.) - 25K0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-156.0	-155.9	-155.8	-155.7	-155.6	-155.5	-154.7
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.0	3.9	6.3	8.7	11.1	13.5	12.7
Telemetry (V-Pol.) - 500K0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Carrier Occupied Bandwidth (kHz)	300	300	300	300	300	300	300
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-172.5	-172.4	-172.3	-172.2	-172.1	-172.0	-171.2
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	20.5	20.4	22.8	25.2	27.6	30.0	29.2
Telemetry (RHCP-Pol.) - 500K0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Carrier Occupied Bandwidth (kHz)	300	300	300	300	300	300	300
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-171.0	-170.9	-170.8	-170.7	-170.6	-170.5	-169.7
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	19.0	18.9	21.3	23.7	26.1	28.5	27.7

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 11450 - 11700 MHz							
NAOR Beam (V-Pol.) -36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	46.8	46.8	46.8	46.8
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-146.2	-146.1	-146.0	-145.3
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	1.2	3.6	6.0	5.3
NAOR Beam (V-Pol.) - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	46.8	46.8	46.8	46.8	46.8	46.8	46.8
Carrier Occupied Bandwidth (kHz)	26667	26667	26667	26667	26667	26667	26667
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-154.8	-154.7	-154.6	-154.5	-154.4	-154.3	-153.5
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	4.8	4.7	7.1	9.5	11.9	14.3	13.5
ULPC Beam (H-Pol.) - 25K0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-154.3	-154.2	-154.1	-154.0	-153.9	-153.8	-153.0
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	4.3	4.2	6.6	9.0	11.4	13.8	13.0
ULPC Beam (V-Pol.) - 25K0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-154.8	-154.7	-154.6	-154.5	-154.4	-154.3	-153.5
FCC Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	4.8	4.7	7.1	9.5	11.9	14.3	13.5

* *This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the carrier at this particular elevation angle will be made to be equal to or lower than the value listed in the table through reduction in the output power of the channel and/or restriction on the movement/placement of the beam.*

EXHIBIT 11: RECEIVE AND TRANSMIT SECTION FILTER RESPONSE CHARACTERISTICS

	Attenuation Relative To Peak Level (dB)		
Frequency Offset Relative to Channel Center Frequency (MHz)	Input Section	Output Section	Total
C-Band: 36 MHz Channel			
±8	0.3	0.2	0.4
±12	0.3	0.4	0.6
±14	0.4	0.4	0.7
±16	0.5	0.7	1.1
±18	0.8	1.7	2.3
C-Band: 41 MHz Channel			
±9	0.3	0.2	0.4
±14	0.3	0.4	0.6
±16	0.4	0.5	0.8
±18	0.5	0.7	1.1
±21	0.8	1.5	2.2
C-Band: 72 MHz Channel			
±16	0.3	0.3	0.5
±24	0.4	0.4	0.6
±28	0.4	0.4	0.8
±32	0.5	0.4	1.0
±36	0.7	1.7	2.2
Ku-Band: 36 MHz Channel			
±8	0.3	0.3	0.5
±12	0.3	0.4	0.6
±14	0.5	0.6	0.8
±16	0.8	1.1	1.5
±18	1.7	3.3	4.0
Ku-Band: 72 MHz Channel			
±16	0.3	0.4	0.6
±24	0.5	0.5	0.8
±28	0.5	0.7	1.0
±32	0.6	1.2	1.6
±36	1.0	2.5	3.9

EXHIBIT 12: INTELSAT 34 LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.9	-5.9	-5.9	-5.9
Uplink Contour G/T (dB/K)	-4.9	-4.9	-4.9	-4.9
Uplink Contour SFD (dBW/m2)	-80.0	-84.0	-75.0	-75.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	37.1	37.1	37.1	37.1
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	53.5W	53.5W	53.5W	53.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	57.5W	57.5W	57.5W	57.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	14.0	7.5	5.5	3.7
Earth Station Gain (dBi)	56.7	51.2	48.6	45.1
Earth Station Elevation Angle	76.5	76.5	76.5	76.5
Rain Rate (mm/yr)	2147	2147	2147	2147
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	10.0	3.7	5.0	5.0
Earth Station Gain (dBi)	50.6	41.9	44.6	44.6
Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Earth Station Elevation Angle	20.3	20.3	20.3	20.3
Rain Rate (mm/yr)	698	698	698	698
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	81.9	75.6	73.5	58.2
Uplink Path Loss, Clear Sky (dB)	-199.4	-199.4	-199.4	-199.4
Satellite G/T(dB/K)	-4.9	-4.9	-4.9	-4.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Uplink C/N(dB)	31.1	22.6	29.7	28.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	37.1	37.0	24.6	9.3
Downlink Path Loss, Clear Sky (dB)	-196.4	-196.4	-196.4	-196.4
Downlink Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Transponder Correction Factor	0.0	-0.4	0.0	0.0
Downlink C / N(dB)	25.9	14.3	11.4	9.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0
C/N Uplink (dB)	31.1	22.6	29.7	28.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.4	13.0	20.0	18.6
Intermodulation C/IM (dB)	124.9	200.0	20.8	20.9
Downlink C/N (dB)	25.9	14.3	11.4	9.9
Downlink Interference C/I (dB)	124.9	200.0	25.7	25.5
Downlink Adjacent Satellite C/I (dB)	20.5	9.0	8.8	7.3
Subtotal C/N (dB)	17.1	6.6	6.4	5.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	5.1	4.9	3.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0
Number of Carriers	1	1	8	223
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-40.8	-52.9	-43.2	-41.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-24.9	-36.3	-39.5	-41.0

EXHIBIT 12: INTELSAT 34 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour SFD (dBW/m2)	-80.8	-80.8	-86.8	-86.8	-86.8	-86.8
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
Downlink Contour EIRP (dBW)	48.7	48.7	48.7	48.7	48.7	48.7
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	53.5W	53.5W	53.5W	53.5W	53.5W	53.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	57.5W	57.5W	57.5W	57.5W	57.5W	57.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	4.0	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	53.1	53.1	46.6	46.6	46.6	46.6
Earth Station Elevation Angle	46.9	46.9	46.9	46.9	46.9	46.9
Rain Rate (mm/yr)	754	754	754	754	754	754
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	1.8	1.8	1.8	0.9	0.9
Earth Station Gain (dBi)	51.4	44.5	44.5	44.5	38.4	38.4
Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Earth Station Elevation Angle	44.1	44.1	44.1	44.1	44.1	44.1
Rain Rate (mm/yr)	775	775	775	775	775	775
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	75.2	76.6	62.3	47.3	60.6	54.7
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	24.4	23.6	18.5	17.3	18.4	18.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	47.7	45.5	36.1	21.0	34.4	28.4
Downlink Path Loss, Clear Sky (dB)	-205.6	-205.6	-205.6	-205.6	-205.6	-205.6
Downlink Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	0.2	0.0	0.0	0.0	0.0
Downlink C / N(dB)	24.6	14.8	14.3	13.0	7.4	7.4
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	24.4	23.6	18.5	17.3	18.4	18.5
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.1	20.2	15.2	14.0	15.1	15.2
Intermodulation C/IM (dB)	124.9	200.0	21.1	18.8	20.2	20.0
Downlink C/N (dB)	24.6	14.8	14.3	13.0	7.4	7.4
Downlink Interference C/I (dB)	124.9	200.0	30.0	19.1	24.5	22.3
Downlink Adjacent Satellite C/I (dB)	23.2	11.3	11.1	9.8	-1.4	-1.4
Subtotal C/N (dB)	17.1	9.2	7.7	6.2	-2.1	-2.1
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	7.7	6.2	4.7	-3.6	-3.6
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.9	-53.8	-52.4	-53.6	-52.5	-52.4

Downlink EIRP Density At Beam Peak (dBW/Hz)	-12.6	-26.1	-26.3	-27.6	-26.4	-26.4

EXHIBIT 12: INTELSAT 34 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Uplink Contour G/T (dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Uplink Contour SFD (dBW/m2)	-80.3	-90.3	-79.3	-79.3	-79.3	-79.3
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Downlink Contour EIRP (dBW)	41.2	41.2	41.2	41.2	41.2	41.2
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	53.5W	53.5W	53.5W	53.5W	53.5W	53.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	57.5W	57.5W	57.5W	57.5W	57.5W	57.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.5	2.4	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	57.4	48.7	53.0	53.0	49.1	49.1
Earth Station Elevation Angle	20.0	20.0	20.0	20.0	20.0	20.0
Rain Rate (mm/yr)	275	275	275	275	275	275
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	12.0	4.0	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	60.9	51.4	51.0	51.0	47.0	47.0
Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Earth Station Elevation Angle	20.2	20.2	20.2	20.2	20.2	20.2
Rain Rate (mm/yr)	222	222	222	222	222	222
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.6	72.3	70.8	55.7	63.4	57.4
Uplink Path Loss, Clear Sky (dB)	-207.6	-207.6	-207.6	-207.6	-207.6	-207.6
Satellite G/T(dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	20.8	11.3	19.0	17.7	13.2	13.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	40.8	41.1	29.5	14.3	21.9	16.0
Downlink Path Loss, Clear Sky (dB)	-205.8	-205.8	-205.8	-205.8	-205.8	-205.8
Downlink Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	-0.4	0.0	0.0	0.0	0.0
Downlink C / N(dB)	27.5	15.7	13.2	11.8	3.2	3.3
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	20.8	11.3	19.0	17.7	13.2	13.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	25.5	16.1	23.6	22.4	17.9	17.9
Intermodulation C/IM (dB)	124.9	200.0	21.1	23.5	19.5	19.1
Downlink C/N (dB)	27.5	15.7	13.2	11.8	3.2	3.3
Downlink Interference C/I (dB)	124.9	200.0	35.8	23.2	18.9	17.4
Downlink Adjacent Satellite C/I (dB)	22.7	11.2	8.4	7.0	-1.6	-1.6
Subtotal C/N (dB)	17.4	7.0	6.6	5.3	-3.0	-3.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.9	5.5	5.1	3.8	-4.5	-4.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-53.7	-50.3	-51.6	-52.2	-52.2

Downlink EIRP Density At Beam Peak (dBW/Hz)	-19.6	-30.6	-33.0	-34.4	-39.0	-38.9

EXHIBIT 13: ADJACENT SATELLITE (53.5º W.L) LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.9	-5.9	-5.9	-5.9
Uplink Contour G/T (dB/K)	-4.9	-4.9	-4.9	-4.9
Uplink Contour SFD (dBW/m2)	-80.0	-84.0	-75.0	-75.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	37.1	37.1	37.1	37.1
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	51.5W	51.5W	51.5W	51.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	14.0	7.5	5.5	3.7
Earth Station Gain (dBi)	56.7	51.2	48.6	45.1
Earth Station Elevation Angle	76.5	76.5	76.5	76.5
Rain Rate (mm/yr)	2147	2147	2147	2147
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	10.0	3.7	5.0	5.0
Earth Station Gain (dBi)	50.6	41.9	44.6	44.6
Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Earth Station Elevation Angle	20.3	20.3	20.3	20.3
Rain Rate (mm/yr)	698	698	698	698
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	81.9	75.6	73.5	58.2
Uplink Path Loss, Clear Sky (dB)	-199.4	-199.4	-199.4	-199.4
Satellite G/T(dB/K)	-4.9	-4.9	-4.9	-4.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Uplink C/N(dB)	31.1	22.6	29.7	28.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	37.1	37.0	24.6	9.3
Downlink Path Loss, Clear Sky (dB)	-196.4	-196.4	-196.4	-196.4
Downlink Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Transponder Correction Factor	0.0	-0.4	0.0	0.0
Downlink C / N(dB)	25.9	14.3	11.4	9.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0
C/N Uplink (dB)	31.1	22.6	29.7	28.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.4	13.0	20.0	18.6
Intermodulation C/IM (dB)	124.9	200.0	20.8	20.9
Downlink C/N (dB)	25.9	14.3	11.4	9.9
Downlink Interference C/I (dB)	124.9	200.0	25.7	25.5
Downlink Adjacent Satellite C/I (dB)	20.5	9.0	8.8	7.3
Subtotal C/N (dB)	17.1	6.6	6.4	5.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	5.1	4.9	3.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0
Number of Carriers	1	1	8	223

CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-40.8	-52.9	-43.2	-41.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-24.9	-36.3	-39.5	-41.0

EXHIBIT 13: ADJACENT SATELLITE (53.5º W.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour SFD (dBW/m2)	-80.8	-80.8	-86.8	-86.8	-86.8	-86.8
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
Downlink Contour EIRP (dBW)	48.7	48.7	48.7	48.7	48.7	48.7
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	51.5W	51.5W	51.5W	51.5W	51.5W	51.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	4.0	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	53.1	53.1	46.6	46.6	46.6	46.6
Earth Station Elevation Angle	46.9	46.9	46.9	46.9	46.9	46.9
Rain Rate (mm/yr)	754	754	754	754	754	754
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	1.8	1.8	1.8	0.9	0.9
Earth Station Gain (dBi)	51.4	44.5	44.5	44.5	38.4	38.4
Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Earth Station Elevation Angle	44.1	44.1	44.1	44.1	44.1	44.1
Rain Rate (mm/yr)	775	775	775	775	775	775
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	75.2	76.6	62.3	47.3	60.6	54.7
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	24.4	23.6	18.5	17.3	18.4	18.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	47.7	45.5	36.1	21.0	34.4	28.4
Downlink Path Loss, Clear Sky (dB)	-205.6	-205.6	-205.6	-205.6	-205.6	-205.6
Downlink Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	0.2	0.0	0.0	0.0	0.0
Downlink C / N(dB)	24.6	14.8	14.3	13.0	7.4	7.4
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	24.4	23.6	18.5	17.3	18.4	18.5
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.1	20.2	15.2	14.0	15.1	15.2
Intermodulation C/IM (dB)	124.9	200.0	21.1	18.8	20.2	20.0
Downlink C/N (dB)	24.6	14.8	14.3	13.0	7.4	7.4
Downlink Interference C/I (dB)	124.9	200.0	30.0	19.1	24.5	22.3
Downlink Adjacent Satellite C/I (dB)	23.2	11.3	11.1	9.8	-1.4	-1.4
Subtotal C/N (dB)	17.1	9.2	7.7	6.2	-2.1	-2.1
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	7.7	6.2	4.7	-3.6	-3.6
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.9	-53.8	-52.4	-53.6	-52.5	-52.4

Downlink EIRP Density At Beam Peak (dBW/Hz)	-12.6	-26.1	-26.3	-27.6	-26.4	-26.4

EXHIBIT 13: ADJACENT SATELLITE (53.5º W.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Uplink Contour G/T (dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Uplink Contour SFD (dBW/m2)	-80.3	-90.3	-79.3	-79.3	-79.3	-79.3
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Downlink Contour EIRP (dBW)	41.2	41.2	41.2	41.2	41.2	41.2
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	51.5W	51.5W	51.5W	51.5W	51.5W	51.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.5	2.4	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	57.4	48.7	53.0	53.0	49.1	49.1
Earth Station Elevation Angle	20.0	20.0	20.0	20.0	20.0	20.0
Rain Rate (mm/yr)	275	275	275	275	275	275
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	12.0	4.0	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	60.9	51.4	51.0	51.0	47.0	47.0
Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Earth Station Elevation Angle	20.2	20.2	20.2	20.2	20.2	20.2
Rain Rate (mm/yr)	222	222	222	222	222	222
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.6	72.3	70.8	55.7	63.4	57.4
Uplink Path Loss, Clear Sky (dB)	-207.6	-207.6	-207.6	-207.6	-207.6	-207.6
Satellite G/T(dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	20.8	11.3	19.0	17.7	13.2	13.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	40.8	41.1	29.5	14.3	21.9	16.0
Downlink Path Loss, Clear Sky (dB)	-205.8	-205.8	-205.8	-205.8	-205.8	-205.8
Downlink Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	-0.4	0.0	0.0	0.0	0.0
Downlink C / N(dB)	27.5	15.7	13.2	11.8	3.2	3.3
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	20.8	11.3	19.0	17.7	13.2	13.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	25.5	16.1	23.6	22.4	17.9	17.9
Intermodulation C/IM (dB)	124.9	200.0	21.1	23.5	19.5	19.1
Downlink C/N (dB)	27.5	15.7	13.2	11.8	3.2	3.3
Downlink Interference C/I (dB)	124.9	200.0	35.8	23.2	18.9	17.4
Downlink Adjacent Satellite C/I (dB)	22.7	11.2	8.4	7.0	-1.6	-1.6
Subtotal C/N (dB)	17.4	7.0	6.6	5.3	-3.0	-3.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.9	5.5	5.1	3.8	-4.5	-4.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54

CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-53.7	-50.3	-51.6	-52.2	-52.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-19.6	-30.6	-33.0	-34.4	-39.0	-38.9

EXHIBIT 14: ADJACENT SATELLITE (57.5º W.L) LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.9	-5.9	-5.9	-5.9
Uplink Contour G/T (dB/K)	-4.9	-4.9	-4.9	-4.9
Uplink Contour SFD (dBW/m2)	-80.0	-84.0	-75.0	-75.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST_HEMI	WEST_HEMI	WEST_HEMI	WEST_HEMI
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	37.1	37.1	37.1	37.1
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	59.5W	59.5W	59.5W	59.5W
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink EIRP Density at ES (dBW/Hz)	-36.0	-36.0	-36.0	-36.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	14.0	7.5	5.5	3.7
Earth Station Gain (dBi)	56.7	51.2	48.6	45.1
Earth Station Elevation Angle	76.5	76.5	76.5	76.5
Rain Rate (mm/yr)	2147	2147	2147	2147
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	10.0	3.7	5.0	5.0
Earth Station Gain (dBi)	50.6	41.9	44.6	44.6
Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Earth Station Elevation Angle	20.3	20.3	20.3	20.3
Rain Rate (mm/yr)	698	698	698	698
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	81.9	75.6	73.5	58.2
Uplink Path Loss, Clear Sky (dB)	-199.4	-199.4	-199.4	-199.4
Satellite G/T(dB/K)	-4.9	-4.9	-4.9	-4.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Uplink C/N(dB)	31.1	22.6	29.7	28.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	37.1	37.0	24.6	9.3
Downlink Path Loss, Clear Sky (dB)	-196.4	-196.4	-196.4	-196.4
Downlink Earth Station G/T (dB/K)	31.7	22.7	22.7	22.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3
Transponder Correction Factor	0.0	-0.4	0.0	0.0
Downlink C / N(dB)	25.9	14.3	11.4	9.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0
C/N Uplink (dB)	31.1	22.6	29.7	28.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.4	13.0	20.0	18.6
Intermodulation C/IM (dB)	124.9	200.0	20.8	20.9
Downlink C/N (dB)	25.9	14.3	11.4	9.9
Downlink Interference C/I (dB)	124.9	200.0	25.7	25.5
Downlink Adjacent Satellite C/I (dB)	20.5	9.0	8.8	7.3
Subtotal C/N (dB)	17.1	6.6	6.4	5.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	5.1	4.9	3.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0
Number of Carriers	1	1	8	223
CARRIER DENSITY LEVELS				

Uplink Power Density (dBW/Hz)	-40.8	-52.9	-43.2	-41.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-24.9	-36.3	-39.5	-41.0

EXHIBIT 14: ADJACENT SATELLITE (57.5º W.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour SFD (dBW/m2)	-80.8	-80.8	-86.8	-86.8	-86.8	-86.8
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL	BRAZIL
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
Downlink Contour EIRP (dBW)	48.7	48.7	48.7	48.7	48.7	48.7
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	59.5W	59.5W	59.5W	59.5W	59.5W	59.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.7	-25.7	-25.7	-25.7	-25.7	-25.7
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	4.0	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	53.1	53.1	46.6	46.6	46.6	46.6
Earth Station Elevation Angle	46.9	46.9	46.9	46.9	46.9	46.9
Rain Rate (mm/yr)	754	754	754	754	754	754
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	4.0	1.8	1.8	1.8	0.9	0.9
Earth Station Gain (dBi)	51.4	44.5	44.5	44.5	38.4	38.4
Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Earth Station Elevation Angle	44.1	44.1	44.1	44.1	44.1	44.1
Rain Rate (mm/yr)	775	775	775	775	775	775
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	75.2	76.6	62.3	47.3	60.6	54.7
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	24.4	23.6	18.5	17.3	18.4	18.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	47.7	45.5	36.1	21.0	34.4	28.4
Downlink Path Loss, Clear Sky (dB)	-205.6	-205.6	-205.6	-205.6	-205.6	-205.6
Downlink Earth Station G/T (dB/K)	29.0	23.3	23.3	23.3	16.5	16.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	0.2	0.0	0.0	0.0	0.0
Downlink C / N(dB)	24.6	14.8	14.3	13.0	7.4	7.4
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	24.4	23.6	18.5	17.3	18.4	18.5
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	21.1	20.2	15.2	14.0	15.1	15.2
Intermodulation C/IM (dB)	124.9	200.0	21.1	18.8	20.2	20.0
Downlink C/N (dB)	24.6	14.8	14.3	13.0	7.4	7.4
Downlink Interference C/I (dB)	124.9	200.0	30.0	19.1	24.5	22.3
Downlink Adjacent Satellite C/I (dB)	23.2	11.3	11.1	9.8	-1.4	-1.4
Subtotal C/N (dB)	17.1	9.2	7.7	6.2	-2.1	-2.1
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.6	7.7	6.2	4.7	-3.6	-3.6
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54
CARRIER DENSITY LEVELS						

Uplink Power Density (dBW/Hz)	-43.9	-53.8	-52.4	-53.6	-52.5	-52.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-12.6	-26.1	-26.3	-27.6	-26.4	-26.4

EXHIBIT 14: ADJACENT SATELLITE (57.5º W.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Uplink Frequency (GHz)	14.125	14.125	14.125	14.125	14.125	14.125
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Uplink Contour G/T (dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Uplink Contour SFD (dBW/m2)	-80.3	-90.3	-79.3	-79.3	-79.3	-79.3
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	NAOR	NAOR	NAOR	NAOR	NAOR	NAOR
Downlink Frequency (GHz)	11.575	11.575	11.575	11.575	11.575	11.575
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Downlink Contour EIRP (dBW)	41.2	41.2	41.2	41.2	41.2	41.2
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	55.5W	55.5W	55.5W	55.5W	55.5W	55.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	59.5W	59.5W	59.5W	59.5W	59.5W	59.5W
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink EIRP Density at ES (dBW/Hz)	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
CARRIER INFORMATION						
Carrier ID	36M0F3F	72M0G7W	8M78G7W	323KG7W	5M33G7W	1M33G7W
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	4	N/A	N/A	N/A	N/A	N/A
Information Rate(kbps)	N/A	49150	6000	256	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x190/200	1/2	1/2
Occupied Bandwidth(kHz)	32400	53333.3	6510.6	269.5	4444.2	1111
Allocated Bandwidth(kHz)	36000	72000	8789.5	323.5	5333	1333.5
Minimum C/N, Clear Sky (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
Minimum C/N, Rain (dB)	15.4	4.5	4.5	3.0	-5.2	-5.2
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.5	2.4	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	57.4	48.7	53.0	53.0	49.1	49.1
Earth Station Elevation Angle	20.0	20.0	20.0	20.0	20.0	20.0
Rain Rate (mm/yr)	275	275	275	275	275	275
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	12.0	4.0	3.8	3.8	2.4	2.4
Earth Station Gain (dBi)	60.9	51.4	51.0	51.0	47.0	47.0
Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Earth Station Elevation Angle	20.2	20.2	20.2	20.2	20.2	20.2
Rain Rate (mm/yr)	222	222	222	222	222	222
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.6	72.3	70.8	55.7	63.4	57.4
Uplink Path Loss, Clear Sky (dB)	-207.6	-207.6	-207.6	-207.6	-207.6	-207.6
Satellite G/T(dB/K)	-4.7	-4.7	-4.7	-4.7	-4.7	-4.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Uplink C/N(dB)	20.8	11.3	19.0	17.7	13.2	13.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	40.8	41.1	29.5	14.3	21.9	16.0
Downlink Path Loss, Clear Sky (dB)	-205.8	-205.8	-205.8	-205.8	-205.8	-205.8
Downlink Earth Station G/T (dB/K)	39.0	29.5	29.0	29.0	25.0	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	32.4	53.3	6.5	0.3	4.4	1.1
Transponder Correction Factor	0.0	-0.4	0.0	0.0	0.0	0.0
Downlink C / N(dB)	27.5	15.7	13.2	11.8	3.2	3.3
COMPOSITE LINK PERFORMANCE						
Uplink Earth Station HPA Intermodulation C/N (dB)	200.0	200.0	200.0	200.0	200.0	200.0
C/N Uplink (dB)	20.8	11.3	19.0	17.7	13.2	13.2
Uplink Interference C/I (dB)	124.9	200.0	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	25.5	16.1	23.6	22.4	17.9	17.9
Intermodulation C/IM (dB)	124.9	200.0	21.1	23.5	19.5	19.1
Downlink C/N (dB)	27.5	15.7	13.2	11.8	3.2	3.3
Downlink Interference C/I (dB)	124.9	200.0	35.8	23.2	18.9	17.4
Downlink Adjacent Satellite C/I (dB)	22.7	11.2	8.4	7.0	-1.6	-1.6
Subtotal C/N (dB)	17.4	7.0	6.6	5.3	-3.0	-3.0
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5	1.5	1.5
Total C/N (dB)	15.9	5.5	5.1	3.8	-4.5	-4.5
Minimum Required C/N (dB)	15.4	4.5	4.5	3.0	-5.2	0.0
Number of Carriers	1	1	8	223	14	54
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.8	-53.7	-50.3	-51.6	-52.2	-52.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-19.6	-30.6	-33.0	-34.4	-39.0	-38.9