Engineering Statement

1) Introduction

Intelsat License LLC ("Intelsat") seeks authority in this application to launch and operate a new satellite designated as Intelsat 19. This spacecraft will operate from 166° E.L and will replace Intelsat 8, which currently operates at this orbital location. The characteristics of the Intelsat 19 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 19 is a Space Systems/Loral model 1300 spacecraft that operates on the C-band frequencies of 5925 – 6425 MHz, 3700 – 4200 MHz; and Ku-band frequencies of 14000 – 14500 MHz and 12250 – 12750 MHz. The spacecraft utilizes 24 C-band channels to provide service to East Asia, Australia, Hawaii and western United States; and 34 Ku-band channels to provide service to East Asia, western United States, Alaska, Hawaii, Australia and New Zealand.

2.1) Structure

Intelsat 19 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 19 utilizes two five-panel deployable solar array wings, one fixed communication reflector and four deployable communication antenna reflectors.

The structural design of Intelsat 19 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 19 mass budget is provided in Exhibit 2.

2.2) Thermal Subsystem

Thermal control is accomplished through the use of thermal control coatings, blankets, shields, heaters, heat pipes, special paint/coating and heat rejection

surfaces. Heat pipes are embedded in a number of key equipment panels. High thermal dissipation components are located directly on the north and south communication panels. Optical Solar Reflectors ("OSRs") are used on the outer faces of these panels. Multilayer Insulation ("MLI") blankets are used on non-radiator areas including the external east, west, nadir and aft surfaces of the spacecraft. Special paint/coating is applied to energy dissipating equipment.

The traveling wave tube amplifiers ("TWTAs") of the Ku-band communication subsystem are equipped with radiators protruding from the spacecraft body which radiate a large percentage of the TWTA heat directly to space. The TWTAs supporting the C-band communications subsystem are conduction cooled via direct contact with the spacecraft panels and heat pipe network. Heaters are employed throughout the spacecraft in order to ensure that temperature variations of the bus and communication units are maintained within appropriate limits throughout the operational life of the satellite. Battery temperatures are maintained within limits through the combined use of heat pipes, heaters, blankets and OSRs.

2.3) Electrical Power Subsystem

The Electrical Power Subsystem ("EPS") generates, stores, conditions and protects the satellite's electrical power. It provides the energy required to operate the satellite during all modes of operation. The EPS consists of the solar array, batteries, associated power electronics, and power harnesses that integrate and regulate the systems.

Intelsat 19 utilizes two deployable solar array wings, with one wing located on the north side of the spacecraft and the other located on the south side of the spacecraft. Each solar wing is composed of five electrically interconnected panels. The panels support the requisite solar cells. During launch, the solar array wings are in the stowed position. However, during transfer orbit the solar wings are deployed, with each wing extending out on the north or south sides of the spacecraft. The solar array is designed to provide power to the spacecraft for at least 15 years.

During eclipse periods, the primary source of power to the spacecraft is through batteries. Intelsat 19 utilizes three 22 cell Lithium ion batteries.

The Intelsat 19 EPS has been designed so that no single failure in the subsystem will cause a spacecraft failure. The EPS will provide sufficient power to the spacecraft throughout its design life to support all active

communication channels as well as all necessary housekeeping loads. The beginning of life ("BOL") and end of life ("EOL") power budgets for Intelsat 19 are provided in Exhibit 3.

2.4) Attitude Control Subsystem

The Attitude Control Subsystem ("ACS") maintains the spacecraft attitude during the transfer orbit, initial acquisition period, and on-station geostationary operations. Additionally, the ACS is responsible for re-acquisition of the spacecraft in case of emergency and its placement into a safe configuration.

The ACS is composed of primary and redundant Earth and sun sensors, 2-for-1 scalable space inertial reference units (i.e., gyros), 4-for-3 redundant reaction wheels, bipropellant thrusters, and associated electronics. Control of the spacecraft attitude and orientation is accomplished through the use of reaction wheels and by pulsed or continuous firing of selected thrusters by the ACS.

2.5) Propulsion Subsystem

The propulsion subsystem provides impulse for the spacecraft maneuvering during all phases of the mission beginning with launch vehicle separation through the operational lifetime of the satellite. The major components of the propulsion subsystem are as follows: 1) three high pressure helium tank, 2) one fuel tank, 3) one oxidizer tank, 4) a single 455-N thruster, 5) twelve 22-N thrusters, and 6) associated pressure regulators, filters, flow control components, and pressure transducers.

The bipropellant system utilizes a combination of Nitrogen Tetroxide and Hydrazine as propellants. The system utilizes Helium gas to pressurize the propellant tanks.

The architecture of the dual mode systems are based on a low risk approach with many of the units having been flight proven. The system utilizes space qualified components and incorporates full redundancy for all critical components.

2.6) Communication Subsystem

2.6.1) Overview

Intelsat 19 provides 24 active communication channels at C-band frequencies, 34 active channels at Ku-band frequencies. The C- and Ku-band payload employs channels having a bandwidth of 36 MHz. The Intelsat 19 frequency plan is provided in Exhibits 4A and 4B.

At C-band, the Intelsat 19 receive and transmit beams provide coverage of East Asia, Hawaii, Australia and western United States. At Ku-band, the spacecraft provides coverage of East Asia, western United States, Alaska, Hawaii, Australia, and New Zealand.

At C- and Ku-band frequencies, Intelsat 19 employs full frequency reuse through the use of orthogonal polarization within the same beam and/or through the use of spatially isolated beams. Accordingly, Intelsat 19 is compliant with the provisions of Sections 25.210(a)(1), (a)(2) and (f) of the Commission's rules.

Section 25.210(a)(3) of the Commission's rules specifies that space stations in the fixed satellite service used for domestic service in 5925 – 6425 MHz and 3700 – 4200 MHz bands be capable of switching polarization sense upon ground command. The Commission instituted this rule in order to minimize the impact of TV/FM interference into adjacent co-frequency satellites operating in a two-degree interference environment and providing domestic service. Intelsat notes that there are no co-frequency C-band satellites located within two degrees of 166º E.L. The nearest co-frequency C-band satellite is Intelsat 5, located at 169º E.L, licensed to Intelsat (see FCC File No.: SAT-MOD-20080725-00150). Intelsat will internally coordinate the C-band operations of Intelsat 19 and Intelsat 5. In view of the foregoing, Intelsat believes that its request for a waiver of Section 25.210(a)(3) is justified.

2.6.2) Antennas and Beam Coverages

Intelsat 19 utilizes four deployable Ku-band transmit/receive reflector antennas, and a fixed C-band transmit/receive antenna. The coverage beams of the Intelsat 19 antennas are shown in Exhibits 5A-1 through 5A-18 in the format prescribed in Section 25.114(d) (3) of the Commission's rules.

The performance characteristics for each beam are provided in Exhibits 5A-1 through 5A-18. 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 29 dB for C-band channels and 24 dB for Ku-band channels.

Exhibit 6 provides a detailed calculation of the EIRP, G/T and SFD of the Intelsat 19 uplink and downlink beams.

A number of the communication beams of Intelsat 19 are not predicted to be compliant with the minimum cross-polarization requirements of Section 25.210(i)(1) of the Commission's rules. Exhibits 5D-1 through 5D-3 depict the cross-polarization isolation contours of those Intelsat 19 beams that do not fully comply with the provisions of Section 25.210(i)(1) of the Commission's rules. Specifically, the minimum cross-polarization isolation within the primary coverage area of these beams is as listed in the table below:

Beam Name	**Beam Polarization**	**Minimum Cross Polarization Isolation (dB)**
West Hemi Downlink	Horizontal	26
North East Pacific Downlink	Vertical	28
South West Hemi Downlink	Vertical	27

Accordingly, Intelsat requests a waiver of the provisions of section 25.210(i)(1) with respect to the communication beams of Intelsat 19 specified in the above table.

The level of cross-polarization isolation achieved for the non-compliant beams was the best that the satellite manufacturer could achieve without causing excessive degradation in the co-polarized gain of the beam and/or in the size of its coverage area. As a result, a reduction in the cross-polarization isolation with respect to the 30 dB requirement was considered

to be the best approach for making efficient use of the orbit/spectrum resources by Intelsat 19.

Moreover, the Commission has previously recognized that a failure to meet the cross-polarization isolation requirements will not adversely impact any other operator, and the party to suffer an increase in interference is primarily the applicant itself.[1]

Further, in the case of Intelsat 19, deviation from the 30 dB requirement has minimal impact on potential self-interference. The reduction in Intelsat 19's cross-polarization isolation in the affected portions of its coverage area will slightly increase the interference to Intelsat 19 carriers from its own oppositely polarized carriers. By controlling the power level of Intelsat 19's carriers, however, Intelsat can compensate for this factor, thereby meeting its transmission objectives and the requirements of its customers.

The Commission previously has granted waivers of the requirement in Section 25.210(i) based on the same reasoning that supports the waiver Intelsat is requesting in this application. Accordingly, Commission precedent supports a grant of Intelsat's waiver request.

2.6.3) Transponder description

2.6.3.1) C-Band

The output of the West Hemi receive antenna is sent to a diplexer that filters or separates the receive signal from the transmit signal. The (receive) input signal is sent to a test coupler and then to a preselect 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 preselect filter is connected to one of four redundant receivers which are arranged in a 4-for-2 redundancy ring.

Given that the receiver converts the received signal to the necessary frequency required for transmission, the frequency stability of the transmitted signal is due entirely to the receiver. The Intelsat 19 C-band receivers 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

[1] *See AMC-15 Ku-Band Circular Polarization Amendment,* File No. SAT-AMD-20030422-00069, Attachment Terms and Conditions of Authorization (¶ 5) (Aug. 18, 2004).

value. Accordingly, Intelsat 19 is compliant with the provisions of Section 25.202(e) of the Commission's rules.

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

The LCAMP/TWTAs are configured in two 15-for-12 redundancy rings, which are also interconnected for limited, added redundancy. Each LCAMP/TWTA is comprised of an LCAMP that feeds a 65 Watt, conduction cooled, C-band TWTA.

The LCAMP provides amplification, gain control, phase pre-distortion, and gain expansion to compensate for TWTA nonlinearity. The LCAMP is operated in the Fixed Gain Mode ("FGM"), whereby the output of the LCAMP may be adjusted by ground command from 0 to 29 dB in 1.16 dB increments.

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 OMUX channel filter provides filtering of each channel and combines each of the individual channels into one wide band composite signal. The output of each OMUX is fed in succession to a harmonic filter, a test coupler, diplexer and the antenna feed.

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 Orthomode Transducer ("OMT"), which divides the receive signal into its polarization specific components. Each input receive signal is fed through a diplexer, an input test coupler and then to a preselect 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 preselect reject filter is connected to a receiver. Intelsat 19 utilizes seven Ku-band receivers which are arranged in 5-for-3 and 6-for-4 redundant configurations. The 5-for-3 and 6-for-4 receiver rings are interconnected for limited additional redundancy.

Given that the receiver converts the received signal to the necessary frequency required for transmission, the frequency stability of the transmitted signal is due entirely to the receiver. The Intelsat 19 Ku-band receivers 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 19 is compliant with the provisions of Section 25.202(e) of the Commission's rules.

From the receiver, the signal is sent to a spur filter and a hybrid or directly to a hybrid, depending on the channel.[2] The output of the hybrid is sent to an IMUX. The IMUX is a filter that provides frequency band separation for each channel.

The output of each IMUX (filter) is connected to a corresponding LCAMP/TWTA pair through a redundancy switching network. The LCAMP/TWTAs are arranged into two 16-for-12 redundancy rings and one 14-for-10 redundancy ring, which are also interconnected for limited, added redundancy. Intelsat 19 utilizes 150 Watt radiation cooled Ku-band TWTAs.

The LCAMP provides amplification, gain control, phase pre-distortion, and gain expansion to compensate for TWTA nonlinearity. 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 24 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 output power may be adjusted over a range of 36 dB in 1 dB increments.

[2] Some uplink frequency/downlink frequency combinations produce unwanted spurious signals that must be filtered out. For this reason, the signals from several uplinks are sent to a "spur" filter before being sent to the succeeding sections of the Ku-band communications payload.

The output of each LCAMP/TWTA is sent through the redundancy switching network and then routed OMUX filter. Channels which are associated with a single downlink beam have a direct path between the LCAMP/TWTA redundancy switching network and the specific OMUX filter. For those channels that can be assigned to multiple downlink beams, the signal from the LCAMP/TWTA redundancy switching network is sent to an output (beam) switch prior to being sent to the OMUX filter. The output switch permits connection of the channel to the appropriate downlink beam. Each OMUX output is connected to a test coupler, a transmit filter, a diplexer, the OMT mentioned above, and the antenna feed.

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 global horn command/telemetry antenna, 2) two omni-directional command antennas located on the nadir (+Z) side of the spacecraft, 3) two omni-directional command antennas located on the aft (-Z) side of the spacecraft, 4) two omni-directional telemetry antennas located on the nadir (+Z) side of the spacecraft, 5) two omni-directional telemetry antennas located on the aft (-Z) side of the spacecraft, 6) three command receivers, 7) two 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-6, 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 19's global horn antenna. The coverage pattern of the on-station command and telemetry beams are shown in Exhibits 5B-1 and 5B-4, respectively.

During emergencies and transfer orbit operations, command and telemetry signals are received and transmitted through the +Z and –Z omni-directional antennas. Intelsat 19 utilizes 4 omni-directional antennas for command and 4 for telemetry – two command and two telemetry antenna located on the nadir side of the spacecraft and the other pairs located on the aft side.

Representative receive and transmit gain graphs for the +Z and -Z antennas are provided in Exhibits 5B-2, 5B-3, 5B-5 and 5B-6.

2.7.2) Command

The Intelsat 19 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 FM signals on the frequencies of 14000.5 MHz and 14003 MHz. The command frequencies are compliant with the provisions of Section 25.202(g) of the Commission's rules. The command signal is received through the global horn antenna and sent to a diplexer that separates the received command and transmitted telemetry signals. The command signal is then routed to a test coupler, a switch bank, a series of hybrids and to three command receivers. The command receivers amplify and demodulate the signal, and convert the command signal into a digital stream. Intelsat 19 utilizes two single frequency command receivers and one dual frequency command receivers. The output of the command receivers are forwarded to baseband data handling system, where the commands are decoded and sent to the appropriate unit.

During transfer orbit and emergency operations, the command signal is received by the +Z and –Z omni-directional antennas. The command signal is then routed to a test coupler, directional coupler, a set of hybrids and to the command receivers.

2.7.3) Telemetry

The Intelsat 19 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, PM signals on two of the following

frequencies: 12253.5 MHz, 12254 MHz, 12256 MHz and 12256.5 MHz. The telemetry frequencies are compliant with the provisions of Section 25.202(g) of the Commission's rules. The telemetry baseband functions are implemented in the baseband data handling system, where data from the various spacecraft units are collected, processed, multiplexed, formatted and encoded onto subcarriers. The output of the baseband data handling system is routed to the telemetry transmitters where the signal is modulated onto the main carrier frequencies.

Intelsat 19 utilizes two dual frequency transmitters. One transmitter can operate on the frequency of 12253.5MHz or 12254 MHz; and the other transmitter can operate at either 12256 MHz or 12256.5 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.

Each telemetry transmitter has a low power output port and a high power output port. During emergency operations, the signal from the low power output port of each telemetry transmitter is routed to a 35 Watt TWTA, a bandpass filter, a directional coupler, a test coupler and then to the +Z and –Z omni antennas. During on-station operations, the signal from the high power output port of the transmitter is routed to a hybrid, a bandpass filter, a test coupler, a diplexer and then to the global horn antenna. During certain conditions, such as launch, the signal from the high power output port of each telemetry transmitter can be sent to the +Z antenna via a test coupler.

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 19 command, telemetry and ranging subsystems are provided in Exhibit 7.

2.8) Uplink Power Control Subsystem ("ULPC")

2.8.1 Antennas

Intelsat 19 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 beam. 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 19 provides two C-band beacons and one Ku-band beacon which can be used for uplink power control by customers transmitting to the spacecraft. The C-Band ULPC beacons are linearly polarized and operate on the frequencies of 3700.5 MHz and 4199.5 MHz. The Ku-Band ULPC beacon is circularly polarized and operates on the frequency of 12257 MHz. Detailed calculation of the EIRP for each ULPC beam is provided in Exhibit 6.

The Intelsat 19 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 19 is compliant with the provisions of Section 25.202(e) of the Commission's rules.

The Ku-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 a bandpass filter, a test coupler, an OMT and then to the Ku-band global horn antenna for transmission to Earth.

For the generation of each C-band ULPC frequency, dedicated 2-for-1 redundant transmitters are utilized. The output of each transmitter is directed to a band-pass filter, a test coupler, an OMT and then to the C-band 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 in excess of 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 at least 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 19 is designed for an operational and mission life of at least 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 at least 15 years. Redundancy concepts are applied to all critical components. All avoidable single-point failure modes have been eliminated.

The projected reliability of the payload is 91.7%. The projected reliability of the bus system is 85.8%. The overall reliability of the Intelsat 19 spacecraft is projected to be 78.6%. The subsystem reliability assessments were based upon the use of failure rates, modeling assumptions from previous spacecraft programs and those specific to Intelsat 19. Failure rates for spacecraft equipment have been calculated using actual electrical stress and operating temperature conditions for each part.

3.0) Services and Emission Designators

Intelsat 19 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 19 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 64 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 is contained in Section 25.208 of the Commission's rules. With respect to the 12250 – 12750 MHz band, the PFD limits are specified in No. 21.16 of the ITU Radio Regulations.

The maximum PFD levels for the Intelsat 19 transmissions were calculated for a number of TV/FM and/or digital carriers listed in Exhibit 9 operating in the 3700 – 4200 MHz and 12250 – 12750 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 19 telemetry and ULPC carriers. The results are provided in Exhibit 10 and show that the downlink power flux density levels of the Intelsat 19 carriers do not exceed limits specified in Sections 25.208 of the Commission's rules or the limits specified in No. 21.16 of the ITU Radio Regulations.

5.0) Emission Limitations

The Intelsat 19 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 19 emissions.

6.0) Service Area

At C-band, the primary service area of Intelsat 19 is East Asia, Australia, Hawaii and western United States. At Ku-band, the primary service area is East Asia, western United States, Alaska, Hawaii, Australia and New Zealand.

7.0) Orbital Location

Intelsat requests that it be assigned the 166° E.L orbital location for Intelsat 19. Intelsat 19 will replace Intelsat 8. The 166° E.L location satisfies Intelsat 19 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 19 is intended to provide video, audio and data services to satellite users within its coverage area. The 166° E.L position affords reasonable earth station angles to the region. The attractiveness of Intelsat 19 to this market would be severely diminished if service to this area is not possible.

9.) Arrangement For Telemetry, Tracking and Control

Intelsat will conduct TC&R operations through its Earth stations in Napa, California and/or Kumsan, South Korea. Additionally, Intelsat is capable of remotely controlling Intelsat 19 from its facility in Washington D.C.

10.0) Intelsat 19 Link Budgets and Interference Analysis

Link analysis for Intelsat 19 was conducted for a number of representative carriers, at C- and Ku-band.

The nearest operating satellites to Intelsat 19 are Intelsat 5, located at 169º E.L, and Optus B3, located at 164º E.L. Intelsat 5 operates on the frequency bands of 5925 – 6425 MHz and 3700 – 4200 MHz, where it provides service to southeast Asia and Australia; the frequency bands of 12750 – 13250 MHz, 14000 – 14250 MHz, 10700 – 10950 MHz, 11200 – 11450 MHz, where it provides service to east Asia; and the frequency band 11450 – 11700 MHz band, where it provides service through a globally steerable beam. Optus B3 operates on the frequency bands of 14000 – 14500 MHz and 12250 – 12750 MHz and provides service to Australia.

At C-band, it was assumed that the nearest co-frequency satellites to Intelsat 19 were two hypothetical satellites – one located at 164º E.L and the other located at 168º E.L. The hypothetical satellites were assumed to have same operational parameters as Intelsat 19. It was further assumed that each of the hypothetical satellites utilized digital carriers having a maximum uplink power density and downlink (beam peak) EIRP density of -38.7 dBW/Hz, as specified in Section 25.212(d) of the Commission's rules, and -32 dBW/Hz, respectively.

At Ku-band, it was assumed that the nearest co-frequency satellites to Intelsat 19 were Optus B3 and a hypothetical satellite located at 168º E.L. At uplink, it was assumed that each of the adjacent satellites operated with a maximum uplink power density of -45 dBW/Hz. On downlink, it was assumed that Optus B3 operated with a maximum (beam peak) downlink EIRP density of -20.6 dBW/Hz, and the hypothetical satellite operated with a maximum (beam peak) EIRP density of -20 dBW/Hz[3].

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 618-8.
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.

At C- and Ku-band frequencies, the impact of the TV/FM carriers from the adjacent satellites at 164º E.L and 168° E.L on the transmissions of Intelsat 19 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

[3] Optus B3 utilized multiple beam types. For the analysis, it was assumed that Optus B3 utilized 54 MHz wide channels and a downlink beam covering Australia with a maximum EIRP of approximately 56 dBW.

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, the Intelsat 19 beam connectivity is extensive. In order to keep the number the Intelsat 19 link calculations to a manageable number, worst-case performance values were assumed for each beam type. The worst-case beam parameters were derived from the beam parameters listed in Exhibits 5A-1 through 5A-18 and chosen in such a manner that would make carrier links utilizing any specific uplink / downlink beam combination as sensitive to adjacent satellite interference as possible. This would ensure that the link performance objectives would be achieved for all possible Intelsat 19 uplink and downlink beam combinations. The worst-case beam performance for each Intelsat 19 beam type is provided below:

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	2.1	-110 to -81	42.4
West Hemi (V)				
Australia (H)	Australia	7.2	-103 to -79	52.4
Australia (V)				
N.W. Pacific (H)	Pacific	5.5	-98.4 to -74.4	48.5
N. W. Pacific (V)				
N.E. Pacific (H)				
N.E. Pacific (V)				
S.W. Pacific				

The results of the C-band and Ku-band analysis are shown in Exhibit 12 and demonstrate that operation of the Intelsat 19 satellite from 166° E.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.

11.0) Adjacent Satellite Link Analysis

At C- and Ku-band, the impact of the proposed Intelsat 19 emissions on the transmissions of the adjacent satellites located at 164º E.L and 168º E.L was analyzed.

For the C-band and Ku-band analysis at 168º E.L, it was assumed that a hypothetical satellite having the same characteristics as Intelsat 19 operated from that location. Furthermore, it was assumed that the nearest adjacent co-frequency satellites to 166º E.L were Intelsat 19, and a hypothetical satellite having the same characteristics as Intelsat 19, located at 170º E.L.[4]

For the C-band analysis at 164º E.L, it was assumed that a hypothetical satellite having the same characteristics as Intelsat 19 operated from that location. Furthermore, it was assumed that the nearest adjacent co-frequency satellites to 164º E.L were Intelsat 19, and a hypothetical satellite having the same characteristics as Intelsat 19, located at 162º E.L.

For the Ku-band analysis at 164º E.L, it was assumed that Optus B3 operated from that location[5]. Furthermore, it was assumed that the nearest adjacent co-frequency satellites to 164º E.L were Intelsat 19, and Superbird B2, located at 162º E.L[6].

The impact of Intelsat 19 emissions on the TV/FM carriers of the adjacent satellites at 164º E.L and 168º E.L was not considered for the reasons articulated in section 10.0, 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.

[4] Intelsat operates its Intelsat 5 spacecraft at 169º E.L. However, the impact of this satellite was not considered given its close proximity to 168º E.L.

[5] Optus B3 utilized multiple beam types. For the analysis, it was assumed that Optus B3 utilized 54 MHz channels with a downlink beam peak EIRP of 46.5 dBW. Moreover, it was assumed that the Optus B3 uplink beam had a beam peak G/T of 3.5 dB/K with a beam peak SFD ranging from -101.5 to -80.5 dBW/m^2 adjustable by ground command in eight 3 dB steps.

[6] For the analysis, it was assumed that Superbird 2 operated a global steerable beam with a beam peak EIRP of 57 dBW and utilized 36 MHz wide channels.

The results of the analysis are listed in Exhibits 13 and 14. The Intelsat 19 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 19 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 19 digital carriers will not exceed -32 dBW/Hz; and within the MHz and 12250 – 12750 MHz bands the downlink EIRP density of the Intelsat 19 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 19 from 166º E.L. In column "g" of Section S13 of the Schedule S, a link budget file has been included for the first link (i.e., the first row of data) contained in that section. This link budget file is applicable to all the links listed in Section S13 and should have been included with each row of data in that section of the Schedule S. However, given that the link budget file is rather large and its inclusion with each link (or data row) would lead to the Schedule S file having an unmanageable size, all other links (or rows of data) contain a small ASCII file that references the link budget file that is attached to the first link (i.e., the link budget file attached to the first row of data).

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) all spacecraft subsystems have redundant components to ensure no single-point failures. The spacecraft does not use any subsystems for end-of-life disposal that are not used for normal operations.

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 8 during the transition of traffic period, Intelsat 19 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 8, Intelsat will take all the necessary steps, e.g., "pass-in-the-night maneuver" or slight relocation of Intelsat 8 and/or Intelsat 19, to minimize the risk of collision between Intelsat 19 and Intelsat 8.

With the exception of Intelsat 8, Intelsat is not aware of any other FCC licensed system, or any other system applied for and under consideration by the FCC, having an overlapping station-keeping volume with Intelsat 19. Intelsat is also not aware of any system with an overlapping station-keeping volume with Intelsat 19 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 will 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 63.5 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 19 spacecraft is 0.55 m^2/kg, resulting in a minimum perigee disposal altitude under the IADC formula of at most 295 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 19 planned disposal orbit complies with the FCC's rules.

Certification Statement

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

/s/ Abdolmajid Khalilzadeh	December 21, 2011
Abdolmajid Khalilzadeh Intelsat Senior Principal Engineer, Spectrum Strategy	Date

EXHIBIT 1: SUMMARY OF SPACECRAFT CHARACTERISTICS

GENERAL	
Spacecraft Name	Intelsat 19
Orbital Location	166° E.L.
Spacecraft Manufacturer	Loral
Spacecraft Model	SS/L 1300
Spacecraft Type	3-axis stabilized
Spacecraft Dimensions	
Length	26.1 meters
Width	8.0 meters
Depth	9.0 meters
Spacecraft Expected Lifetime	≥ 15 years
Eclipse Capability	100%
Station-keeping	
North-South	±0.05°
East-West	±0.05°
Antenna Pointing Accuracy	
North-South, East-West, Rotational	0.13°, 0.12º, 0. 30º
Spacecraft Reliability	78.6%
Payload Reliability	91.7%
Bus Reliability	85.8%
Propulsion Type	Bi-propellant
Deployed Area of Solar Array	74.4 sq. meters
Ranging Accuracy	≤ 30 meters

EXHIBIT 2: SPACECRAFT MASS BUDGET

Mass of Spacecraft without Fuel (kg)	2395
Mass of Fuel and Disposables (kg)	3146
Launch Mass (kg)	5541
Mass of Fuel, in orbit, at Beginning of Life (kg)	1086

EXHIBIT 3: SPACECRAFT POWER BUDGET

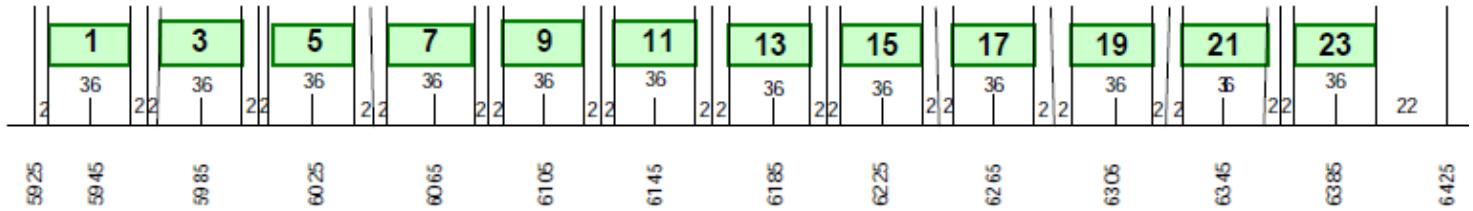
	BEGINNING OF LIFE		END OF LIFE	
	AUTUMN EQUINOX	SUMMER SOLSTICE	AUTUMN EQUINOX	SUMMER SOLSTICE
PAYLOAD (WATTS)	10896	10896	10896	10896
BUS (WATTS)	2541	1299	2541	1299
TOTAL POWER (WATTS)	13437	12195	13437	12195
SOLAR ARRAY POWER (WATTS)	14924	13516	14602	13226
DEPTH OF BATTERY DISCHARGE (%)	67.8%	N/A	72.3%	N/A

EXHIBIT 4A: FREQUENCY PLAN

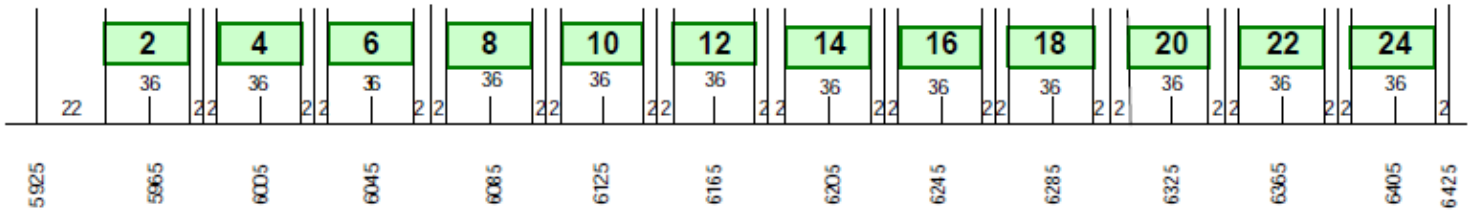
C-Band Frequency Plan

Uplink

West Hemi
Horizontal-pol

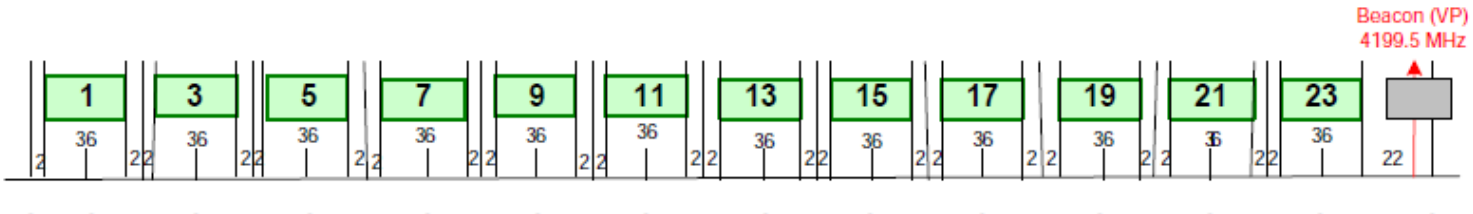


West Hemi
Vertical-pol



Downlink

West Hemi
Vertical-pol



West Hemi
Horizontal-pol

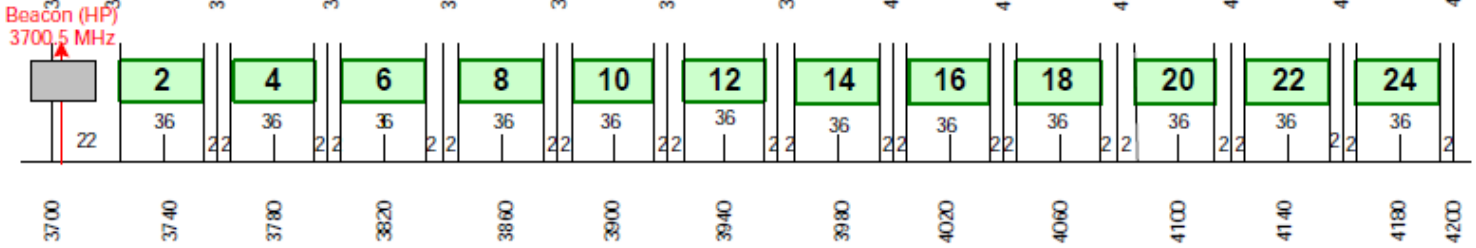


EXHIBIT 4A: FREQUENCY PLAN (continued)

Ku-Band Frequency Plan

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)
1	West Hemi	H	5945	1	West Hemi	V	3720	36	134.4
3	West Hemi	H	5985	3	West Hemi	V	3760	36	134.4
5	West Hemi	H	6025	5	West Hemi	V	3800	36	134.4
7	West Hemi	H	6065	7	West Hemi	V	3840	36	134.4
9	West Hemi	H	6105	9	West Hemi	V	3880	36	134.4
11	West Hemi	H	6145	11	West Hemi	V	3920	36	134.4
13	West Hemi	H	6185	13	West Hemi	V	3960	36	134.4
15	West Hemi	H	6225	15	West Hemi	V	4000	36	134.4
17	West Hemi	H	6265	17	West Hemi	V	4040	36	134.4
19	West Hemi	H	6305	19	West Hemi	V	4080	36	134.4
21	West Hemi	H	6345	21	West Hemi	V	4120	36	134.4
23	West Hemi	H	6385	23	West Hemi	V	4160	36	134.4
2	West Hemi	V	5965	2	West Hemi	H	3740	36	134.8
4	West Hemi	V	6005	4	West Hemi	H	3780	36	134.8
6	West Hemi	V	6045	6	West Hemi	H	3820	36	134.8
8	West Hemi	V	6085	8	West Hemi	H	3860	36	134.8
10	West Hemi	V	6125	10	West Hemi	H	3900	36	134.8
12	West Hemi	V	6165	12	West Hemi	H	3940	36	134.8
14	West Hemi	V	6205	14	West Hemi	H	3980	36	134.8
16	West Hemi	V	6245	16	West Hemi	H	4020	36	134.8
18	West Hemi	V	6285	18	West Hemi	H	4060	36	134.8
20	West Hemi	V	6325	20	West Hemi	H	4100	36	134.8
22	West Hemi	V	6365	22	West Hemi	H	4140	36	134.8
24	West Hemi	V	6405	24	West Hemi	H	4180	36	134.8
				BNC 1	Global	H	3700.5	0.025	
				BNC 2	Global	V	4199.5	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	Australia	H	14034	1K	Australia	V	12286	36	133.0
3K	Australia	H	14074	3K	Australia	V	12326	36	133.0
5K	Australia	H	14114	5K	Australia	V	12366	36	133.0
7K	Australia	H	14154	7K	Australia	V	12406	36	133.0
9K	Australia	H	14194	9K	Australia	V	12446	36	133.0
11K	Australia	H	14234	11K	Australia	V	12486	36	133.0
13K	Australia	H	14274	13K	Australia	V	12526	36	133.0
15K	Australia	H	14314	15K	Australia	V	12566	36	133.0
17K	Australia	H	14354	17K	Australia	V	12606	36	133.0
19K	Australia	H	14394	19K	Australia	V	12646	36	133.0
21K	Australia	H	14434	21K	Australia	V	12686	36	133.0
23K	Australia	H	14474	23K	Australia	V	12726	36	133.0
1K	Australia	H	14034	1K	South West Pacific	V	12286	36	132.7
3K	Australia	H	14074	3K	South West Pacific	V	12326	36	132.7
5K	Australia	H	14114	5K	South West Pacific	V	12366	36	132.7
7K	Australia	H	14154	7K	South West Pacific	V	12406	36	132.7
19K	Australia	H	14394	19K	South West Pacific	V	12646	36	132.7
21K	Australia	H	14434	21K	South West Pacific	V	12686	36	132.7
23K	Australia	H	14474	23K	South West Pacific	V	12726	36	132.7
7K	Australia	H	14154	7K	North West Pacific	V	12406	36	133.1
19K	Australia	H	14394	19K	North East Pacific	V	12646	36	133.1
21K	Australia	H	14434	21K	North East Pacific	V	12686	36	133.1
23K	Australia	H	14474	23K	North East Pacific	V	12726	36	133.1
2K	Australia	V	14034	2K	Australia	H	12286	36	132.9
4K	Australia	V	14074	4K	Australia	H	12326	36	132.9
6K	Australia	V	14114	6K	Australia	H	12366	36	132.9
8K	Australia	V	14154	8K	Australia	H	12406	36	132.9
10K	Australia	V	14194	10K	Australia	H	12446	36	132.9
12K	Australia	V	14234	12K	Australia	H	12486	36	132.9
14K	Australia	V	14274	14K	Australia	H	12526	36	132.9
16K	Australia	V	14314	16K	Australia	H	12566	36	132.9
18K	Australia	V	14354	18K	Australia	H	12606	36	132.9
20K	Australia	V	14394	20K	Australia	H	12646	36	132.9
22K	Australia	V	14434	22K	Australia	H	12686	36	132.9
24K	Australia	V	14474	24K	Australia	H	12726	36	132.9
19K	North East Pacific	H	14394	19K	North East Pacific	V	12646	36	129.7
21K	North East Pacific	H	14434	21K	North East Pacific	V	12686	36	129.7
23K	North East Pacific	H	14474	23K	North East Pacific	V	12726	36	129.7
25K	North East Pacific	H	14194	25K	North East Pacific	V	12446	36	129.7
27K	North East Pacific	H	14234	27K	North East Pacific	V	12486	36	129.7
29K	North East Pacific	H	14274	29K	North East Pacific	V	12526	36	129.7
31K	North East Pacific	H	14314	31K	North East Pacific	V	12566	36	129.7
33K	North East Pacific	H	14354	33K	North East Pacific	V	12606	36	129.7
19K	North East Pacific	H	14394	19K	Australia	V	12646	36	129.6
21K	North East Pacific	H	14434	21K	Australia	V	12686	36	129.6
23K	North East Pacific	H	14474	23K	Australia	V	12726	36	129.6
19K	North East Pacific	H	14394	19K	South West Pacific	V	12646	36	129.3
21K	North East Pacific	H	14434	21K	South West Pacific	V	12686	36	129.3
23K	North East Pacific	H	14474	23K	South West Pacific	V	12726	36	129.3
25K	North East Pacific	H	14194	25K	North West Pacific	V	12446	36	129.7

27K	North East Pacific	H	14234	27K	North West Pacific	V	12486	36	129.7
29K	North East Pacific	H	14274	29K	North West Pacific	V	12526	36	129.7
31K	North East Pacific	H	14314	31K	North West Pacific	V	12566	36	129.7
33K	North East Pacific	H	14354	33K	North West Pacific	V	12606	36	129.7
26K	North East Pacific	V	14154	26K	North East Pacific	H	12406	36	129.5
28K	North East Pacific	V	14194	28K	North East Pacific	H	12446	36	129.5
30K	North East Pacific	V	14234	30K	North East Pacific	H	12486	36	129.5
~~31K~~	~~North East Pacific~~	~~V~~	~~14314~~		~~North East Pacific~~	~~H~~	~~12566~~	~~36~~	129.5
32K	North East Pacific	V	14274	32K	North East Pacific	H	12526	36	129.5
34K	North East Pacific	V	14354	34K	North East Pacific	H	12606	36	129.5
26K	North East Pacific	V	14154	26K	North West Pacific	H	12406	36	129.5
28K	North East Pacific	V	14194	28K	North West Pacific	H	12446	36	129.5
30K	North East Pacific	V	14234	30K	North West Pacific	H	12486	36	129.5
32K	North East Pacific	V	14274	32K	North West Pacific	H	12526	36	129.5
34K	North East Pacific	V	14354	34K	North West Pacific	H	12606	36	129.5
7K	North West Pacific	H	14154	7K	North West Pacific	V	12406	36	130.5
25K	North West Pacific	H	14194	25K	North West Pacific	V	12446	36	130.5
27K	North West Pacific	H	14234	27K	North West Pacific	V	12486	36	130.5
29K	North West Pacific	H	14274	29K	North West Pacific	V	12526	36	130.5
31K	North West Pacific	H	14314	31K	North West Pacific	V	12566	36	130.5
33K	North West Pacific	H	14354	33K	North West Pacific	V	12606	36	130.5
7K	North West Pacific	H	14154	7K	Australia	V	12406	36	130.4
7K	North West Pacific	H	14154	7K	South West Pacific	V	12406	36	130.1
25K	North West Pacific	H	14194	25K	North East Pacific	V	12446	36	130.5
27K	North West Pacific	H	14234	27K	North East Pacific	V	12486	36	130.5
29K	North West Pacific	H	14274	29K	North East Pacific	V	12526	36	130.5
31K	North West Pacific	H	14314	31K	North East Pacific	V	12566	36	130.5
33K	North West Pacific	H	14354	33K	North East Pacific	V	12606	36	130.5
2K	North West Pacific	V	14034	2K	Australia	H	12286	36	130.3
4K	North West Pacific	V	14074	4K	Australia	H	12326	36	130.3
6K	North West Pacific	V	14114	6K	Australia	H	12366	36	130.3
16K	North West Pacific	V	14314	16K	Australia	H	12566	36	130.3
20K	North West Pacific	V	14394	20K	Australia	H	12646	36	130.3
22K	North West Pacific	V	14434	22K	Australia	H	12686	36	130.3
24K	North West Pacific	V	14474	24K	Australia	H	12726	36	130.3
26K	North West Pacific	V	14154	26K	North West Pacific	H	12406	36	130.4
28K	North West Pacific	V	14194	28K	North West Pacific	H	12446	36	130.4
30K	North West Pacific	V	14234	30K	North West Pacific	H	12486	36	130.4
32K	North West Pacific	V	14274	32K	North West Pacific	H	12526	36	130.4
34K	North West Pacific	V	14354	34K	North West Pacific	H	12606	36	130.4
26K	North West Pacific	V	14154	26K	North East Pacific	H	12406	36	130.4
28K	North West Pacific	V	14194	28K	North East Pacific	H	12446	36	130.4
30K	North West Pacific	V	14234	30K	North East Pacific	H	12486	36	130.4
32K	North West Pacific	V	14274	32K	North East Pacific	H	12526	36	130.4
34K	North West Pacific	V	14354	34K	North East Pacific	H	12606	36	130.4
1K	South West Pacific	H	14034	1K	South West Pacific	V	12286	36	131.6
3K	South West Pacific	H	14074	3K	South West Pacific	V	12326	36	131.6
5K	South West Pacific	H	14114	5K	South West Pacific	V	12366	36	131.6
7K	South West Pacific	H	14154	7K	South West Pacific	V	12406	36	131.6
19K	South West Pacific	H	14394	19K	South West Pacific	V	12646	36	131.6
21K	South West Pacific	H	14434	21K	South West Pacific	V	12686	36	131.6
23K	South West Pacific	H	14474	23K	South West Pacific	V	12726	36	131.6
1K	South West Pacific	H	14034	1K	Australia	V	12286	36	131.9
3K	South West Pacific	H	14074	3K	Australia	V	12326	36	131.9

5K	South West Pacific	H	14114	5K	Australia	V	12366	36	131.9
7K	South West Pacific	H	14154	7K	Australia	V	12406	36	131.9
19K	South West Pacific	H	14394	19K	Australia	V	12646	36	131.9
21K	South West Pacific	H	14434	21K	Australia	V	12686	36	131.9
23K	South West Pacific	H	14474	23K	Australia	V	12726	36	131.9
7K	South West Pacific	H	14154	7K	North West Pacific	V	12406	36	132.0
19K	South West Pacific	H	14394	19K	North East Pacific	V	12646	36	132.0
21K	South West Pacific	H	14434	21K	North East Pacific	V	12686	36	132.0
23K	South West Pacific	H	14474	23K	North East Pacific	V	12726	36	132.0
CMD 1	Global	V	14000.5					1	
CMD 2	Global	V	14003					1	
CMD 3	Global	LHCP	14000.5					1	
CMD 4	Global	LHCP	14003					1	
				TLM 1	Global	V	12253.5	0.5	
				TLM 2	Global	V	12254.0	0.5	
				TLM 3	Global	V	12256	0.5	
				TLM 4	Global	V	12256.5	0.5	
				TLM 5	Global	LHCP	12253.5	0.5	
				TLM 6	Global	LHCP	12254.0	0.5	
				TLM 7	Global	LHCP	12256	0.5	
				TLM 8	Global	LHCP	12256.5	0.5	
				BNK 1	Global	RHCP	12257	0.025	

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

Beam Polarization: Horizontal
Peak Beam Gain: 28.2 dBi
Peak Beam G/T: 2.1 dB/K
Saturated Flux Density @ Peak Beam G/T: -108.8 to -79.8 dBW/m^2

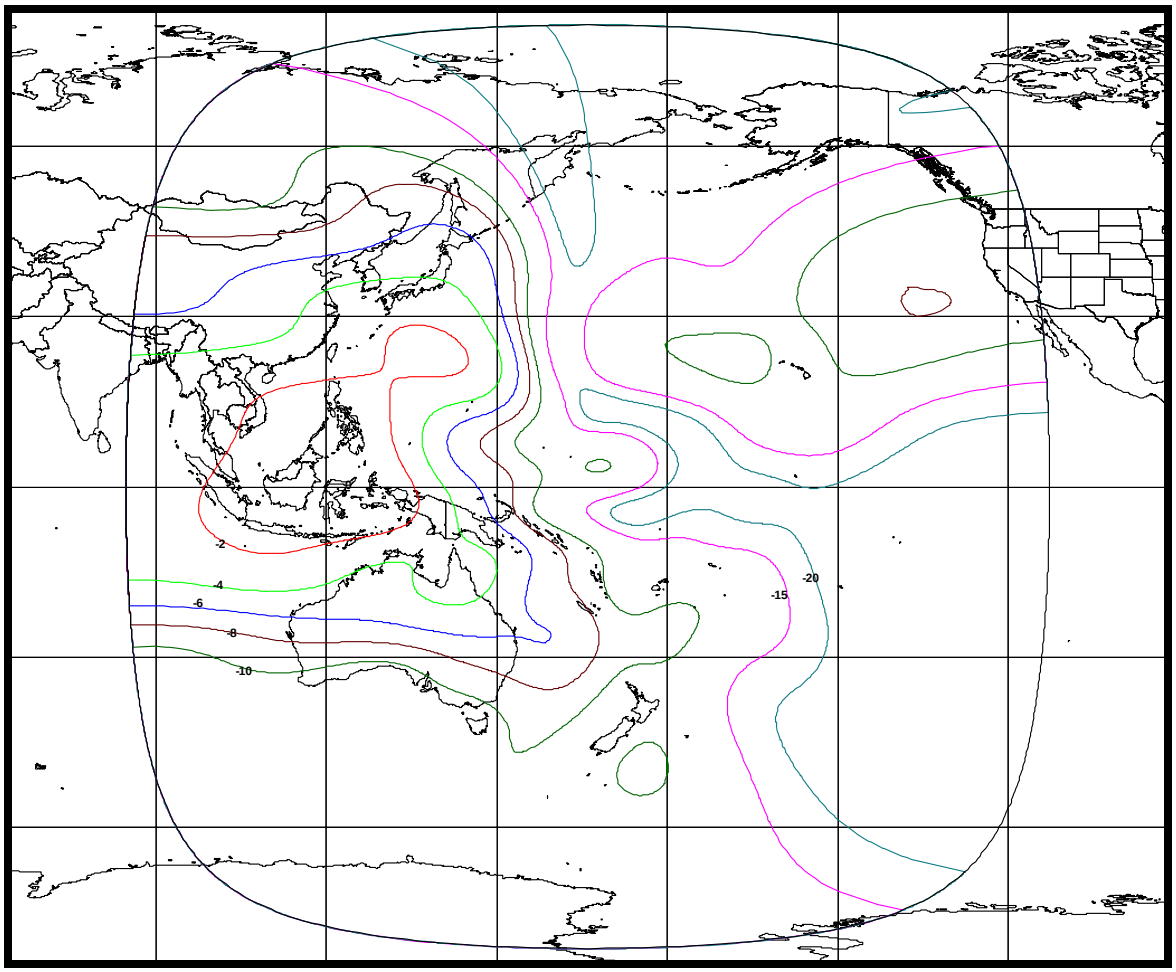


EXHIBIT 5A-2: WEST HEMI RECEIVE BEAM
(Schedule S Beam ID: WHVU)

Beam Polarization: Vertical
Peak Beam Gain: 29.0 dBi
Peak Beam G/T: 2.1 dB/K
Saturated Flux Density @ Peak Beam G/T: -110 to -81 dBW/m^2

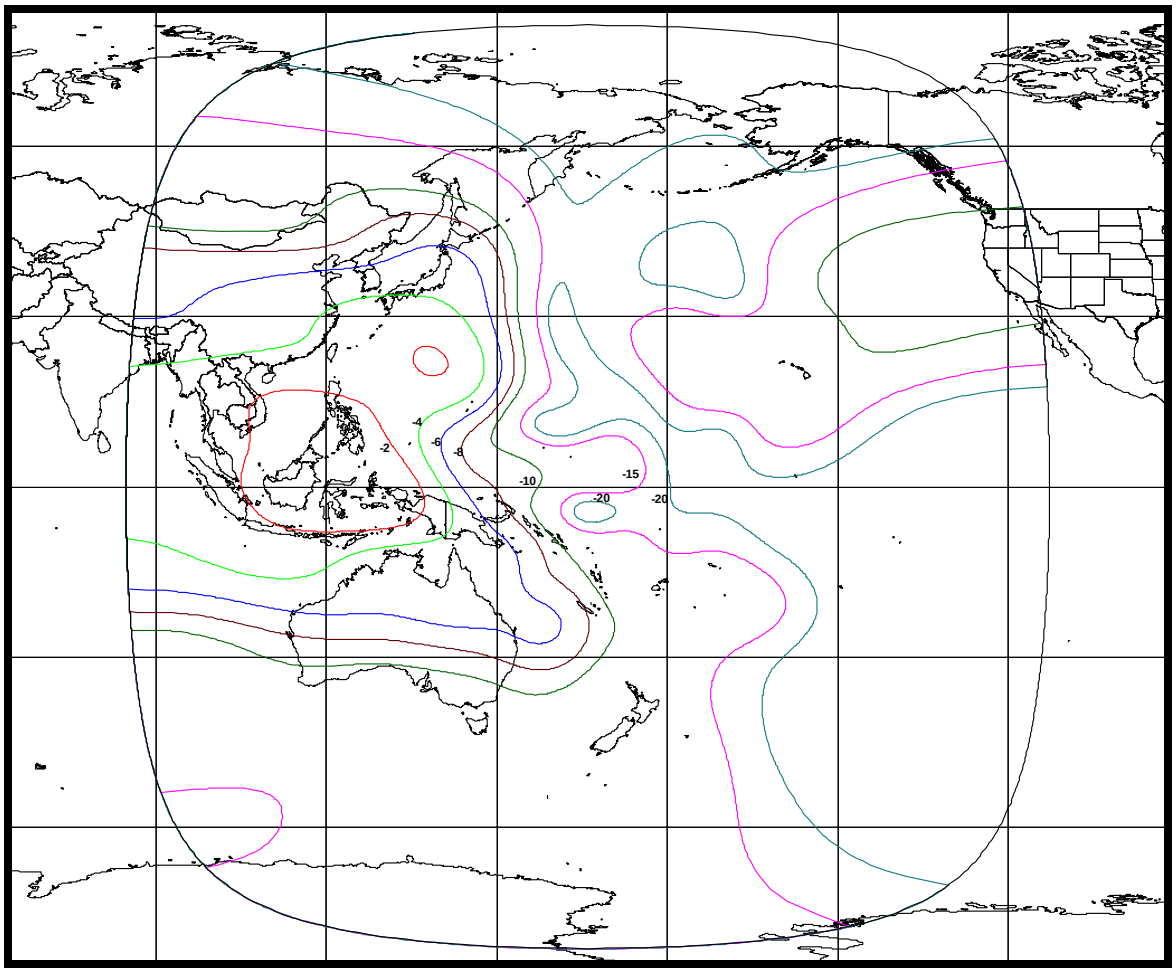


EXHIBIT 5A-3: AUSTRALIA RECEIVE BEAM
(Schedule S Beam ID: AHU)

Beam Polarization: Horizontal
Peak Beam Gain: 34.0 dBi
Peak Beam G/T: 7.2 dB/K
Saturated Flux Density @ Peak Beam G/T: -102.9 to -78.9 dBW/m^2

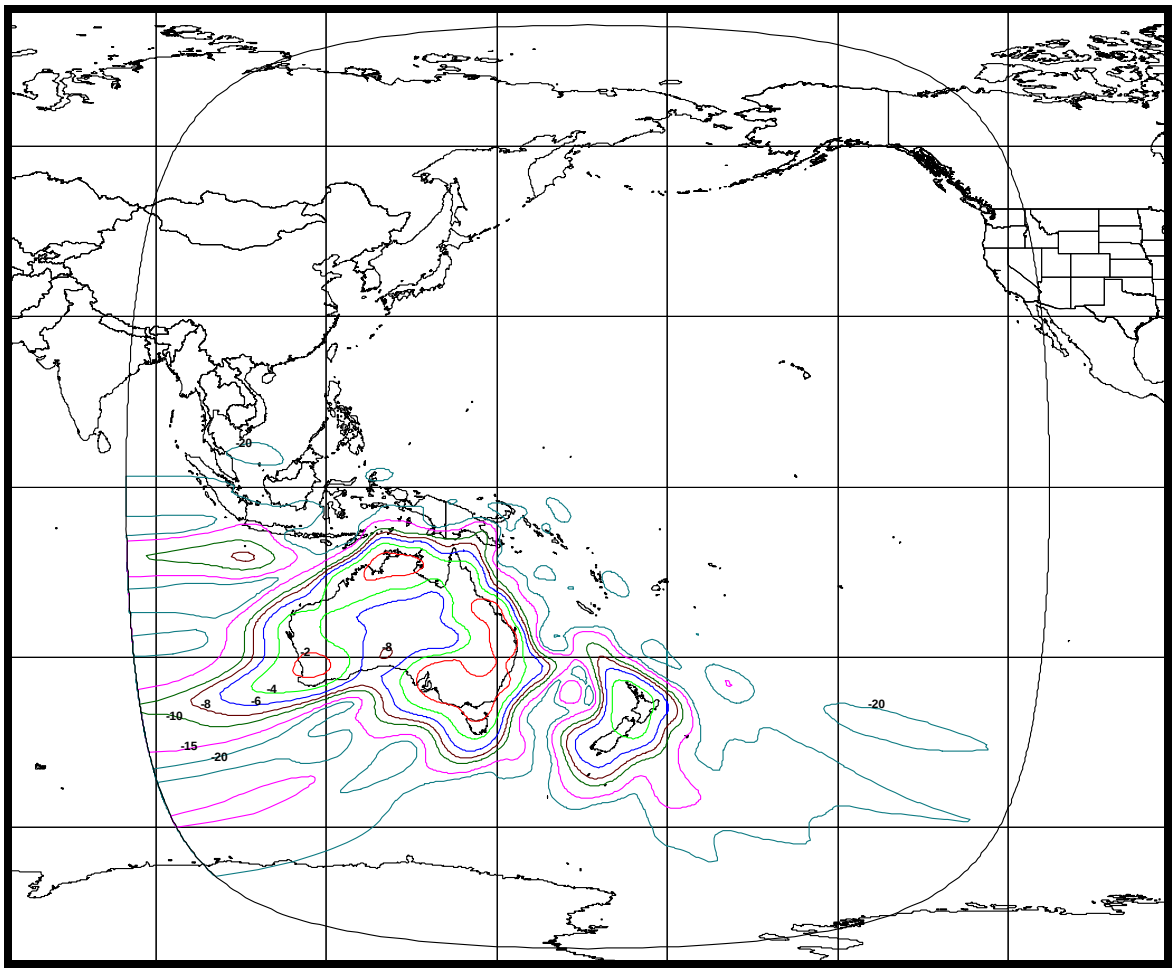


EXHIBIT 5A-4: AUSTRALIA RECEIVE BEAM
(Schedule S Beam ID: AVU)

Beam Polarization: Vertical
Peak Beam Gain: 34.1 dBi
Peak Beam G/T: 7.2 dB/K
Saturated Flux Density @ Peak Beam G/T: -103 to -79 dBW/m^2

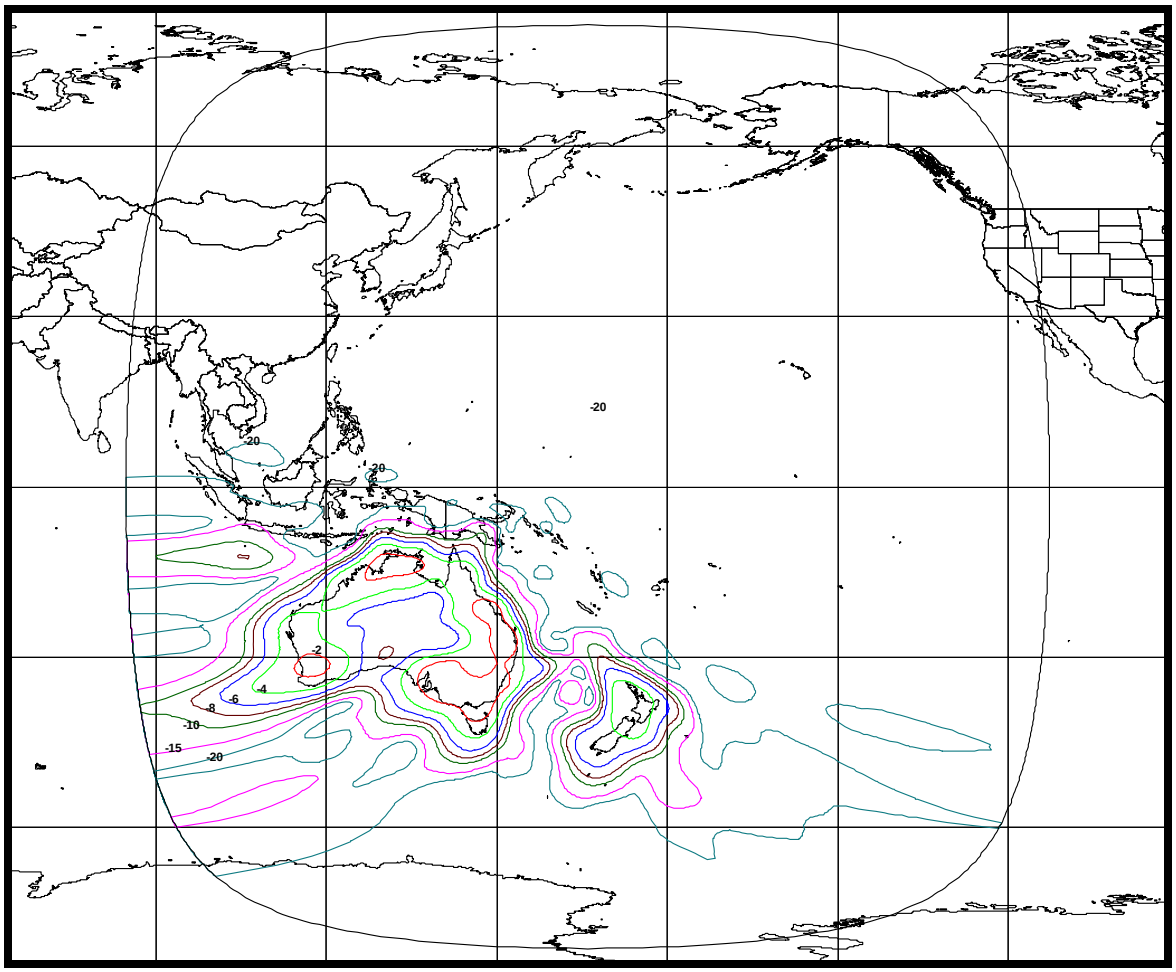


EXHIBIT 5A-5: NORTH WEST PACIFIC RECEIVE BEAM
(Schedule S Beam ID: NWHU)

Beam Polarization: Horizontal
Peak Beam Gain: 32.1 dBi
Peak Beam G/T: 5.5 dB/K
Saturated Flux Density @ Peak Beam G/T: -98.4 to -74.4 dBW/m^2

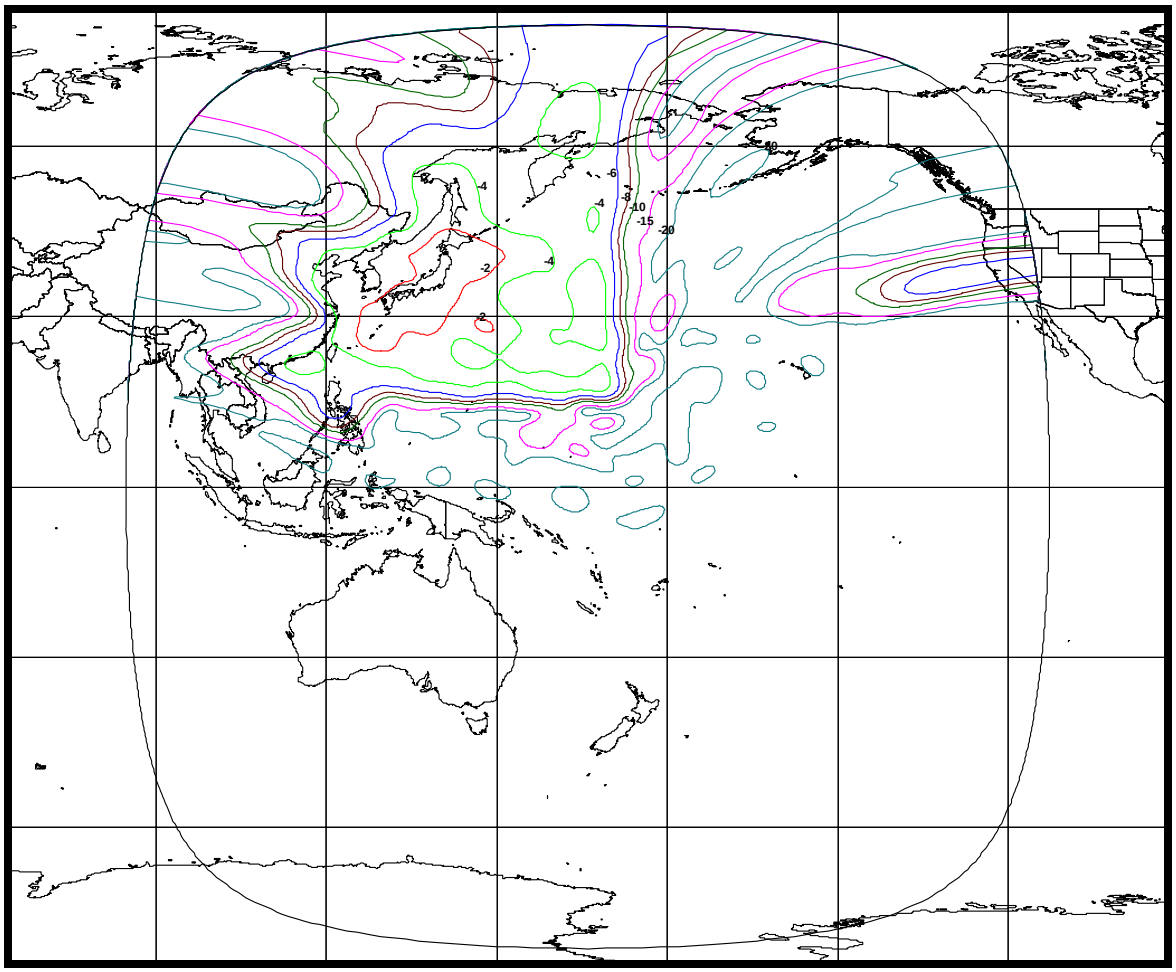


EXHIBIT 5A-6: NORTH WEST PACIFIC RECEIVE BEAM
(Schedule S Beam ID: NWVU)

Beam Polarization: Vertical
Peak Beam Gain: 32.0 dBi
Peak Beam G/T: 5.5 dB/K
Saturated Flux Density @ Peak Beam G/T: -98.3 to -74.3 dBW/m^2

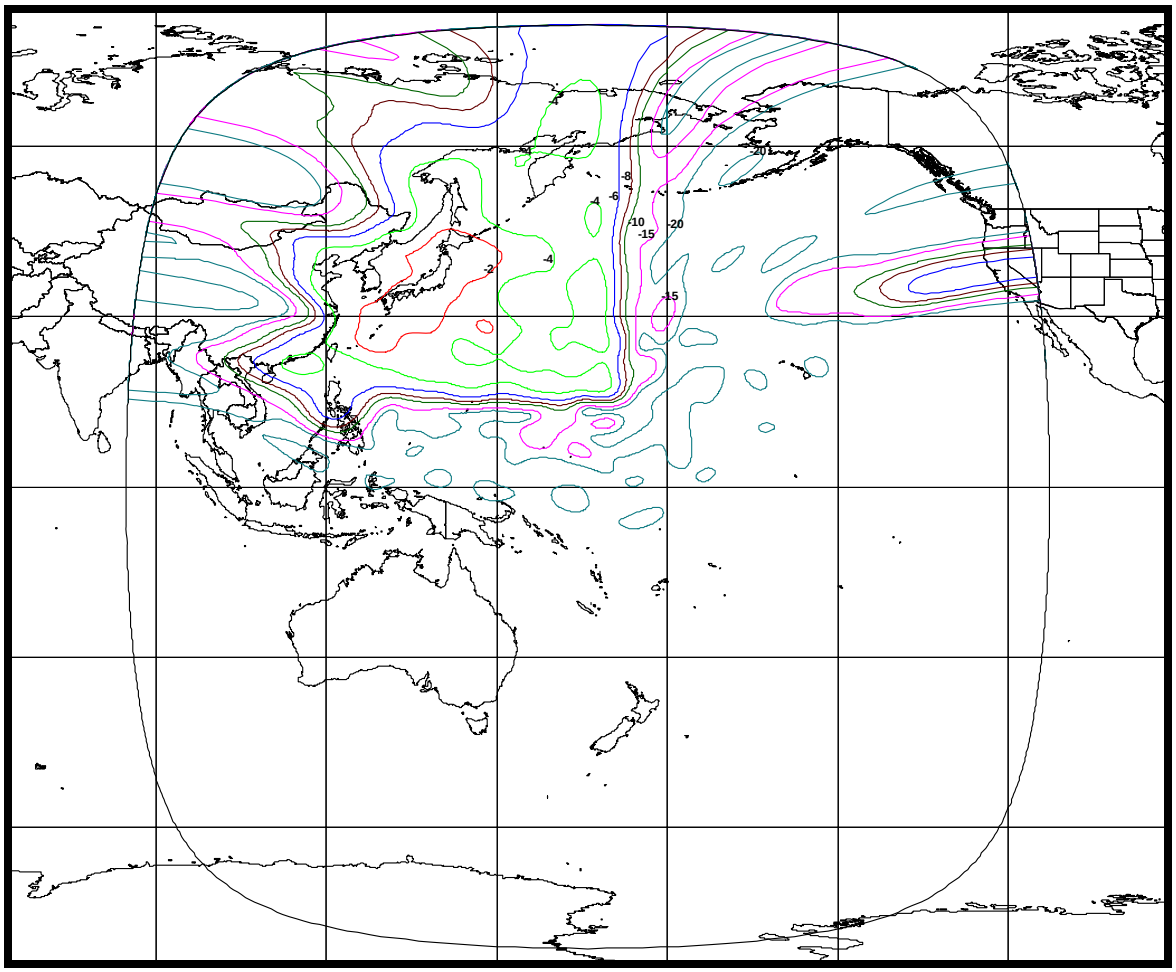


EXHIBIT 5A-7: NORTH EAST PACIFIC RECEIVE BEAM
(Schedule S Beam ID: NEHU)

Beam Polarization: Horizontal
Peak Beam Gain: 30.4 dBi
Peak Beam G/T: 3.7 dB/K
Saturated Flux Density @ Peak Beam G/T: -95.9 to –71.9 dBW/m^2

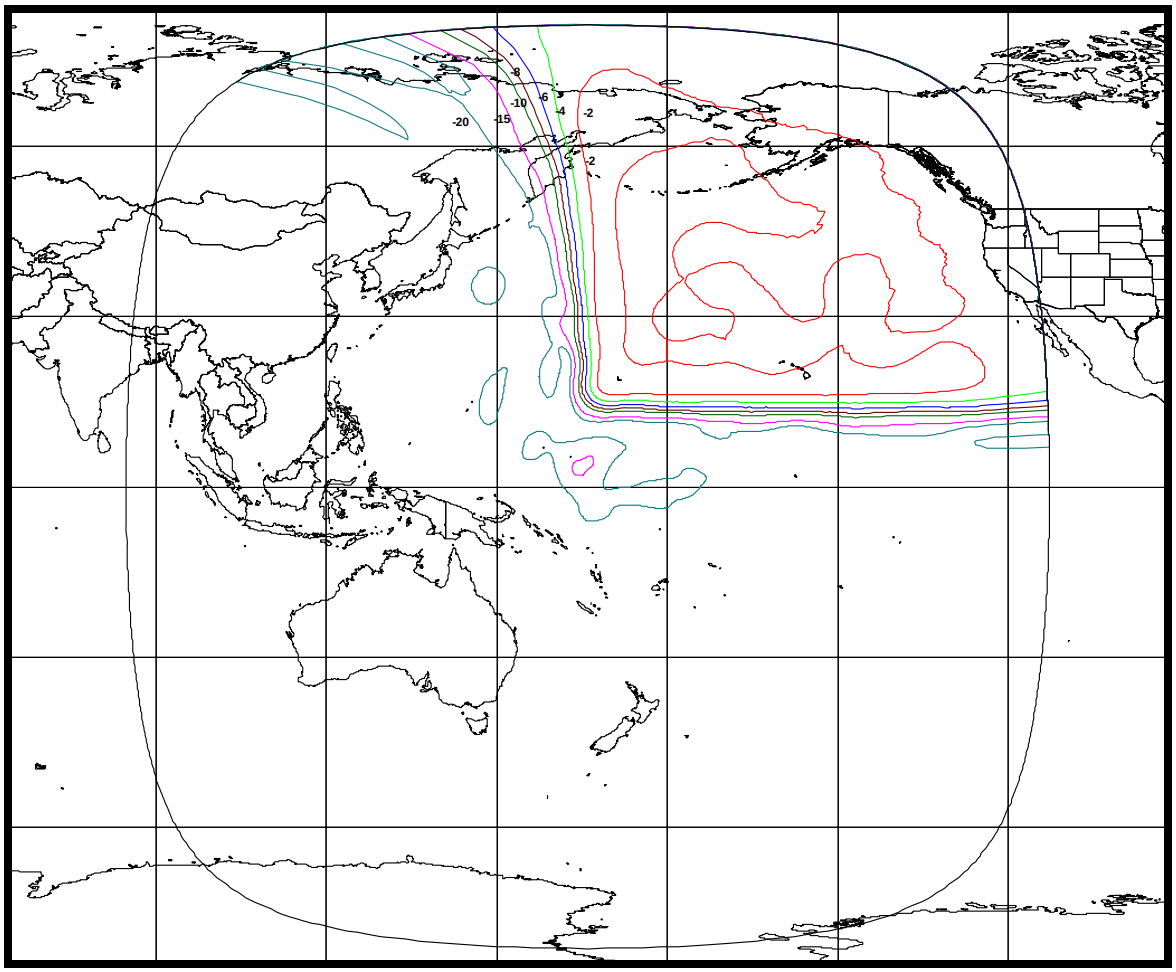


EXHIBIT 5A-8: NORTH EAST PACIFIC RECEIVE BEAM
(Schedule S Beam ID: NEVU)

Beam Polarization: Vertical
Peak Beam Gain: 30.4 dBi
Peak Beam G/T: 3.7 dB/K
Saturated Flux Density @ Peak Beam G/T: -95.8 to -71.8 dBW/m^2

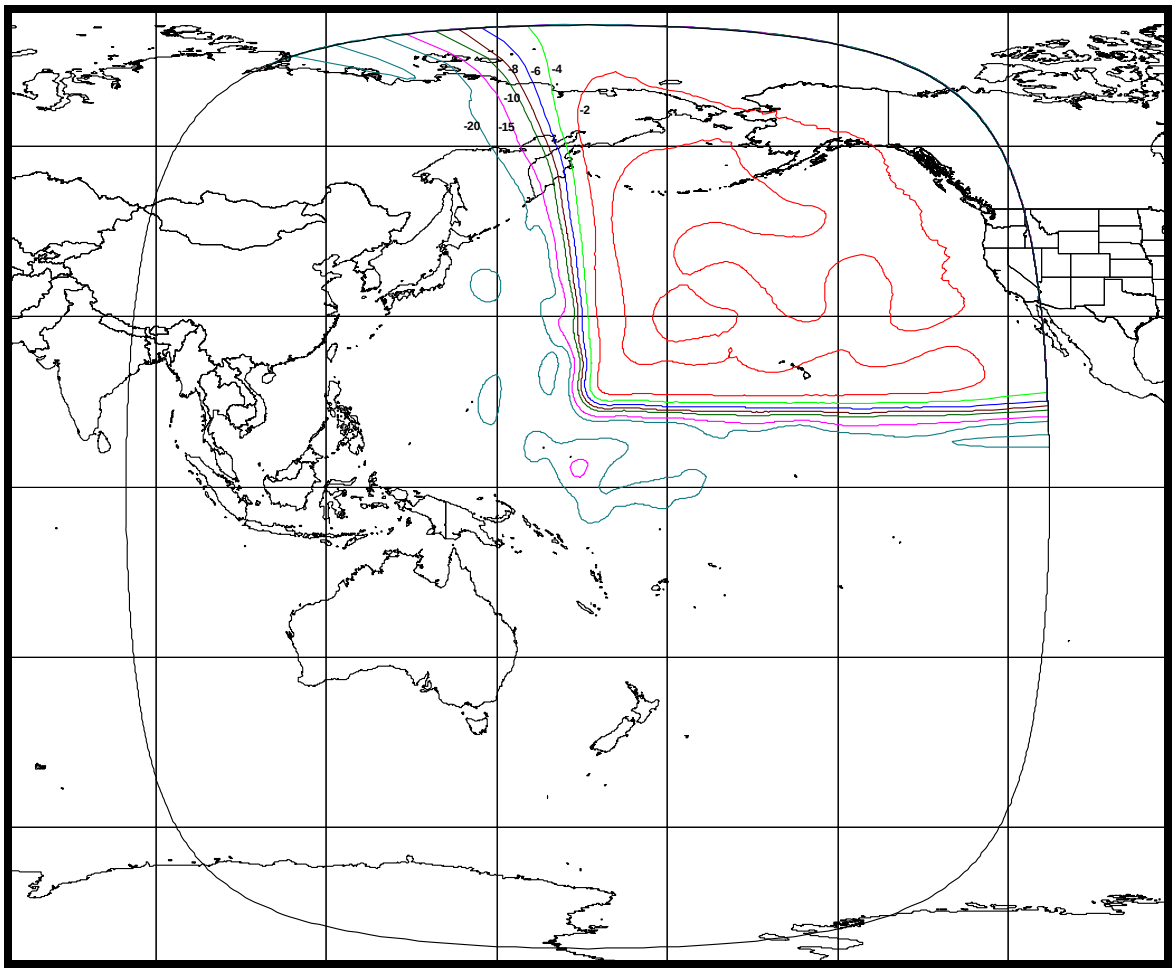


EXHIBIT 5A-9: SOUTH WEST PACIFIC RECEIVE BEAM
(Schedule S Beam ID: SWHU)

Beam Polarization: Horizontal
Peak Beam Gain: 30.4 dBi
Peak Beam G/T: 3.6 dB/K
Saturated Flux Density @ Peak Beam G/T: -98.2 to -74.2 dBW/m^2

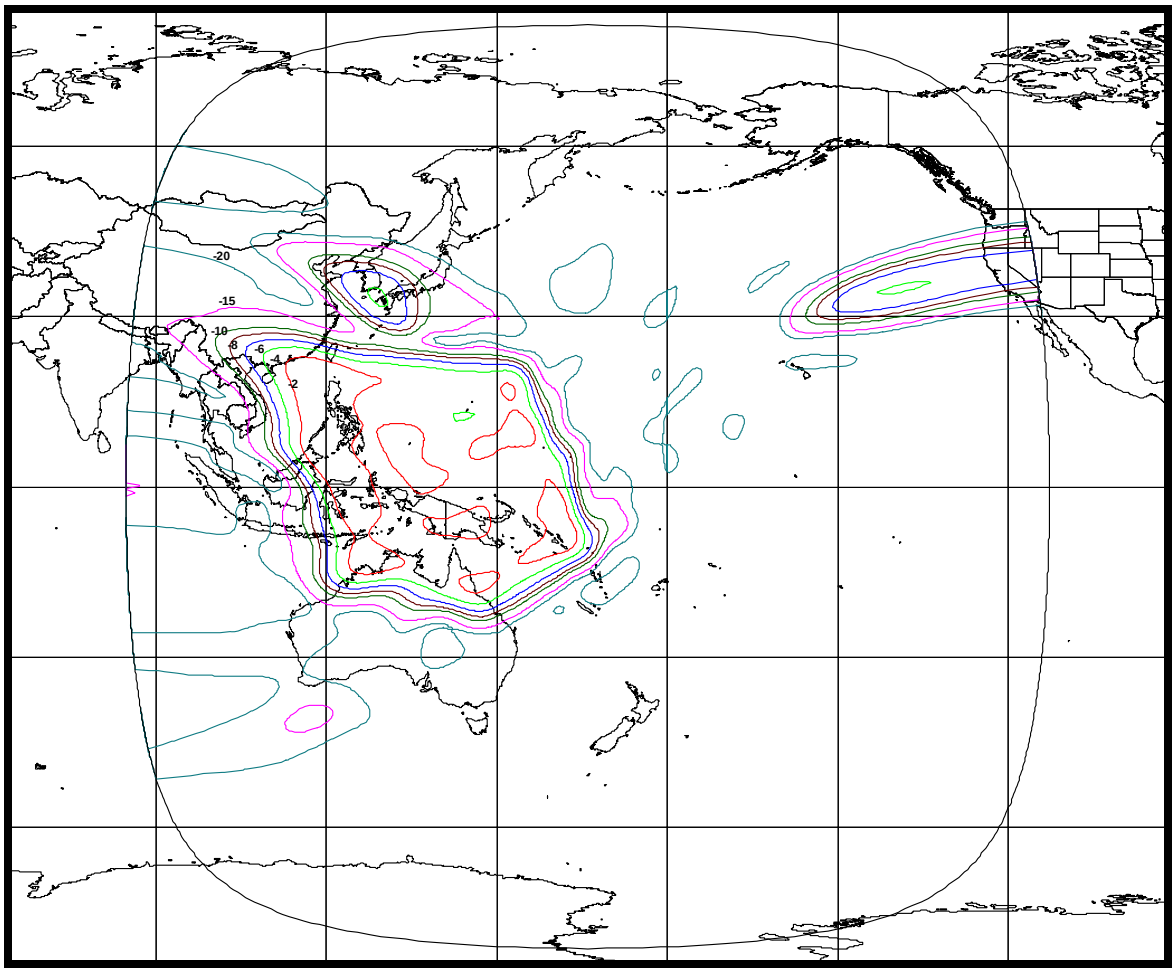


EXHIBIT 5A-10: WEST HEMI TRANSMIT BEAM
(Schedule S Beam ID: WHHD)

Beam Polarization: Horizontal
Peak Beam Gain: 25.9 dBi
Peak Beam EIRP: 42.4 dBW

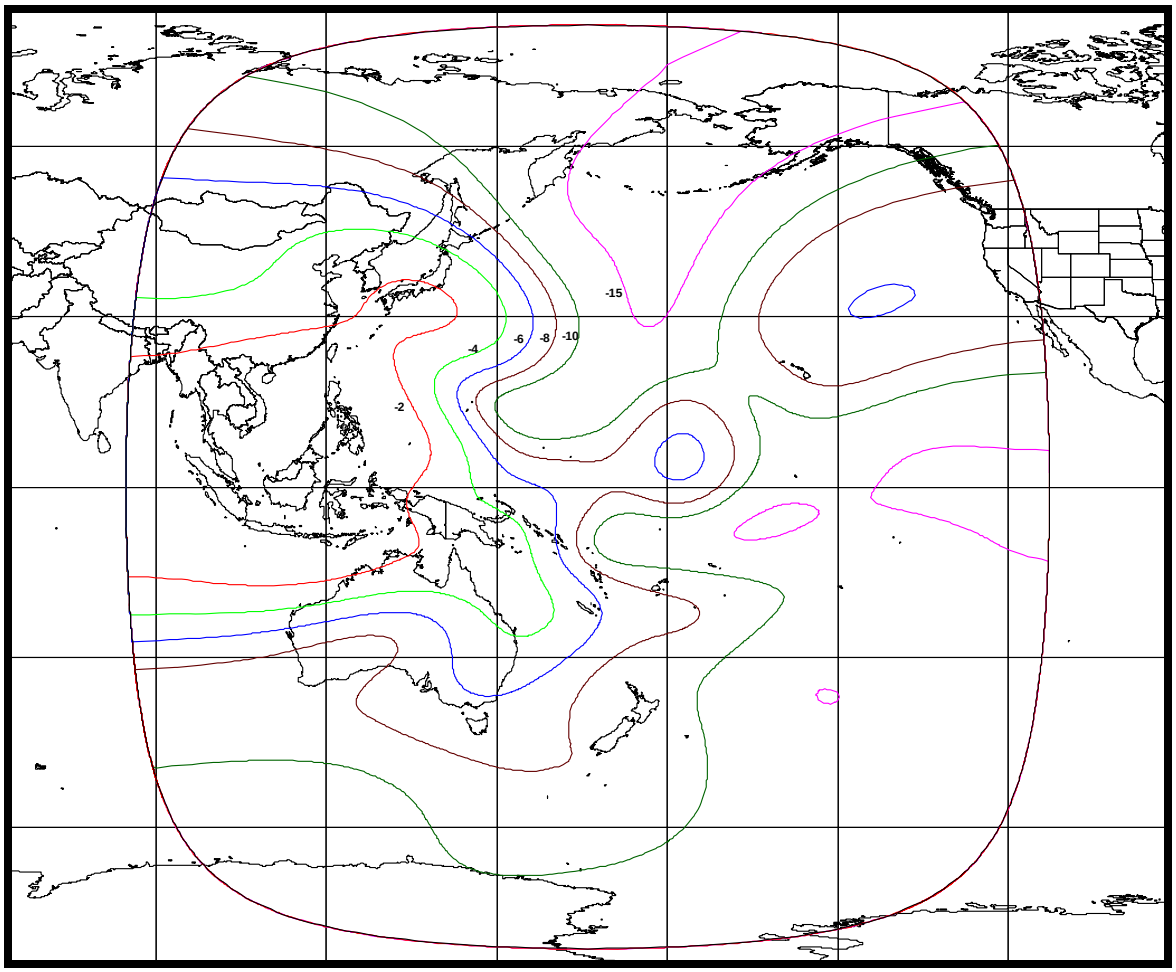


EXHIBIT 5A-11: WEST HEMI TRANSMIT BEAM
(Schedule S Beam ID: WHVD)

Beam Polarization: Vertical
Peak Beam Gain: 25.9 dBi
Peak Beam EIRP: 42.4 dBW

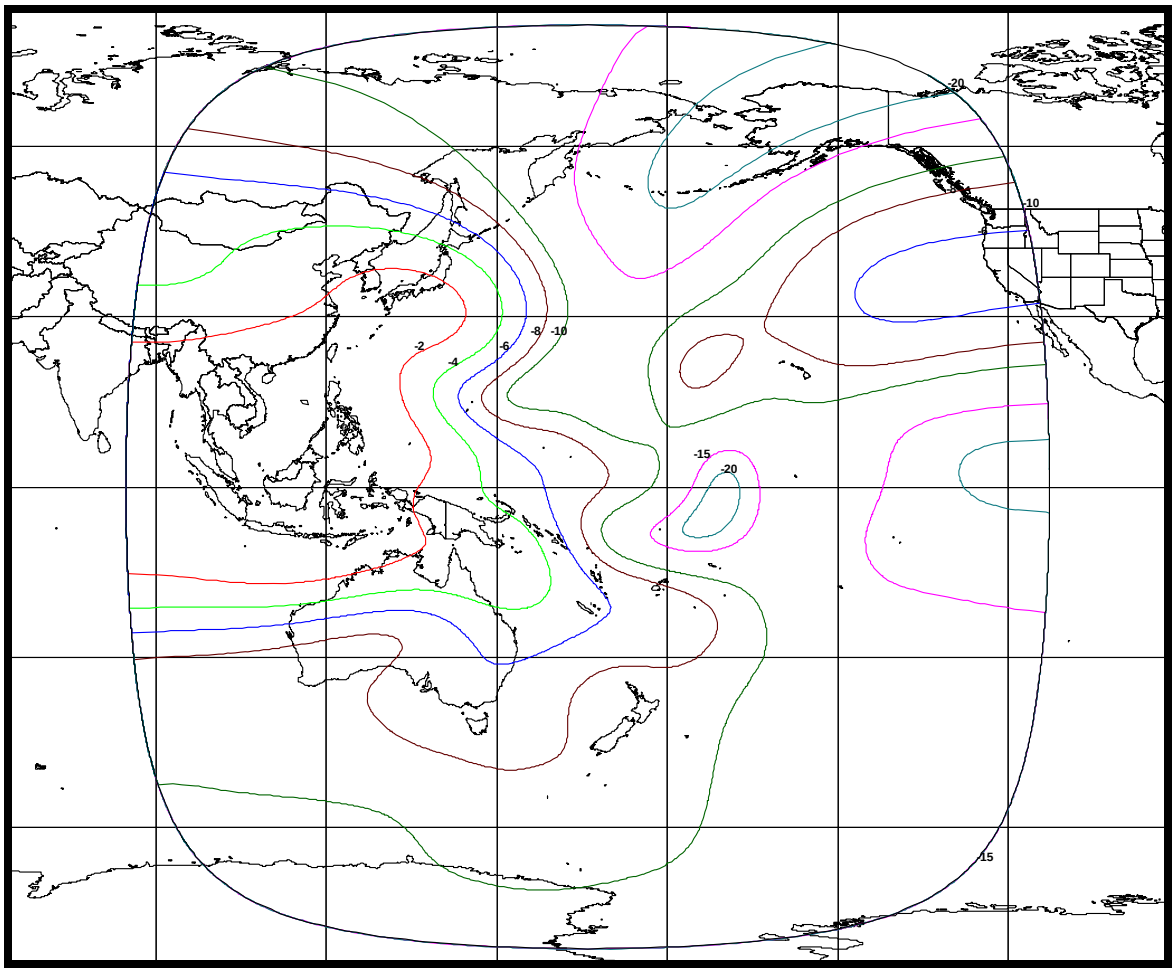


EXHIBIT 5A-12: AUSTRALIA TRANSMIT BEAM
(Schedule S Beam ID: AHD)

Beam Polarization: Horizontal
Peak Beam Gain: 32.9 dBi
Peak Beam EIRP: 52.4 dBW

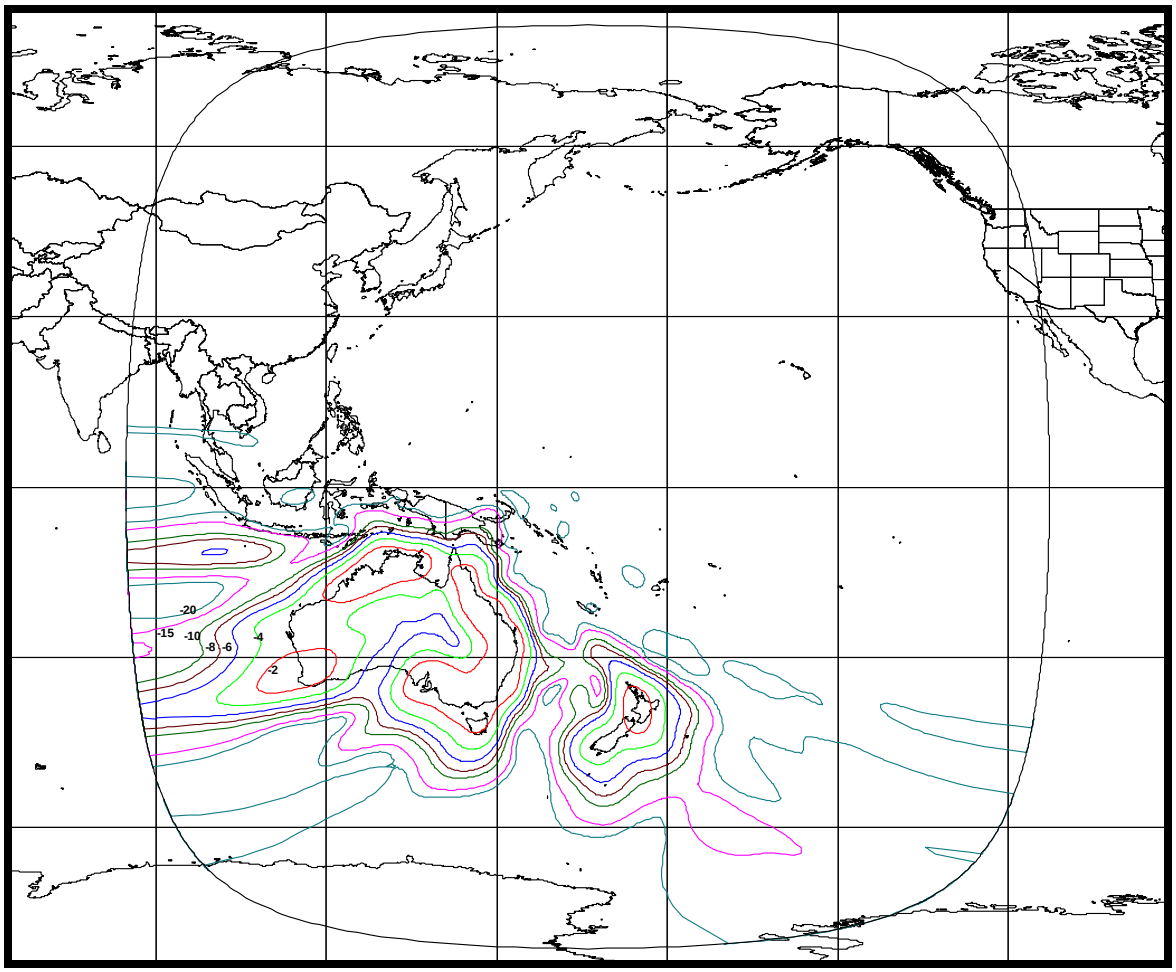


EXHIBIT 5A-13: AUSTRALIA TRANSMIT BEAM
(Schedule S Beam ID: AVD)

Beam Polarization: Vertical
Peak Beam Gain: 32.8 dBi
Peak Beam EIRP: 52.4 dBW

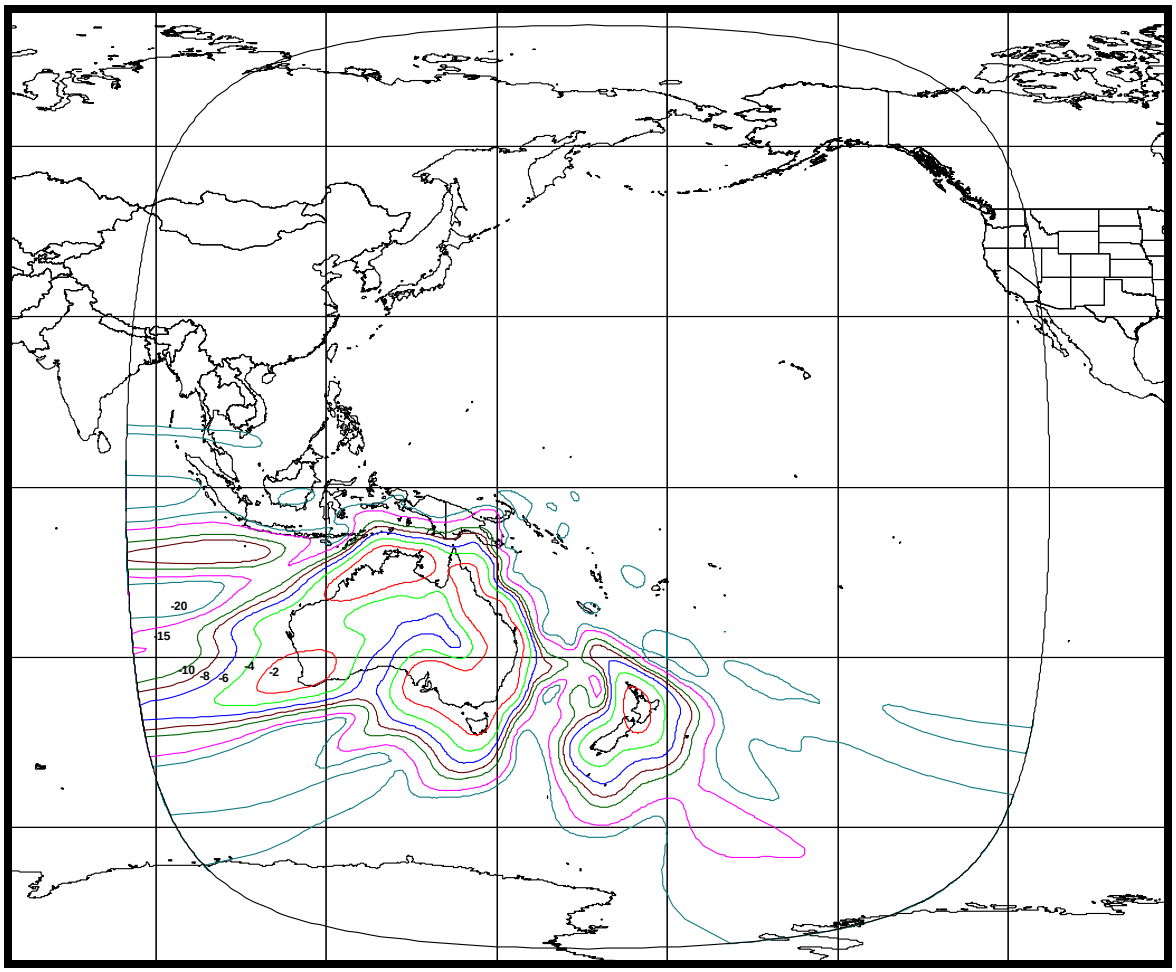


EXHIBIT 5A-14: NORTH WEST PACIFIC TRANSMIT BEAM
(Schedule S Beam ID: NWHD)

Beam Polarization: Horizontal
Peak Beam Gain: 31.5 dBi
Peak Beam EIRP: 51.1 dBW

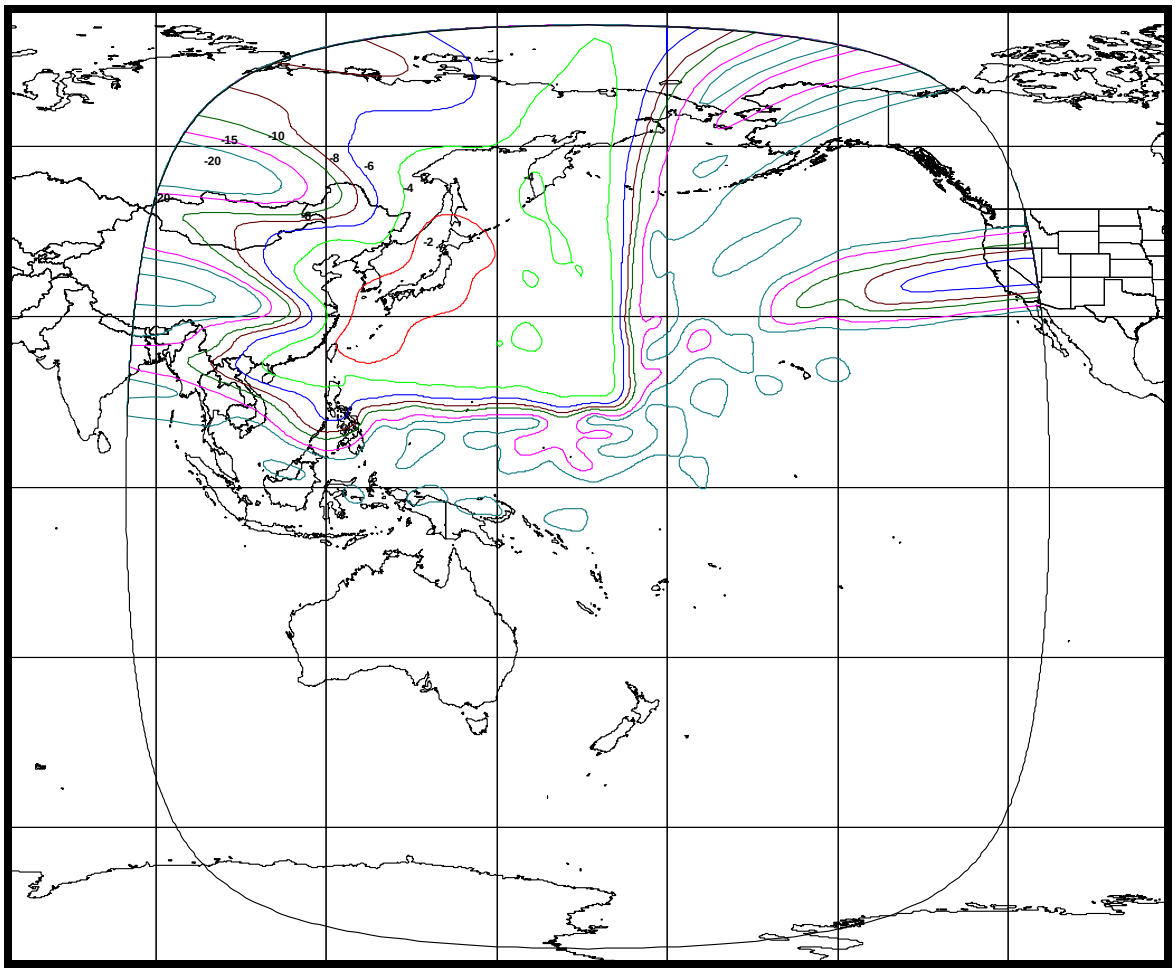


EXHIBIT 5A-15: NORTH WEST PACIFIC TRANSMIT BEAM
(Schedule S Beam ID: NWVD)

Beam Polarization: Vertical
Peak Beam Gain: 31.4 dBi
Peak Beam EIRP: 51.1 dBW

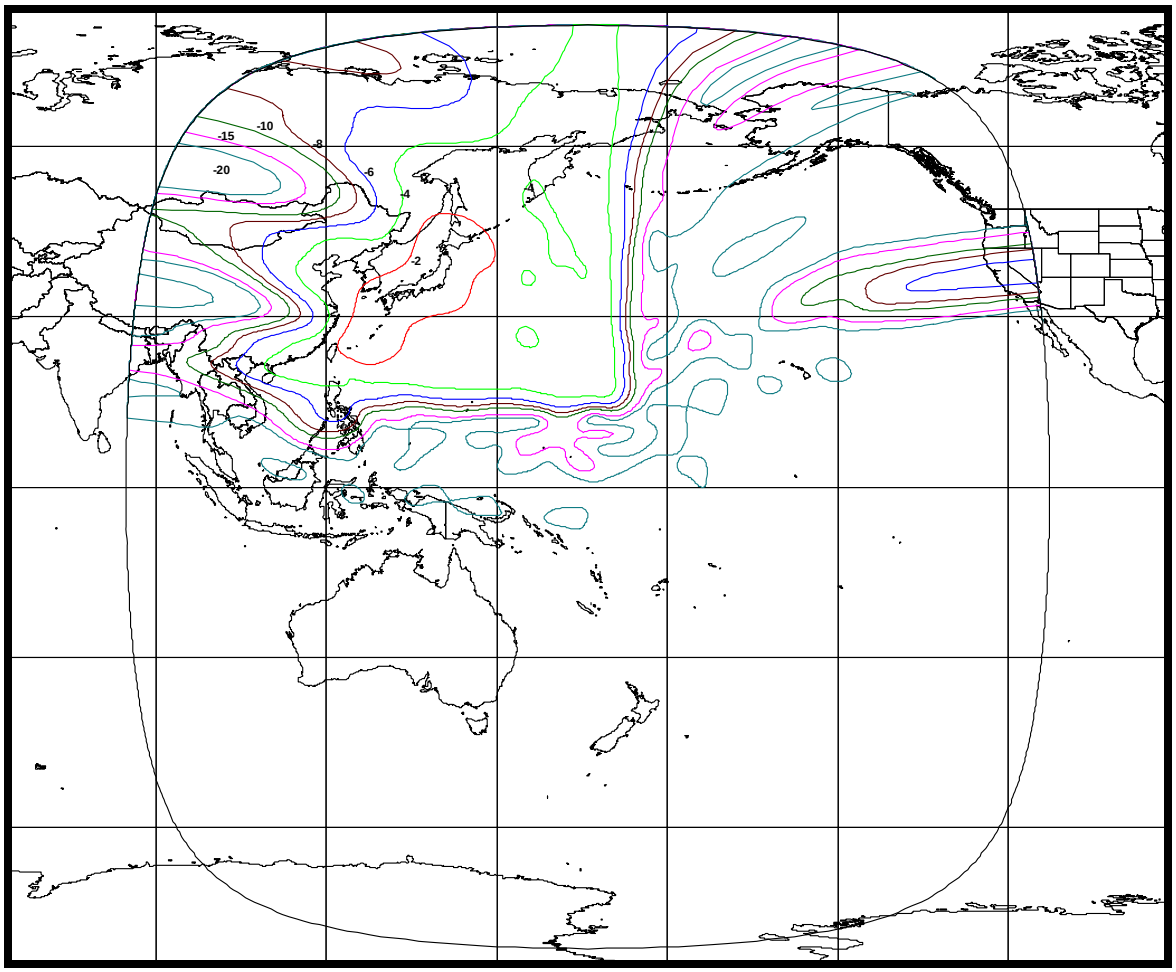


EXHIBIT 5A-16: NORTH EAST PACIFIC TRANSMIT BEAM
(Schedule S Beam ID: NEHD)

Beam Polarization: Horizontal
Peak Beam Gain: 28.9 dBi
Peak Beam EIRP: 48.5 dBW

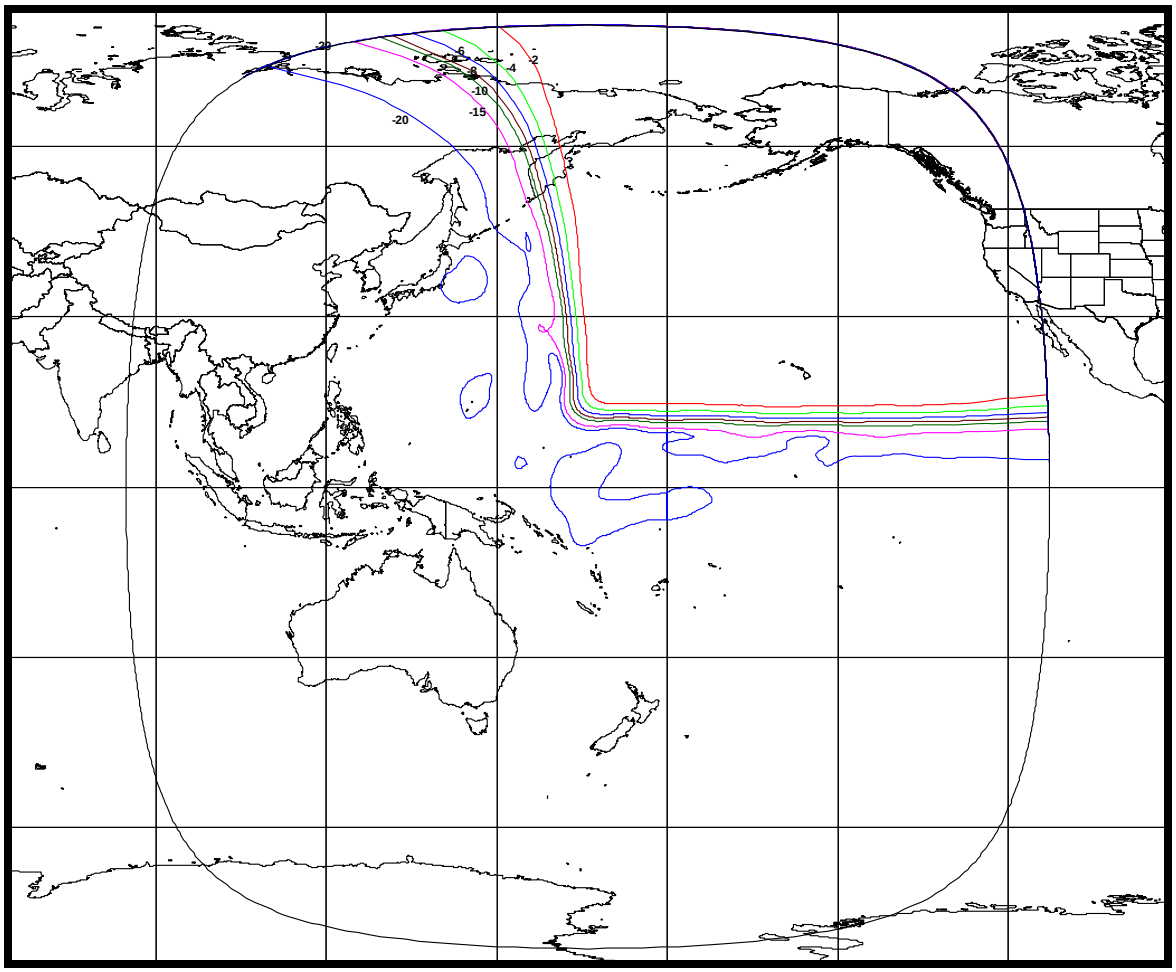


EXHIBIT 5A-17: NORTH EAST PACIFIC TRANSMIT BEAM
(Schedule S Beam ID: NEVD)

Beam Polarization: Vertical
Peak Beam Gain: 28.8 dBi
Peak Beam EIRP: 48.5 dBW

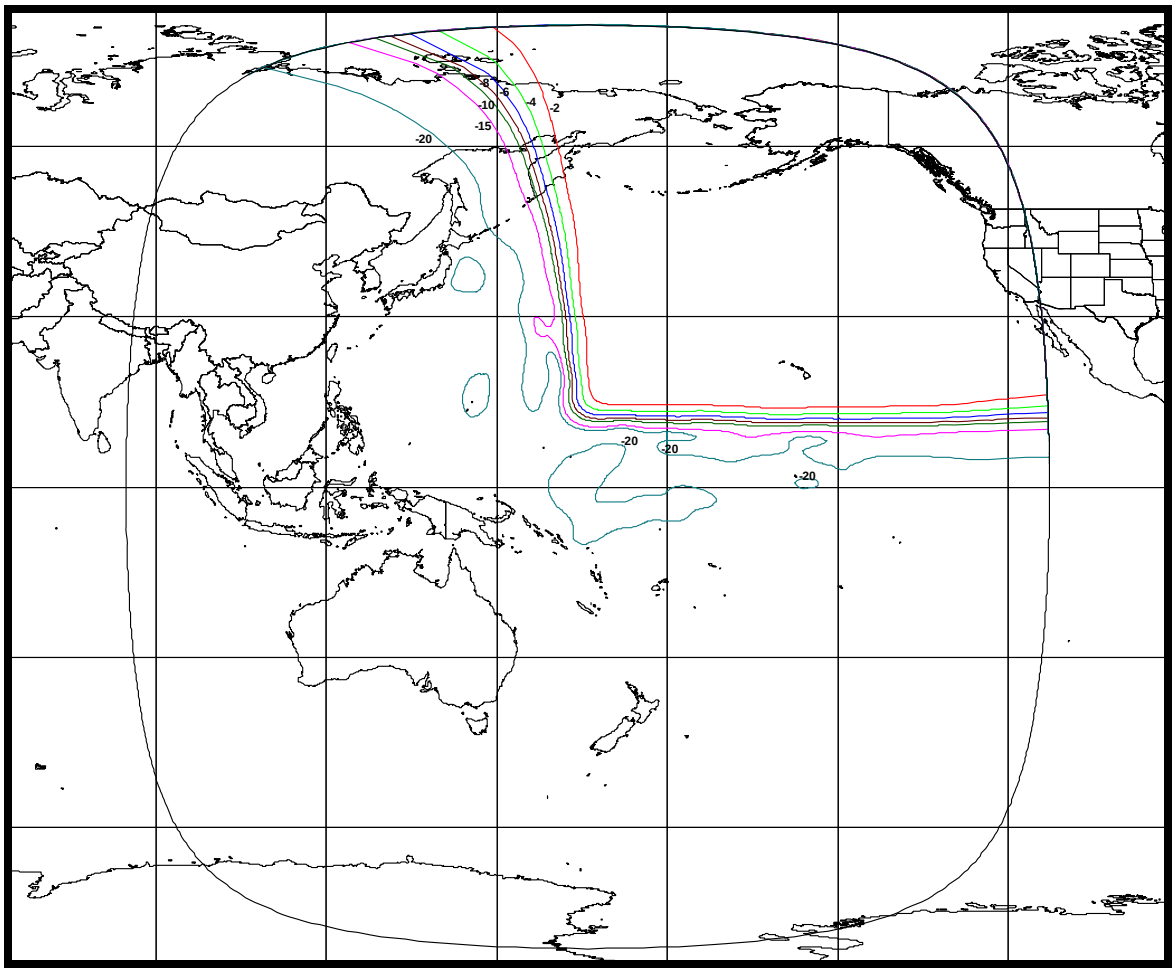


EXHIBIT 5A-18: SOUTH WEST TRANSMIT BEAM
(Schedule S Beam ID: SWVD)

Beam Polarization: Vertical
Peak Beam Gain: 29.3 dBi
Peak Beam EIRP: 48.6 dBW

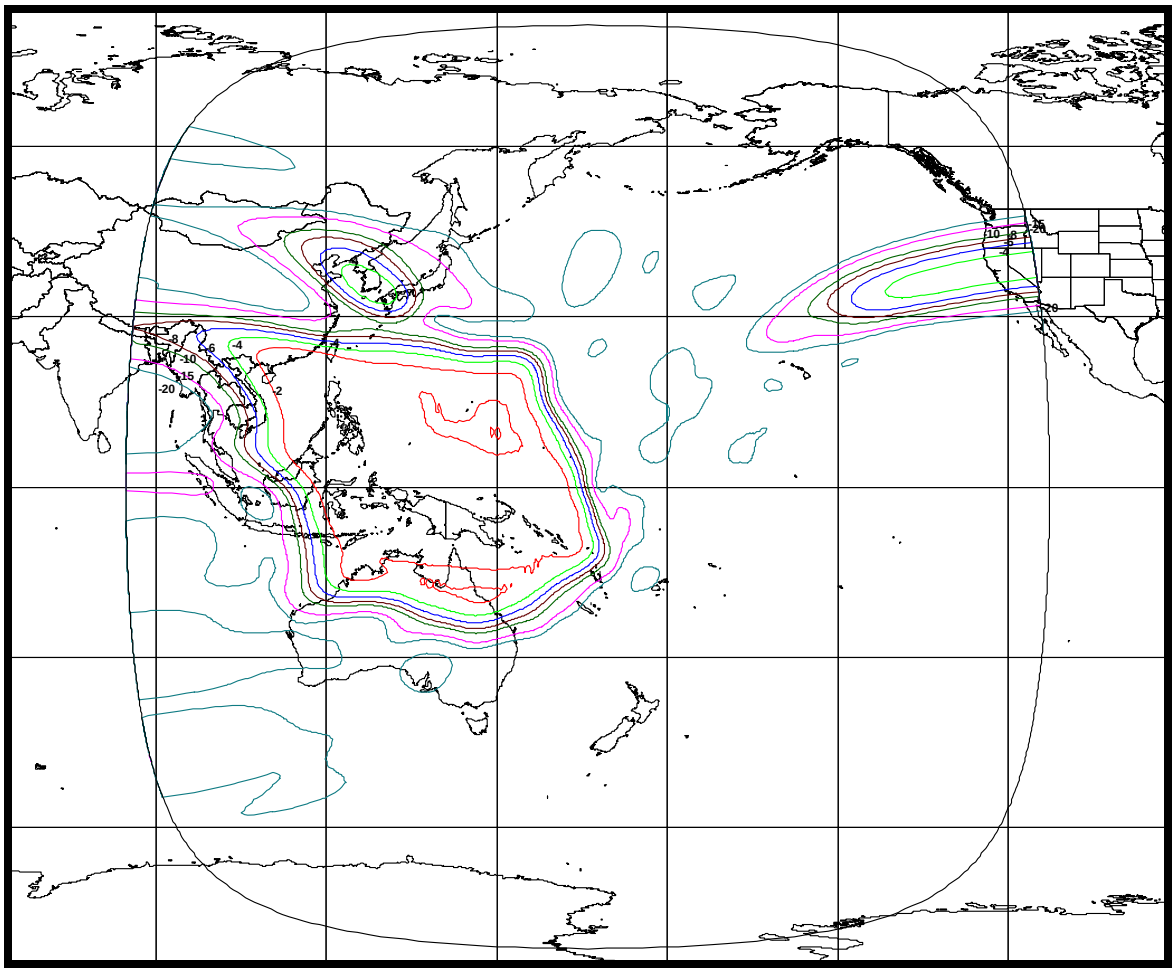
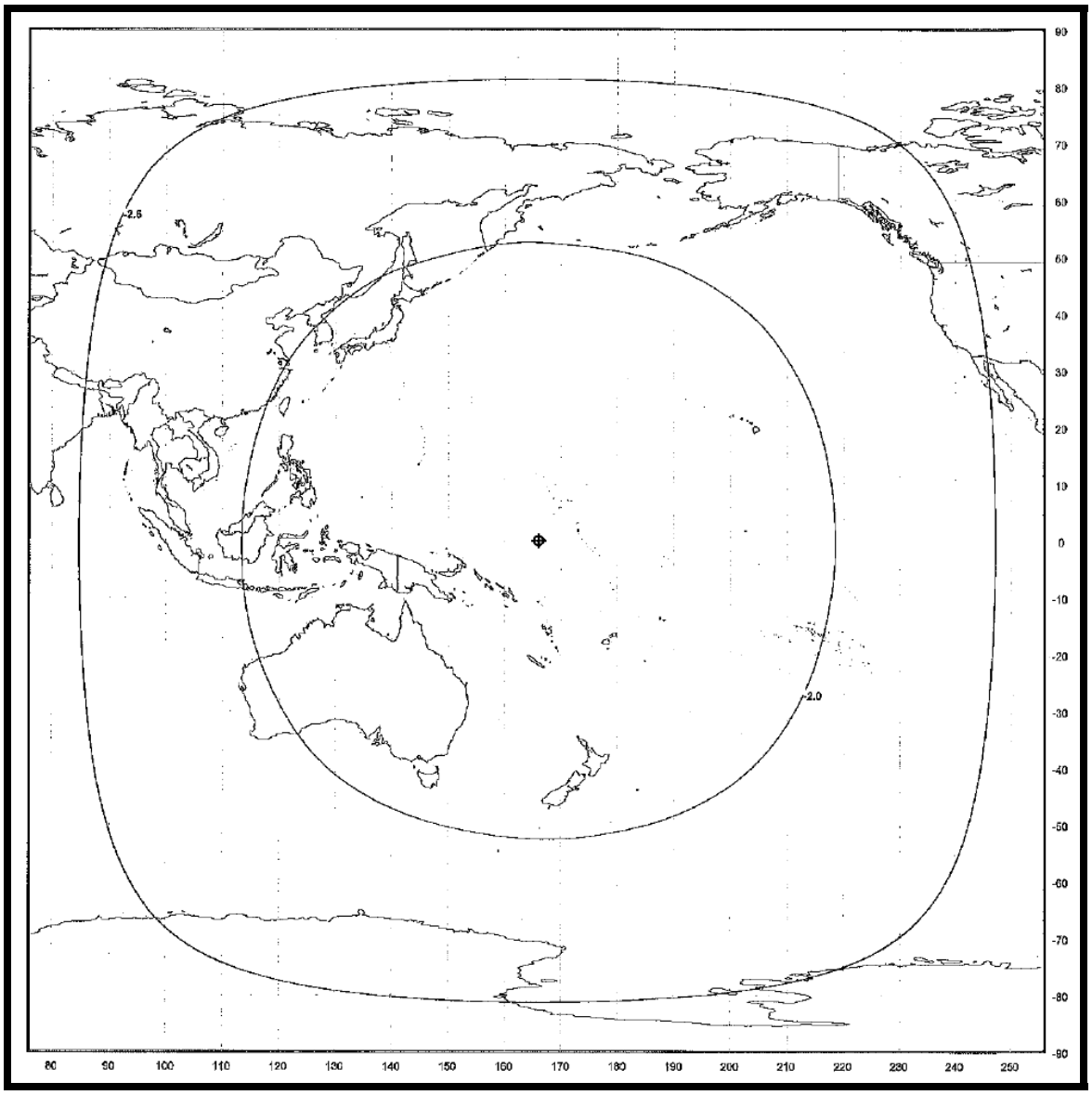


EXHIBIT 5B-1: COMMAND RECEIVE BEAM (on-station)
(Schedule S Beam ID: CMDO)

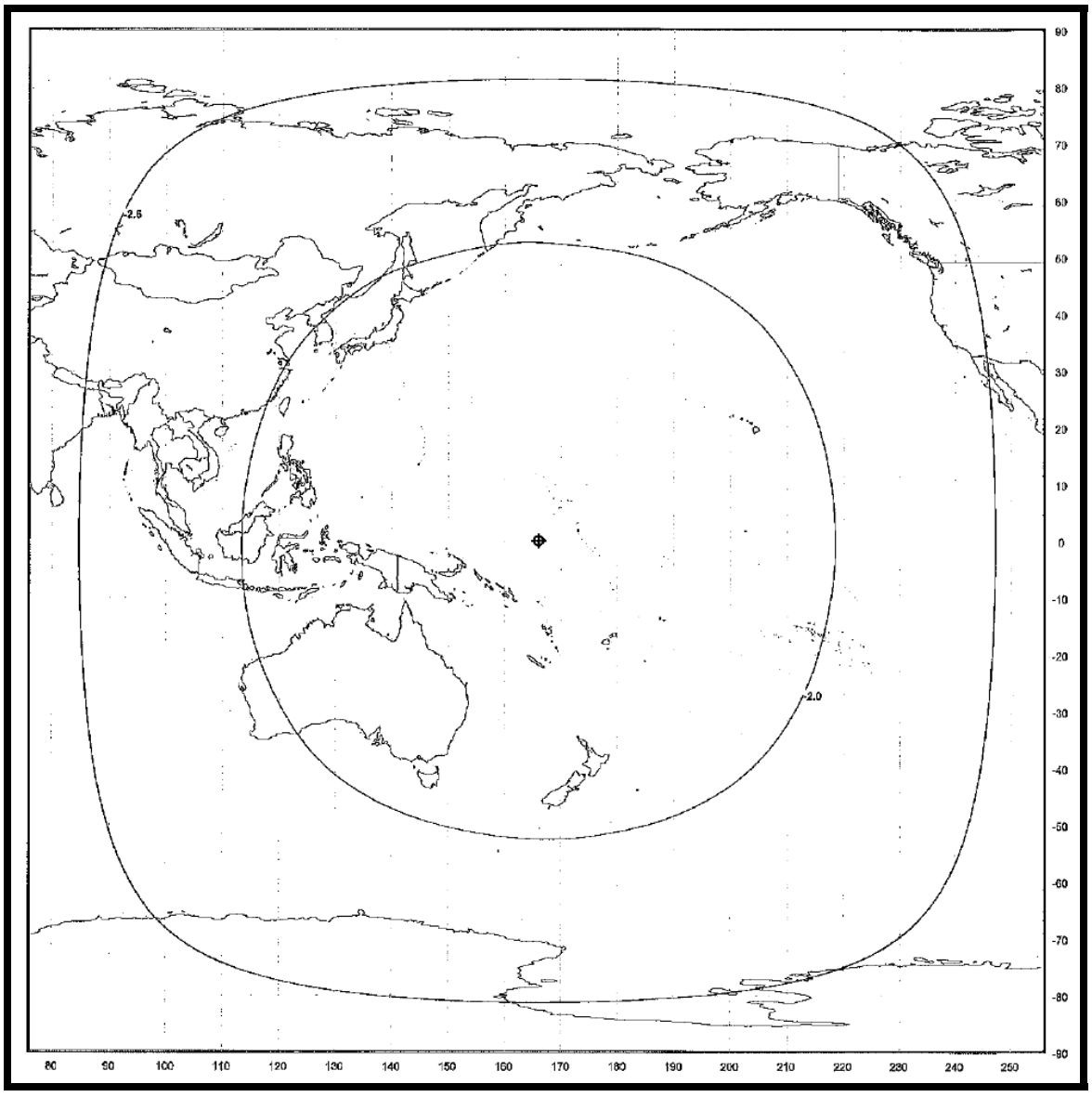
Beam Polarization: Vertical
Peak Beam Gain: 21.0 dBi
Peak Beam G/T: -15.9 dB/K
Command Threshold Flux Density @ Peak Beam G/T: -108.3 dBW/m^2



Relative Gain Contours Shown: -2, -2.6 dB.

EXHIBIT 5B-2: COMMAND RECEIVE BEAM (back-up)
(+Z Pipe Antenna)
(Schedule S Beam ID: CMDF)

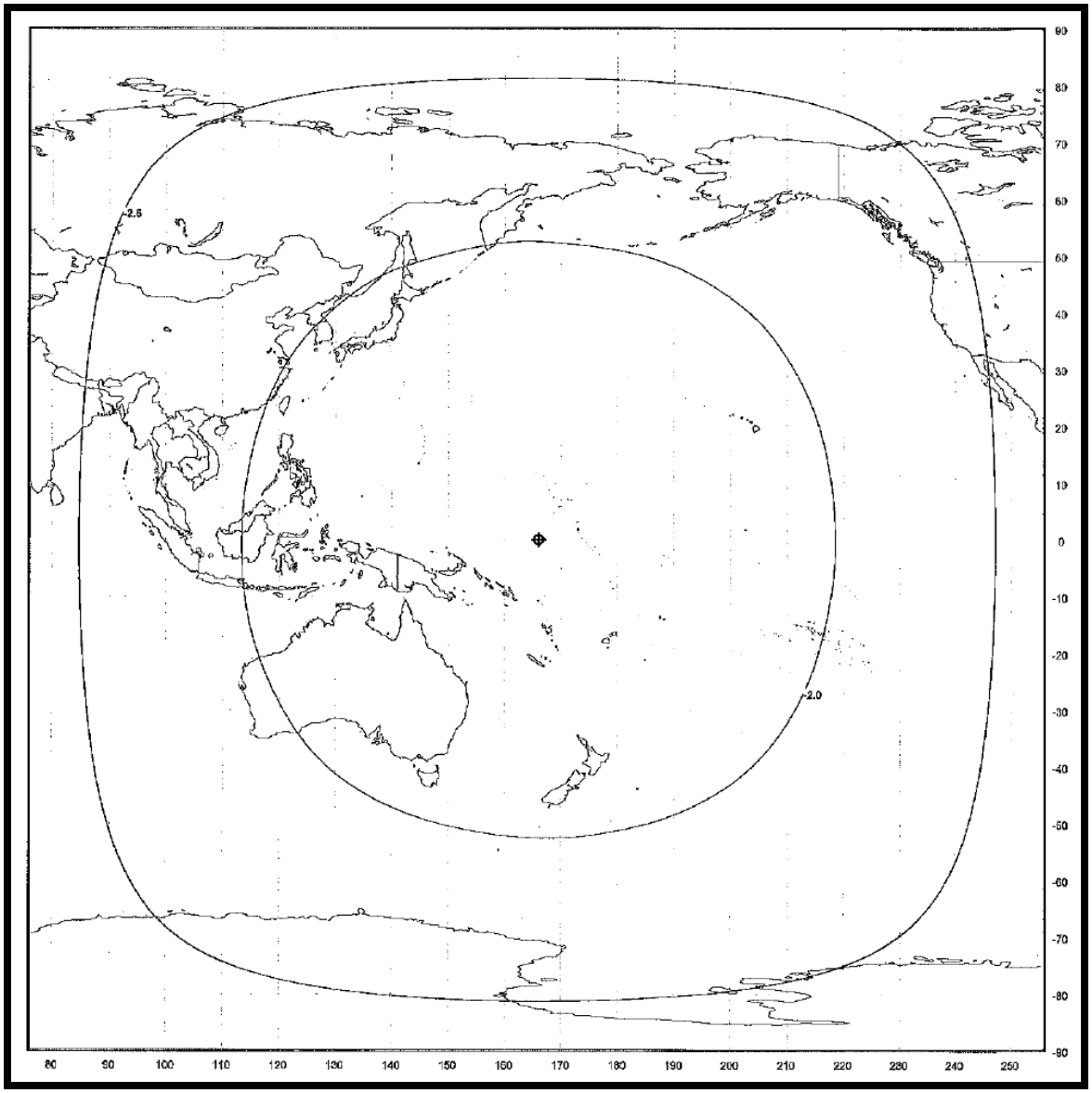
Beam Polarization: Left Hand Circular
Peak Beam Gain: 3 dBi
Peak Beam G/T: -30.3 dB/K
Command Threshold Flux Density @ Peak Beam G/T: -93.9 dBW/m^2



Relative Gain Contours Shown: -2, -2.6 dB.

EXHIBIT 5B-3: COMMAND RECEIVE BEAM (back-up)
(-Z Pipe Antennas)
(Schedule S Beam ID: CMDA)

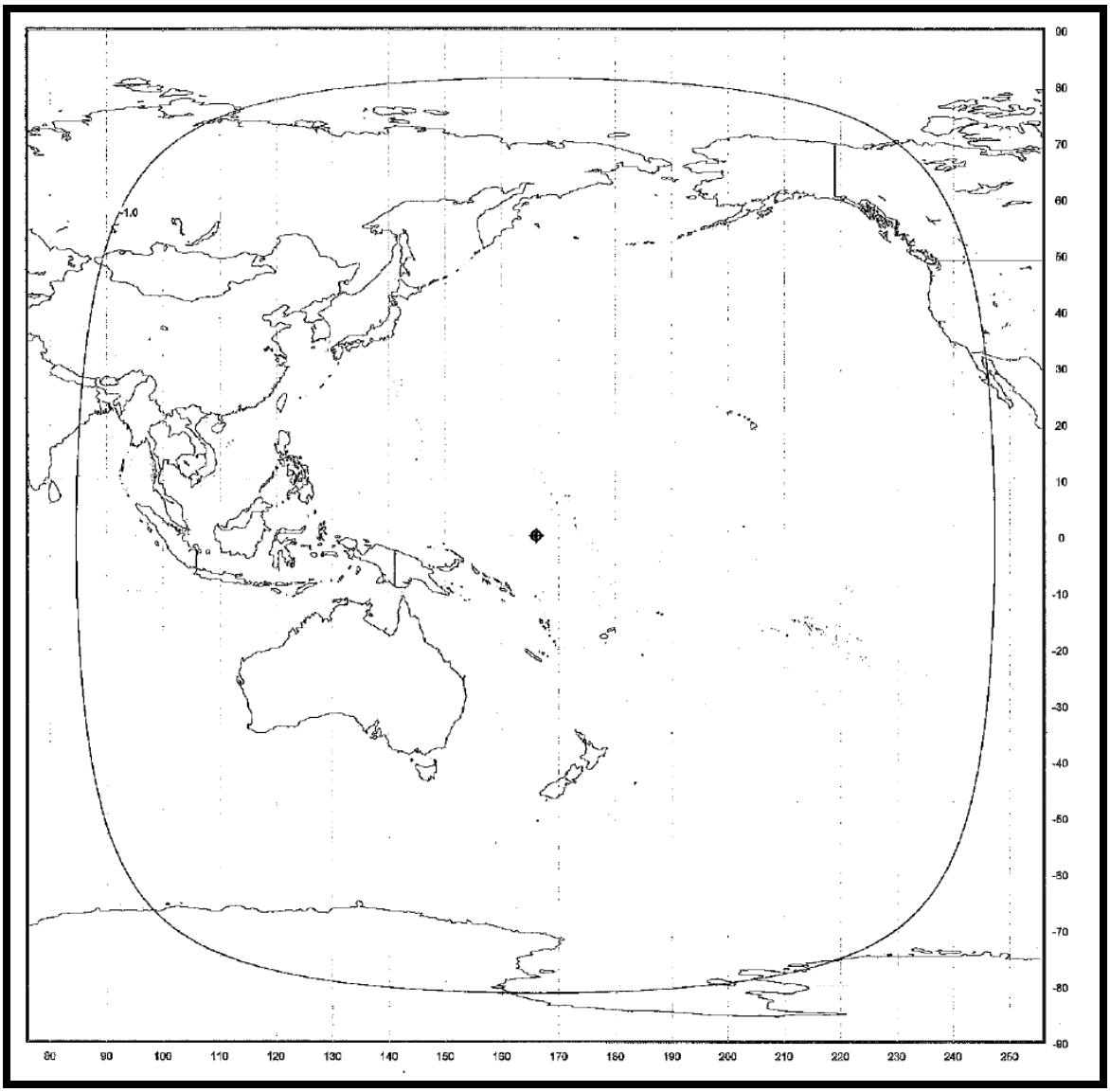
Beam Polarization: Left Hand Circular
Peak Beam Gain: 8 dBi
Peak Beam G/T: -31 dB/K
Command Threshold Flux Density @ Peak Beam G/T: -93.2 dBW/m^2



Relative Gain Contours Shown: -2, -2.6 dB.

EXHIBIT 5B-4: TELEMETRY TRANSMIT BEAM (on-station)
(Schedule S Beam ID: TLMO)

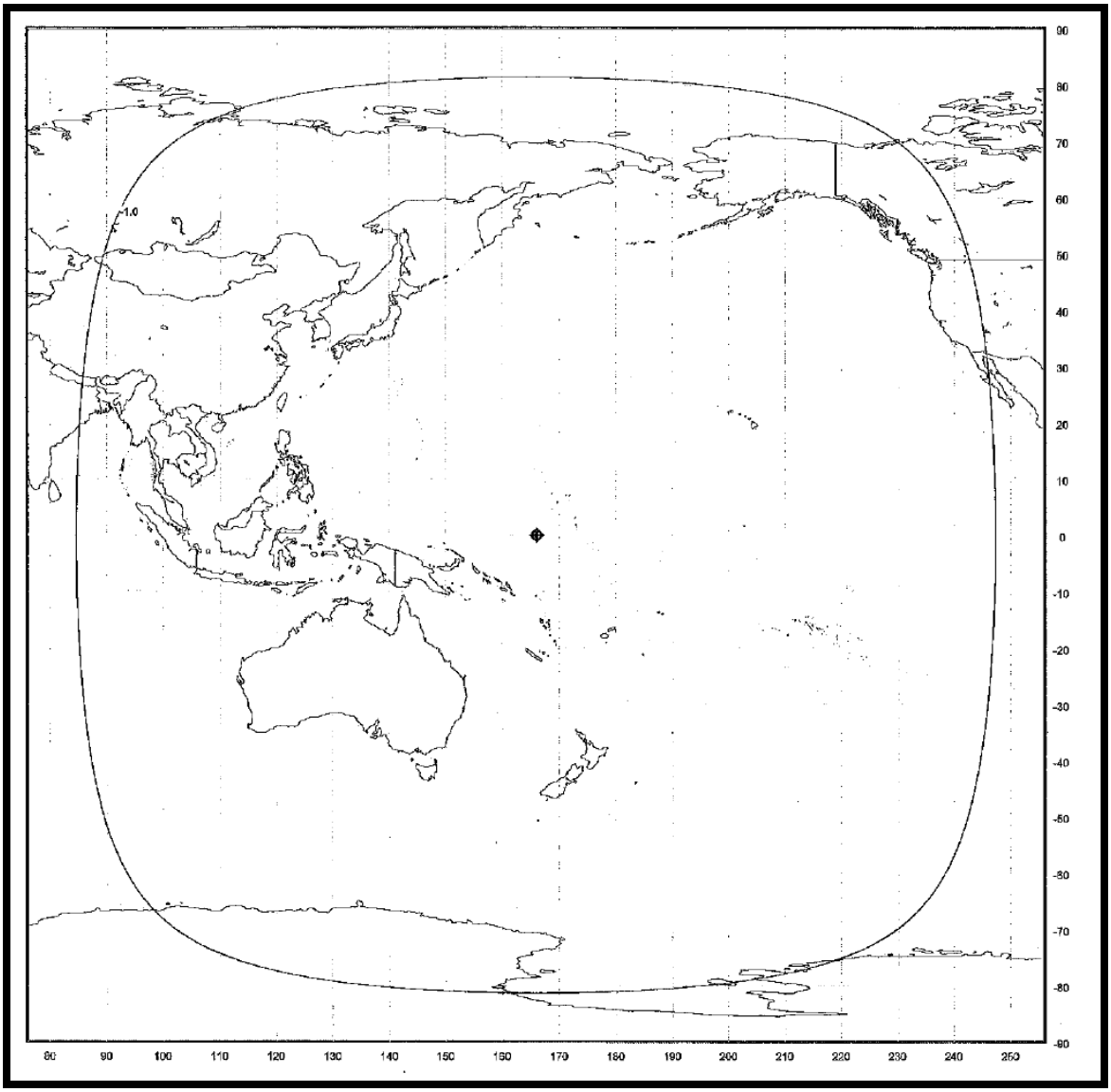
Beam Polarization: Vertical
Peak Beam Gain: 21 dBi
Peak Beam EIRP: 12.4 dBW



Relative Gain Contours Shown: -1 dB.

EXHIBIT 5B-5: TELEMETRY TRANSMIT BEAM (back-up)
(+Z Pipe Antenna)
(Schedule S Beam ID: TLMF)

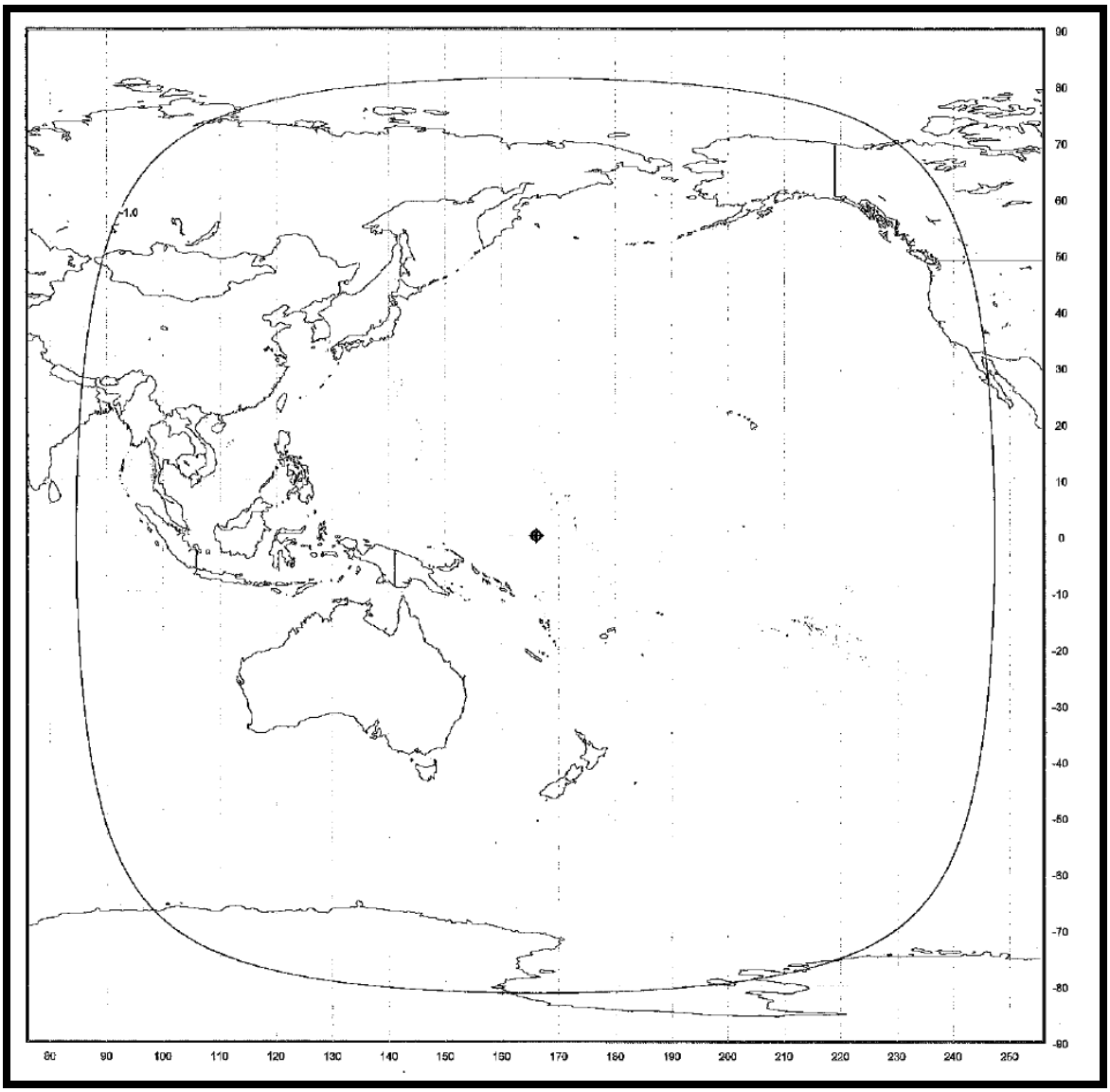
Beam Polarization: Left Hand Circular
Peak Beam Gain: 3.0 dBi
Peak Beam EIRP: 15.2 dBW



Relative Gain Contours Shown: -1 dB.

EXHIBIT 5B-6: TELEMETRY TRANSMIT BEAM (back-up)
(-Z Pipe Antenna)
(Schedule S Beam ID: TLMA)

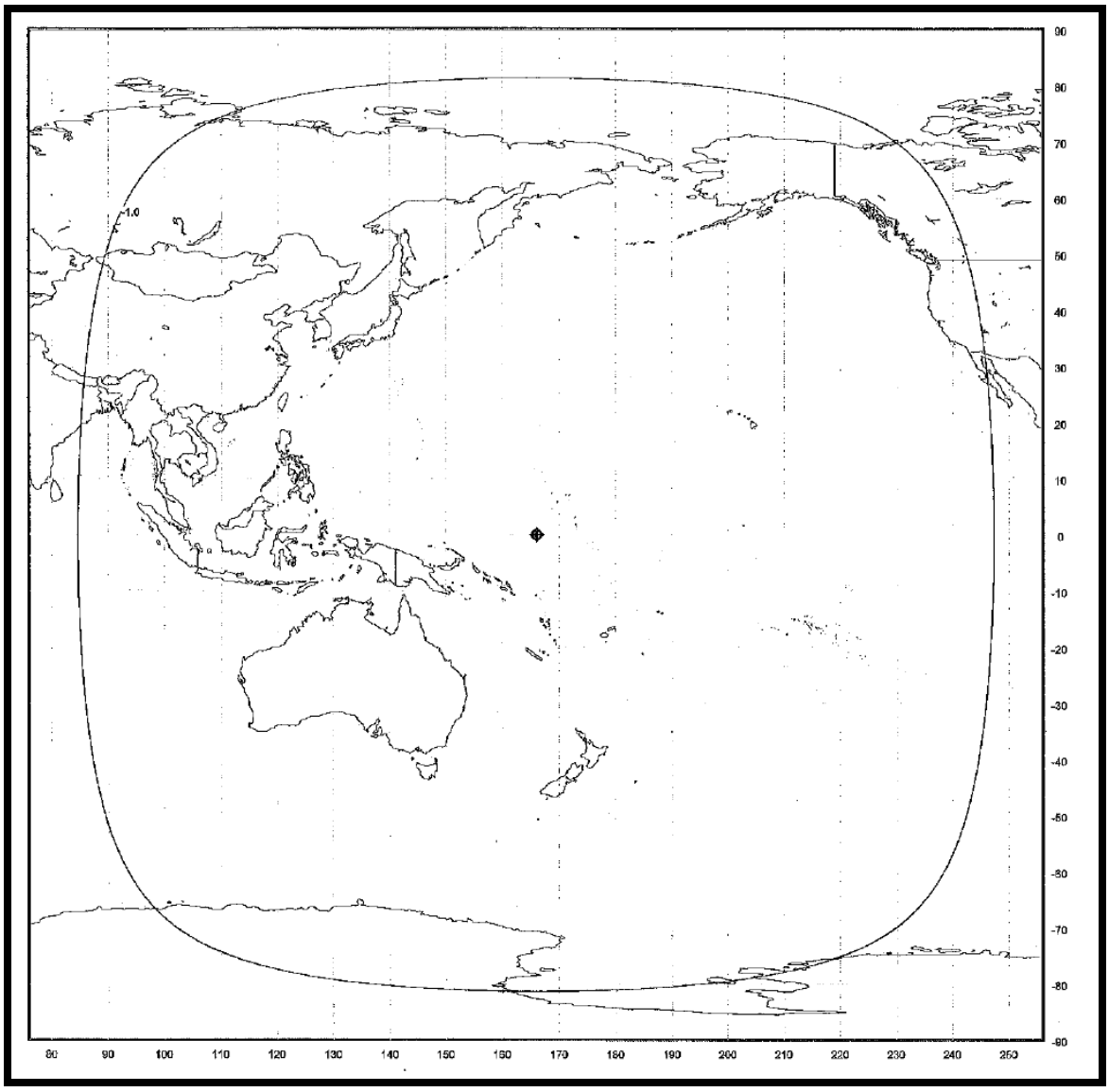
Beam Polarization: Left Hand Circular
Peak Beam Gain: 8.0 dBi
Peak Beam EIRP: 15.5 dBW



Relative Gain Contours Shown: -1 dB.

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

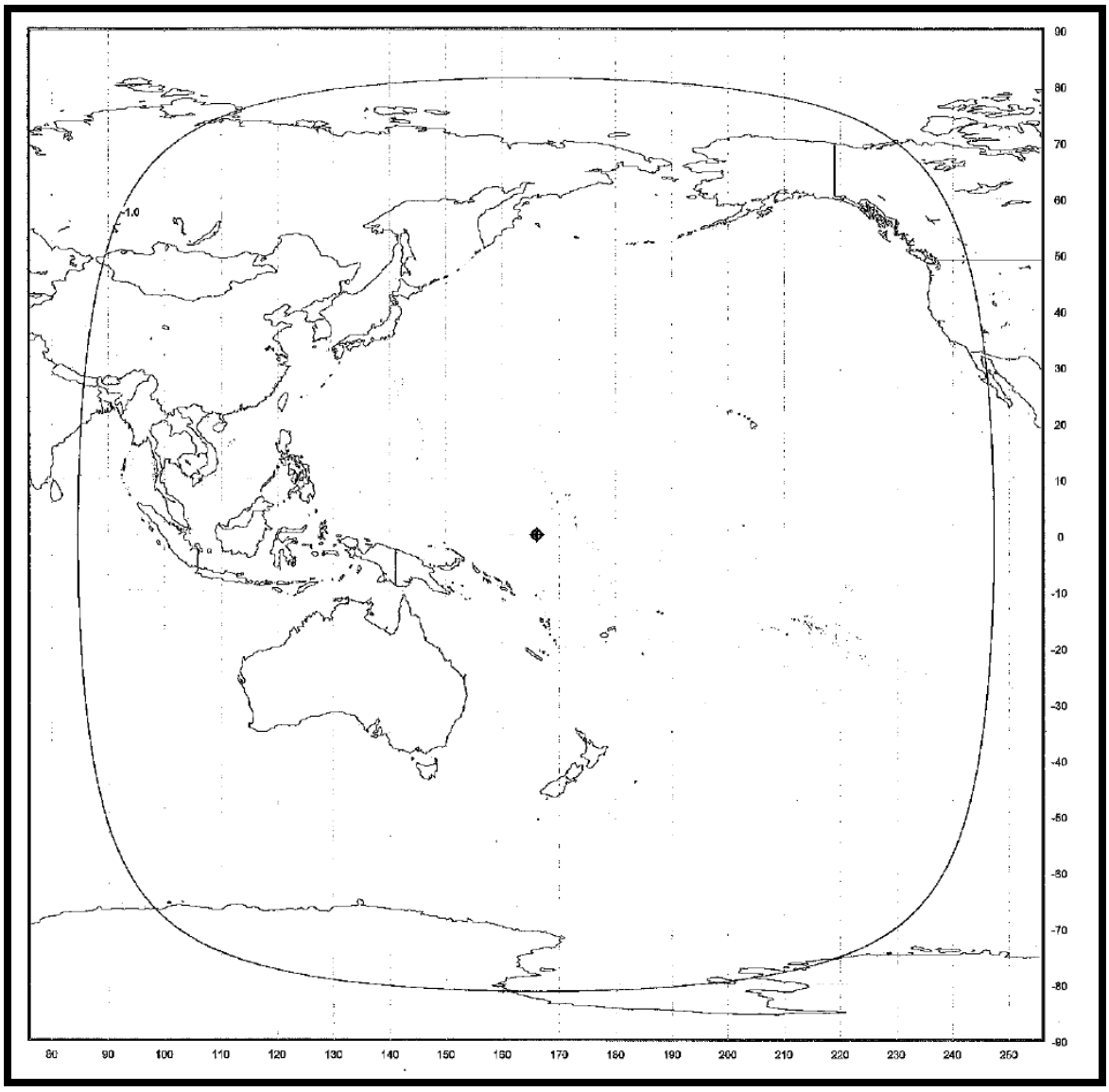
Beam Polarization: Horizontal
Peak Beam Gain: 24.0 dBi
Peak Beam EIRP: 15.2 dBW



Relative Gain Contours Shown: -1 dB.

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

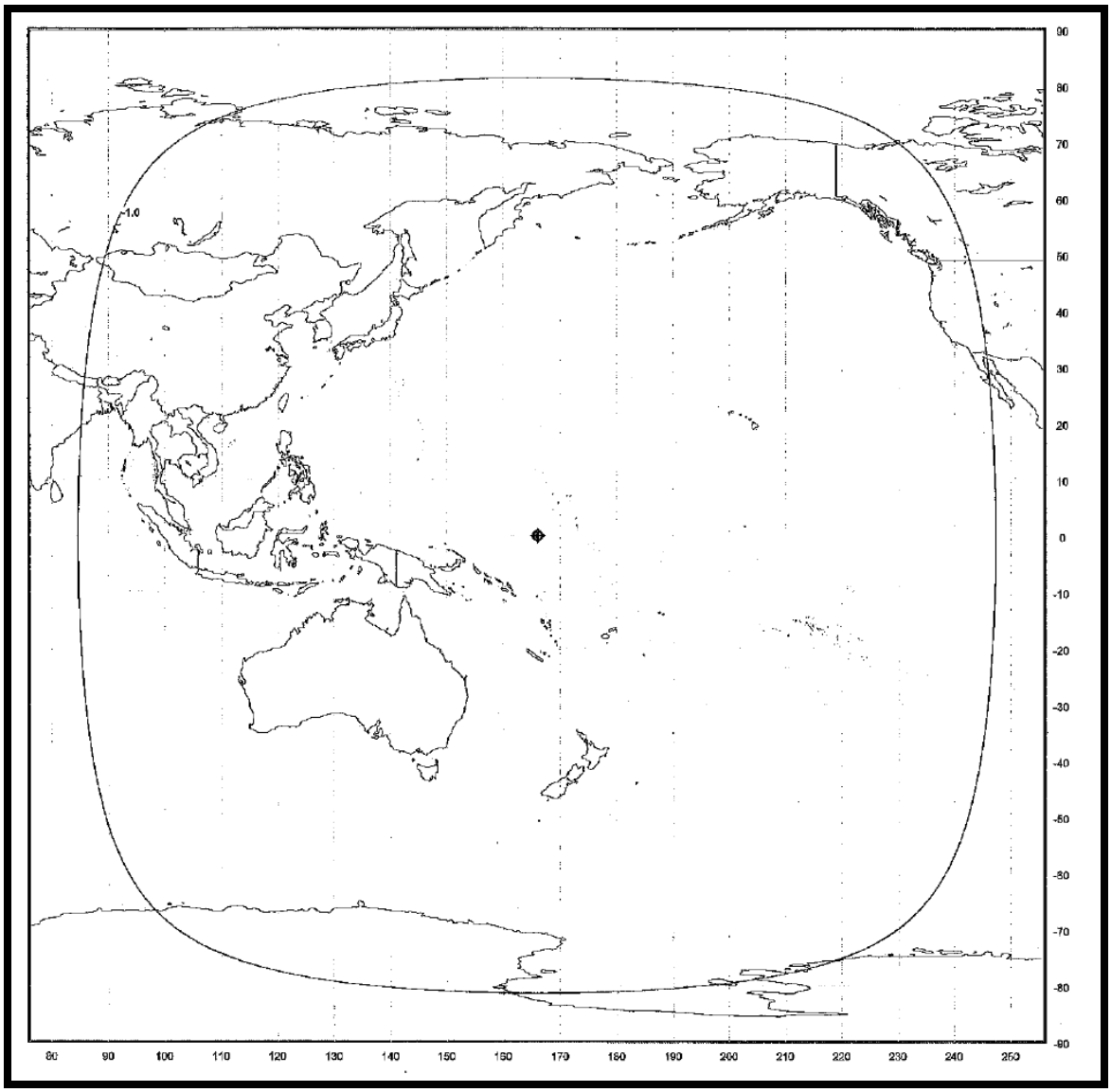
Beam Polarization: Vertical
Peak Beam Gain: 24.0 dBi
Peak Beam EIRP: 15.2 dBW



Relative Gain Contours Shown: -1 dB.

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

Beam Polarization: Right Hand Circular
Peak Beam Gain: 24.0 dBi
Peak Beam EIRP: 18.2 dBW

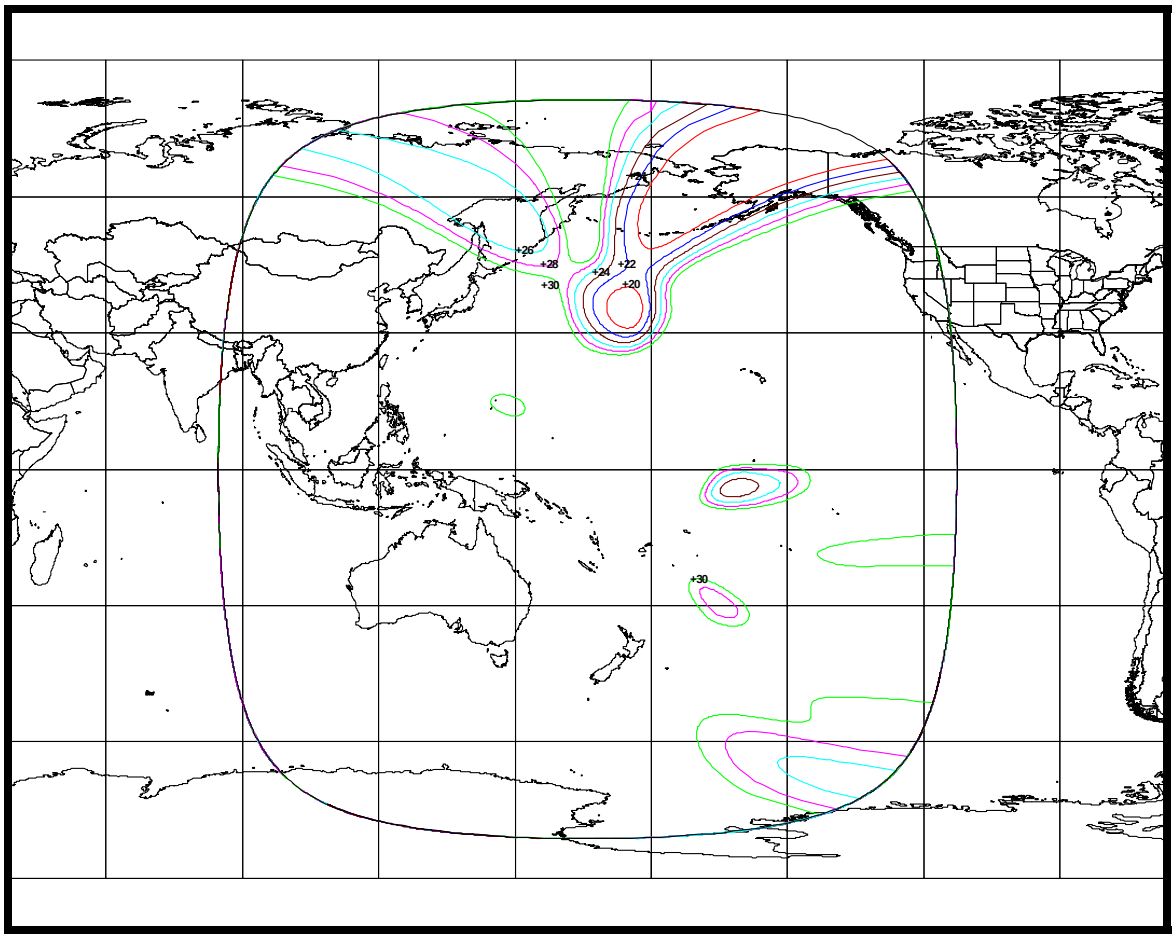


Relative Gain Contours Shown: -1 dB.

EXHIBIT 5D-1: WEST HEMI TRANSMIT BEAM

Beam Polarization: Horizontal

(Schedule S Beam ID: WHHD_XP)

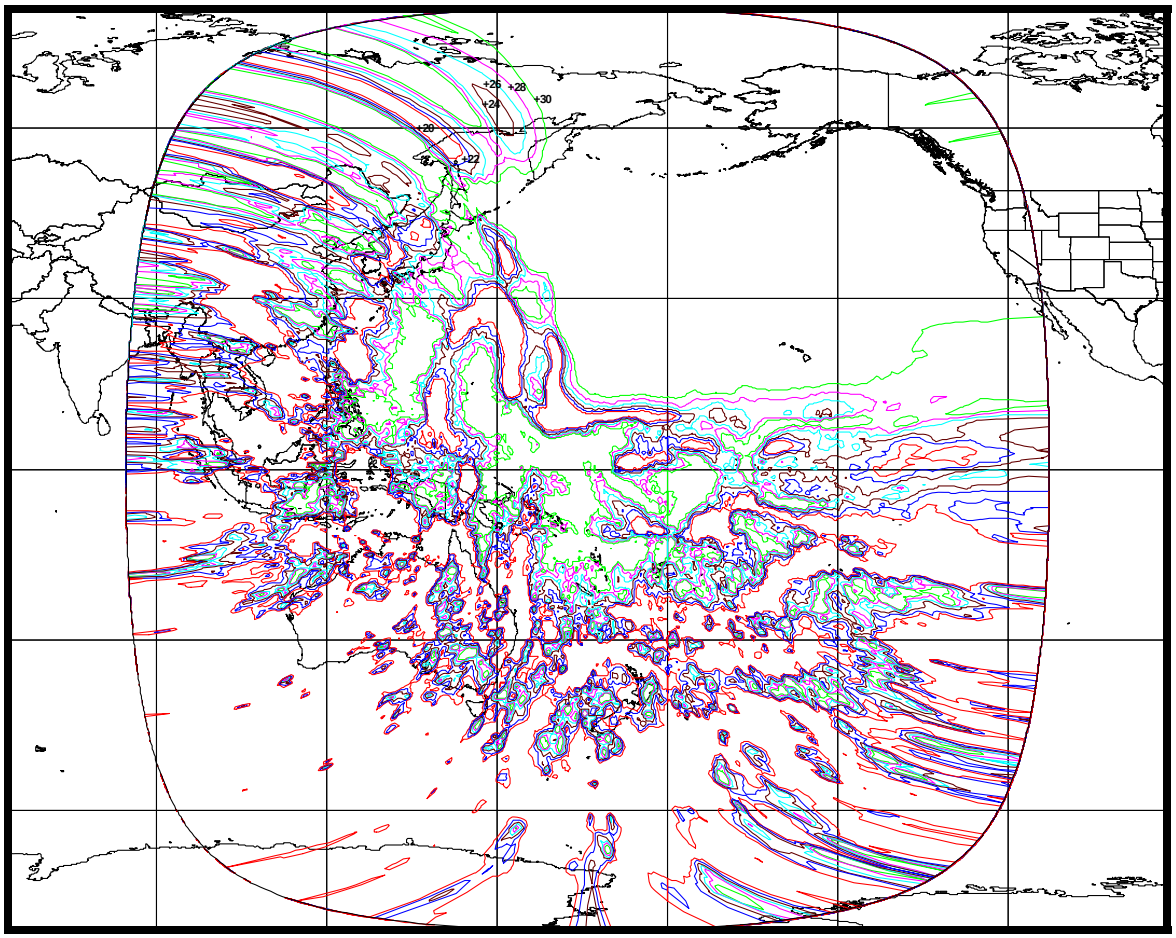


Absolute Cross Polarization Contours Shown: 30, 28, 26, 24, 22 and 20 dB

EXHIBIT 5D-2: NORTH EAST PACIFIC TRANSMIT BEAM

Beam Polarization: Vertical

(Schedule S Beam ID: NEVD_XP)

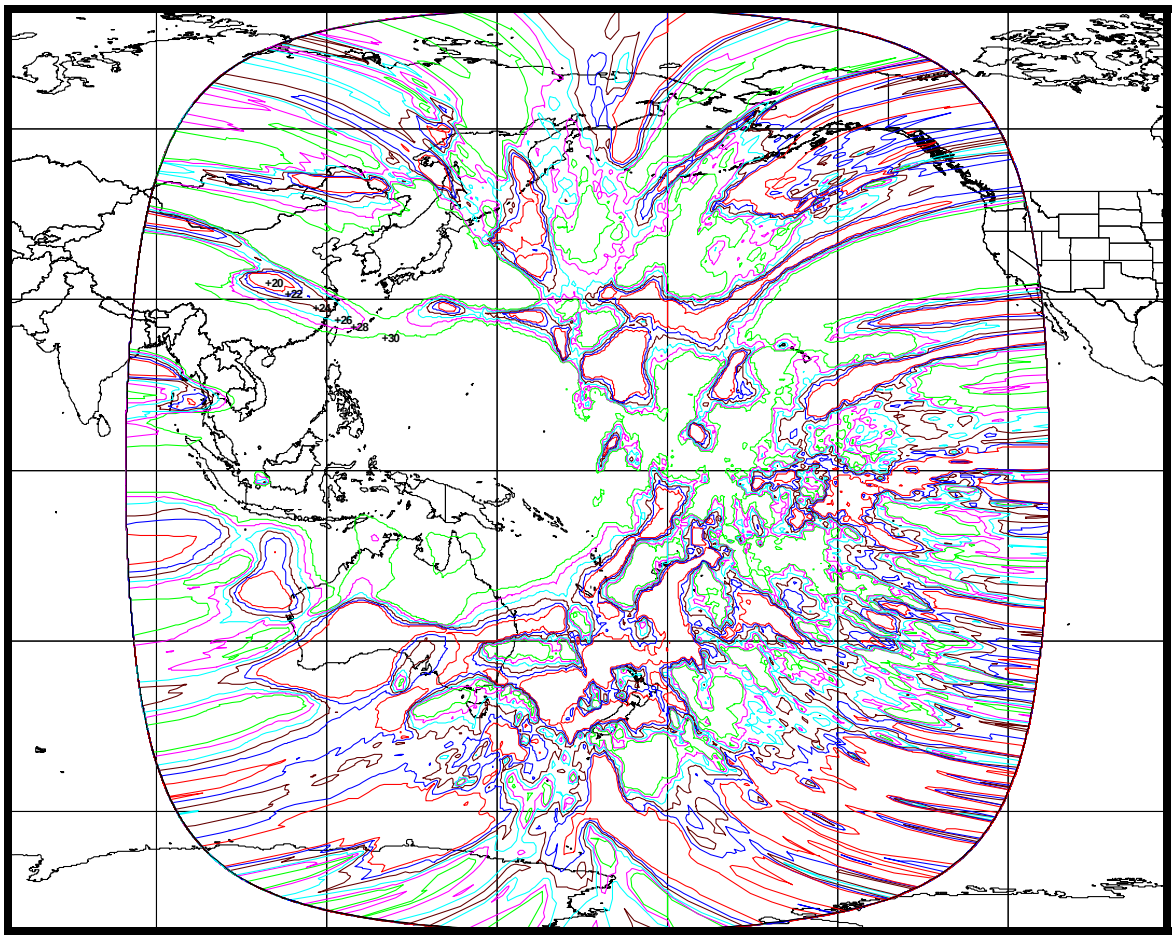


Absolute Cross Polarization Contours Shown: 30, 28, 26, 24, 22 and 20 dB

EXHIBIT 5D-3: SOUTH WEST PACIFIC TRANSMIT BEAM

Beam Polarization: Vertical

(Schedule S Beam ID: SWVD_XP)



Absolute Cross Polarization Contours Shown: 30, 28, 26, 24, 22 and 20 dB

EXHIBIT 6: COMMUNICATION SUBSYSTEM
EIRP AND G/T BUDGETS

Beam Name	West Hemi	West Hemi	Australia	Australia
Frequency Band (MHz)	5925 - 6425	5925 - 6425	14000 - 14500	14000 - 14500
Polarization	Horizontal	Vertical	Horizontal	Vertical
Channel Bandwidth (MHz)	36	36	36	36
Antenna Noise Temperature (°Kelvin)	123	214	223	229
Receiver Noise Temperature (°Kelvin)	283	281	259	259
Total System Noise Temperature (°Kelvin)	406	495	482	488
Total System Noise Temperature (dB/K)	26.1	26.9	26.8	26.9
Peak Gain of Satellite Receive Antenna (dBi)	28.2	29.0	34.0	34.1
Peak G/T (dB/K)	2.1	2.1	7.2	7.2
Minimum SFD [G/T: Peak, Attn: 0 dB] -- (dBW/m^2)	-108.8	-110.0	-102.9	-103.0
Beam Name	North West Pacific	North West Pacific	North East Pacific	North East Pacific
Frequency Band (MHz)	14134 - 14374	14000 - 14500	14134 - 14374	14174 - 14500
Polarization	Horizontal	Vertical	Horizontal	Vertical
Channel Bandwidth (MHz)	36	36	36	36
Antenna Noise Temperature (°Kelvin)	205	197	203	201
Receiver Noise Temperature (°Kelvin)	254	254	265	265
Total System Noise Temperature (°Kelvin)	459	451	468	466
Total System Noise Temperature (dB/K)	26.6	26.5	26.7	26.7
Peak Gain of Satellite Receive Antenna (dBi)	32.1	32.0	30.4	30.4
Peak G/T (dB/K)	5.5	5.5	3.7	3.7
Minimum SFD [G/T: Peak, Attn: 0 dB] -- (dBW/m^2)	-98.4	-98.3	-95.9	-95.8
Beam Name	South West Pacific			
Frequency Band (MHz)	14000 - 14174 14374 - 14500			
Polarization	Horizontal			
Channel Bandwidth (MHz)	36			
Antenna Noise Temperature (°Kelvin)	208			
Receiver Noise Temperature (°Kelvin)	268			
Total System Noise Temperature (°Kelvin)	476			
Total System Noise Temperature (dB/K)	26.8			
Peak Gain of Satellite Receive Antenna (dBi)	30.4			
Peak G/T (dB/K)	3.6			
Minimum SFD [G/T: Peak, Attn: 0 dB] -- (dBW/m^2)	-98.2			

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

Beam Name	West Hemi	West Hemi	Australia	Australia
Frequency Band (MHz)	3700 - 4200	3700 - 4200	12250 - 12750	12250 - 12750
Polarization	Horizontal	Vertical	Horizontal	Vertical
Channel Bandwidth (MHz)	36	36	36	36
Maximum Power At The Output of Last Stage Amplifier (dBW)	18.1	18.1	21.8	21.8
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	1.6	1.6	2.3	2.2
Power Into Transmit Antenna (dBW)	16.5	16.5	19.5	19.6
Power Into Transmit Antenna (Watts)	45.1	44.5	89.1	91.2
Peak Gain of Satellite Transmit Antenna (dBi)	25.9	25.9	32.9	32.8
Maximum Downlink EIRP (dBW)	42.4	42.4	52.4	52.4
Beam Name	North West Pacific	North West Pacific	North East Pacific	North East Pacific
Frequency Band (MHz)	12386 - 12626	12386 - 12626	12386 - 12626	12426 - 12750
Polarization	Horizontal	Vertical	Horizontal	Vertical
Channel Bandwidth (MHz)	36	36	36	36
Maximum Power At The Output of Last Stage Amplifier (dBW)	21.8	21.8	21.8	21.8
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	2.2	2.1	2.2	2.1
Power Into Transmit Antenna (dBW)	19.6	19.7	19.6	19.7
Power Into Transmit Antenna (Watts)	91.8	92.9	90.6	93.5
Peak Gain of Satellite Transmit Antenna (dBi)	31.5	31.4	28.9	28.8
Maximum Downlink EIRP (dBW)	51.1	51.1	48.5	48.5
Beam Name	South West Pacific	C-Band ULPC	C-Band ULPC	Ku-Band ULPC
Frequency Band (MHz)	12250 - 12426 12626 - 12750	3700.5	4199.5	12257.0
Polarization	Vertical	Horizontal	Vertical	Right Hand Circular
Channel Bandwidth (MHz)	36	0.025	0.025	0.025
Maximum Power At The Output of Last Stage Amplifier (dBW)	21.8	-4.0	-4.0	0.0
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	2.5	4.8	4.8	5.8
Power Into Transmit Antenna (dBW)	19.3	-8.8	-8.8	-5.8
Power Into Transmit Antenna (Watts)	85.9	0.1	0.1	0.3
Peak Gain of Satellite Transmit Antenna (dBi)	29.3	24.0	24.0	24.0
Maximum Downlink EIRP (dBW)	48.6	15.2	15.2	18.2

EXHIBIT 7: TC&R SUBSYSTEM CHARACTERISTICS

	Global Horn	+Z Omni	+Z Omni
Command Frequency (MHz) / Polarization (see note)			
Transfer Orbit / Emergency	n/a	14000.5 (LHCP) 14003.0 (LHCP)	14000.5 (LHCP) 14003.0 (LHCP)
On-Station	14000.5 (V) 14003.0 (V)	n/a	n/a
Command Modulation	FM	FM	FM
Bandwidth of Command Carrier (kHz)			
Occupied Bandwidth	800	800	800
Allocated Bandwidth	1000	1000	1000
Command Threshold (dBW/m^2)			
Beam Peak	-108.3	-93.9	-93.2
Edge of Coverage	-105.7	-91.3	-90.6
Command G/T (dB/K)			
Beam Peak	-15.9	-30.3	-31.0
Edge of Coverage	-18.5	-32.9	-33.6
Telemetry Frequency (MHz) / Polarization (see note)			
Transfer Orbit / Emergency	n/a	12253.5 (LHCP) 12254.0 (LHCP) 12256.0 (LHCP) 12256.5 (LHCP)	12253.5 (LHCP) 12254.0 (LHCP) 12256.0 (LHCP) 12256.5 (LHCP)
On-Station	12253.5 (V) 12254.0 (V) 12256.0 (V) 12256.5 (V)	n/a	n/a
Telemetry Modulation	PM	PM	PM
Bandwidth of Telemetry Carrier (kHz)			
Occupied	300	300	300
Allocated	500	500	500
Telemetry EIRP			
Beam Peak	12.4	15.2	15.5
Edge of Coverage	11.4	14.2	14.5
On-Station Ranging Accuracy (meters)	≤ 30	≤ 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	Back-up
Antenna Type	Global Horn	Omni (+Z)	Omni (-Z)
Frequency (MHz)	14000.5 / 14003	14000.5 / 14003	14000.5 / 14003
Polarization	Vertical	Left Hand Circular	Left Hand Circular
Antenna Noise Temperature (°Kelvin)	290	290	290
Receiver Noise Temperature (°Kelvin)	4635	1860	7697
Total System Noise Temperature (°Kelvin)	4925	2150	7987
Total System Noise Temperature (dB/K)	36.9	33.3	39.0
Peak Gain of Satellite Receive Antenna (dBi)	21	3	8
Peak G/T (dB/K)	-15.9	-30.3	-31.0
SFD Threshold at Peak G/T (dBW/m^2)	-108.3	-93.9	-93.2
Operating Mode	On-Station	Back-up	Back-up
Antenna Type	Global	Omni (+Z)	Omni (-Z)
Frequency (MHz)	12253.5 12254.0 12256.0 12256.5	12253.5 12254.0 12256.0 12256.5	12253.5 12254.0 12256.0 12256.5
Polarization	Vertical	Left Hand Circular	Left Hand Circular
Maximum Power At The Output of Last Stage Amplifier (dBW)	-2.7	15.4	15.4
Loss From Last Stage Amplifier To Transmit Antenna Interface (dB)	5.9	3.2	7.9
Power Into The Transmit Antenna (dBW)	-8.6	12.2	7.5
Power Into The Transmit Antenna (Watts)	0.1	16.6	5.6
Peak Gain of Satellite Transmit Antenna (dBi)	21.0	3.0	8.0
Maximum Downlink EIRP (dBW)	12.4	15.2	15.5

EXHIBIT 9: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
Analog TV/FM Carrier	36M0F3F	36000
64 kbps Carrier	100KG7W	100
128 kbps Carrier	400KG7W	400
512 kbps Carrier	1M45G7W	1450
6000 kbps carrier	10M3G7W	10300
24575 kbps Carrier	36M0G7W	36000

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS

FREQUENCY BAND : 3700 - 4200 MHz							
West Hemi Beam (H) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	41.4*	41.3*	42.4	42.4	42.4	42.4	42.4
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-152.0	-152.0	-150.8	-150.6	-150.5	-150.4	-149.7
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	1.3	3.6	6.0	8.4	7.7
West Hemi Beam (H) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	42.4	42.4	42.4	42.4	42.4	42.4	42.4
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-159.8	-159.6	-159.5	-159.4	-159.3	-159.2	-158.4
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.8	7.6	10.0	12.4	14.8	17.2	16.4

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3700 – 4200 MHz							
West Hemi Beam (V) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	41.4*	41.3*	42.4	42.4	42.4	42.4	42.4
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-152.0	-152.0	-150.8	-150.6	-150.5	-150.4	-149.7
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	1.3	3.6	6.0	8.4	7.7
West Hemi Beam (V) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	42.4	42.4	42.4	42.4	42.4	42.4	42.4
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-159.8	-159.6	-159.5	-159.4	-159.3	-159.2	-158.4
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.8	7.6	10.0	12.4	14.8	17.2	16.4

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3700 – 4200 MHz							
ULPC Beam (H) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Carrier Occupied Bandwidth (kHz)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
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)	-156.1	-156.0	-155.9	-155.8	-155.7	-155.6	-154.8
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.1	4.0	6.4	8.8	11.2	13.6	12.8
ULPC Beam (V) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Carrier Occupied Bandwidth (kHz)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
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)	-156.1	-156.0	-155.9	-155.8	-155.7	-155.6	-154.8
FCC Limit (dBW/m^2/4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	4.1	4.0	6.4	8.8	11.2	13.6	12.8

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 – 12750 MHz							
Australia Beam (H) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4	52.4	52.4
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-143.0	-140.5	-140.4	-139.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	2.4	1.7
Australia Beam (H) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	52.4	52.4	52.4	52.4	52.4	52.4	52.4
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-149.8	-149.6	-149.5	-149.4	-149.3	-149.2	-148.4
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	1.8	1.6	4.0	6.4	8.8	11.2	10.4

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 – 12750 MHz							
Australia Beam (V) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4	52.4	52.4
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-143.0	-140.5	-140.4	-139.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	2.4	1.7
Australia Beam (V) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	52.4	52.4	52.4	52.4	52.4	52.4	52.4
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-149.8	-149.6	-149.5	-149.4	-149.3	-149.2	-148.4
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	1.8	1.6	4.0	6.4	8.8	11.2	10.4

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 – 12750 MHz							
North West Pacific Beam (H) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	51.1	51.1	51.1
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-143.0	-141.8	-141.7	-141.0
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	1.3	3.7	3.0
North West Pacific Beam (H) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-151.1	-150.9	-150.8	-150.7	-150.6	-150.5	-149.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	3.1	2.9	5.3	7.7	10.1	12.5	11.7

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 – 12750 MHz							
North West Pacific Beam (V) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	51.1	51.1	51.1
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-143.0	-141.8	-141.7	-141.0
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	1.3	3.7	3.0
North West Pacific Beam (V) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-151.1	-150.9	-150.8	-150.7	-150.6	-150.5	-149.7
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	3.1	2.9	5.3	7.7	10.1	12.5	11.7

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 - 12750 MHz							
North East Pacific Beam (H) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	48.5	48.5	48.5	48.5
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-144.5	-144.4	-144.3	-143.6
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	1.5	3.9	6.3	5.6
North East Pacific Beam (H) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	48.5	48.5	48.5	48.5	48.5	48.5	48.5
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-153.7	-153.5	-153.4	-153.3	-153.2	-153.1	-152.3
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	5.7	5.5	7.9	10.3	12.7	15.1	14.3

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 - 12750 MHz							
North East Pacific Beam (V) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	48.5	48.5	48.5	48.5
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-144.5	-144.4	-144.3	-143.6
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	1.5	3.9	6.3	5.6
North East Pacific Beam (V) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	48.5	48.5	48.5	48.5	48.5	48.5	48.5
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-153.7	-153.5	-153.4	-153.3	-153.2	-153.1	-152.3
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	5.7	5.5	7.9	10.3	12.7	15.1	14.3

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 - 12750 MHz							
South West Pacific Beam (V) - 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	45.4*	45.3*	47.7*	48.6	48.6	48.6	48.6
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
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)	-148.0	-148.0	-145.5	-144.4	-144.3	-144.2	-143.5
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	1.4	3.8	6.2	5.5
South West Pacific Beam (V) - 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	48.6	48.6	48.6	48.6	48.6	48.6	48.6
Carrier Occupied Bandwidth (kHz)	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0	30133.0
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)	-153.6	-153.4	-153.3	-153.2	-153.1	-153.0	-152.2
ITU Limit (dBW/m^2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	5.6	5.4	7.8	10.2	12.6	15.0	14.2

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 - 12750 MHz							
ULPC Beam (LHCP) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	18.2	18.2	18.2	18.2	18.2	18.2	18.2
Carrier Occupied Bandwidth (kHz)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
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)	-153.1	-153.0	-152.9	-152.8	-152.7	-152.6	-151.8
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	5.1	5.0	7.4	9.8	12.2	14.6	13.8
Global Telemetry Beam (V) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Carrier Occupied Bandwidth (kHz)	300.0	300.0	300.0	300.0	300.0	300.0	300.0
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)	-169.7	-169.6	-169.5	-169.4	-169.3	-169.2	-168.4
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	21.7	21.6	24.0	26.4	28.8	31.2	30.4

EXHIBIT 10: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12250 - 12750 MHz							
Omni (+Z) Telemetry Beam (LHCP) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Carrier Occupied Bandwidth (kHz)	300.0	300.0	300.0	300.0	300.0	300.0	300.0
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)	-166.9	-166.8	-166.7	-166.6	-166.5	-166.4	-165.6
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	18.9	18.8	21.2	23.6	26.0	28.4	27.6
Omni (-Z) Telemetry Beam (LHCP) - 25K0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	15.5	15.5	15.5	15.5	15.5	15.5	15.5
Carrier Occupied Bandwidth (kHz)	300.0	300.0	300.0	300.0	300.0	300.0	300.0
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)	-166.6	-166.5	-166.4	-166.3	-166.2	-166.1	-165.3
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	18.6	18.5	20.9	23.3	25.7	28.1	27.3

* 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	0.24	0.20	0.39
±12	0.30	0.31	0.54
±14	0.39	0.38	0.68
±16	0.50	0.55	0.96
±18	0.79	1.42	2.10
Ku-Band: 36 MHz Channel			
±8	0.30	0.27	0.53
±12	0.37	0.51	0.80
±14	0.55	0.65	1.12
±16	0.88	1.16	1.94
±18	1.71	3.27	4.87

EXHIBIT 12: INTELSAT 19 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	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-10.0	-10.0	-10.0	-10.0
Uplink Contour G/T (dB/K)	-7.9	-7.9	-7.9	-7.9
Uplink SFD (dBW/m2)	-79.1	-84.9	-79.1	-79.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST HEMI	WEST HEMI	WEST HEMI	WEST HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	34.4	34.4	34.4	34.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	164E	164E	164E	164E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	168E	168E	168E	168E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
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	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	9.0	6.1	6.1
Earth Station Gain (dBi)	60.2	53.4	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	3.5	4.5	3.7
Earth Station Gain (dBi)	49.3	41.1	43.9	41.2
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	83.8	78.0	70.4	51.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.9	-7.9	-7.9	-7.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	28.7	23.7	22.6	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34.4	34.4	25.7	7.1
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	19.0	12.4	12.7	11.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	28.7	23.7	22.6	23.5
C/N Downlink (dB)	19.0	12.4	12.7	11.0
C/I Intermodulation (dB)	N/A	N/A	18.7	19.6
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Uplink Adjacent Satellite 1 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 1 (dB)	17.9	7.9	10.4	8.4
C/I Uplink Adjacent Satellite 2 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 2 (dB)	19.3	12.7	12.9	11.4
C/(N+I) Composite (dB)	11.3	4.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.3	3.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.3	0.0	0.0	0.0
Number of Carriers	1	1.0	3.3	238.6
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.4	-50.2	-47.3	-46.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.6	-32.4	-34.7	-33.7

EXHIBIT 12: INTELSAT 19 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Uplink SFD (dBW/m2)	-81	-71	-77	-77	-77	-77
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	44.4	44.4	44.4	44.4	44.4	44.4
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	164.0E	164.0E	164.0E	164.0E	164.0E	164.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	168.0E	168.0E	168.0E	168.0E	168.0E	168.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.0	7.0	6.1	6.1	6.1	2.4
Earth Station Gain (dBi)	58.1	58.1	56.9	56.9	56.9	49.0
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.0	2.4	2.4	2.4	6.1
Earth Station Gain (dBi)	51.5	49.6	47.9	47.9	47.9	55.9
Earth Station G/T (dB/K)	29.0	27.1	25.4	25.4	25.4	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	81.9	82.5	72.7	52.5	64.5	52.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	7W	0.0	0.0
Satellite G/T(dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	26.7	28.0	24.7	24.1	24.0	17.8
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.4	40.8	34.3	14.1	26.1	14.0
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	29.0	27.1	25.4	25.4	25.4	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.6	14.9	13.1	12.5	12.4	14.4
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.7	28.0	24.7	24.1	24.0	17.8
C/N Downlink (dB)	19.6	14.9	13.1	12.5	12.4	14.4
C/I Intermodulation (dB)	N/A	N/A	25.4	24.7	24.6	18.5
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.4	25.4	25.8	19.2
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.4	25.4	25.8	19.2
C/I Uplink Adjacent Satellite 1 (dB)	25.3	26.7	23.4	22.8	22.6	16.5
C/I Downlink Adjacent Satellite 1 (dB)	18.4	13.6	11.6	11.0	10.9	13.2
C/I Uplink Adjacent Satellite 2 (dB)	25.3	26.7	23.4	22.8	22.6	16.5
C/I Downlink Adjacent Satellite 2 (dB)	19.3	14.7	13.1	12.5	12.3	13.8
C/(N+I) Composite (dB)	12.9	9.1	7.3	6.7	6.6	6.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.9	8.1	6.3	5.7	5.6	5.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.9	4.7	2.4	2.7	2.2	2.1
Number of Carriers	1	1.0	3.2	328.6	20.7	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.2	-50.4	-52.5	-53.1	-53.3	-51.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-13.6	-26.0	-26.0	-26.6	-26.8	-32.9

EXHIBIT 12: INTELSAT 19 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Uplink SFD (dBW/m2)	-83	-83	-75	-75	-75	-75
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	42.5	42.5	42.5	42.5	42.5	42.5
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	164.0E	164.0E	164.0E	164.0E	164.0E	164.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	168.0E	168.0E	168.0E	168.0E	168.0E	168.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	7.0	7.0	6.1	3.7
Earth Station Gain (dBi)	56.9	56.9	58.1	58.1	56.9	52.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	2.4	3.0	3.0	3.7	6.1
Earth Station Gain (dBi)	55.9	47.9	49.6	49.6	51.5	55.9
Earth Station G/T (dB/K)	33.5	25.4	27.1	27.1	29.0	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.9	79.9	76.0	55.9	66.1	56.3
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	24.7	25.4	28.1	27.4	25.5	21.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	42.5	42.5	33.8	13.6	23.8	14.0
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.5	25.4	27.1	27.1	29.0	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.2	14.8	14.3	13.7	13.7	14.4
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	24.7	25.4	28.1	27.4	25.5	21.7
C/N Downlink (dB)	22.2	14.8	14.3	13.7	13.7	14.4
C/I Intermodulation (dB)	N/A	N/A	26.7	26.1	24.2	20.4
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.8	26.8	25.4	21.1
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.8	26.8	25.4	21.1
C/I Uplink Adjacent Satellite 1 (dB)	23.3	24.1	26.7	26.1	24.2	20.4
C/I Downlink Adjacent Satellite 1 (dB)	21.0	13.3	13.0	12.3	12.4	13.2
C/I Uplink Adjacent Satellite 2 (dB)	23.3	24.1	26.7	26.1	24.2	20.4
C/I Downlink Adjacent Satellite 2 (dB)	21.6	14.8	14.1	13.5	13.4	13.8
C/(N+I) Composite (dB)	14.0	8.9	8.6	8.0	7.8	7.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	13.0	7.9	7.6	7.0	6.8	6.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	3.0	4.5	3.7	4.0	3.4	3.1
Number of Carriers	1	1.0	2.3	240.6	22.8	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.0	-51.8	-50.4	-51.0	-51.7	-51.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.5	-26.3	-28.6	-29.2	-31.1	-34.9

EXHIBIT 12: INTELSAT 19 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Uplink SFD (dBW/m2)	-81.4	-74.4	-76.4	-76.4	-76.4	-76.4
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	44.4	44.4	44.4	44.4	44.4	44.4
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	164.0E	164.0E	164.0E	164.0E	164.0E	164.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	168.0E	168.0E	168.0E	168.0E	168.0E	168.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	3.0
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	49.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	4.6	3.7	3.0	3.0	3.0	6.1
Earth Station Gain (dBi)	53.9	51.5	49.6	49.6	49.6	55.9
Earth Station G/T (dB/K)	31.4	29.0	27.1	27.1	27.1	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	81.5	79.1	73.3	53.3	65.3	54.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	26.6	24.9	25.6	25.2	25.0	20.3
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.4	40.8	34.3	14.3	26.3	15.5
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	31.4	29.0	27.1	27.1	27.1	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.0	16.8	14.9	14.4	14.2	15.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.6	24.9	25.6	25.2	25.0	20.3
C/N Downlink (dB)	22.0	16.8	14.9	14.4	14.2	15.9
C/I Intermodulation (dB)	N/A	N/A	25.4	24.9	24.8	20.0
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.5	25.6	25.9	20.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.5	25.6	25.9	20.8
C/I Uplink Adjacent Satellite 1 (dB)	26.9	25.3	26.0	25.5	25.4	20.7
C/I Downlink Adjacent Satellite 1 (dB)	20.9	15.6	13.5	13.1	12.9	14.8
C/I Uplink Adjacent Satellite 2 (dB)	26.9	25.3	26.0	25.5	25.4	20.7
C/I Downlink Adjacent Satellite 2 (dB)	21.6	16.5	14.7	14.2	14.0	15.4
C/(N+I) Composite (dB)	14.7	10.6	8.9	8.5	8.4	8.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	13.7	9.6	7.9	7.5	7.4	7.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	3.7	6.3	4.1	4.5	4.0	4.1
Number of Carriers	1	1.0	3.1	315.1	20.1	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-41.4	-52.6	-51.9	-52.4	-52.5	-50.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-13.6	-26.0	-26.0	-26.4	-26.6	-31.3

EXHIBIT 12: INTELSAT 19 LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Uplink SFD (dBW/m2)	-79.4	-82.4	-73.4	-73.4	-73.4	-73.4
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	42.5	42.5	42.5	42.5	42.5	42.5
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	164.0E	164.0E	164.0E	164.0E	164.0E	164.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	168.0E	168.0E	168.0E	168.0E	168.0E	168.0E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	9.0	6.1	9.0	9.0	9.0	3.7
Earth Station Gain (dBi)	60.2	56.9	60.2	60.2	60.2	52.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	2.4	3.7	3.7	3.7	9.0
Earth Station Gain (dBi)	55.9	47.9	51.5	51.5	51.5	59.4
Earth Station G/T (dB/K)	33.5	25.4	29.0	29.0	29.0	37.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	83.5	80.5	77.2	57.2	69.1	56.7
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	28.6	26.3	29.5	29.0	28.9	22.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	42.5	42.5	33.3	13.3	25.2	12.9
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.5	25.4	29.0	29.0	29.0	37.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.2	14.8	15.7	15.2	15.1	16.7
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	28.6	26.3	29.5	29.0	28.9	22.5
C/N Downlink (dB)	22.2	14.8	15.7	15.2	15.1	16.7
C/I Intermodulation (dB)	N/A	N/A	26.2	25.8	25.6	19.3
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.3	26.4	26.8	20.0
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.3	26.4	26.8	20.0
C/I Uplink Adjacent Satellite 1 (dB)	28.9	26.7	29.9	29.4	29.2	22.9
C/I Downlink Adjacent Satellite 1 (dB)	21.0	13.3	14.5	14.0	13.9	15.7
C/I Uplink Adjacent Satellite 2 (dB)	28.9	26.7	29.9	29.4	29.2	22.9
C/I Downlink Adjacent Satellite 2 (dB)	21.6	14.8	15.4	15.0	14.8	16.1
C/(N+I) Composite (dB)	15.1	9.0	9.9	9.5	9.4	9.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	14.1	8.0	8.9	8.5	8.4	8.2
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	4.1	4.7	5.1	5.5	5.0	4.8
Number of Carriers	1	1.0	2.6	258.5	16.5	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.7	-51.2	-51.3	-51.8	-52.0	-50.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.5	-26.3	-29.0	-29.5	-29.7	-36.0

EXHIBIT 13: ADJACENT SATELLITE (164º E.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	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-10.0	-10.0	-10.0	-10.0
Uplink Contour G/T (dB/K)	-7.9	-7.9	-7.9	-7.9
Uplink SFD (dBW/m2)	-79.1	-84.9	-79.1	-79.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST HEMI	WEST HEMI	WEST HEMI	WEST HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	34.4	34.4	34.4	34.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	162E	162E	162E	162E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
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	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	9.0	6.1	6.1
Earth Station Gain (dBi)	60.2	53.4	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	3.5	4.5	3.7
Earth Station Gain (dBi)	49.3	41.1	43.9	41.2
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	83.8	78.0	70.4	51.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.9	-7.9	-7.9	-7.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	28.7	23.7	22.6	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34.4	34.4	25.7	7.1
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	19.0	12.4	12.7	11.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	28.7	23.7	22.6	23.5
C/N Downlink (dB)	19.0	12.4	12.7	11.0
C/I Intermodulation (dB)	N/A	N/A	18.7	19.6
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Uplink Adjacent Satellite 1 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 1 (dB)	17.9	7.9	10.4	8.4
C/I Uplink Adjacent Satellite 2 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 2 (dB)	19.3	12.7	12.9	11.4
C/(N+I) Composite (dB)	11.3	4.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.3	3.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.3	0.0	0.0	0.0
Number of Carriers	1	1.0	3.3	238.6
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.4	-50.2	-47.3	-46.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.6	-32.4	-34.7	-33.7

EXHIBIT 13: ADJACENT SATELLITE (164º E.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Uplink Contour G/T (dB/K)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Uplink SFD (dBW/m2)	-77	-83	-80	-80	-80	-80
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Downlink Contour EIRP (dBW)	40	40	40	40	40	40
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	162E	162E	162E	162E	162E	162E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	166E	166E	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG7W
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	36862	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	45200	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	54000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	11.0	6.1	6.1	6.1	6.1	4.6
Earth Station Gain (dBi)	61.7	56.9	56.9	56.9	56.9	54.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	3.7	4.6	4.6	4.6	6.1
Earth Station Gain (dBi)	55.9	51.5	53.9	53.9	53.9	55.9
Earth Station G/T (dB/K)	33.5	29.0	31.4	31.4	31.4	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	85.9	79.9	68.9	48.8	60.8	53.3
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-76.6	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	28.5	21.5	18.7	18.1	18.0	16.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	40.0	40.0	30.7	10.6	22.6	15.1
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.5	29.0	31.4	31.4	31.4	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-76.6	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.7	14.2	15.5	14.9	14.8	15.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	28.5	21.5	18.7	18.1	18.0	16.6
C/N Downlink (dB)	19.7	14.2	15.5	14.9	14.8	15.5
C/I Intermodulation (dB)	N/A	N/A	19.8	19.3	19.1	17.7
C/I Uplink Co-Channel (dB)*	26.8	25.0	26.4	26.4	26.8	25.0
C/I Downlink Co-Channel (dB)*	26.8	25.0	26.4	26.4	26.8	25.0
C/I Uplink Adjacent Satellite 1 (dB)	30.8	23.9	21.1	20.5	20.4	19.0
C/I Downlink Adjacent Satellite 1 (dB)	16.3	10.8	12.2	11.6	11.5	12.1
C/I Uplink Adjacent Satellite 2 (dB)	30.8	23.9	21.1	20.5	20.4	19.0
C/I Downlink Adjacent Satellite 2 (dB)	19.1	13.9	15.1	14.6	14.4	15.0
C/(N+I) Composite (dB)	12.7	7.3	7.9	7.3	7.2	7.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.7	6.3	6.9	6.3	6.2	6.2
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.7	3.0	3.0	3.3	2.8	2.8
Number of Carriers	1	1.0	3.8	389.5	24.7	135.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-41.8	-53.6	-56.3	-56.9	-57.0	-56.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-19.5	-30.1	-31.1	-31.7	-31.8	-33.2

EXHIBIT 14: ADJACENT SATELLITE (168º E.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	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-10.0	-10.0	-10.0	-10.0
Uplink Contour G/T (dB/K)	-7.9	-7.9	-7.9	-7.9
Uplink SFD (dBW/m2)	-79.1	-84.9	-79.1	-79.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	WEST HEMI	WEST HEMI	WEST HEMI	WEST HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	34.4	34.4	34.4	34.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	170E	170E	170E	170E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W
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	24575	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth(kHz)	36000	36000	10300	100
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79
UPLINK EARTH STATION				
Earth Station Diameter (meters)	18.3	9.0	6.1	6.1
Earth Station Gain (dBi)	60.2	53.4	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	3.5	4.5	3.7
Earth Station Gain (dBi)	49.3	41.1	43.9	41.2
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	83.8	78.0	70.4	51.8
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.9	-7.9	-7.9	-7.9
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N(dB)	28.7	23.7	22.6	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	34.4	34.4	25.7	7.1
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	28.4	21.0	23.6	20.9
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C / N(dB)	19.0	12.4	12.7	11.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	28.7	23.7	22.6	23.5
C/N Downlink (dB)	19.0	12.4	12.7	11.0
C/I Intermodulation (dB)	N/A	N/A	18.7	19.6
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.2	26.8
C/I Uplink Adjacent Satellite 1 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 1 (dB)	17.9	7.9	10.4	8.4
C/I Uplink Adjacent Satellite 2 (dB)	18.9	13.9	12.8	13.8
C/I Downlink Adjacent Satellite 2 (dB)	19.3	12.7	12.9	11.4
C/(N+I) Composite (dB)	11.3	4.4	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.3	3.4	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.3	0.0	0.0	0.0
Number of Carriers	1	1.0	3.3	238.6
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.4	-50.2	-47.3	-46.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.6	-32.4	-34.7	-33.7

EXHIBIT 14: ADJACENT SATELLITE (168º E.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Uplink SFD (dBW/m2)	-81	-71	-77	-77	-77	-77
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	44.4	44.4	44.4	44.4	44.4	44.4
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	166E	166E	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	170E	170E	170E	170E	170E	170E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.0	7.0	6.1	6.1	6.1	2.4
Earth Station Gain (dBi)	58.1	58.1	56.9	56.9	56.9	49.0
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.0	2.4	2.4	2.4	6.1
Earth Station Gain (dBi)	51.5	49.6	47.9	47.9	47.9	55.9
Earth Station G/T (dB/K)	29.0	27.1	25.4	25.4	25.4	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	81.9	82.5	72.7	52.5	64.5	52.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	7W	0.0	0.0
Satellite G/T(dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	26.7	28.0	24.7	24.1	24.0	17.8
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.4	40.8	34.3	14.1	26.1	14.0
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	29.0	27.1	25.4	25.4	25.4	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.6	14.9	13.1	12.5	12.4	14.4
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.7	28.0	24.7	24.1	24.0	17.8
C/N Downlink (dB)	19.6	14.9	13.1	12.5	12.4	14.4
C/I Intermodulation (dB)	N/A	N/A	25.4	24.7	24.6	18.5
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.4	25.4	25.8	19.2
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.4	25.4	25.8	19.2
C/I Uplink Adjacent Satellite 1 (dB)	25.3	26.7	23.4	22.8	22.6	16.5
C/I Downlink Adjacent Satellite 1 (dB)	18.4	13.6	11.6	11.0	10.9	13.2
C/I Uplink Adjacent Satellite 2 (dB)	25.3	26.7	23.4	22.8	22.6	16.5
C/I Downlink Adjacent Satellite 2 (dB)	19.3	14.7	13.1	12.5	12.3	13.8
C/(N+I) Composite (dB)	12.9	9.1	7.3	6.7	6.6	6.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.9	8.1	6.3	5.7	5.6	5.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	1.9	4.7	2.4	2.7	2.2	2.1
Number of Carriers	1	1.0	3.2	328.6	20.7	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.2	-50.4	-52.5	-53.1	-53.3	-51.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-13.6	-26.0	-26.0	-26.6	-26.8	-32.9

EXHIBIT 14: ADJACENT SATELLITE (168º E.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Uplink Contour G/T (dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Uplink SFD (dBW/m2)	-83	-83	-75	-75	-75	-75
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	42.5	42.5	42.5	42.5	42.5	42.5
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	166E	166E	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	170E	170E	170E	170E	170E	170E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	7.0	7.0	6.1	3.7
Earth Station Gain (dBi)	56.9	56.9	58.1	58.1	56.9	52.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	2.4	3.0	3.0	3.7	6.1
Earth Station Gain (dBi)	55.9	47.9	49.6	49.6	51.5	55.9
Earth Station G/T (dB/K)	33.5	25.4	27.1	27.1	29.0	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.9	79.9	76.0	55.9	66.1	56.3
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	24.7	25.4	28.1	27.4	25.5	21.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	42.5	42.5	33.8	13.6	23.8	14.0
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.5	25.4	27.1	27.1	29.0	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.2	14.8	14.3	13.7	13.7	14.4
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	24.7	25.4	28.1	27.4	25.5	21.7
C/N Downlink (dB)	22.2	14.8	14.3	13.7	13.7	14.4
C/I Intermodulation (dB)	N/A	N/A	26.7	26.1	24.2	20.4
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.8	26.8	25.4	21.1
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.8	26.8	25.4	21.1
C/I Uplink Adjacent Satellite 1 (dB)	23.3	24.1	26.7	26.1	24.2	20.4
C/I Downlink Adjacent Satellite 1 (dB)	21.0	13.3	13.0	12.3	12.4	13.2
C/I Uplink Adjacent Satellite 2 (dB)	23.3	24.1	26.7	26.1	24.2	20.4
C/I Downlink Adjacent Satellite 2 (dB)	21.6	14.8	14.1	13.5	13.4	13.8
C/(N+I) Composite (dB)	14.0	8.9	8.6	8.0	7.8	7.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	13.0	7.9	7.6	7.0	6.8	6.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	3.0	4.5	3.7	4.0	3.4	3.1
Number of Carriers	1	1.0	2.3	240.6	22.8	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.0	-51.8	-50.4	-51.0	-51.7	-51.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.5	-26.3	-28.6	-29.2	-31.1	-34.9

EXHIBIT 14: ADJACENT SATELLITE (168º E.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Uplink SFD (dBW/m2)	-81.4	-74.4	-76.4	-76.4	-76.4	-76.4
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA	AUSTRALIA
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-8.0	-8.0	-8.0	-8.0	-8.0	-8.0
Downlink Contour EIRP (dBW)	44.4	44.4	44.4	44.4	44.4	44.4
Rain Rate (mm/hr)	63.0	63.0	63.0	63.0	63.0	63.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	166E	166E	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	170E	170E	170E	170E	170E	170E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	3.0
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	49.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	4.6	3.7	3.0	3.0	3.0	6.1
Earth Station Gain (dBi)	53.9	51.5	49.6	49.6	49.6	55.9
Earth Station G/T (dB/K)	31.4	29.0	27.1	27.1	27.1	33.5
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	81.5	79.1	73.3	53.3	65.3	54.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	26.6	24.9	25.6	25.2	25.0	20.3
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.4	40.8	34.3	14.3	26.3	15.5
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	31.4	29.0	27.1	27.1	27.1	33.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.0	16.8	14.9	14.4	14.2	15.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.6	24.9	25.6	25.2	25.0	20.3
C/N Downlink (dB)	22.0	16.8	14.9	14.4	14.2	15.9
C/I Intermodulation (dB)	N/A	N/A	25.4	24.9	24.8	20.0
C/I Uplink Co-Channel (dB)*	25.0	25.0	25.5	25.6	25.9	20.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	25.5	25.6	25.9	20.8
C/I Uplink Adjacent Satellite 1 (dB)	26.9	25.3	26.0	25.5	25.4	20.7
C/I Downlink Adjacent Satellite 1 (dB)	20.9	15.6	13.5	13.1	12.9	14.8
C/I Uplink Adjacent Satellite 2 (dB)	26.9	25.3	26.0	25.5	25.4	20.7
C/I Downlink Adjacent Satellite 2 (dB)	21.6	16.5	14.7	14.2	14.0	15.4
C/(N+I) Composite (dB)	14.7	10.6	8.9	8.5	8.4	8.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	13.7	9.6	7.9	7.5	7.4	7.5
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	3.7	6.3	4.1	4.5	4.0	4.1
Number of Carriers	1	1.0	3.1	315.1	20.1	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-41.4	-52.6	-51.9	-52.4	-52.5	-50.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-13.6	-26.0	-26.0	-26.4	-26.6	-31.3

EXHIBIT 14: ADJACENT SATELLITE (168º E.L) LINK BUDGETS (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Uplink SFD (dBW/m2)	-79.4	-82.4	-73.4	-73.4	-73.4	-73.4
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC	PACIFIC
Downlink Frequency (GHz)	12.500	12.500	12.500	12.500	12.500	12.500
Downlink Beam Polarization	Linear	Linear	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	42.5	42.5	42.5	42.5	42.5	42.5
Rain Rate (mm/hr)	145.	145.	145.	145.	145.	145.
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	166E	166E	166E	166E	166E	166E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	170E	170E	170E	170E	170E	170E
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Downlink Polarization Advantage (dB)	0.0	0.0	0.0	0.0	0.0	0.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	36M0G7W	10M3G7W	100KG7W	1M45G7W	400KG
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	24575	6000	64	512	128
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256	R1/2	R1/2
Occupied Bandwidth(kHz)	36000	30133	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	36000	10300	100	1450.0	400.0
Minimum C/N, Clear Sky (dB)	10.0	3.36	3.87	2.99	3.4	3.4
Minimum C/N, Rain (dB)	10.0	3.36	3.57	2.79	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	9.0	6.1	9.0	9.0	9.0	3.7
Earth Station Gain (dBi)	60.2	56.9	60.2	60.2	60.2	52.7
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	6.1	2.4	3.7	3.7	3.7	9.0
Earth Station Gain (dBi)	55.9	47.9	51.5	51.5	51.5	59.4
Earth Station G/T (dB/K)	33.5	25.4	29.0	29.0	29.0	37.0
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	83.5	80.5	77.2	57.2	69.1	56.7
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	28.6	26.3	29.5	29.0	28.9	22.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	42.5	42.5	33.3	13.3	25.2	12.9
Antenna Pointing Error (dB)	-.5	-.5	-.5	-.5	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.3	-206.3	-206.3	-206.3	-206.3	-206.3
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.5	25.4	29.0	29.0	29.0	37.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	22.2	14.8	15.7	15.2	15.1	16.7
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	28.6	26.3	29.5	29.0	28.9	22.5
C/N Downlink (dB)	22.2	14.8	15.7	15.2	15.1	16.7
C/I Intermodulation (dB)	N/A	N/A	26.2	25.8	25.6	19.3
C/I Uplink Co-Channel (dB)*	25.0	25.0	26.3	26.4	26.8	20.0
C/I Downlink Co-Channel (dB)*	25.0	25.0	26.3	26.4	26.8	20.0
C/I Uplink Adjacent Satellite 1 (dB)	28.9	26.7	29.9	29.4	29.2	22.9
C/I Downlink Adjacent Satellite 1 (dB)	21.0	13.3	14.5	14.0	13.9	15.7
C/I Uplink Adjacent Satellite 2 (dB)	28.9	26.7	29.9	29.4	29.2	22.9
C/I Downlink Adjacent Satellite 2 (dB)	21.6	14.8	15.4	15.0	14.8	16.1
C/(N+I) Composite (dB)	15.1	9.0	9.9	9.5	9.4	9.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	14.1	8.0	8.9	8.5	8.4	8.2
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	4.1	4.7	5.1	5.5	5.0	4.8
Number of Carriers	1	1.0	2.6	258.5	16.5	90.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.7	-51.2	-51.3	-51.8	-52.0	-50.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-17.5	-26.3	-29.0	-29.5	-29.7	-36.0