Engineering Statement

Intelsat License LLC ("Intelsat") proposes herein to operate the Intelsat 5 satellite from 157.0° E.L. From 157.0° E.L., Intelsat 5 would utilize the frequency bands 5925 – 6425 MHz and 3700 – 4200 MHz for uplink and downlink, respectively in C-band; and the unplanned FSS Ku-band frequencies in 14000 – 14250 MHz and 11450 – 11700 MHz for uplink and downlink, respectively, to provide service to Asia, Australia, and the Pacific. In addition, the frequencies 13999 MHz and 14498 MHz will be used for telecommand. Intelsat does not plan to use the satellite's FSS Plan band frequencies of 12750 – 13250 MHz, 10700 – 10950 MHz and 11200 – 11450 MHz at 157.0° E.L. at this time.

To take the impact of the proposed change in the Intelsat 5 orbital location into account, this engineering statement provides the following technical information for Intelsat 5 at 157.0° E.L.: (1) frequency plan; (2) antenna gain contours; (3) emission designators; (4) link budgets; (5) adjacent satellite link analysis; (6) power flux density ("PFD") levels; (7) orbital debris mitigation plan; (8) arrangement for telemetry, tracking and control; and (9) Schedule S.

1) Frequency Plan

The Intelsat 5 frequency plan is provided in Exhibit 1.

2) Antenna Gain Contours

The co-polarized coverage patterns for the Intelsat 5 that will be utilized when operating from 157.0º E.L. are shown in Exhibits 2A through 2N. These exhibits specify for each beam the maximum antenna gain, the minimum Saturated Flux Density ("SFD") and maximum G/T for each uplink beam, and the maximum EIRP for each downlink beam.

The antenna pattern information is in the format prescribed in Section 25.114(d)(3) of the Commission's rules with the exception of the Telemetry, Command and Ranging's ("TC&R's") bicone antenna and the uplink power control ("ULPC") antenna.

For the bicone antenna, the antenna performance information is provided in Exhibits 2I and 2L. The information provided in these two exhibits is the same as the information contained in the SAT-MOD-20080725-00150 filing and shows the variation in gain of the antenna at various elevation angles. The descriptive text contained in SAT-MOD-20080725-00150 with respect to the circumstances that the bicone antenna would be utilized and with respect to the interpretation of the gain plots (as replicated in Exhibits 2I and 2L) is also applicable at the proposed 157.0° E.L. orbital location.

With regard to the ULPC antenna, the graphs in Exhibits 2M and 2N show the variation in the gain of the antenna at 0° elevation angle, referenced to the (horizontal) plane on the center axis of the antenna aperture, with the azimuth varying from -40º and +45º – generally referred to as the "azimuth cut." Given that the ULPC antenna is a horn antenna having symmetrical gain performance about the center axis of the antenna

aperture, the gain variation shown in Exhibits 2M and 2N is also representative of the case where the azimuth angle of the antenna is 0°, referenced to the (vertical) plane located at the center axis of the antenna aperture, with the elevation varying from -40° and +45° – generally referred to as the "elevation cut."

The field of view of the ULPC antenna envelopes the Earth disk (±8.4º). From Exhibits 2M and 2N it is evident that the coverage of the ULPC antenna is relatively flat over the entire Earth and that the variation in gain will be typically less than 3 dB within the antennas' field of view.

The gain diagrams associated with the bicone antenna, shown in exhibits 2I, and 2L, as well as those associated with the ULPC antenna, shown in Exhibits 2M and 2N, were not prepared in accordance with the parameters specified in Section 25.114(d)(3) of the Commission's rules due to the fact that the satellite manufacturer does not provide the patterns in the required form. Given the specificity of the situation, it is Intelsat's understanding that Exhibits 2I, 2L, 2M and 2N, together with the descriptive characterization given in the previous paragraphs (and those in SAT-MOD-20080725-00150), fulfill the requirements of Section 25.114(d)(3). However, in case the Commission disagrees, a waiver of the requirements of Section 25.114(d)(3) of the FCC's rules with respect to the presentation of these antenna patterns is respectfully requested.

3) Emission Designators

Emission designators and allocated bandwidths for representative communication carriers are provided in Exhibit 3.

4) Link Budgets and Interference Analysis

Link analysis for Intelsat 5 was conducted for a number of representative carriers. For the analysis, it was assumed that the satellites nearest to Intelsat 5 were ABS-6 operating from 159.0° E.L. in C-band,[1] a hypothetical Ku-band satellite operating from 159.0° E.L., and a hypothetical C- and Ku-band satellite operating from 155.0° E.L.[2] The hypothetical satellites were assumed to have the same operational parameters as Intelsat 5.

[1] ABS-6 also contains a Ku-band payload in the bands 13.75-14.0 GHz and 12.5-12.75 GHz that does not overlap with IS-5 Ku-band frequencies and were therefore not considered in this analysis.

[2] The Optus C1 and Optus D3 satellites are co-located at 156.0° E.L. but were not used in the analysis. Optus C1 has overlapping coverage, uplink frequency, and polarization with Intelsat 5. Optus D3 has overlapping coverage and uplink frequency but operates in the opposite polarization from Intelsat 5. Due to the close separation and limited frequency overlap, these satellites are not useful as examples of adjacent satellites in a two-degree sharing environment. It should be noted there are existing coordination agreements to protect the operations of both Intelsat and Optus satellites.

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

a. In the plane of the geostationary satellite orbit, all transmitting and receiving earth station antennas have off-axis co-polar gains that are compliant with the limits specified in Section 25.209(a)(1) of the FCC's rules.
b. All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
c. At C-band frequencies degradation due to rain is not considered because rain (attenuation) effects are insignificant at C-band.
d. At Ku-band frequencies rain attenuation predictions are derived using Recommendation ITU-R P.618-7.
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.

In order to reduce the number the Intelsat 5 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 Exhibit 2 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 5 uplink and downlink beam combinations. The worst-case beam performance for each Intelsat 5 beam type is provided below:

Beam Name (Polarization)	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)
C-Band (H)	C-Band	0.6	-96.6 to -81.6	41.0
C-Band (V)				
Ku-Band (H)	Ku-Band	2.9	-91.9 to -76.9	48.6
Steerable (V)				

The results of the C-band and Ku-band analyses are shown in Exhibit 4 and demonstrate that operation of the Intelsat 5 satellite from 157.0º E.L. would permit the intended services to achieve their respective performance objectives while maintaining sufficient link margin. Additionally, the EIRP density levels of the carriers listed in Exhibit 5 comply with the FCC limits contained in Section 25.212(c) and 25.212(d) of the Commission's rules.

5) Adjacent Satellite Link Analysis

The impact of the proposed Intelsat 5 emissions on the transmissions of ABS-6 operating from 159.0° E.L. in C-band, a hypothetical Ku-band satellite operating from 159.0° E.L.

and a hypothetical C- and Ku-band satellite operating from 155.0° E.L. were evaluated. ABS-6 utilizes the bands 5725-6725 MHz, 3400-4200 MHz, 13750-14000 MHz and 12500-12750 MHz with linear polarization[3]. The worst-case G/T is -2 dB/K and the SFD at the beam peak ranges from -97 to -75 dBW/m2 in C-band. C-band worst-case EIRP at beam peak is 38 dB.[4] The hypothetical satellites were assumed to have the same operational parameters as Intelsat 5.

For ABS-6, it was assumed that the adjacent satellites were Intelsat 5, located at 157.0º E.L and a hypothetical satellite having the same operating characteristics as ABS-6 located at 161.0º E.L. For the hypothetical Ku-band satellite operating from 159.0° E.L, it was assumed that the adjacent satellites were Intelsat 5, located at 157.0º E.L, and a hypothetical satellite having the same operating characteristics as Intelsat 5 located at 161.0º E.L. For the hypothetical satellite operating from 155.0° E.L, it was assumed that the adjacent satellites were Intelsat 5, located at 157.0º E.L, and a hypothetical satellite having the same operating characteristics as Intelsat 5 located at 153.0º E.L.

The assumptions made in Section 5 pertaining to Earth station off-axis gain performance, Earth station cross-polarization performance, and rain attenuation were also applied in the analysis. The results of the analysis are given in Exhibits 5, 6, and 7. The Intelsat 5 transmissions in the bands addressed in Exhibits 5, 6, and 7 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.

6) Power Flux Density Levels

The power flux density ("PFD") limits for space stations operating in the 3700 – 4200 MHz and 11450 – 11700 MHz bands are contained in Section 25.208 of the Commission's rules.

The maximum PFD levels for the Intelsat 5 transmissions were calculated for a number of digital carriers listed in Exhibit 3 operating in the 3700 – 4200 MHz and 11450 – 11700 MHz bands. These carriers were chosen because they generally produce high PFD levels on the Earth's surface. The PFD levels were also calculated for the Intelsat 5 telemetry and ULPC carriers. The results are provided in Exhibit 8 and show that the downlink power flux density levels of the Intelsat 5 carriers do not exceed limits specified in Section 25.208 of the Commission's rules or in the ITU Radio Regulations.

7) 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.

[3] The bands 13.75-14.0 GHz and 12.5-12.75 GHz do not overlap with Intelsat 5 Ku-band frequencies and were therefore not considered in this analysis.

[4] These values are taken from the ABS website (http://www.absatellite.net/satellite-fleet/?sat=abs6).

b. 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 (orbit-raising to safe altitude above GEO) that are not used for normal operations.

c. 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 do the best within the spacecraft and operation capability to remove the stored energy on the spacecraft by depleting all propellant tanks and turning off all active units.

d. Safe Flight Profiles

Intelsat has assessed and limited the probability of the space station becoming a source of debris as a result of collisions with large debris or other operational space stations. Intelsat 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 5. Intelsat is also not aware of any non-Intelsat system with an overlapping station-keeping volume with Intelsat 5 that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

e. Post Mission Disposal

At the end of the mission, Intelsat plans to dispose of the spacecraft by moving it to a planned minimum altitude of 150 kilometers (perigee) above the geostationary arc.[5] Nevertheless, as the Commission is aware, because there is no mechanism for precisely calculating the amount of propellant fuel left on the spacecraft once it is in orbit, it is possible that the spacecraft will not meet the planned minimum de-orbit altitude.

The FCC's rules state that satellites launched prior to March 18, 2002, such as Intelsat 5, would be designated as grandfathered satellites not subject to a specific disposal altitude.[6] Therefore, the Intelsat 5 planned disposal orbit complies with the FCC's rules.

[5] Intelsat has reserved 25.1 kilograms of bi-propellant fuel for this purpose. The fuel gauging uncertainty of remaining propellant has been taken into account in these calculations.

[6] 47 C.F.R. § 25.283(d).

8) Arrangement For Telemetry, Tracking and Control

Intelsat will conduct TC&R operations through one or more of the following earth stations: Regency Park, Australia and Kumsan, South Korea. Additionally, Intelsat is capable of remotely controlling Intelsat 5 from its facility in Washington D.C.

9) Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 5 from 157.0º E.L. The Schedule S contains only: (1) those Intelsat 5 data items that have changed from those that were listed in the Schedule S for SAT-MOD-20080725-00150; and (2) data items whose inclusion was required in order for the software application to function properly. It is noted that the antenna gain pattern for the Intelsat 5 bicone antenna and the ULPC antenna were included in column "e" (instead of column "f") of Section S8 of the Schedule S, since they are not in GXT format (see Section 2, above).

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/	August 26, 2014
Roya Shambayati Intelsat Director, Spectrum Strategy	Date

Exhibit 1: 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 Transponder Gain (dBi)
1C	C-Band	Vertical	5945	1C	C-Band	Horizontal	3720	36	121.9
3C	C-Band	Vertical	5985	3C	C-Band	Horizontal	3760	36	121.9
5C	C-Band	Vertical	6025	5C	C-Band	Horizontal	3800	36	121.9
7C	C-Band	Vertical	6065	7C	C-Band	Horizontal	3840	36	121.9
9C	C-Band	Vertical	6105	9C	C-Band	Horizontal	3880	36	121.9
11C	C-Band	Vertical	6145	11C	C-Band	Horizontal	3920	36	121.9
13C	C-Band	Vertical	6185	13C	C-Band	Horizontal	3960	36	121.9
15C	C-Band	Vertical	6225	15C	C-Band	Horizontal	4000	36	121.9
17C	C-Band	Vertical	6265	17C	C-Band	Horizontal	4040	36	121.9
19C	C-Band	Vertical	6305	19C	C-Band	Horizontal	4080	36	121.9
21C	C-Band	Vertical	6345	21C	C-Band	Horizontal	4120	36	121.9
23C	C-Band	Vertical	6385	23C	C-Band	Horizontal	4160	36	121.9
2C	C-Band	Horizontal	5945	2C	C-Band	Vertical	3720	36	121.4
4C	C-Band	Horizontal	5985	4C	C-Band	Vertical	3760	36	121.4
6C	C-Band	Horizontal	6025	6C	C-Band	Vertical	3800	36	121.4
8C	C-Band	Horizontal	6065	8C	C-Band	Vertical	3840	36	121.4
10C	C-Band	Horizontal	6105	10C	C-Band	Vertical	3880	36	121.4
12C	C-Band	Horizontal	6145	12C	C-Band	Vertical	3920	36	121.4
14C	C-Band	Horizontal	6185	14C	C-Band	Vertical	3960	36	121.4
16C	C-Band	Horizontal	6225	16C	C-Band	Vertical	4000	36	121.4
18C	C-Band	Horizontal	6265	18C	C-Band	Vertical	4040	36	121.4
20C	C-Band	Horizontal	6305	20C	C-Band	Vertical	4080	36	121.4
22C	C-Band	Horizontal	6345	22C	C-Band	Vertical	4120	36	121.4
24C	C-Band	Horizontal	6385	24C	C-Band	Vertical	4160	36	121.4
13K	Ku-Band	Horizontal	14019	13K	Steerable Spot	Vertical	11476	36	123.7
14K	Ku-Band	Horizontal	14060	14K	Steerable Spot	Vertical	11517	36	123.7
15K	Ku-Band	Horizontal	14101	15K	Steerable Spot	Vertical	11558	36	123.7
16K	Ku-Band	Horizontal	14142	16K	Steerable Spot	Vertical	11599	36	123.7
17K	Ku-Band	Horizontal	14183	17K	Steerable Spot	Vertical	11640	36	123.7
18K	Ku-Band	Horizontal	14224	18K	Steerable Spot	Vertical	11681	36	123.7
Command 1	Global	Horizontal	14498					1	
Command 2	Global	Right Hand Circular	13999					1	
Command 3	Global	Horizontal	14498					1	
				Telemetry 1	Global	Horizontal	11451	0.5	
				Telemetry 2	Global	Horizontal	11452	0.5	
				Telemetry 3	Global	Right Hand Circular	11451	0.5	
				Telemetry 4	Global	Right Hand Circular	11452	0.5	
				Telemetry 5	Global	Vertical	11451	0.5	
				Telemetry 6	Global	Vertical	11452	0.5	
				ULPC 1	Global	Right Hand Circular	11454	0.025	
				ULPC 2	Global	Left Hand Circular	11454	0.025	

Exhibit 2A: C-Band Uplink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 28.0 dBi
Beam Peak G/T: 0.6 dB/K
Saturated Flux Density @ Beam Peak G/T: -96.6 to -81.6 dBW/m^2
[Schedule S Beam Designation: PCHU]

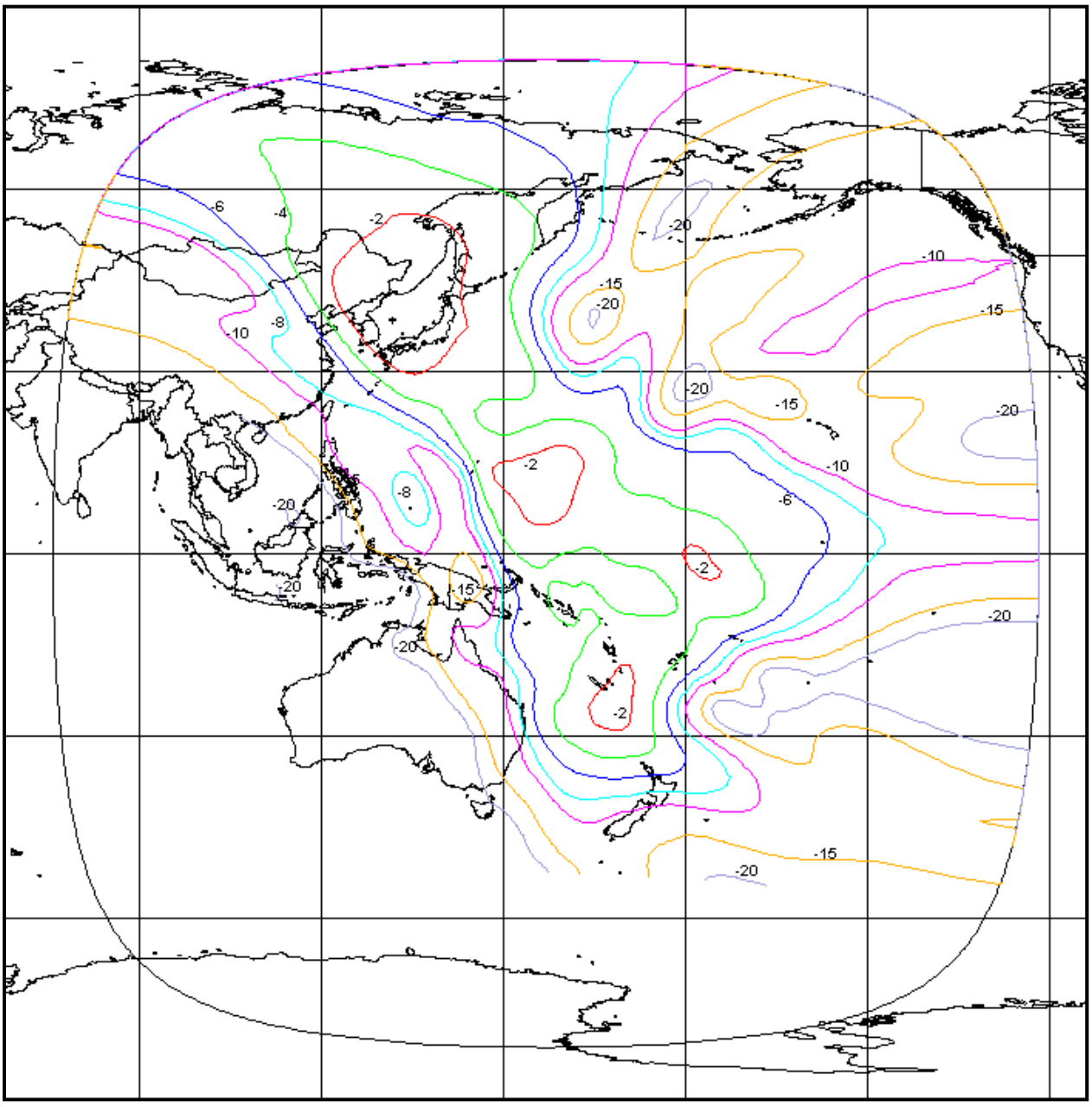

Exhibit 2B: C-Band Uplink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 27.4 dBi
Beam Peak G/T: 0.2 dB/K
Saturated Flux Density @ Beam Peak G/T: -96.2 to -81.2 dBW/m^2
[Schedule S Beam Designation: PCVU]

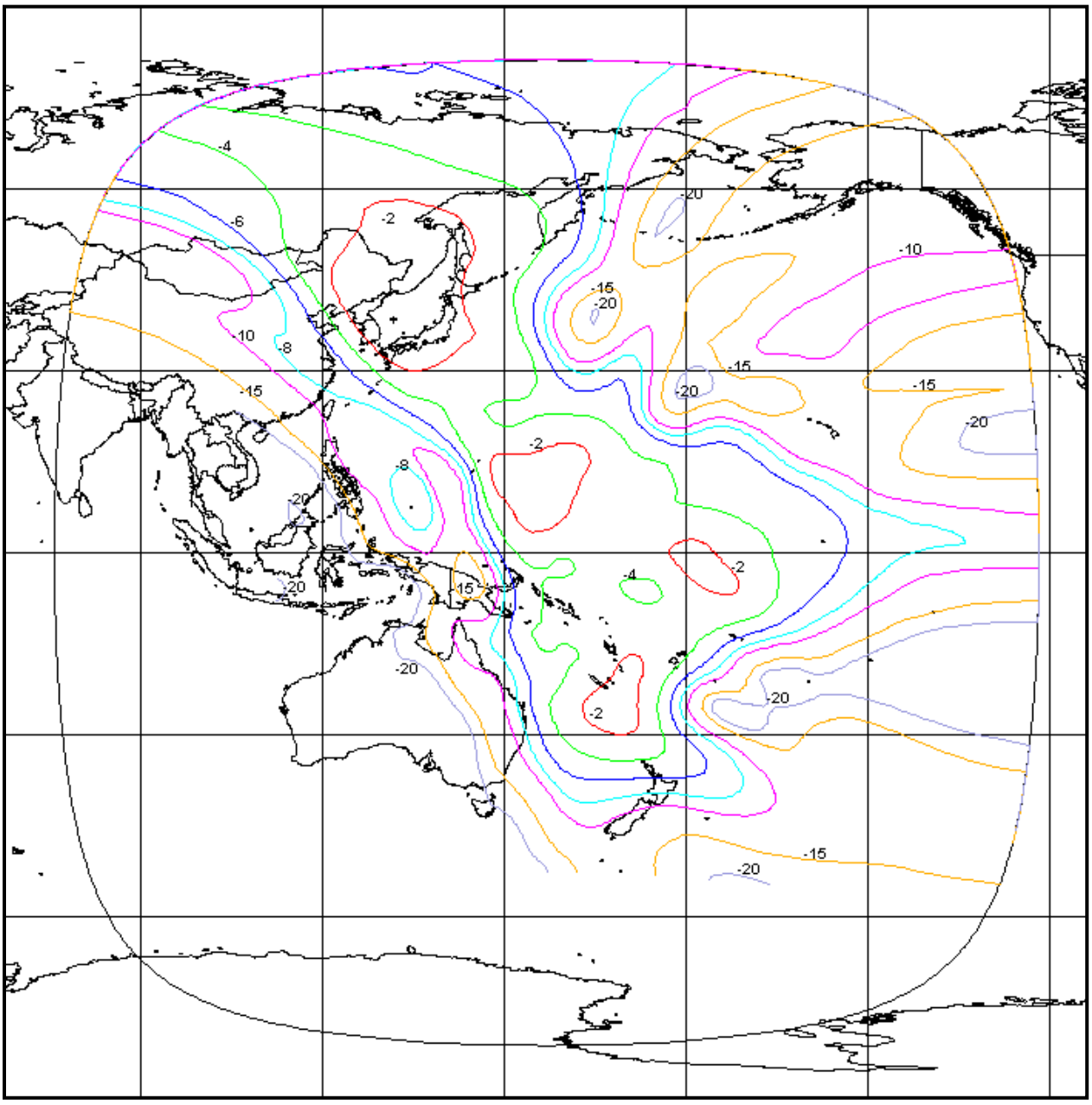

Exhibit 2C: Ku-Band Uplink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 28.3 dBi
Beam Peak G/T: 2.9 dB/K
Saturated Flux Density @ Beam Peak G/T: -91.9 to -76.9 dBW/m^2
[Schedule S Beam Designation: PKHU]

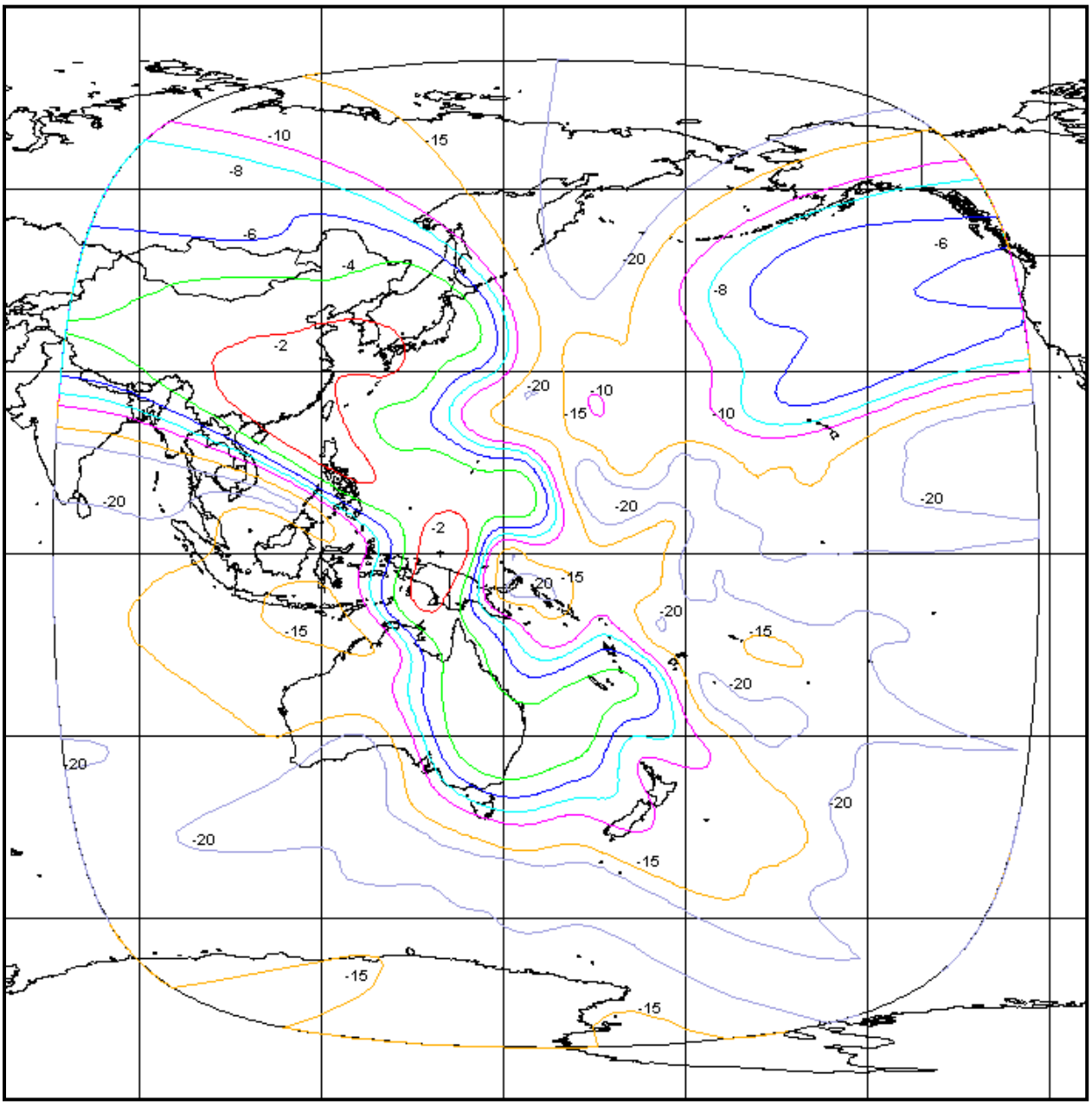

Exhibit 2D: C-Band Downlink Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 25.8 dBi
Beam Peak EIRP: 41.6 dBW
[Schedule S Beam Designation: PCHD]

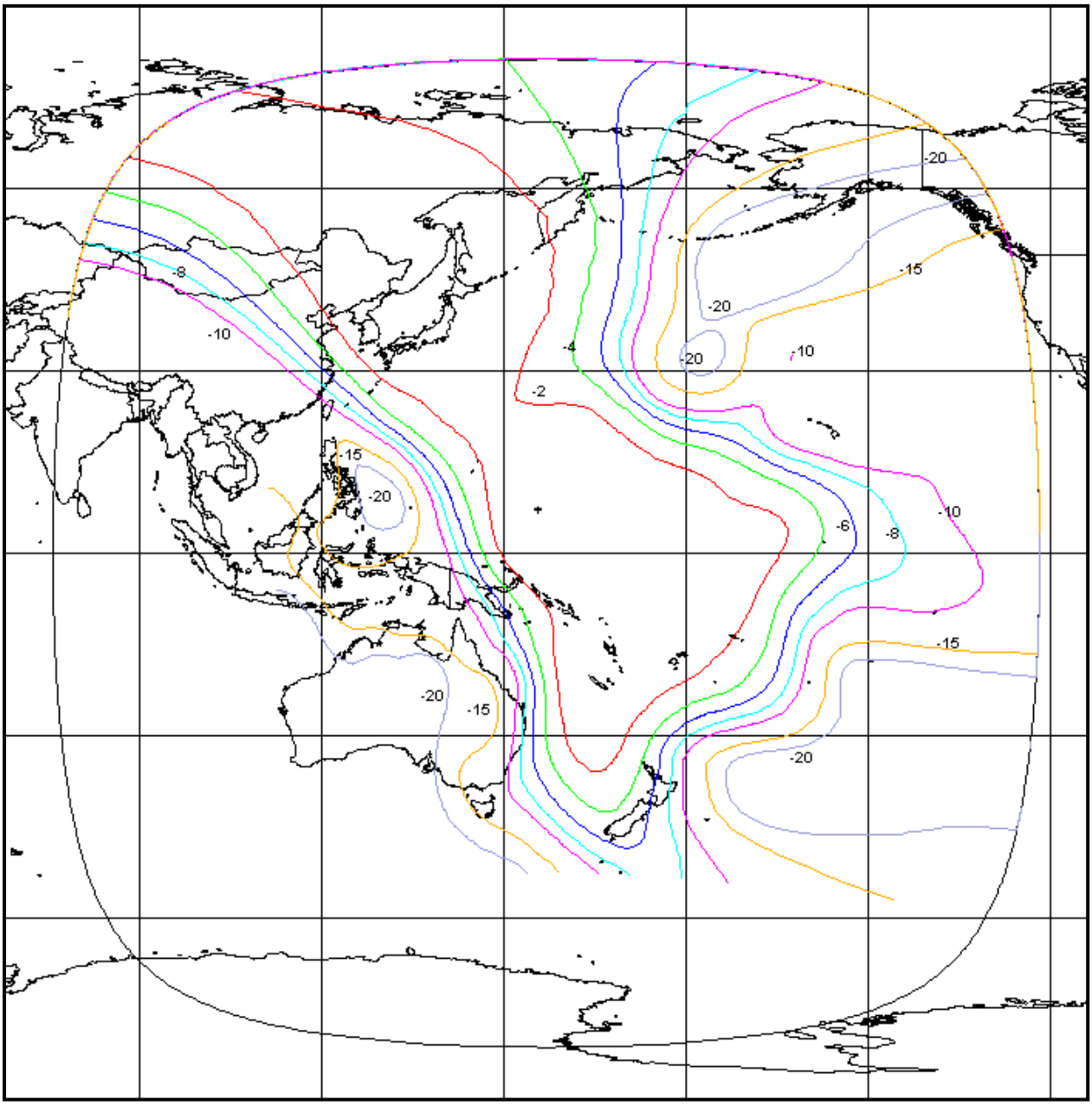

Exhibit 2E: C-Band Downlink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 25.5 dBi
Beam Peak EIRP: 41.0 dBW
[Schedule S Beam Designation: PCVD]

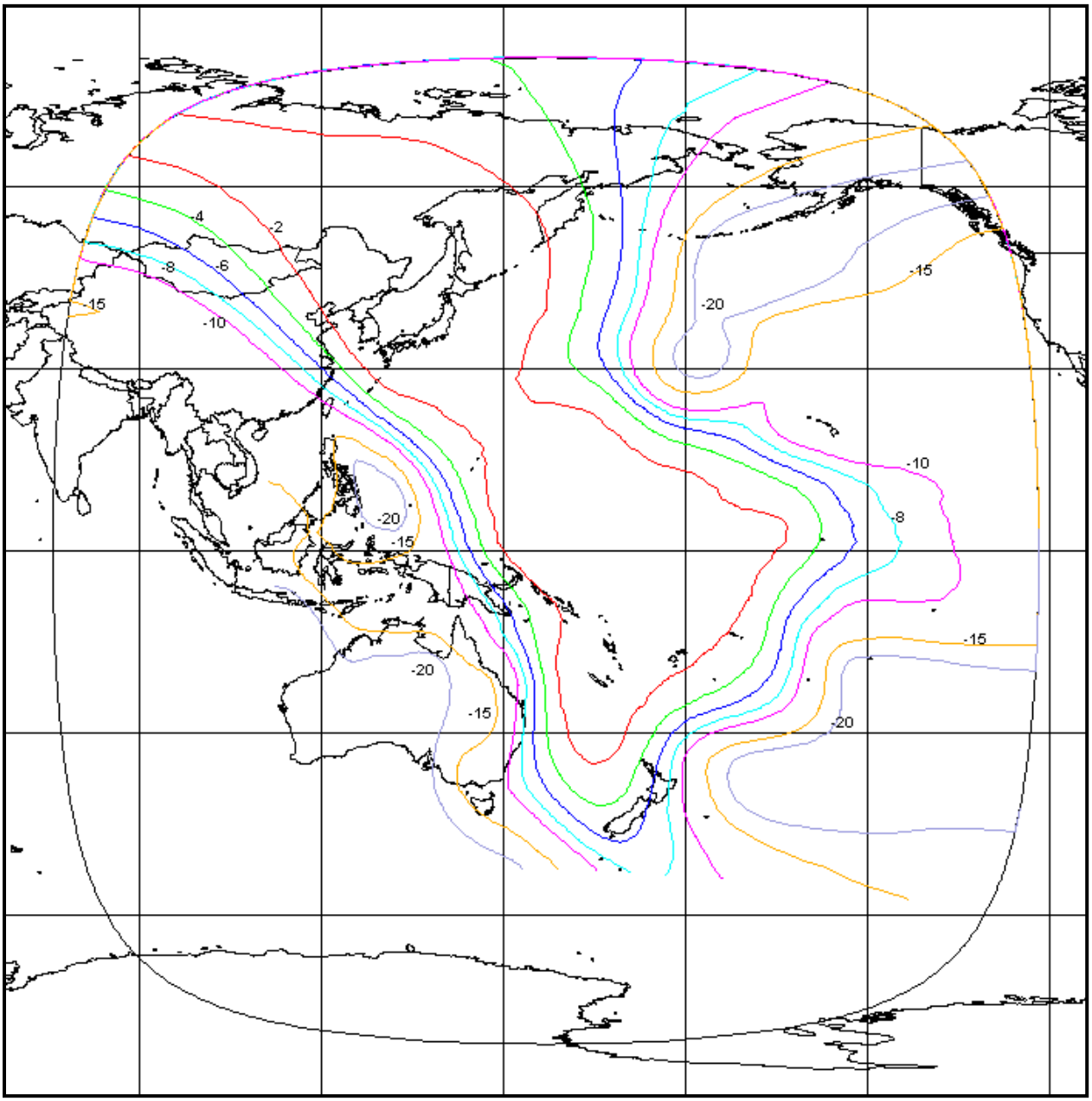

Exhibit 2F: Ku-Band Steerable Spot Downlink Beam

Beam Polarization: Vertical
Peak Antenna Gain: 32.9 dBi
Beam Peak EIRP: 48.6 dBW
[Schedule S Beam Designation: SKVD]

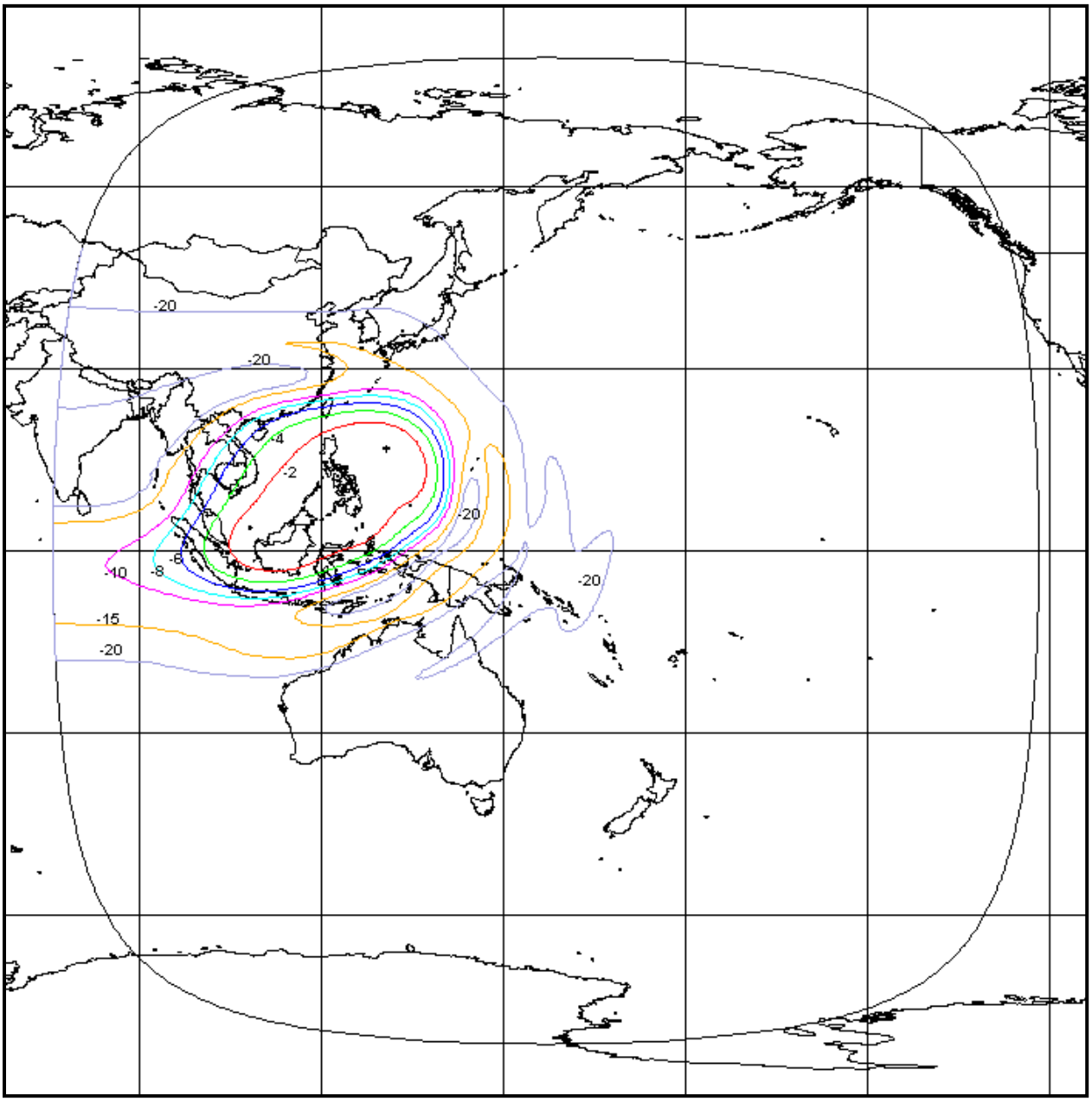

Exhibit 2G: Global Horn Antenna Command Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 22 dBi
Beam Peak G/T: -12.6 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -104.8 dBW/m^2
[Schedule S Beam Designation: CMDG]

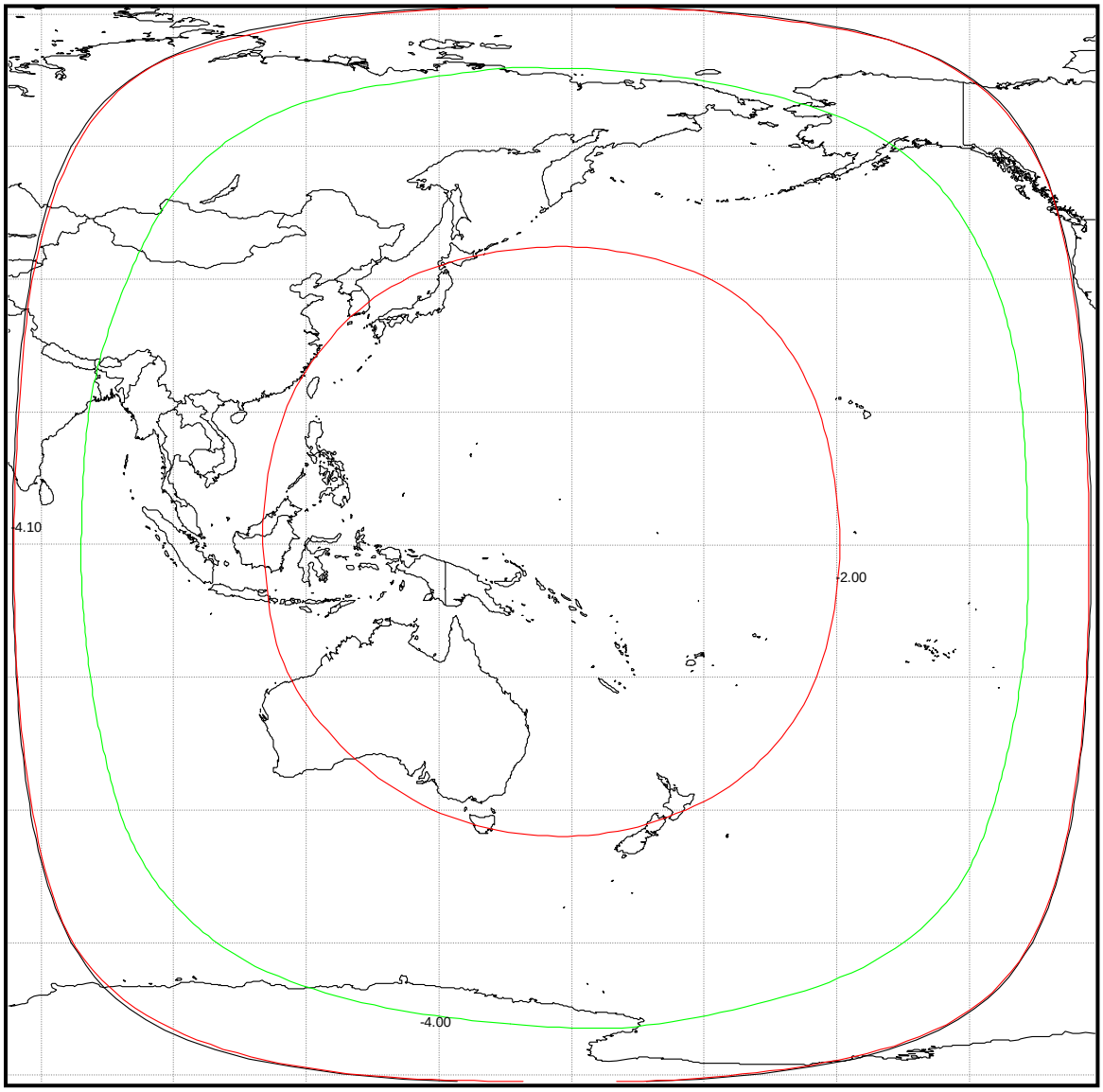

Exhibit 2H: Pipe Antenna Command Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 5.0 dBi
Beam Peak G/T: -25.3 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -92.5 dBW/m^2
[Schedule S Beam Designation: CMDP]

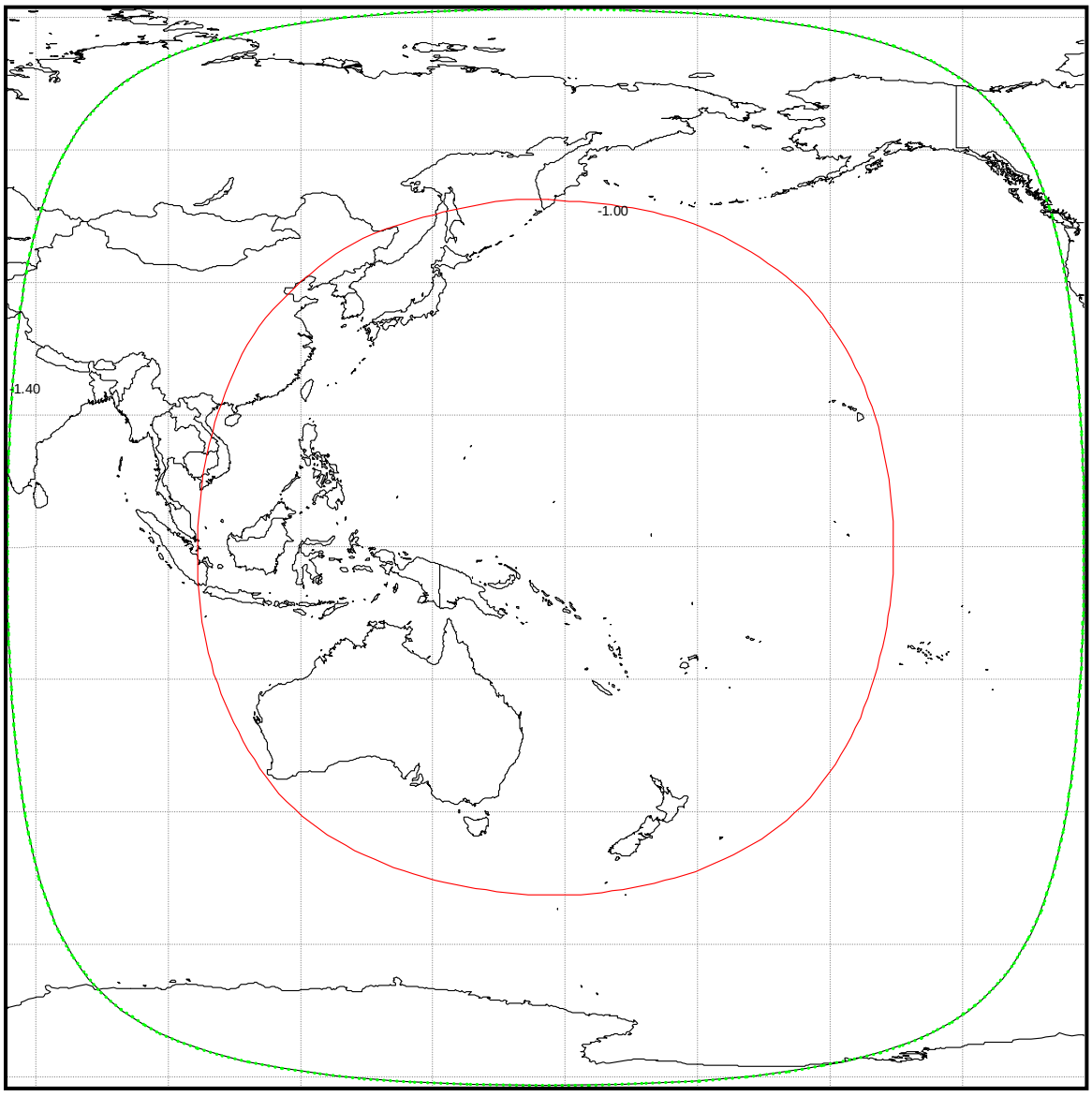

Exhibit 2I: Bicone Antenna Command Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 2.1 dBi
Beam Peak G/T: -22.4 dB/K
Command Threshold Flux Density @ Beam Peak G/T: -95 dBW/m^2
[Schedule S Beam Designation: CMDB]

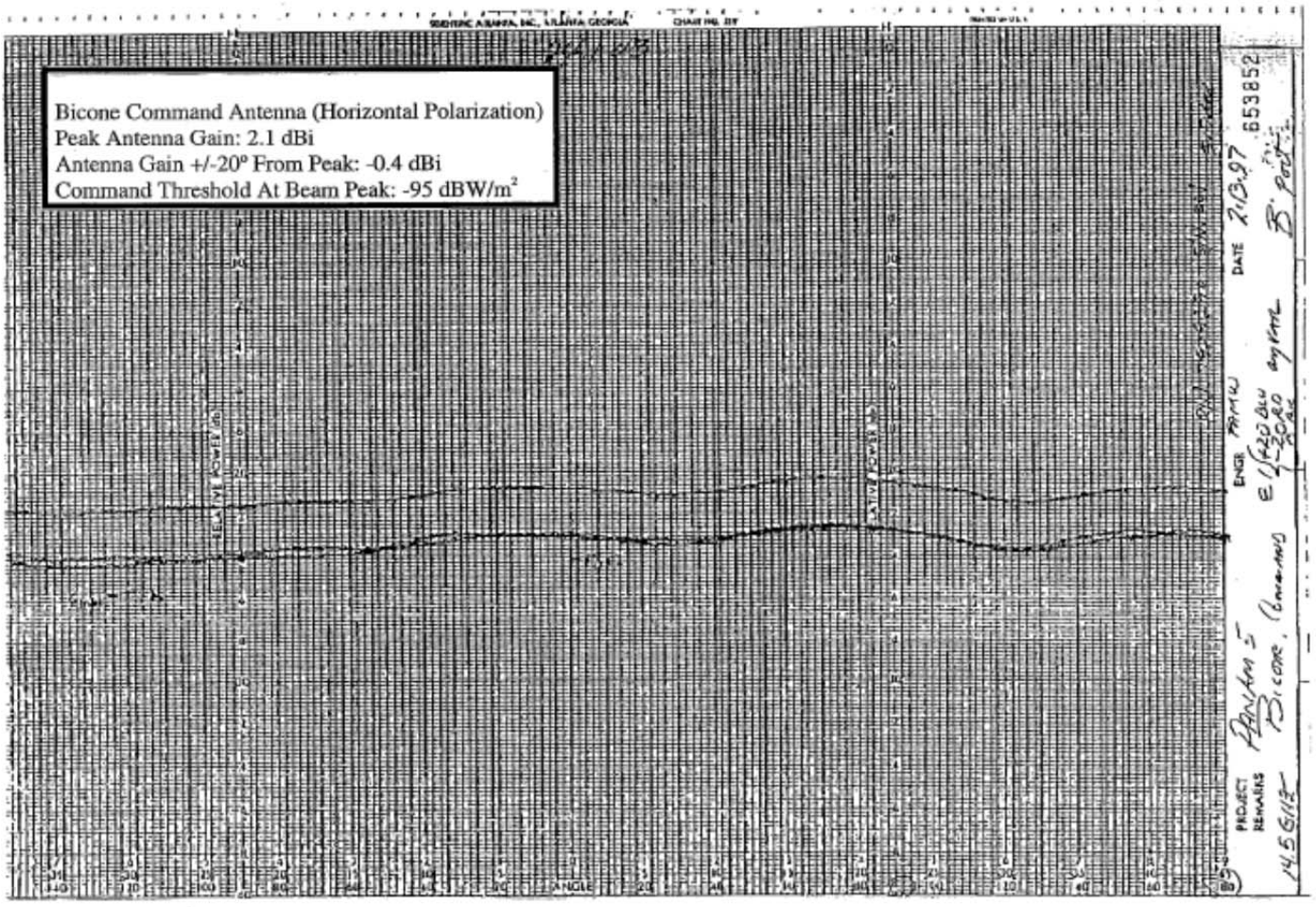

Exhibit 2J: Global Horn Antenna Telemetry Beam

Beam Polarization: Horizontal
Peak Antenna Gain: 20.4 dBi
Beam Peak EIRP: 9.2 dBW
[Schedule S Beam Designation: TLMG]

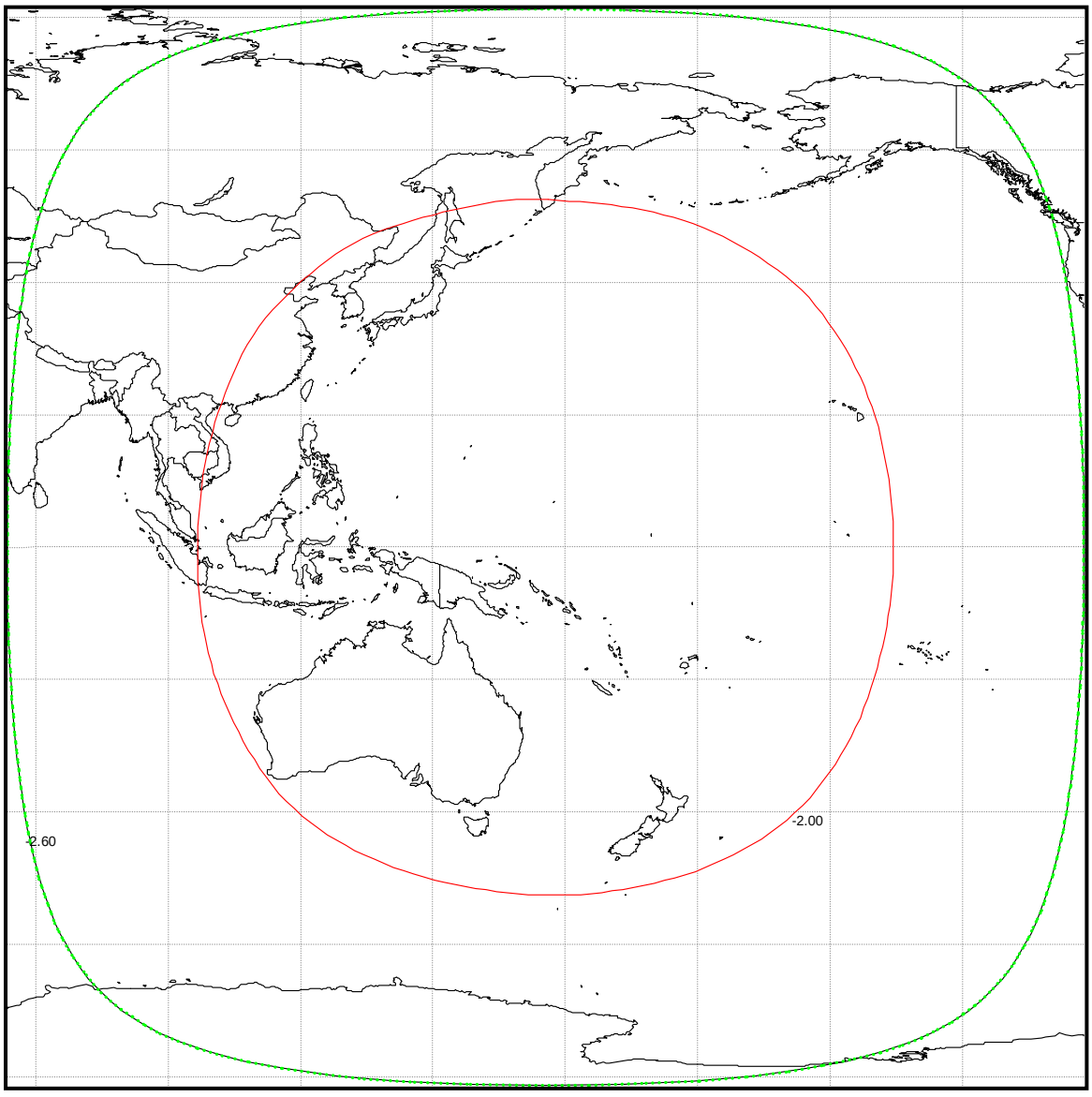

Exhibit 2K: Pipe Antenna Telemetry Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 5.8 dBi
Beam Peak EIRP: 10.2 dBW
[Schedule S Beam Designation: TLMP]

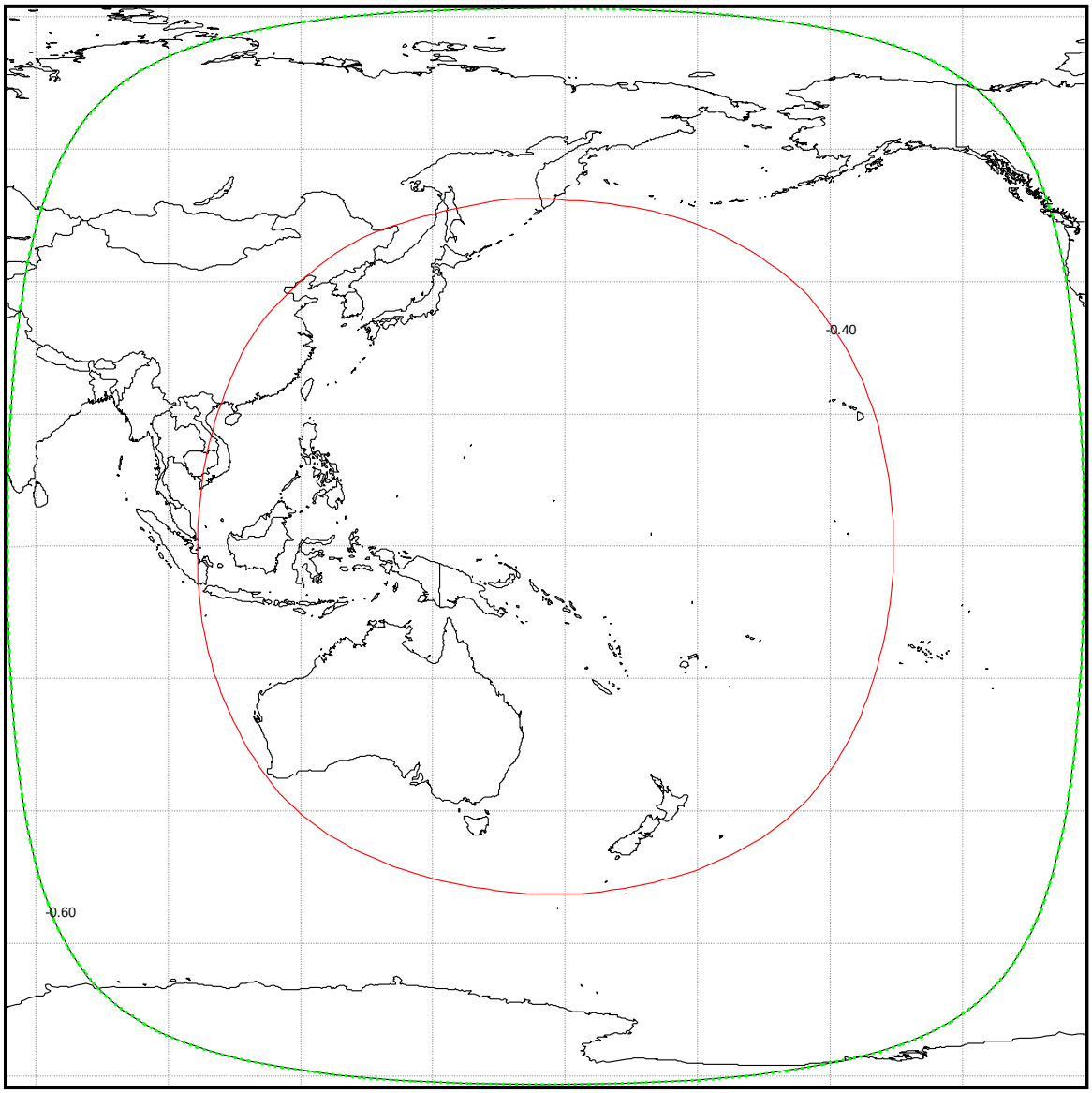

Exhibit 2L: Bicone Antenna Telemetry Beam

Beam Polarization: Vertical
Peak Antenna Gain: 1.6 dBi
Beam Peak EIRP: 9.0 dBW
[Schedule S Beam Designation: TLMB]

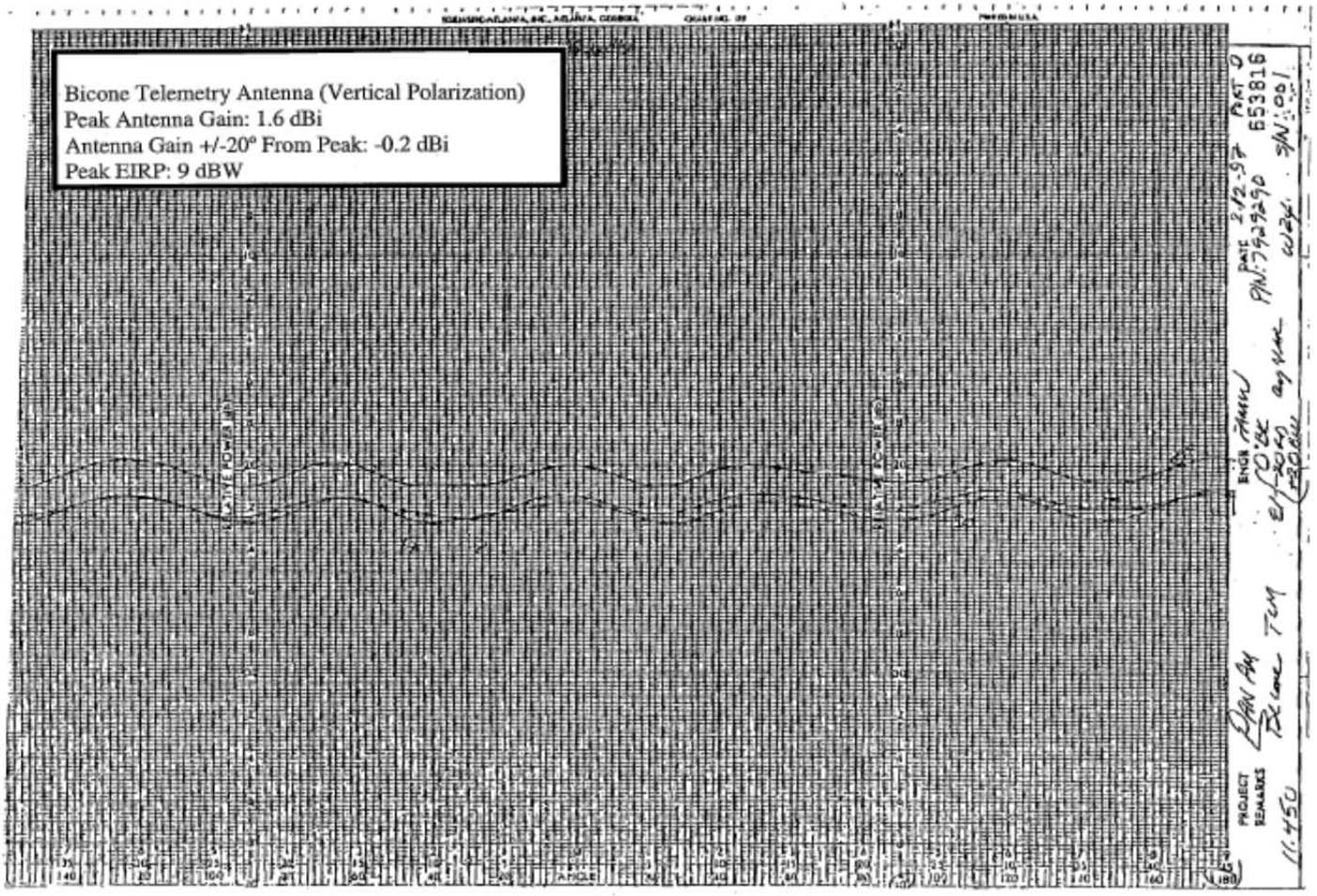

Exhibit 2M: Uplink Power Control Beam

Beam Polarization: Right Hand Circular
Peak Antenna Gain: 18.6 dBi
Beam Peak EIRP: 11.4 dBW
[Schedule S Beam Designation: UPCR]

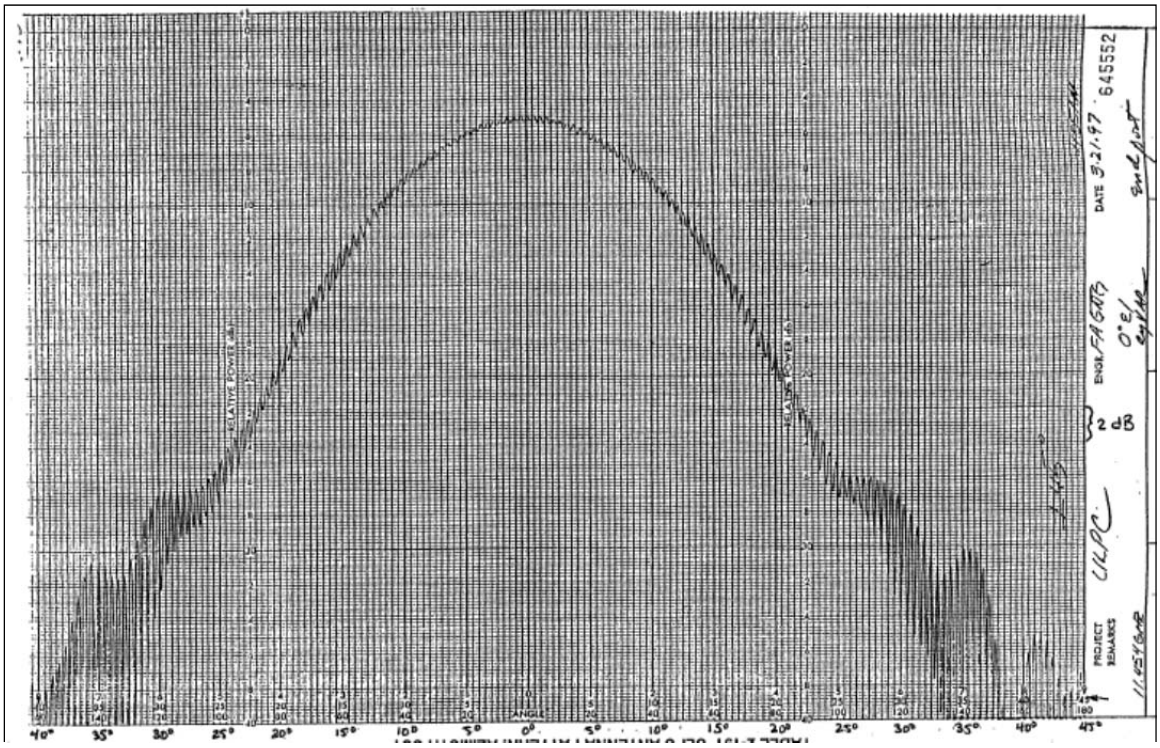

Exhibit 2N: Uplink Power Control Beam

Beam Polarization: Left Hand Circular
Peak Antenna Gain: 18.6 dBi
Beam Peak EIRP: 11.4 dBW
[Schedule S Beam Designation: UPCL]

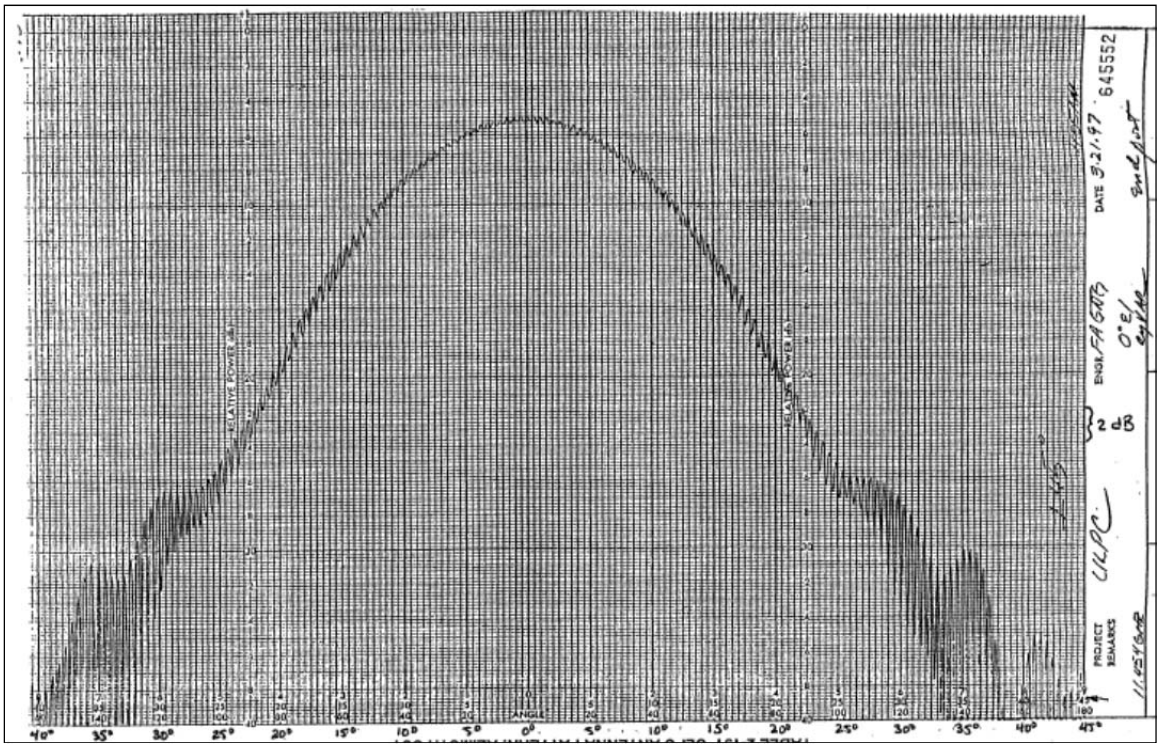

EXHIBIT 3: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
36860 kbps Carrier	36M0G7W	36000
9681kbps Carrier	9M00G7W	9000
1024 kbps Carrier	1M43G7W	1434
256 kbps Carrier	222KG7W	222

Exhibit 4: INTELSAT 5 LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C-Band	C-Band	C-Band	C-Band
Uplink Frequency (GHz)	5.925-6.025	5.925-6.025	5.925-6.025	5.925-6.025
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Peak G/T (dB/K)	0.6	0.6	0.6	0.6
Uplink Beam Peak SFD (dBW/m2)	-87.6	-88.6	-88.6	-88.6
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C-Band	C-Band	C-Band	C-Band
Downlink Frequency (GHz)	3.7-4.2	3.7-4.2	3.7-4.2	3.7-4.2
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Beam Peak EIRP (dBW)	41.0	41.0	41.0	41.0
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1				
Satellite Name	ABS-6	ABS-6	ABS-6	ABS-6
Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-42.0	-42.0	-42.0	-42.0
ADJACENT SATELLITE 2				
Satellite Name	HYP 155E	HYP 155E	HYP 155E	HYP 155E
Orbital Location	155.0 E	155.0 E	155.0 E	155.0 E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	3.7	2.4	2.4
Earth Station Gain (dBi)	54.5	45.1	41.4	41.4
Earth Station Elevation Angle	10.4	10.4	10.4	10.4
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	3.7	5.0	3.7	5.0
Earth Station Gain (dBi)	41.9	44.6	41.9	4.6
Earth Station G/T (dB/K)	22.1	22.7	22.1	22.7
Earth Station Elevation Angle	10.1	10.1	10.1	10.1
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	78.8	68.8	61.0	53.0
Uplink Path Loss, Clear Sky (dB)	-200.7	-200.7	-200.7	-200.7
Satellite G/T(dB/K)	-5.4	-5.4	-5.4	-5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	27.0	23.1	23.4	22.8
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	26.1	18.1	10.0
Downlink Path Loss, Clear Sky (dB)	-196.8	-196.8	-196.8	-196.8
Downlink Earth Station G/T (dB/K)	22.1	22.7	22.1	22.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	14.6	12.4	11.9	11.8
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	41.9	38.0	38.3	37.7
C/N Thermal Uplink (dB)	27.0	23.1	23.4	22.8
Uplink Interference C/I (dB)	28.2	23.9	24.2	27.4
Uplink Adjacent Satellite C/I (dB)	19.8	15.9	16.2	15.6
Intermodulation C/IM (dB)	200.0	20.4	21.2	21.5
Downlink Thermal C/N (dB)	14.6	12.4	11.9	11.8
Downlink Interference C/I (dB)	26.8	22.1	21.6	23.0
Downlink Adjacent Satellite C/I (dB)	11.1	11.9	8.4	11.4
Subtotal C/N (dB)	8.9	7.6	5.9	7.3
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	7.4	6.1	4.4	5.8
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50.0	-44.5	-40.5	-41.1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.3	-36.1	-36.0	-36.7

UPLINK BEAM INFORMATION				
Uplink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Uplink Frequency (GHz)	14-14.25	14-14.25	14-14.25	14-14.25
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Peak G/T (dB/K)	2.9	2.9	2.9	2.9
Uplink Beam Peak SFD (dBW/m2)	-91.9	-86.9	-86.9	-86.9
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Downlink Frequency (GHz)	11.45-11.7	11.45-11.7	11.45-11.7	11.45-11.7
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical
Downlink Beam Peak EIRP (dBW)	48.6	48.6	48.6	48.6
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1				
Satellite Name	HYP 159E	HYP 159E	HYP 159E	HYP 159E
Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite Name	HYP 155E	HYP 155E	HYP 155E	HYP 155E
Orbital Location	155.0 E	155.0 E	155.0 E	155.0 E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	48.7	48.7	48.7	48.7
Earth Station Elevation Angle	42.7	42.7	42.7	42.7
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	1.8	2.4	1.8	2.4
Earth Station Gain (dBi)	44.5	47.0	44.5	47.0
Earth Station G/T (dB/K)	23.3	25.0	23.3	25.0
Earth Station Elevation Angle	22.4	22.4	22.4	22.4
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	72.0	66.6	58.3	50.8
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	-3.2	-3.2	-3.2	-3.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	16.0	16.7	16.5	16.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	41.5	32.0	23.5	15.9
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Earth Station G/T (dB/K)	23.3	25.0	23.3	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	13.2	11.5	9.4	10.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	35.1	35.8	35.7	35.5
C/N Thermal Uplink (dB)	16.0	16.7	16.5	16.4
Uplink Interference C/I (dB)	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	19.3	20.0	19.8	19.7
Intermodulation C/IM (dB)	200.0	18.7	20.1	20.0
Downlink Thermal C/N (dB)	13.2	11.5	9.4	11.3
Downlink Interference C/I (dB)	200.0	25.6	25.9	25.4
Downlink Adjacent Satellite C/I (dB)	14.0	13.1	10.2	12.6
Subtotal C/N (dB)	9.1	7.7	5.9	7.6
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	7.6	6.2	4.4	6.1
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51.0	-50.3	-50.5	-50.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.8	-30.2	-30.6	-30.8

Exhibit 5: ABS-6 LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C-Band	C-Band	C-Band	C-Band
Uplink Frequency (GHz)	5.725-6.725	5.725-6.725	5.725-6.725	5.725-6.725
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Peak G/T (dB/K)	-2.0	-2.0	-2.0	-2.0
Uplink Beam Peak SFD (dBW/m2)	-83.0	-83.0	-83.0	-83.0
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C-Band	C-Band	C-Band	C-Band
Downlink Frequency (GHz)	3.4-4.2	3.4-4.2	3.4-4.2	3.4-4.2
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Beam Peak EIRP (dBW)	38.0	38.0	38.0	38.0
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1	The			
Satellite Name	HYP 161E	HYP 161E	HYP 161E	HYP 161E
Orbital Location	161.0	161.0	161.0	161.0
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-42.0	-42.0	-42.0	-42.0
ADJACENT SATELLITE 2				
Satellite Name	IS 5	IS 5	IS 5	IS 5
Orbital Location	157.0	157.0	157	157
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	10.0	5.0	3.7	3.7
Earth Station Gain (dBi)	53.7	47.7	45.1	45.1
Earth Station Elevation Angle	32.1	32.1	32.1	32.1
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	7.5	5.5	5.5	7.5
Earth Station Gain (dBi)	48.1	45.4	45.4	48.1
Earth Station G/T (dB/K)	29.0	27.0	27.0	29.0
Earth Station Elevation Angle	32.1	32.1	32.1	32.1
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	77.2	71.5	62.3	54.8
Uplink Path Loss, Clear Sky (dB)	-200.7	-200.7	-200.7	-200.7
Satellite G/T(dB/K)	-8.0	-8.0	-8.0	-8.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	22.8	23.2	22.1	22.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	26.0	20.2	11.0	3.5
Downlink Path Loss, Clear Sky (dB)	-196.8	-196.8	-196.8	-196.8
Downlink Earth Station G/T (dB/K)	29.0	27.0	27.0	29.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	12.5	10.8	9.7	11.6
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	40.4	40.7	39.6	39.6
C/N Thermal Uplink (dB)	22.8	23.2	22.1	22.0
Uplink Interference C/I (dB)	33.5	26.2	24.9	25.2
Uplink Adjacent Satellite C/I (dB)	17.3	17.7	16.5	16.5
Intermodulation C/IM (dB)	200.0	30.1	29.0	30.3
Downlink Thermal C/N (dB)	12.5	10.8	9.7	11.6
Downlink Interference C/I (dB)	23.6	16.4	15.2	16.2
Downlink Adjacent Satellite C/I (dB)	13.3	10.5	9.4	12.3
Subtotal C/N (dB)	8.8	6.6	5.4	7.3
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	7.3	5.1	3.9	5.8
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50.8	-44.4	-42.9	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-42.3	-42.0	-43.1	-43.2

Exhibit 6: HYPOTHETICAL SATELLITE AT 159.0° E.L. LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Uplink Frequency (GHz)	14-14.25	14-14.25	14-14.25	14-14.25
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Peak G/T (dB/K)	2.9	2.9	2.9	2.9
Uplink Beam Peak SFD (dBW/m2)	-91.9	-86.9	-86.9	-86.9
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Downlink Frequency (GHz)	11.45-11.7	11.45-11.7	11.45-11.7	11.45-11.7
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical
Downlink Beam Peak EIRP (dBW)	48.6	48.6	48.6	48.6
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1				
Satellite Name	HYP 161E	HYP 161E	HYP 161E	HYP 161E
Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite Name	Intelsat 5	Intelsat 5	Intelsat 5	Intelsat 5
Orbital Location	157.0 E	157.0 E	157.0 E	157.0 E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	48.7	48.7	48.7	48.7
Earth Station Elevation Angle	42.7	42.7	42.7	42.7
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	1.8	2.4	1.8	2.4
Earth Station Gain (dBi)	44.5	47.0	44.5	47.0
Earth Station G/T (dB/K)	23.3	25.0	23.3	25.0
Earth Station Elevation Angle	22.4	22.4	22.4	22.4
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	72.0	66.6	58.3	50.8
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	-3.2	-3.2	-3.2	-3.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	16.0	16.7	16.5	16.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	41.5	32.0	23.5	15.9
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Earth Station G/T (dB/K)	23.3	25.0	23.3	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	13.2	11.5	9.4	10.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	35.1	35.8	35.7	35.5
C/N Thermal Uplink (dB)	16.0	16.7	16.5	16.4
Uplink Interference C/I (dB)	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	19.3	20.0	19.8	19.7
Intermodulation C/IM (dB)	200.0	18.7	20.1	20.0
Downlink Thermal C/N (dB)	13.2	11.5	9.4	11.3
Downlink Interference C/I (dB)	200.0	25.6	25.9	25.4
Downlink Adjacent Satellite C/I (dB)	14.0	13.1	10.2	12.6
Subtotal C/N (dB)	9.1	7.7	5.9	7.6
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	7.6	6.2	4.4	6.1
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51.0	-50.3	-50.5	-50.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.8	-30.2	-30.6	-30.8

Exhibit 7: HYPOTHETICAL SATELLITE AT 155.0° E.L. LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	C-Band	C-Band	C-Band	C-Band
Uplink Frequency (GHz)	5.925-6.025	5.925-6.027	5.925-6.027	5.925-6.028
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Peak G/T (dB/K)	0.6	0.6	0.6	0.6
Uplink Beam Peak SFD (dBW/m2)	-93.7	-87.6	-87.6	-87.6
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	C-Band	C-Band	C-Band	C-Band
Downlink Frequency (GHz)	3.7-4.2	3.7-4.2	3.7-4.2	3.7-4.2
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Beam Peak EIRP (dBW)	41.0	41.0	41.0	41.0
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1				
Satellite Name	IS-5	IS-5	IS-5	IS-5
Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
ADJACENT SATELLITE 2				
Satellite Name	HYP 153E	HYP 153E	HYP 153E	HYP 153E
Orbital Location	153.0 E	153.0 E	153.0 E	153.0 E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Beam Peak Downlink EIRP Density (dBW/Hz)	-32.0	-32.0	-32.0	-32.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	7.5	5.0	2.4	2.4
Earth Station Gain (dBi)	51.2	47.7	41.4	41.4
Earth Station Elevation Angle	10.4	10.4	10.4	10.4
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	5.0	5.0	3.7	5.5
Earth Station Gain (dBi)	44.6	4.6	41.9	45.4
Earth Station G/T (dB/K)	22.7	22.7	22.1	27.0
Earth Station Elevation Angle	10.1	10.1	10.1	10.1
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	73.7	69.8	62.0	54.0
Uplink Path Loss, Clear Sky (dB)	-200.7	-200.7	-200.7	-200.7
Satellite G/T(dB/K)	-5.4	-5.4	-5.4	-5.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	21.9	24.1	24.4	23.8
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	26.1	18.1	10.0
Downlink Path Loss, Clear Sky (dB)	-196.8	-196.8	-196.8	-196.8
Downlink Earth Station G/T (dB/K)	22.7	22.7	22.1	27.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	15.2	12.4	11.9	16.1
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	36.9	39.0	39.3	38.7
C/N Thermal Uplink (dB)	21.9	24.1	24.4	23.8
Uplink Interference C/I (dB)	23.2	28.4	28.5	28.2
Uplink Adjacent Satellite C/I (dB)	14.8	16.9	17.2	16.6
Intermodulation C/IM (dB)	200.0	20.4	21.2	21.5
Downlink Thermal C/N (dB)	15.2	12.4	11.9	16.1
Downlink Interference C/I (dB)	26.8	24.6	23.6	23.2
Downlink Adjacent Satellite C/I (dB)	13.0	10.1	7.0	10.5
Subtotal C/N (dB)	9.0	7.1	5.2	8.2
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	7.5	5.6	3.7	6.7
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-51.8	-46.1	-39.5	-40.1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.3	-36.1	-36.0	-36.7

UPLINK BEAM INFORMATION				
Uplink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Uplink Frequency (GHz)	14-14.25	14-14.25	14-14.25	14-14.25
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Peak G/T (dB/K)	2.9	2.9	2.9	2.9
Uplink Beam Peak SFD (dBW/m2)	-91.9	-83.9	-83.9	-83.9
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Ku-Band	Ku-Band	Ku-Band	Ku-Band
Downlink Frequency (GHz)	11.45-11.7	11.45-11.7	11.45-11.7	11.45-11.7
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical
Downlink Beam Peak EIRP (dBW)	48.6	48.6	48.6	48.6
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
ADJACENT SATELLITE 1				
Satellite Name	IS-5	IS-5	IS-5	IS-5
Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite Name	HYP 153E	HYP 153E	HYP 153E	HYP 153E
Orbital Location	153.0 E	153.0 E	153.0 E	153.0 E
Uplink Power Density (dBW/Hz)	-50.0	-50.0	-50.0	-50.0
Beam Peak Downlink EIRP Density (dBW/Hz)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0G7W	9M00G7W	1M43G7W	222KG7W
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Information Rate(kbps)	36860	9681	1024	256
Code Rate	3/4x188/203	3/4	1/2	3/4
Occupied Bandwidth(kHz)	26664.7	6666.7	1024	184.7
Allocated Bandwidth(kHz)	36000	9000	1434	222
Minimum C/N, Rain (dB)	7.3	5.0	3.7	5.6
UPLINK EARTH STATION				
Earth Station Diameter (meters)	4.0	4.0	4.0	4.0
Earth Station Gain (dBi)	53.1	53.1	53.1	53.1
Earth Station Elevation Angle	42.7	42.7	42.7	42.7
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	1.8	1.8	1.8	2.4
Earth Station Gain (dBi)	44.5	44.5	44.5	47.0
Earth Station G/T (dB/K)	23.3	23.3	23.3	25.0
Earth Station Elevation Angle	22.4	22.4	22.4	22.4
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	73.0	69.7	61.9	53.8
Uplink Path Loss, Clear Sky (dB)	-207.1	-207.1	-207.1	-207.1
Satellite G/T(dB/K)	-3.1	-3.1	-3.1	-3.1
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Uplink Thermal C/N(dB)	17.1	19.9	20.2	19.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	42.0	32.0	24.0	15.9
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Earth Station G/T (dB/K)	23.3	23.3	23.3	25.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (MHz)	26.7	6.7	1.0	0.2
Downlink Thermal C / N(dB)	13.7	9.8	9.9	10.9
COMPOSITE LINK PERFORMANCE				
Uplink Earth Station HPA Intermodulation C/N (dB)	36.2	38.9	39.2	38.6
C/N Thermal Uplink (dB)	17.1	19.9	20.2	19.5
Uplink Interference C/I (dB)	200.0	200.0	200.0	200.0
Uplink Adjacent Satellite C/I (dB)	25.3	28.0	28.4	27.7
Intermodulation C/IM (dB)	200.0	18.4	20.5	19.7
Downlink Thermal C/N (dB)	13.7	9.8	9.9	10.9
Downlink Interference C/I (dB)	200.0	25.6	25.9	25.4
Downlink Adjacent Satellite C/I (dB)	14.5	10.5	10.7	12.6
Subtotal C/N (dB)	10.0	6.5	6.8	7.9
Antenna Mispointing and Other Losses (dB)	1.5	1.5	1.5	1.5
Total C/N (dB)	8.5	5.0	5.3	6.4
Minimum Required C/N (dB)	7.3	5.0	3.7	5.6
Number of Carriers	1	4	25	162
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-54.4	-51.6	-51.3	-52.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.3	-30.2	-30.1	-30.8

Exhibit 8: POWER FLUX DENSITY CALCULATION

3700 – 4200 MHz							
C-Band (H-Pol.): 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	41.6	41.6	41.6	41.6	41.6	41.6	41.6
Carrier Occupied Bandwidth (kHz)	36860	36860	36860	36860	36860	36860	36860
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)	-161.4	-161.3	-161.2	-161.1	-161.0	-160.9	-160.1
ITU Limit (dBW/m^2/4Hz)	-152.0	-152.0	-142.0	-145.0	-142.5	-140.0	-140.0
Margin (dB)	9.4	9.3	19.2	16.1	18.5	20.9	20.1
C-Band (V-Pol.): 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Carrier Occupied Bandwidth (kHz)	36860	36860	36860	36860	36860	36860	36860
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)	-162.0	-161.9	-161.8	-161.7	-161.6	-161.5	-160.7
ITU Limit (dBW/m^2/4Hz)	-152.0	-152.0	-142.0	-145.0	-142.5	-140.0	-140.0
Margin (dB)	10.0	9.9	19.8	16.7	19.1	21.5	20.7

11450 – 11700 MHz							
Steerable Spot (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)	36860	36860	36860	36860	36860	36860	36860
Spreading Loss (dB/m^2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-154.4	-154.3	-154.2	-154.1	-154.0	-153.9	-153.1
ITU Limit (dBW/m^2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	4.4	4.3	6.7	9.1	11.5	13.9	13.1
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	9.2	9.2	9.2	9.2	9.2	9.2	9.2
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-172.1	-172.0	-171.9	-171.8	-171.7	-171.6	-170.8
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	22.1	22.0	24.4	26.8	29.2	31.6	30.8

11450 – 11700 MHz							
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-171.1	-171.0	-170.9	-170.8	-170.7	-170.6	-169.8
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	21.1	21.0	23.4	25.8	28.2	30.6	29.8
TELEMETRY							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Spreading Loss (dB/m^2)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-172.3	-172.2	-172.1	-172.0	-171.9	-171.8	-171.0
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	22.3	22.2	24.6	27.0	29.4	31.8	31.0
ULPC							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Spreading Loss (dB/m^2)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Noise Bandwidth (kHz)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m^2/4kHz)	-159.9	-159.8	-159.7	-159.6	-159.5	-159.4	-158.6
FCC Limit (dBW/m^2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	9.9	9.8	12.2	14.6	17.0	19.4	18.6