

Engineering Statement

Intelsat North America LLC (“Intelsat”) proposes to relocate its Intelsat 801 (“IS 801”) spacecraft to operate from 29.5° W.L. The spacecraft will utilize the frequency bands 5850 – 6425 MHz, 14000 – 14500 MHz, 3625 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz, 11700 – 11950 MHz and 12500 – 12750 MHz to provide service to the visible portion of North America, South America, Europe, Africa and the visible portion of Asia. At the 29.5° W.L. orbital location, Intelsat 801 will operate with an orbital inclination of approximately 1.4°.

Intelsat also requests that the Part 25 waivers originally granted to the Intelsat 801 spacecraft continue to apply at the 29.5° W.L. location, namely, the waivers of Sections 25.202(g), 25.210(a)(1), 25.210(a)(3), 25.210(i)(1) and 25.211(a) of the Commission’s rules.¹

On August 2000, the Commission granted Intelsat authorization to operate Intelsat 801 from 31.5° W.L. (see FCC File Nos.: SAT-AMD-20000119-00037). Currently, Intelsat has pending before the Commission an application for Special Temporary Authority (“STA”) to operate Intelsat 801 from 29.5° W.L. Herein, Intelsat proposes to modify the existing license of Intelsat 801 to permit operation from 29.5° W.L.

This engineering statement updates the following technical information for Intelsat 801: (1) frequency plan (2) beam performance and gain contours, (3) emission designators, (4) power flux density calculations, (5) link budget analysis, (6) adjacent satellite link analysis, (7) Schedule S information and (8) orbital debris mitigation plan. In all other respects, the characteristics of Intelsat 801 are the same as those described in SAT-AMD-20000119-00037.

Frequency Plan

The Intelsat 801 frequency and polarization plan is provided in Exhibit 1.²

¹ See Applications of Intelsat LLC for Authority to Operate and Further Construct, Launch, and Operate C-Band and Ku-Band Satellites that Form a Global Communications System in Geostationary Orbit, 15 FCC Rcd 15460, 15529 (Appendix C)(2000)(Memorandum Opinion and Order and Authorization), *recon. denied*, 15 FCC Rcd 25234(2000)(Order on Reconsideration).

² As indicated in Intelsat’s application to operate Intelsat 705 from 29.5° W.L., Intelsat will submit the necessary ITU filings for the use of the 11700 – 11950 MHz (see FCC File Number: SAT-MOD-20100115-00010). Given that Intelsat 801 also utilizes the 11700 – 11950 MHz band, these ITU filings will be applicable to both Intelsat 705 and Intelsat 801.

Gain Contours

The co-polarized coverage patterns of Intelsat 801 operating from 29.5° W.L. are shown in Exhibits 2-1 through 2-30. The peak antenna gain, G/T, SFD (“Saturated Flux Density”) and EIRP levels for each uplink and downlink beam, as appropriate, are also provided in these exhibits.

Given that the cross-polarization isolation performance of Intelsat 801 with respect to the axis of each satellite beam will not change as a result of the proposed relocation of Intelsat 801 from 31.5° W.L. to 29.5° W.L., no cross-polarization patterns are provided herein.

Emission Designators

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

Power Flux Density Levels

The power flux density (“PFD”) limits for space stations operating in the 3700 – 4200 MHz, 10950 – 11200 MHz and 11450 – 11700 MHz bands are contained in section 25.208 of the Commission’s rules. With respect to the 12500 – 12750 MHz band, the PFD limits are specified in No. 21.16 of the ITU Radio Regulations. Neither the FCC rules nor the ITU Radio Regulations specify any PFD limits for the 11700 – 11950 MHz frequency band.

The maximum PFD levels for the Intelsat 801 transmissions were calculated for a number of TV/FM and/or digital carriers listed in Exhibit 3 operating in the 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz and 12500 – 12750 MHz bands. The PFD levels were also calculated for the Intelsat 801 telemetry and uplink power control (“ULPC”) carriers. These carriers were chosen because they generally produce high PFD levels on the Earth’s surface. The results are provided in Exhibit 4 and show that the downlink power flux density levels of the Intelsat 801 carriers do not exceed limits specified in section 25.208 of the Commission’s rules and No. 21.16 of the ITU Radio Regulations.

Link Budgets and Interference Analysis

Link analysis for Intelsat 801 was conducted for a number of representative carriers. For the analyses, it was assumed that the nearest satellites to Intelsat 801 were a hypothetical satellite operating from 27.5° W.L. and a hypothetical satellite operating from 31.5° W.L. The hypothetical satellites were assumed to have the same operational parameters as Intelsat 801.

At C-band, the uplink power density of the emissions to each of the hypothetical satellites was assumed to be -38.7 dBW/Hz, the maximum level specified in section 25.212(d) of the Commission's rules for digital C-band carriers. At Ku-band, the uplink power density of the emissions to each of the hypothetical satellites was assumed to be -50 dBW/Hz, and the downlink EIRP density was assumed to be -26 dBW/Hz, the maximum levels specified in sections 25.212(c) of the Commission's rules for digital Ku-band carriers.

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 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 was not considered, given that rain (attenuation) effects are insignificant at C-band.
- d) At Ku-band frequencies, rain attenuation predictions are derived using Recommendation ITU-R 618.
- e) At Ku-band frequencies, increase in noise temperature of the receiving earth station due to rain is taken into account.
- f) For the cases where the transponder operates in a multi-carrier mode, the effects due to intermodulation interference are taken into account.

The impact of the TV/FM carriers from the adjacent satellites at 27.5° W.L. and 31.5° W.L on the transmissions of Intelsat 801 was not considered due to the fact that TV/FM carriers are known to be high-density carriers with most of the energy contained within the near vicinity of the carrier center frequency. Operation of sensitive narrow-band carriers is typically precluded within these high power density areas of the TV/FM carrier. Accordingly, placement and operation of TV/FM carriers are normally achieved through internal coordination and/or coordination discussions with the adjacent satellite operator, whichever may be the case, rather than through C/I calculations – since the results of such calculations would show that narrow-band carriers typically could not operate on a co-frequency basis with TV/FM carriers.

As shown in Exhibit 1, the Intelsat 801 beam connectivity is extensive. In order to keep the number the Intelsat 801 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 801 uplink and downlink beam combinations. The worst-case beam performance for each Intelsat 801 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)
Global A	Global	-8.0	-94.3 to -72.3	32.5
Global B				
East Hemi	Hemi	-0.5	-98.4 to -76.4	39.5
West Hemi				
Northwest Zone	Zone	5.0	-100.5 to -78.5	41.0
Northeast Zone				
Southwest Zone				
Southeast Zone				
Combined Northwest and Southeast Zone				
Combined Northeast and Southwest Zone				
Spot 1	Spot	10.0	-98.4 to -76.4	51.0
Spot 2				

As shown in Exhibit 1, Intelsat 801 employs, with each beam, channels having varying bandwidths. In an effort to keep the number of link calculations to a manageable level, link calculations were not performed for each channel size, but rather for only one channel size. The channel size chosen for each beam was based upon the level of adjacent satellite downlink interference. As an example, if a channel having a bandwidth of 77 MHz and a channel having a bandwidth of 34 MHz have the same associated adjacent satellite downlink interfering EIRP density, then link budgets were performed only for emissions that were transmitted through the 77 MHz channel, since the carrier level would typically have less (uplink and downlink) power in comparison to those which would be transmitted

through the 34 MHz channel; and thus the impact of the adjacent satellite interference would be greater on the former. As a second example, if the level of downlink interfering EIRP density to which the 34 MHz channel was subjected was larger than that for the 77 MHz channel (as may happen for the C-band link budgets), and if this additional level of interference was larger than ten times the logarithmic ratio of the two channel bandwidths (i.e., $10\log[77/34]$), then link calculations were performed only for the emissions of the 34 MHz channel, since the impact of adjacent satellite interference is greater on emissions of this channel (in comparison to those being transmitted through the 77 MHz channel).

As previously mentioned, at Ku-band, Intelsat 801 can utilize the downlink frequency bands of 10950 – 11200 MHz, 11450 – 11700 MHz, 11700 – 11950 MHz and 12500 – 12750 MHz. In order to keep the number the Intelsat 801 link calculations to a manageable number, all Ku-band link calculations were conducted at the single representative uplink frequency of 14250 MHz and downlink frequency of 11950 MHz (that is approximately midway between 10950 MHz and 12750 MHz). At C-band, all calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for the downlink.

The results of the C-band and Ku-band analyses are shown in Exhibit 5 and demonstrate that operation of the Intelsat 801 satellite from 29.5° W.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 sections 25.212(c) and 25.212(d) of the Commission's rules.

Adjacent Satellite Link Analysis

The impact of the Intelsat 801 emissions on the transmissions of adjacent satellites was not analyzed because the power levels of Intelsat 801 transmissions will be limited to those levels contained in sections 25.212(c) and (d) of the FCC's rules. In those cases where Intelsat may need to transmit carriers with higher power levels, it will coordinate with the affected adjacent satellite operators as part of the normal coordination process.

Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 801 from 29.5° W.L. The Schedule S contains only those Intelsat 801 data items

whose inclusion was required in order for the software application to function properly.

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 of row of data) contained in that section. This link budget file is applicable to all of 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).

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.

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.

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 turning off all active units.

Safe Flight Profiles: Intelsat has assessed and limited the probability of the space station becoming a source of debris as a result of collision with large debris or other operational space stations. Intelsat 801 will be located at the same orbital location proposed for the operation of Intelsat 705 (see SAT-MOD-20100115-

00010). Intelsat will internally coordinate the orbital operations of Intelsat 705 and Intelsat 801 in order to minimize the risk of collision between these two spacecraft.

With the exception of the Intelsat 705 satellite, 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 801. Intelsat is also not aware of any non-Intelsat system with an overlapping station-keeping volume with Intelsat 801 that is the subject of an ITU filing and that is either in orbit or progressing towards launch.

Post Mission Disposal: At the end of the mission, Intelsat expects to dispose of the spacecraft by moving it to a planned minimum altitude of 150 kilometers (perigee) above the geostationary arc.³ Nevertheless, as the Commission is aware, because there is no mechanism for precisely calculating the amount of 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.

In its Second Report and Order in IB Docket 02-54 (FCC Document Number: 04-130), the FCC declared that satellites launched prior to March 18, 2002, such as Intelsat 801, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the Intelsat 801 planned disposal orbit complies with the FCC's rules.

In addition, Intelsat provides the following information:

- 1) Planned orbital eccentricity: 0.00021066 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission.⁴)

³ Intelsat has reserved 14.0 kilograms of fuel for this purpose. The fuel gauging uncertainty has been taken into account in these calculations.

⁴ Because it is extremely difficult to anticipate end-of-life thruster performance and operational conditions, it is extremely difficult to achieve the planned eccentricity. Intelsat's priority is to achieve the planned minimum perigee of 150 kilometers. In order to achieve the planned eccentricity, not only must there be sufficient propellant reserved but, in addition, individual thrusters must be fired at specific times during satellite decommissioning because the timing of thruster firing will affect eccentricity. Due to difficulties in predicting the thruster end-of-life performance, as well as earth station availability and visibility as the satellite drifts, it may not be possible to fire the right thrusters at the optimal times. Thus, optimal eccentricity may not be achieved, which, in turn, will affect the apogee altitude.

- 2) Planned apogee altitude: 167.8 km⁵
- 3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty: For the Intelsat 801 spacecraft, in addition to the nominal hold-back and reserves provided to us by the manufacturer, Intelsat propulsion engineers review the current propellant usage – particularly the mixing ratio – to properly allocate sufficient margin to account for unavailable propellant that may result from a non-optimal mixing ratio. In addition, Intelsat performs thermal gauging near the spacecraft's end of life by inferring the remaining propellant from the thermal signature when Intelsat applies heat to different parts of the propellant tank system. This information is considered when determining the additional hold-back and adjustments to book values to attempt to ensure sufficient propellant to achieve the planned minimum altitude. There are, however, many uncertainties to both methods that could lead to incorrect conclusions regarding remaining fuel.

⁵ See n.3.

Certification Statement

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

/s/ Jose Albuquerque

Jose Albuquerque
Intelsat
Senior Director
Spectrum Engineering

February 5, 2010

Date

Exhibit 1: Frequency and Beam 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)	Channel Gain (dB)
AUA	Global A	LHCP	6280	ADA	Global A	RHCP	4055	36	123.6
AUB	Global A	LHCP	6320	ADB	Global A	RHCP	4095	36	123.6
AUC	Global A	LHCP	6360	ADC	Global A	RHCP	4135	36	123.6
AUD	Global A	LHCP	6402.5	ADD	Global A	RHCP	4177.5	41	123.6
AUA	Global A	LHCP	6280	EDA	West Hemi	RHCP	4055	36	124.5
BUA	Global B	RHCP	6280	BDA	Global B	LHCP	4055	36	124.2
BUB	Global B	RHCP	6320	BDB	Global B	LHCP	4095	36	124.2
BUC	Global B	RHCP	6360	BDC	Global B	LHCP	4135	36	124.2
BUD	Global B	RHCP	6402.5	BDD	Global B	LHCP	4177.5	41	124.2
BUA	Global B	RHCP	6280	FDA	East Hemi	RHCP	4055	36	125.3
EU0	West Hemi	LHCP	5890	ED0	West Hemi	RHCP	3665	72	121.8
EU1	West Hemi	LHCP	5970	ED1	West Hemi	RHCP	3745	72	121.8
EU2	West Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	121.8
EU3	West Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	121.8
EU4	West Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	121.8
EU6	West Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	121.8
EUA	West Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	121.8
EU0	West Hemi	LHCP	5890	FD0	East Hemi	RHCP	3665	72	122.0
EU1	West Hemi	LHCP	5970	FD1	East Hemi	RHCP	3745	72	122.0
EU2	West Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	122.0
EU3	West Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	122.0
EU4	West Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	122.0
EU6	West Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	122.0
EUA	West Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	122.0
EU1	West Hemi	LHCP	5970	GD1	NW Zone	LHCP	3745	72	117.3
EU2	West Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	117.3
EU3	West Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	117.3
EU4	West Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	117.3
EU6	West Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	117.3
EUA	West Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	117.3
EU1	West Hemi	LHCP	5970	JD1	SE Zone	LHCP	3745	72	119.6
EU2	West Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	119.6
EU3	West Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	119.6
EU4	West Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	119.6
EU6	West Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	119.6
EUA	West Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	119.6
EU1	West Hemi	LHCP	5970	HD1	NE Zone	LHCP	3745	72	119.0
EU2	West Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	119.0
EU3	West Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	119.0
EU4	West Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	119.0
EU6	West Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	119.0
EUA	West Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	119.0
EU1	West Hemi	LHCP	5970	ID1	SW Zone	LHCP	3745	72	119.8
EU2	West Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	119.8
EU3	West Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	119.8
EU4	West Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	119.8
EU6	West Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	119.8
EUA	West Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	119.8

EUA	West Hemi	LHCP	6280	ADA	Global A	RHCP	4055	36	120.9
FU0	East Hemi	LHCP	5890	ED0	West Hemi	RHCP	3665	72	122.6
FU1	East Hemi	LHCP	5970	ED1	West Hemi	RHCP	3745	72	122.6
FU2	East Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	122.6
FU3	East Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	122.6
FU4	East Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	122.6
FU6	East Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	122.6
FUA	East Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	122.6
FU0	East Hemi	LHCP	5890	FD0	East Hemi	RHCP	3665	72	122.8
FU1	East Hemi	LHCP	5970	FD1	East Hemi	RHCP	3745	72	122.8
FU2	East Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	122.8
FU3	East Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	122.8
FU4	East Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	122.8
FU6	East Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	122.8
FUA	East Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	122.8
FU1	East Hemi	LHCP	5970	GD1	NW Zone	LHCP	3745	72	118.1
FU2	East Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	118.1
FU3	East Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	118.1
FU4	East Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	118.1
FU6	East Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	118.1
FUA	East Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	118.1
FU1	East Hemi	LHCP	5970	JD1	SE Zone	LHCP	3745	72	120.4
FU2	East Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	120.4
FU3	East Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	120.4
FU4	East Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	120.4
FU6	East Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	120.4
FUA	East Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	120.4
FU1	East Hemi	LHCP	5970	HD1	NE Zone	LHCP	3745	72	119.8
FU2	East Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	119.8
FU3	East Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	119.8
FU4	East Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	119.8
FU6	East Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	119.8
FUA	East Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	119.8
FU1	East Hemi	LHCP	5970	ID1	SW Zone	LHCP	3745	72	120.6
FU2	East Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	120.6
FU3	East Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	120.6
FU4	East Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	120.6
FU6	East Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	120.6
FUA	East Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	120.6
FUA	East Hemi	LHCP	6280	BDA	Global B	LHCP	4055	36	121.7
GU1	NW Zone	RHCP	5970	ED1	West Hemi	RHCP	3745	72	115.1
GU2	NW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	115.1
GU3	NW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	115.1
GU4	NW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	115.1
GU6	NW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	115.1
GUA	NW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	115.1
GU1	NW Zone	RHCP	5970	FD1	East Hemi	RHCP	3745	72	115.3
GU2	NW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	115.3
GU3	NW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	115.3
GU4	NW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	115.3
GU6	NW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	115.3
GUA	NW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	115.3
GUE	NW Zone	RHCP	5967.5	GDE	NW Zone	LHCP	3742.5	77	110.6
GU2	NW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	110.6
GU3	NW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	110.6

GU4	NW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	110.6
GU6	NW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	110.6
GUA	NW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	110.6
GUE	NW Zone	RHCP	5967.5	JDE	SE Zone	LHCP	3742.5	77	112.9
GU2	NW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	112.9
GU3	NW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	112.9
GU4	NW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	112.9
GU6	NW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	112.9
GUA	NW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	112.9
GUE	NW Zone	RHCP	5967.5	HDE	NE Zone	LHCP	3742.5	77	112.3
GU2	NW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	112.3
GU3	NW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	112.3
GU4	NW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	112.3
GU6	NW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	112.3
GUA	NW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	112.3
GUE	NW Zone	RHCP	5967.5	IDE	SW Zone	LHCP	3742.5	77	113.1
GU2	NW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	113.1
GU3	NW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	113.1
GU4	NW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	113.1
GU6	NW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	113.1
GUA	NW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	113.1
JU1	SE Zone	RHCP	5970	ED1	West Hemi	RHCP	3745	72	120.1
JU2	SE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	120.1
JU3	SE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	120.1
JU4	SE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	120.1
JU6	SE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	120.1
JUA	SE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	120.1
JU1	SE Zone	RHCP	5970	FD1	East Hemi	RHCP	3745	72	120.3
JU2	SE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	120.3
JU3	SE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	120.3
JU4	SE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	120.3
JU6	SE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	120.3
JUA	SE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	120.3
JUE	SE Zone	RHCP	5967.5	GDE	NW Zone	LHCP	3742.5	77	115.6
JU2	SE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	115.6
JU3	SE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	115.6
JU4	SE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	115.6
JU6	SE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	115.6
JUA	SE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	115.6
JUE	SE Zone	RHCP	5967.5	JDE	SE Zone	LHCP	3742.5	77	117.9
JU2	SE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	117.9
JU3	SE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	117.9
JU4	SE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	117.9
JU6	SE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	117.9
JUA	SE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	117.9
JUE	SE Zone	RHCP	5967.5	HDE	NE Zone	LHCP	3742.5	77	117.3
JU2	SE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	117.3
JU3	SE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	117.3
JU4	SE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	117.3
JU6	SE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	117.3
JUA	SE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	117.3
JUE	SE Zone	RHCP	5967.5	IDE	SW Zone	LHCP	3742.5	77	118.1
JU2	SE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	118.1
JU3	SE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	118.1
JU4	SE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	118.1
JU6	SE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	118.1

JUA	SE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	118.1
HU1	NE Zone	RHCP	5970	ED1	West Hemi	RHCP	3745	72	111.1
HU2	NE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	111.1
HU3	NE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	111.1
HU4	NE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	111.1
HU6	NE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	111.1
HUA	NE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	111.1
HU1	NE Zone	RHCP	5970	FD1	East Hemi	RHCP	3745	72	111.3
HU2	NE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	111.3
HU3	NE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	111.3
HU4	NE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	111.3
HU6	NE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	111.3
HUA	NE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	111.3
HUE	NE Zone	RHCP	5967.5	GDE	NW Zone	LHCP	3742.5	77	106.6
HU2	NE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	106.6
HU3	NE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	106.6
HU4	NE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	106.6
HU6	NE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	106.6
HUA	NE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	106.6
HUE	NE Zone	RHCP	5967.5	JDE	SE Zone	LHCP	3742.5	77	108.7
HU2	NE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	108.7
HU3	NE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	108.7
HU4	NE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	108.7
HU6	NE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	108.7
HUA	NE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	108.7
HUE	NE Zone	RHCP	5967.5	HDE	NE Zone	LHCP	3742.5	77	108.3
HU2	NE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	108.3
HU3	NE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	108.3
HU4	NE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	108.3
HU6	NE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	108.3
HUA	NE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	108.3
HUE	NE Zone	RHCP	5967.5	IDE	SW Zone	LHCP	3742.5	77	109.1
HU2	NE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	109.1
HU3	NE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	109.1
HU4	NE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	109.1
HU5	NE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	109.1
HU6	NE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	109.1
HUA	NE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	109.1
IU1	SW Zone	RHCP	5970	ED1	West Hemi	RHCP	3745	72	119.5
IU2	SW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	119.5
IU3	SW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	119.5
IU4	SW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	119.5
IU6	SW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	119.5
IUA	SW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	119.5
IU1	SW Zone	RHCP	5970	FD1	East Hemi	RHCP	3745	72	119.7
IU2	SW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	119.7
IU3	SW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	119.7
IU4	SW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	119.7
IU6	SW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	119.7
IUA	SW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	119.7
IUE	SW Zone	RHCP	5967.5	GDE	NW Zone	LHCP	3742.5	77	115.0
IU2	SW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	115.0
IU3	SW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	115.0
IU4	SW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	115.0
IU6	SW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	115.0
IUA	SW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	115.0

IUE	SW Zone	RHCP	5967.5	JDE	SE Zone	LHCP	3742.5	77	117.3
IU2	SW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	117.3
IU3	SW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	117.3
IU4	SW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	117.3
IU6	SW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	117.3
IUA	SW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	117.3
IUE	SW Zone	RHCP	5967.5	HDE	NE Zone	LHCP	3742.5	77	116.7
IU2	SW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	116.7
IU3	SW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	116.7
IU4	SW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	116.7
IU6	SW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	116.7
IUA	SW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	116.7
IUE	SW Zone	RHCP	5967.5	IDE	SW Zone	LHCP	3742.5	77	117.5
IU2	SW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	117.5
IU3	SW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	117.5
IU4	SW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	117.5
IU6	SW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	117.5
IUA	SW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	117.5
SU1	Spot 1	H	14042.5	S1D1	Spot 1	V	10992.5	77	117.4
SU2	Spot 1	H	14125	S1D2	Spot 1	V	11075	72	117.4
SU3	Spot 1	H	14186	S1D3	Spot 1	V	11136	34	117.4
SU4	Spot 1	H	14224	S1D4	Spot 1	V	11174	34	117.4
SU6	Spot 1	H	14314	S1D6	Spot 1	V	11514	112	117.4
SU7	Spot 1	H	14438	S1D7	Spot 1	V	11638	112	117.4
SU1	Spot 1	H	14042.5	U1D1	Spot 2	H	10992.5	77	117.3
SU2	Spot 1	H	14125	U1D2	Spot 2	H	11075	72	117.3
SU3	Spot 1	H	14186	U1D3	Spot 2	H	11136	34	117.3
SU4	Spot 1	H	14224	U1D4	Spot 2	H	11174	34	117.3
SU6	Spot 1	H	14314	U1D6	Spot 2	H	11514	112	117.3
SU7	Spot 1	H	14438	U1D7	Spot 2	H	11638	112	117.3
UU1	Spot 2	V	14042.5	S1D1	Spot 1	V	10992.5	77	119.4
UU2	Spot 2	V	14125	S1D2	Spot 1	V	11075	72	119.4
UU3	Spot 2	V	14186	S1D3	Spot 1	V	11136	34	119.4
UU4	Spot 2	V	14224	S1D4	Spot 1	V	11174	34	119.4
UU6	Spot 2	V	14314	S1D6	Spot 1	V	11514	112	119.4
UU7	Spot 2	V	14438	S1D7	Spot 1	V	11638	112	119.4
UU1	Spot 2	V	14042.5	U1D1	Spot 2	H	10992.5	77	119.3
UU2	Spot 2	V	14125	U1D2	Spot 2	H	11075	72	119.3
UU3	Spot 2	V	14186	U1D3	Spot 2	H	11136	34	119.3
UU4	Spot 2	V	14224	U1D4	Spot 2	H	11174	34	119.3
UU6	Spot 2	V	14314	U1D6	Spot 2	H	11514	112	119.3
UU7	Spot 2	V	14438	U1D7	Spot 2	H	11638	112	119.3
SU1	Spot 1	H	14042.5	S2D1	Spot 1	V	12547.5	77	117.4
SU2	Spot 1	H	14125	S2D2	Spot 1	V	12630	72	117.4
SU3	Spot 1	H	14186	S2D3	Spot 1	V	12691	34	117.4
SU4	Spot 1	H	14224	S2D4	Spot 1	V	12729	34	117.4
SU6	Spot 1	H	14314	S2D6	Spot 1	V	11514	112	117.4
SU7	Spot 1	H	14438	S2D7	Spot 1	V	11638	112	117.4
SU1	Spot 1	H	14042.5	U2D1	Spot 2	H	12547.5	77	117.3
SU2	Spot 1	H	14125	U2D2	Spot 2	H	12630	72	117.3
SU3	Spot 1	H	14186	U2D3	Spot 2	H	12691	34	117.3
SU4	Spot 1	H	14224	U2D4	Spot 2	H	12729	34	117.3
SU6	Spot 1	H	14314	U2D6	Spot 2	H	11514	112	117.3
SU7	Spot 1	H	14438	U2D7	Spot 2	H	11638	112	117.3
UU1	Spot 2	V	14042.5	S2D1	Spot 1	V	12547.5	77	119.4

UU2	Spot 2	V	14125	S2D2	Spot 1	V	12630	72	119.4
UU3	Spot 2	V	14186	S2D3	Spot 1	V	12691	34	119.4
UU4	Spot 2	V	14224	S2D4	Spot 1	V	12729	34	119.4
UU6	Spot 2	V	14314	S2D6	Spot 1	V	11514	112	119.4
UU7	Spot 2	V	14438	S2D7	Spot 1	V	11638	112	119.4
UU1	Spot 2	V	14042.5	U2D1	Spot 2	H	12547.5	77	119.3
UU2	Spot 2	V	14125	U2D2	Spot 2	H	12630	72	119.3
UU3	Spot 2	V	14186	U2D3	Spot 2	H	12691	34	119.3
UU4	Spot 2	V	14224	U2D4	Spot 2	H	12729	34	119.3
UU6	Spot 2	V	14314	U2D6	Spot 2	H	11514	112	119.3
UU7	Spot 2	V	14438	U2D7	Spot 2	H	11638	112	119.3
SU1	Spot 1	H	14042.5	S3D1	Spot 1	V	11747.5	77	117.4
SU2	Spot 1	H	14125	S3D2	Spot 1	V	11830	72	117.4
SU3	Spot 1	H	14186	S3D3	Spot 1	V	11891	34	117.4
SU4	Spot 1	H	14224	S3D4	Spot 1	V	11929	34	117.4
SU6	Spot 1	H	14314	S3D6	Spot 1	V	11514	112	117.4
SU7	Spot 1	H	14438	S3D7	Spot 1	V	11638	112	117.4
SU1	Spot 1	H	14042.5	U3D1	Spot 2	H	11747.5	77	117.3
SU2	Spot 1	H	14125	U3D2	Spot 2	H	11830	72	117.3
SU3	Spot 1	H	14186	U3D3	Spot 2	H	11891	34	117.3
SU4	Spot 1	H	14224	U3D4	Spot 2	H	11929	34	117.3
SU6	Spot 1	H	14314	U3D6	Spot 2	H	11514	112	117.3
SU7	Spot 1	H	14438	U3D7	Spot 2	H	11638	112	117.3
UU1	Spot 2	V	14042.5	S3D1	Spot 1	V	11747.5	77	119.4
UU2	Spot 2	V	14125	S3D2	Spot 1	V	11830	72	119.4
UU3	Spot 2	V	14186	S3D3	Spot 1	V	11891	34	119.4
UU4	Spot 2	V	14224	S3D4	Spot 1	V	11929	34	119.4
UU6	Spot 2	V	14314	S3D6	Spot 1	V	11514	112	119.4
UU7	Spot 2	V	14438	S3D7	Spot 1	V	11638	112	119.4
UU1	Spot 2	V	14042.5	U3D1	Spot 2	H	11747.5	77	119.3
UU2	Spot 2	V	14125	U3D2	Spot 2	H	11830	72	119.3
UU3	Spot 2	V	14186	U3D3	Spot 2	H	11891	34	119.3
UU4	Spot 2	V	14224	U3D4	Spot 2	H	11929	34	119.3
UU6	Spot 2	V	14314	U3D6	Spot 2	H	11514	112	119.3
UU7	Spot 2	V	14438	U3D7	Spot 2	H	11638	112	119.3
SUF	Spot 1	H	14045	ED1	West Hemi	RHCP	3745	72	116.7
SU2	Spot 1	H	14125	ED2	West Hemi	RHCP	3825	72	116.7
SU3	Spot 1	H	14186	ED3	West Hemi	RHCP	3886	34	116.7
SU4	Spot 1	H	14224	ED4	West Hemi	RHCP	3924	34	116.7
SUG	Spot 1	H	14295	ED6	West Hemi	RHCP	3995	72	116.7
SUF	Spot 1	H	14045	FD1	East Hemi	RHCP	3745	72	116.9
SU2	Spot 1	H	14125	FD2	East Hemi	RHCP	3825	72	116.9
SU3	Spot 1	H	14186	FD3	East Hemi	RHCP	3886	34	116.9
SU4	Spot 1	H	14224	FD4	East Hemi	RHCP	3924	34	116.9
SUG	Spot 1	H	14295	FD6	East Hemi	RHCP	3995	72	116.9
SU1	Spot 1	H	14042.5	GDE	NW Zone	LHCP	3742.5	77	112.2
SU2	Spot 1	H	14125	GD2	NW Zone	LHCP	3825	72	112.2
SU3	Spot 1	H	14186	GD3	NW Zone	LHCP	3886	34	112.2
SU4	Spot 1	H	14224	GD4	NW Zone	LHCP	3924	34	112.2
SUG	Spot 1	H	14295	GD6	NW Zone	LHCP	3995	72	112.2
SU1	Spot 1	H	14042.5	JDE	SE Zone	LHCP	3742.5	77	114.5
SU2	Spot 1	H	14125	JD2	SE Zone	LHCP	3825	72	114.5
SU3	Spot 1	H	14186	JD3	SE Zone	LHCP	3886	34	114.5
SU4	Spot 1	H	14224	JD4	SE Zone	LHCP	3924	34	114.5
SUG	Spot 1	H	14295	JD6	SE Zone	LHCP	3995	72	114.5

SU1	Spot 1	H	14042.5	HDE	NE Zone	LHCP	3742.5	77	113.9
SU2	Spot 1	H	14125	HD2	NE Zone	LHCP	3825	72	113.9
SU3	Spot 1	H	14186	HD3	NE Zone	LHCP	3886	34	113.9
SU4	Spot 1	H	14224	HD4	NE Zone	LHCP	3924	34	113.9
SUG	Spot 1	H	14295	HD6	NE Zone	LHCP	3995	72	113.9
SU1	Spot 1	H	14042.5	IDE	SW Zone	LHCP	3742.5	77	114.7
SU2	Spot 1	H	14125	ID2	SW Zone	LHCP	3825	72	114.7
SU3	Spot 1	H	14186	ID3	SW Zone	LHCP	3886	34	114.7
SU4	Spot 1	H	14224	ID4	SW Zone	LHCP	3924	34	114.7
SUG	Spot 1	H	14295	ID6	SW Zone	LHCP	3995	72	114.7
SUH	Spot 1	H	14477.5	ADD	Global A	RHCP	4177.5	41	115.8
SUH	Spot 1	H	14477.5	BDD	Global B	LHCP	4177.5	41	115.8
TUF	Spot 2	V	14045	ED1	West Hemi	RHCP	3745	72	118.7
TU2	Spot 2	V	14125	ED2	West Hemi	RHCP	3825	72	118.7
TU3	Spot 2	V	14186	ED3	West Hemi	RHCP	3886	34	118.7
TU4	Spot 2	V	14224	ED4	West Hemi	RHCP	3924	34	118.7
TUG	Spot 2	V	14295	ED6	West Hemi	RHCP	3995	72	118.7
TUF	Spot 2	V	14045	FD1	East Hemi	RHCP	3745	72	118.9
TU2	Spot 2	V	14125	FD2	East Hemi	RHCP	3825	72	118.9
TU3	Spot 2	V	14186	FD3	East Hemi	RHCP	3886	34	118.9
TU4	Spot 2	V	14224	FD4	East Hemi	RHCP	3924	34	118.9
TUG	Spot 2	V	14295	FD6	East Hemi	RHCP	3995	72	118.9
TU1	Spot 2	V	14042.5	GDE	NW Zone	LHCP	3742.5	77	114.2
TU2	Spot 2	V	14125	GD2	NW Zone	LHCP	3825	72	114.2
TU3	Spot 2	V	14186	GD3	NW Zone	LHCP	3886	34	114.2
TU4	Spot 2	V	14224	GD4	NW Zone	LHCP	3924	34	114.2
TUG	Spot 2	V	14295	GD6	NW Zone	LHCP	3995	72	114.2
TU1	Spot 2	V	14042.5	JDE	SE Zone	LHCP	3742.5	77	116.5
TU2	Spot 2	V	14125	JD2	SE Zone	LHCP	3825	72	116.5
TU3	Spot 2	V	14186	JD3	SE Zone	LHCP	3886	34	116.5
TU4	Spot 2	V	14224	JD4	SE Zone	LHCP	3924	34	116.5
TUG	Spot 2	V	14295	JD6	SE Zone	LHCP	3995	72	116.5
TU1	Spot 2	V	14042.5	HDE	NE Zone	LHCP	3742.5	77	115.9
TU2	Spot 2	V	14125	HD2	NE Zone	LHCP	3825	72	115.9
TU3	Spot 2	V	14186	HD3	NE Zone	LHCP	3886	34	115.9
TU4	Spot 2	V	14224	HD4	NE Zone	LHCP	3924	34	115.9
TUG	Spot 2	V	14295	HD6	NE Zone	LHCP	3995	72	115.9
TU1	Spot 2	V	14042.5	IDE	SW Zone	LHCP	3742.5	77	116.7
TU2	Spot 2	V	14125	ID2	SW Zone	LHCP	3825	72	116.7
TU3	Spot 2	V	14186	ID3	SW Zone	LHCP	3886	34	116.7
TU4	Spot 2	V	14224	ID4	SW Zone	LHCP	3924	34	116.7
TUG	Spot 2	V	14295	ID6	SW Zone	LHCP	3995	72	116.7
TUH	Spot 2	V	14477.5	ADD	Global A	RHCP	4177.5	41	117.8
TUH	Spot 2	V	14477.5	BDD	Global B	LHCP	4177.5	41	117.8
AUD	Global A	LHCP	6402.5	S1DD	Spot 1	V	11677.5	41	125.2
AUD	Global A	LHCP	6402.5	U1DD	Spot 2	H	11677.5	41	125.1
BUD	Global B	RHCP	6402.5	S1DD	Spot 1	V	11677.5	41	125.8
BUD	Global B	RHCP	6402.5	U1DD	Spot 2	H	11677.5	41	125.7
EU1	West Hemi	LHCP	5970	S1DC	Spot 1	V	10995	72	122.5

EU2	West Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	122.5
EU3	West Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	122.5
EU4	West Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	122.5
EU6	West Hemi	LHCP	6220	S1DE	Spot 1	V	11495	72	122.5
EU1	West Hemi	LHCP	5970	U1DC	Spot 2	H	10995	72	122.4
EU2	West Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	122.4
EU3	West Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	122.4
EU4	West Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	122.4
EU6	West Hemi	LHCP	6220	U1DE	Spot 2	H	11495	72	122.4
FU1	East Hemi	LHCP	5970	S1DC	Spot 1	V	10995	72	123.3
FU2	East Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	123.3
FU3	East Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	123.3
FU4	East Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	123.3
FU6	East Hemi	LHCP	6220	S1DE	Spot 1	V	11495	72	123.3
FU1	East Hemi	LHCP	5970	U1DC	Spot 2	H	10995	72	123.2
FU2	East Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	123.2
FU3	East Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	123.2
FU4	East Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	123.2
FU6	East Hemi	LHCP	6220	U1DE	Spot 2	H	11495	72	123.2
GUE	NW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	115.8
GU2	NW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	115.8
GU3	NW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	115.8
GU4	NW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	115.8
GU6	NW Zone	RHCP	6220	S1DE	Spot 1	V	11495	72	115.8
GUE	NW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	115.7
GU2	NW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	115.7
GU3	NW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	115.7
GU4	NW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	115.7
GU6	NW Zone	RHCP	6220	U1DE	Spot 2	H	11495	72	115.7
JUE	SE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	120.8
JU2	SE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	120.8
JU3	SE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	120.8
JU4	SE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	120.8
JU6	SE Zone	RHCP	6220	S1DE	Spot 1	V	11495	72	120.8
JUE	SE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	120.7
JU2	SE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	120.7
JU3	SE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	120.7
JU4	SE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	120.7
JU6	SE Zone	RHCP	6220	U1DE	Spot 2	H	11495	72	120.7
HUE	NE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	111.8
HU2	NE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	111.8
HU3	NE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	111.8
HU4	NE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	111.8
HU6	NE Zone	RHCP	6220	S1DE	Spot 1	V	11495	72	111.8
HUE	NE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	111.7
HU2	NE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	111.7
HU3	NE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	111.7
HU4	NE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	111.7
HU6	NE Zone	RHCP	6220	U1DE	Spot 2	H	11495	72	111.7
IUE	SW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	120.2
IU2	SW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	120.2
IU3	SW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	120.2
IU4	SW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	120.2
IU6	SW Zone	RHCP	6220	S1DE	Spot 1	V	11495	72	120.2

IUE	SW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	120.1
IU2	SW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	120.1
IU3	SW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	120.1
IU4	SW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	120.1
IU6	SW Zone	RHCP	6220	U1DE	Spot 2	H	11495	72	120.1
AUD	Global A	LHCP	6402.5	S2DD	Spot 1	V	11677.5	41	125.2
AUD	Global A	LHCP	6402.5	U2DD	Spot 2	H	11677.5	41	125.1
BUD	Global B	RHCP	6402.5	S2DD	Spot 1	V	11677.5	41	125.8
BUD	Global B	RHCP	6402.5	U2DD	Spot 2	H	11677.5	41	125.7
EU1	West Hemi	LHCP	5970	S2DC	Spot 1	V	12550	72	122.5
EU2	West Hemi	LHCP	6050	S2D2	Spot 1	V	12630	72	122.5
EU3	West Hemi	LHCP	6111	S2D3	Spot 1	V	12691	34	122.5
EU4	West Hemi	LHCP	6149	S2D4	Spot 1	V	12729	34	122.5
EU6	West Hemi	LHCP	6220	S2DE	Spot 1	V	11495	72	122.5
EU1	West Hemi	LHCP	5970	U2DC	Spot 2	H	12550	72	122.4
EU2	West Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	122.4
EU3	West Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	122.4
EU4	West Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	122.4
EU6	West Hemi	LHCP	6220	U2DE	Spot 2	H	11495	72	122.4
FU1	East Hemi	LHCP	5970	S2DC	Spot 1	V	12550	72	123.3
FU2	East Hemi	LHCP	6050	S2D2	Spot 1	V	12630	72	123.3
FU3	East Hemi	LHCP	6111	S2D3	Spot 1	V	12691	34	123.3
FU4	East Hemi	LHCP	6149	S2D4	Spot 1	V	12729	34	123.3
FU6	East Hemi	LHCP	6220	S2DE	Spot 1	V	11495	72	123.3
FU1	East Hemi	LHCP	5970	U2DC	Spot 2	H	12550	72	123.2
FU2	East Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	123.2
FU3	East Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	123.2
FU4	East Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	123.2
FU6	East Hemi	LHCP	6220	U2DE	Spot 2	H	11495	72	123.2
GUE	NW Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	115.8
GU2	NW Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	115.8
GU3	NW Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	115.8
GU4	NW Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	115.8
GU6	NW Zone	RHCP	6220	S2DE	Spot 1	V	11495	72	115.8
GUE	NW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	115.7
GU2	NW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	115.7
GU3	NW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	115.7
GU4	NW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	115.7
GU6	NW Zone	RHCP	6220	U2DE	Spot 2	H	11495	72	115.7
JUE	SE Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	120.8
JU2	SE Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	120.8
JU3	SE Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	120.8
JU4	SE Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	120.8
JU6	SE Zone	RHCP	6220	S2DE	Spot 1	V	11495	72	120.8
JUE	SE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	120.7
JU2	SE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	120.7
JU3	SE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	120.7
JU4	SE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	120.7
JU6	SE Zone	RHCP	6220	U2DE	Spot 2	H	11495	72	120.7
HUE	NE Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	111.8
HU2	NE Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	111.8
HU3	NE Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	111.8

HU4	NE Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	111.8
HU6	NE Zone	RHCP	6220	S2DE	Spot 1	V	11495	72	111.8
HUE	NE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	111.7
HU2	NE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	111.7
HU3	NE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	111.7
HU4	NE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	111.7
HU6	NE Zone	RHCP	6220	U2DE	Spot 2	H	11495	72	111.7
IUE	SW Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	120.2
IU2	SW Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	120.2
IU3	SW Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	120.2
IU4	SW Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	120.2
IU6	SW Zone	RHCP	6220	S2DE	Spot 1	V	11495	72	120.2
IUE	SW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	120.1
IU2	SW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	120.1
IU3	SW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	120.1
IU4	SW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	120.1
IU6	SW Zone	RHCP	6220	U2DE	Spot 2	H	11495	72	120.1
AUD	Global A	LHCP	6402.5	S3DD	Spot 1	V	11677.5	41	125.2
AUD	Global A	LHCP	6402.5	U3DD	Spot 2	H	11677.5	41	125.1
BUD	Global B	RHCP	6402.5	S3DD	Spot 1	V	11677.5	41	125.8
BUD	Global B	RHCP	6402.5	U3DD	Spot 2	H	11677.5	41	125.7
EU1	West Hemi	LHCP	5970	S3DC	Spot 1	V	11750	72	122.5
EU2	West Hemi	LHCP	6050	S3D2	Spot 1	V	11830	72	122.5
EU3	West Hemi	LHCP	6111	S3D3	Spot 1	V	11891	34	122.5
EU4	West Hemi	LHCP	6149	S3D4	Spot 1	V	11929	34	122.5
EU6	West Hemi	LHCP	6220	S3DE	Spot 1	V	11495	72	122.5
EU1	West Hemi	LHCP	5970	U3DC	Spot 2	H	11750	72	122.4
EU2	West Hemi	LHCP	6050	U3D2	Spot 2	H	11830	72	122.4
EU3	West Hemi	LHCP	6111	U3D3	Spot 2	H	11891	34	122.4
EU4	West Hemi	LHCP	6149	U3D4	Spot 2	H	11929	34	122.4
EU6	West Hemi	LHCP	6220	U3DE	Spot 2	H	11495	72	122.4
FU1	East Hemi	LHCP	5970	S3DC	Spot 1	V	11750	72	123.3
FU2	East Hemi	LHCP	6050	S3D2	Spot 1	V	11830	72	123.3
FU3	East Hemi	LHCP	6111	S3D3	Spot 1	V	11891	34	123.3
FU4	East Hemi	LHCP	6149	S3D4	Spot 1	V	11929	34	123.3
FU6	East Hemi	LHCP	6220	S3DE	Spot 1	V	11495	72	123.3
FU1	East Hemi	LHCP	5970	U3DC	Spot 2	H	11750	72	123.2
FU2	East Hemi	LHCP	6050	U3D2	Spot 2	H	11830	72	123.2
FU3	East Hemi	LHCP	6111	U3D3	Spot 2	H	11891	34	123.2
FU4	East Hemi	LHCP	6149	U3D4	Spot 2	H	11929	34	123.2
FU6	East Hemi	LHCP	6220	U3DE	Spot 2	H	11495	72	123.2
GUE	NW Zone	RHCP	5967.5	S3D1	Spot 1	V	11747.5	77	115.8
GU2	NW Zone	RHCP	6050	S3D2	Spot 1	V	11830	72	115.8
GU3	NW Zone	RHCP	6111	S3D3	Spot 1	V	11891	34	115.8
GU4	NW Zone	RHCP	6149	S3D4	Spot 1	V	11929	34	115.8
GU6	NW Zone	RHCP	6220	S3DE	Spot 1	V	11495	72	115.8
GUE	NW Zone	RHCP	5967.5	U3D1	Spot 2	H	11747.5	77	115.7
GU2	NW Zone	RHCP	6050	U3D2	Spot 2	H	11830	72	115.7
GU3	NW Zone	RHCP	6111	U3D3	Spot 2	H	11891	34	115.7
GU4	NW Zone	RHCP	6149	U3D4	Spot 2	H	11929	34	115.7
GU6	NW Zone	RHCP	6220	U3DE	Spot 2	H	11495	72	115.7

JUE	SE Zone	RHCP	5967.5	S3D1	Spot 1	V	11747.5	77	120.8
JU2	SE Zone	RHCP	6050	S3D2	Spot 1	V	11830	72	120.8
JU3	SE Zone	RHCP	6111	S3D3	Spot 1	V	11891	34	120.8
JU4	SE Zone	RHCP	6149	S3D4	Spot 1	V	11929	34	120.8
JU6	SE Zone	RHCP	6220	S3DE	Spot 1	V	11495	72	120.8
JUE	SE Zone	RHCP	5967.5	U3D1	Spot 2	H	11747.5	77	120.7
JU2	SE Zone	RHCP	6050	U3D2	Spot 2	H	11830	72	120.7
JU3	SE Zone	RHCP	6111	U3D3	Spot 2	H	11891	34	120.7
JU4	SE Zone	RHCP	6149	U3D4	Spot 2	H	11929	34	120.7
J U 6	SE Zone	RHCP	6220	U3DE	Spot 2	H	11495	72	120.7
HUE	NE Zone	RHCP	5967.5	S3D1	Spot 1	V	11747.5	77	111.8
HU2	NE Zone	RHCP	6050	S3D2	Spot 1	V	11830	72	111.8
HU3	NE Zone	RHCP	6111	S3D3	Spot 1	V	11891	34	111.8
HU4	NE Zone	RHCP	6149	S3D4	Spot 1	V	11929	34	111.8
HU6	NE Zone	RHCP	6220	S3DE	Spot 1	V	11495	72	111.8
HUE	NE Zone	RHCP	5967.5	U3D1	Spot 2	H	11747.5	77	111.7
HU2	NE Zone	RHCP	6050	U3D2	Spot 2	H	11830	72	111.7
HU3	NE Zone	RHCP	6111	U3D3	Spot 2	H	11891	34	111.7
HU4	NE Zone	RHCP	6149	U3D4	Spot 2	H	11929	34	111.7
HU6	NE Zone	RHCP	6220	U3DE	Spot 2	H	11495	72	111.7
IUE	SW Zone	RHCP	5967.5	S3D1	Spot 1	V	11747.5	77	120.2
IU2	SW Zone	RHCP	6050	S3D2	Spot 1	V	11830	72	120.2
IU3	SW Zone	RHCP	6111	S3D3	Spot 1	V	11891	34	120.2
IU4	SW Zone	RHCP	6149	S3D4	Spot 1	V	11929	34	120.2
IU6	SW Zone	RHCP	6220	S3DE	Spot 1	V	11495	72	120.2
IUE	SW Zone	RHCP	5967.5	U3D1	Spot 2	H	11747.5	77	120.1
IU2	SW Zone	RHCP	6050	U3D2	Spot 2	H	11830	72	120.1
IU3	SW Zone	RHCP	6111	U3D3	Spot 2	H	11891	34	120.1
IU4	SW Zone	RHCP	6149	U3D4	Spot 2	H	11929	34	120.1
IU6	SW Zone	RHCP	6220	U3DE	Spot 2	H	11495	72	120.1
CMD 1	Global (horn)	LHCP	6173.7					1	
CMD 2	Global (omni)	RHCP	6176.3					1	
CMD 3	Global (omni)	RHCP	6173.7					1	
CMD 4	Global (omni)	LHCP	6176.3					1	
CMD 5	Global (omni)	LHCP	6173.7					1	
				TLM 1	Global	RHCP	3947.5	0.5	
				TLM 2	Global	RHCP	3948	0.5	
				TLM 3	Global	RHCP	3952	0.5	
				TLM 4	Global	RHCP	3952.5	0.5	
				UPC 1	Global	V	3950	0.025	
				UPK 1	Global	RHCP	11198	0.025	
				UPK 2	Global	RHCP	11452	0.025	
				UPK 3	Spot 1	V	11701	0.025	
				UPK 4	Spot 2	V	11701	0.025	
				UPK 5	Spot 1	H	12501	0.025	
				UPK 6	Spot 2	H	12501	0.025	

Note:

H: Linear horizontal polarization

V: Linear vertical polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 2-1: C-Band Global A Uplink Beam
[Schedule S Beam Designation: GAUL]

Beam Peak Gain: 20 dBi
Beam Polarization: Left Hand Circular
Beam Peak G/T: -8 dB/K
Saturated Flux Density @ Beam Peak G/T: -93.7 to -71.7 dBW/m²

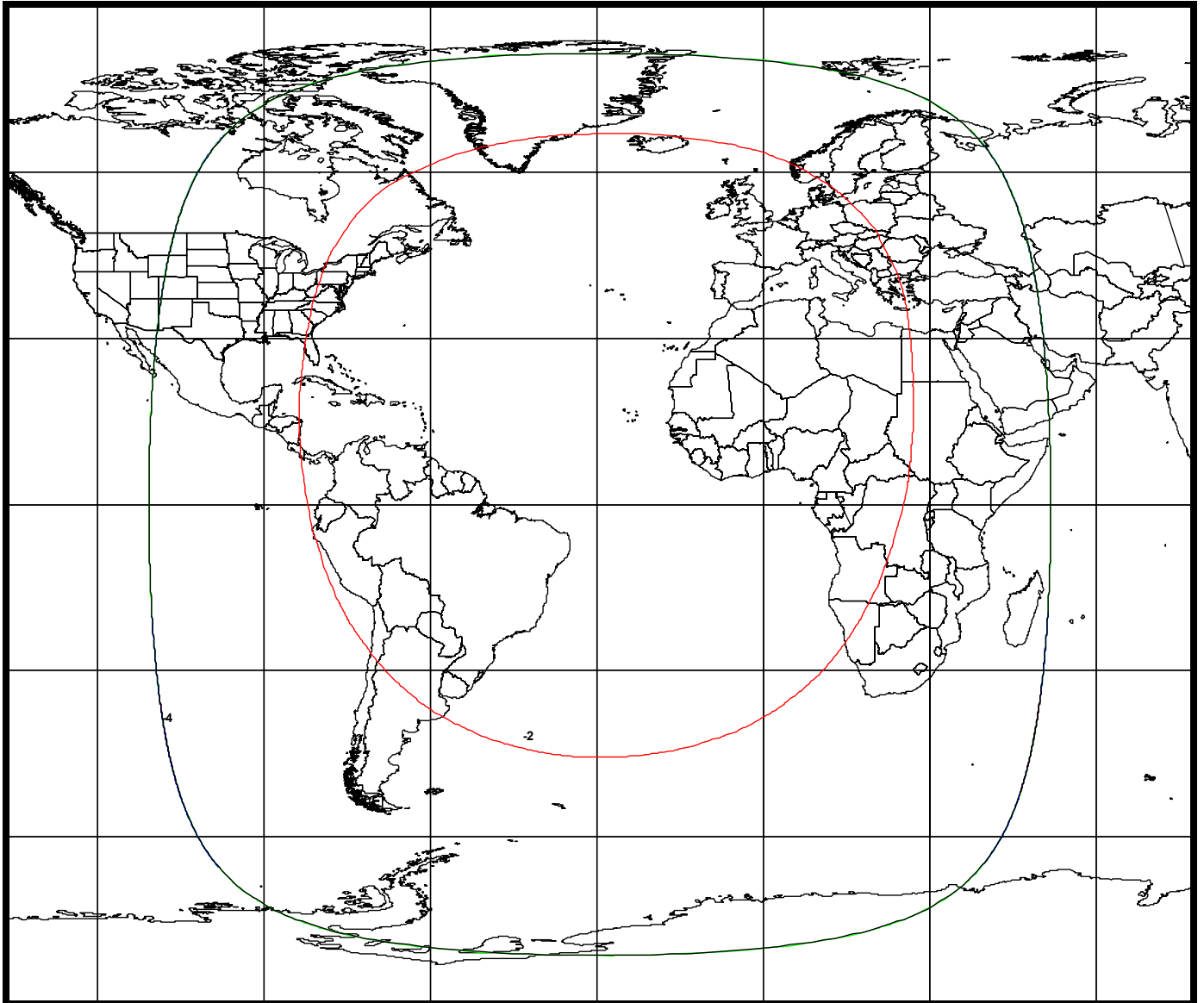


Exhibit 2-2: C-Band Global B Uplink Beam
[Schedule S Beam Designation: GBUL]

Beam Peak Gain: 20 dBi
Beam Polarization: Right Hand Circular
Beam Peak G/T: -8 dB/K
Saturated Flux Density @ Beam Peak G/T: -94.3 to -72.3 dBW/m²

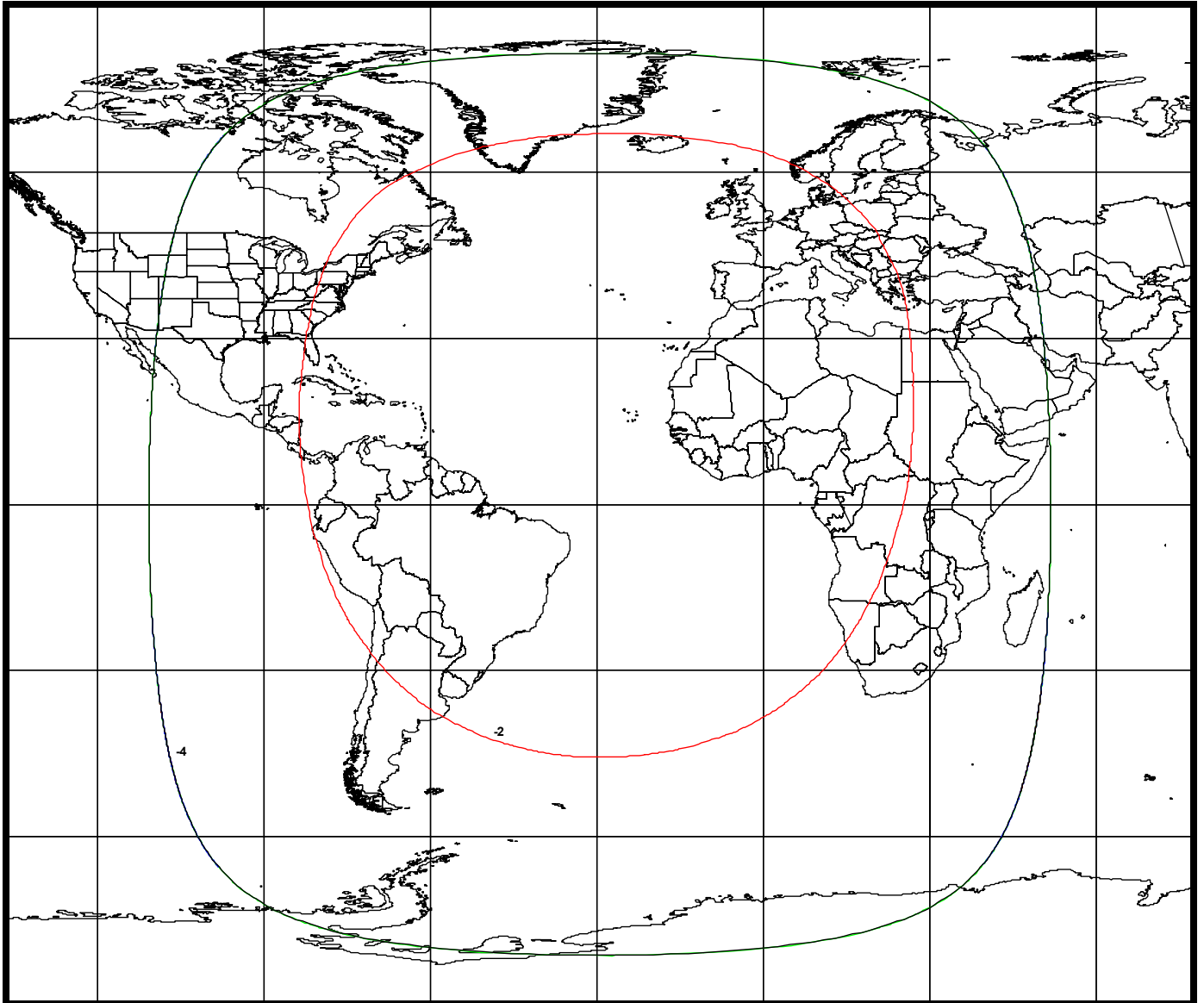


Exhibit 2-3: C-Band West Hemi Uplink Beam

[Schedule S Beam Designation: WHUL]

Beam Peak Gain: 27.4 dBi

Beam Polarization: Left Hand Circular

Beam Peak G/T: -0.5 dB/K

Saturated Flux Density @ Beam Peak G/T: -98.4 to -76.4 dBW/m²

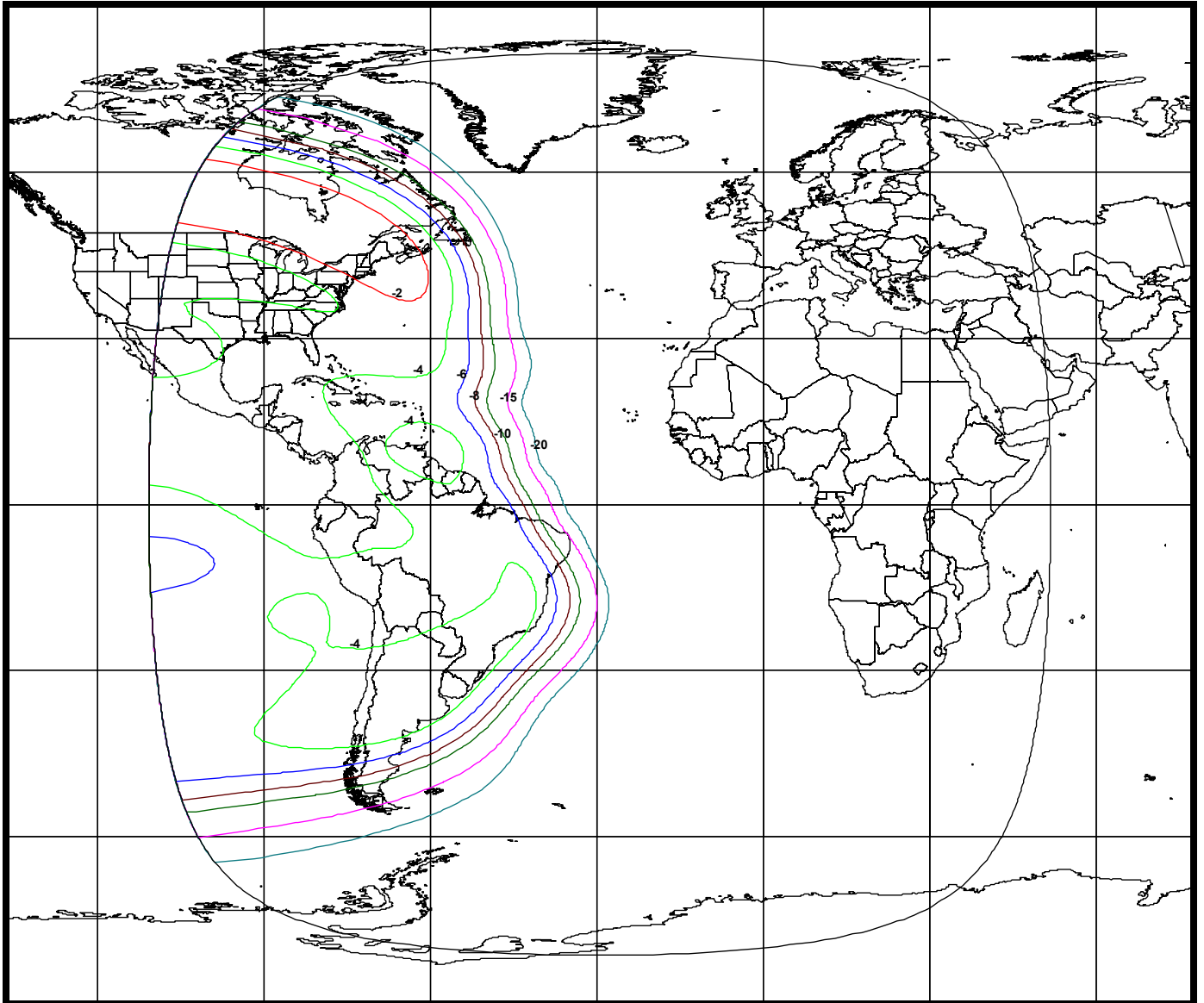


Exhibit 2-4: C-Band East Hemi Uplink Beam
[Schedule S Beam Designation: EHUL]

Beam Peak Gain: 25.1 dBi

Beam Polarization: Left Hand Circular

Beam Peak G/T: -3.0 dB/K

Saturated Flux Density @ Beam Peak G/T: -96.9 to -74.9 dBW/m²

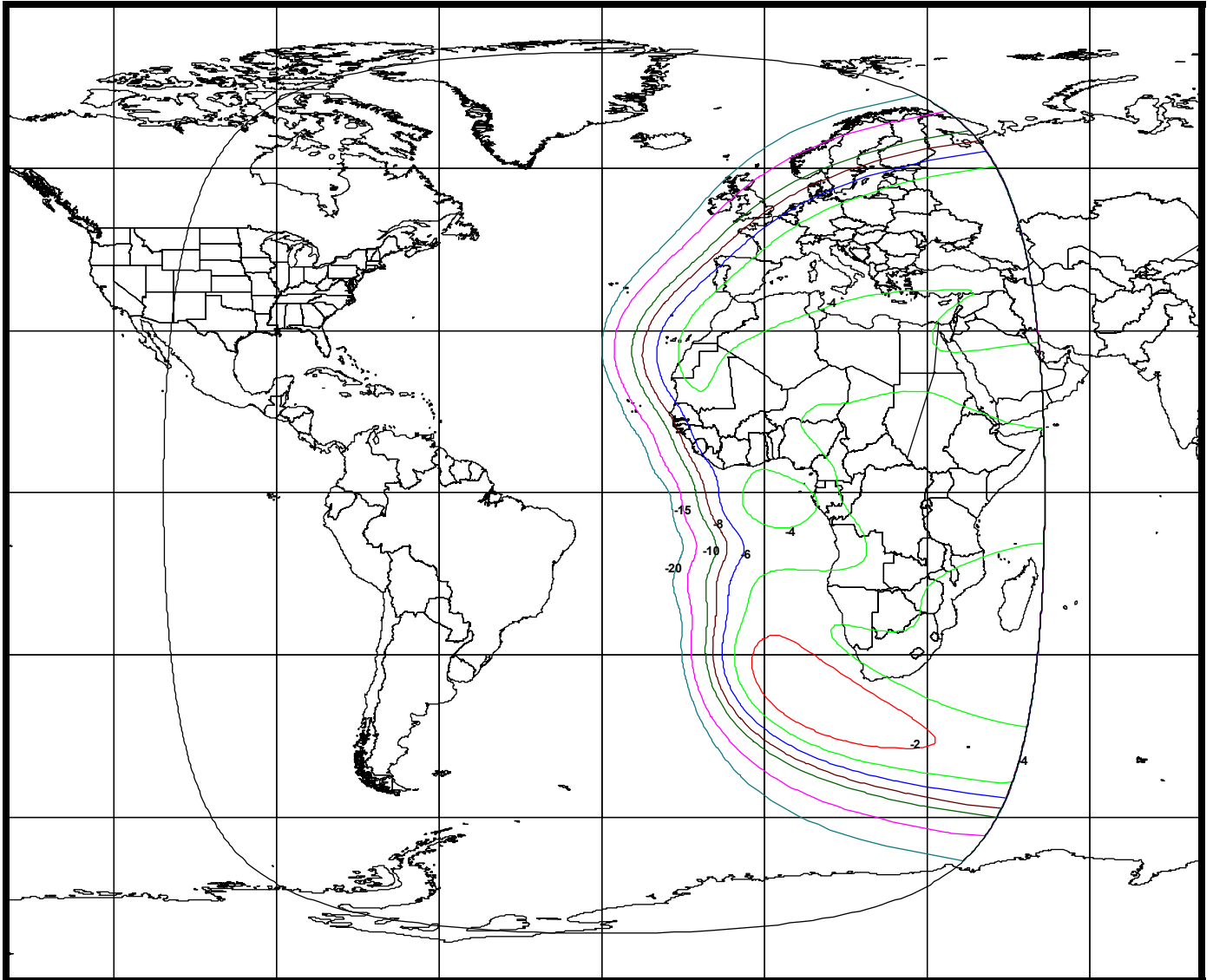


Exhibit 2-5: C-Band Northwest Zone Uplink Beam

[Schedule S Beam Designation: NWUL]

Beam Peak Gain: 34.3 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 5.0 dB/K

Saturated Flux Density @ Beam Peak G/T: -98.6 to -76.6 dBW/m²

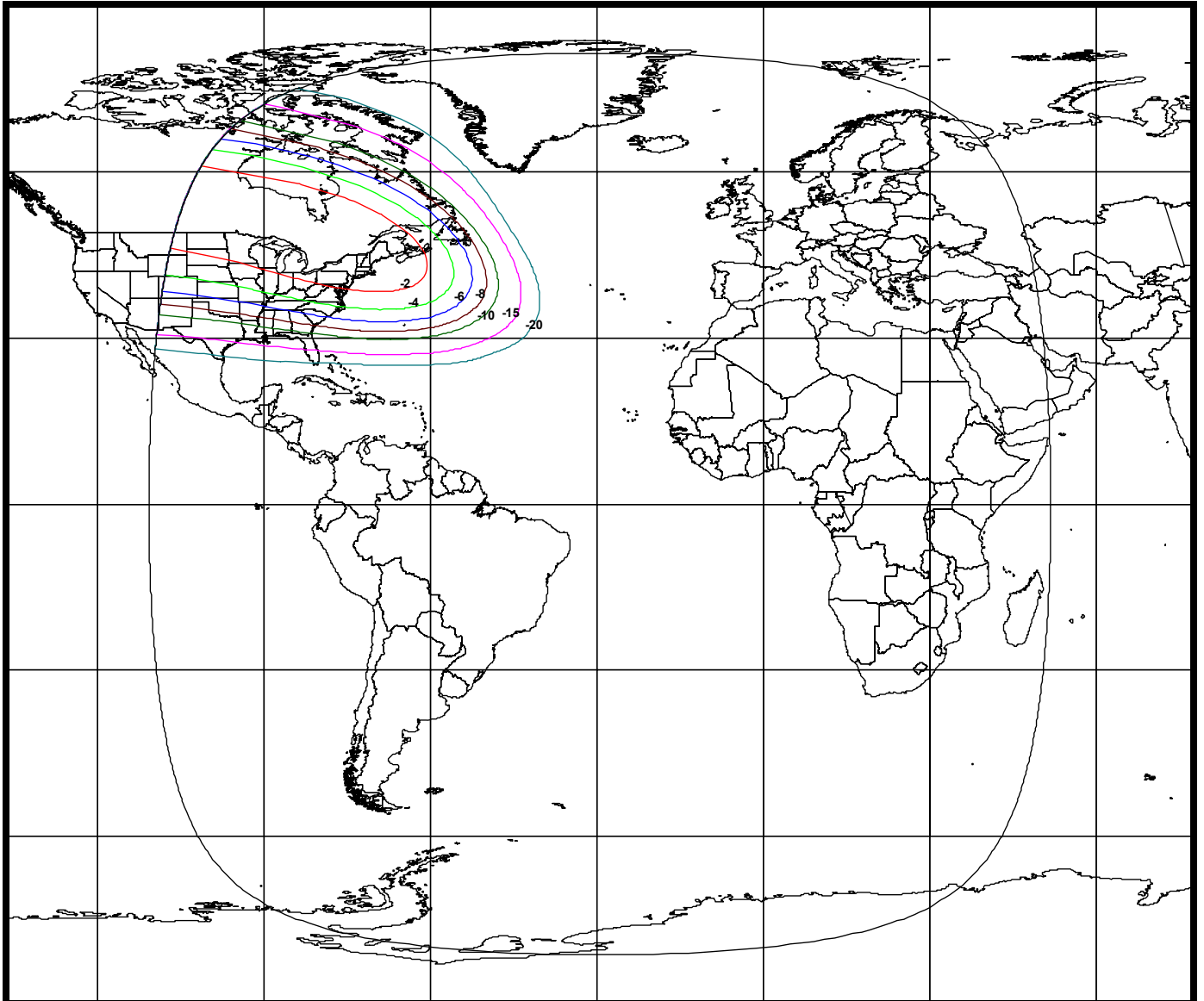


Exhibit 2-6: C-Band Northeast Zone Uplink Beam

[Schedule S Beam Designation: NEUL]

Beam Peak Gain: 30.7 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 1.5 dB/K

Saturated Flux Density @ Beam Peak G/T: -91.0 to -69.0 dBW/m²

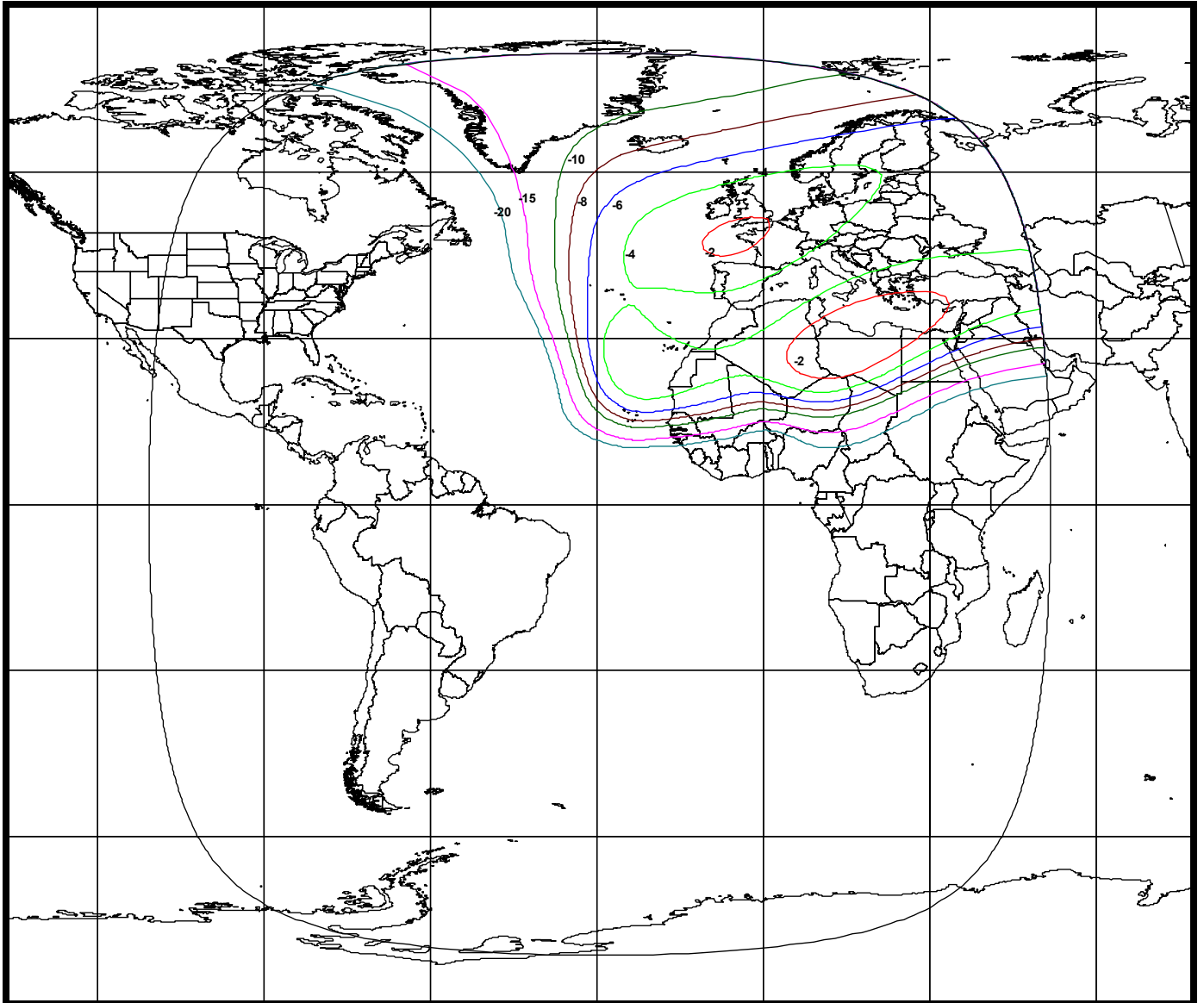


Exhibit 2-7: C-Band Southwest Zone Uplink Beam
[Schedule S Beam Designation: SWUL]

Beam Peak Gain: 30.9 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 2.0 dB/K

Saturated Flux Density @ Beam Peak G/T: -99.6 to -77.6 dBW/m²

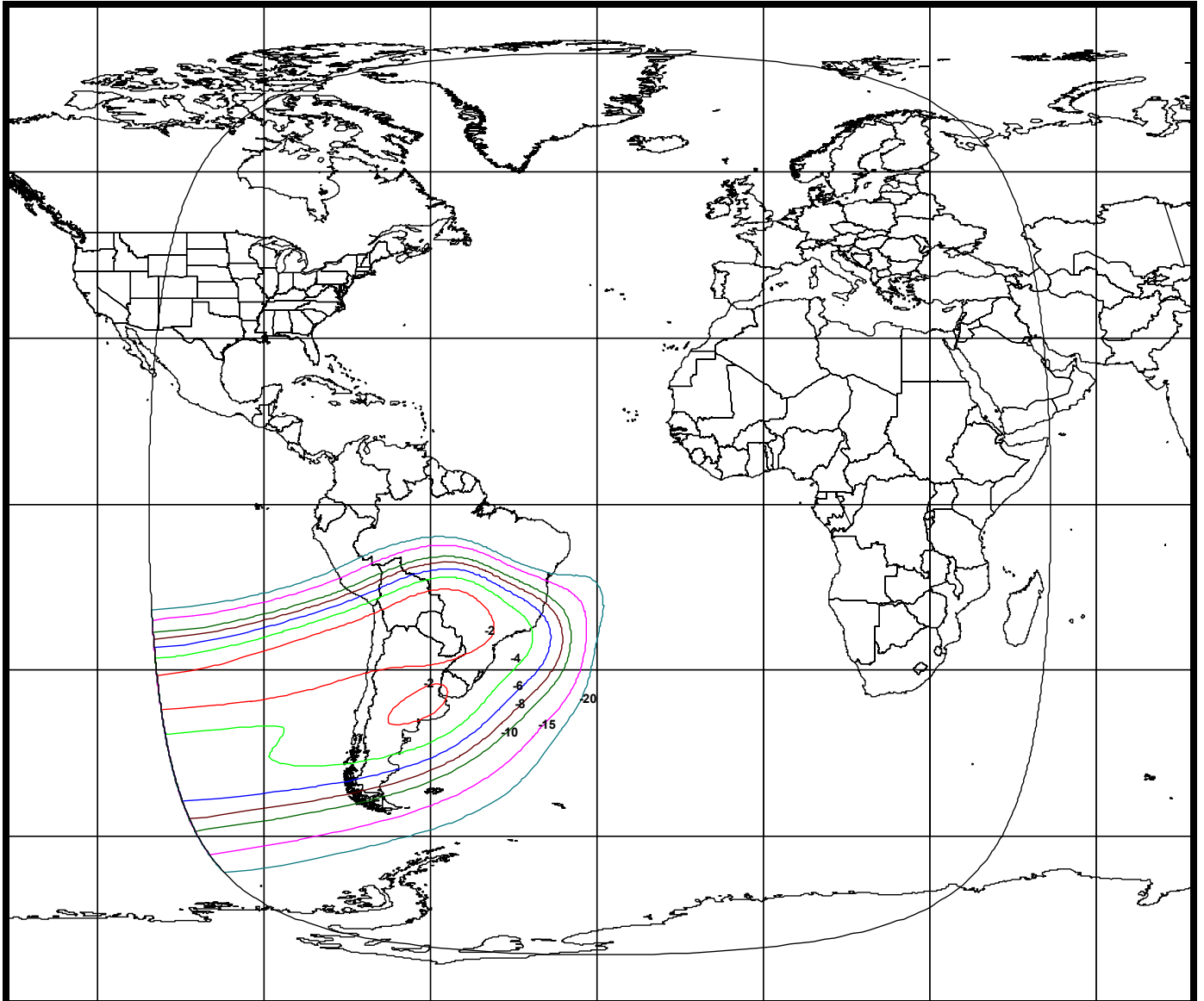


Exhibit 2-8: C-Band Southeast Zone Uplink Beam
[Schedule S Beam Designation: SEUL]

Beam Peak Gain: 31.2 dBi

Beam Polarization: Right Hand Circular

Beam Peak G/T: 2.5 dB/K

Saturated Flux Density @ Beam Peak G/T: -100.5 to -78.5 dBW/m²

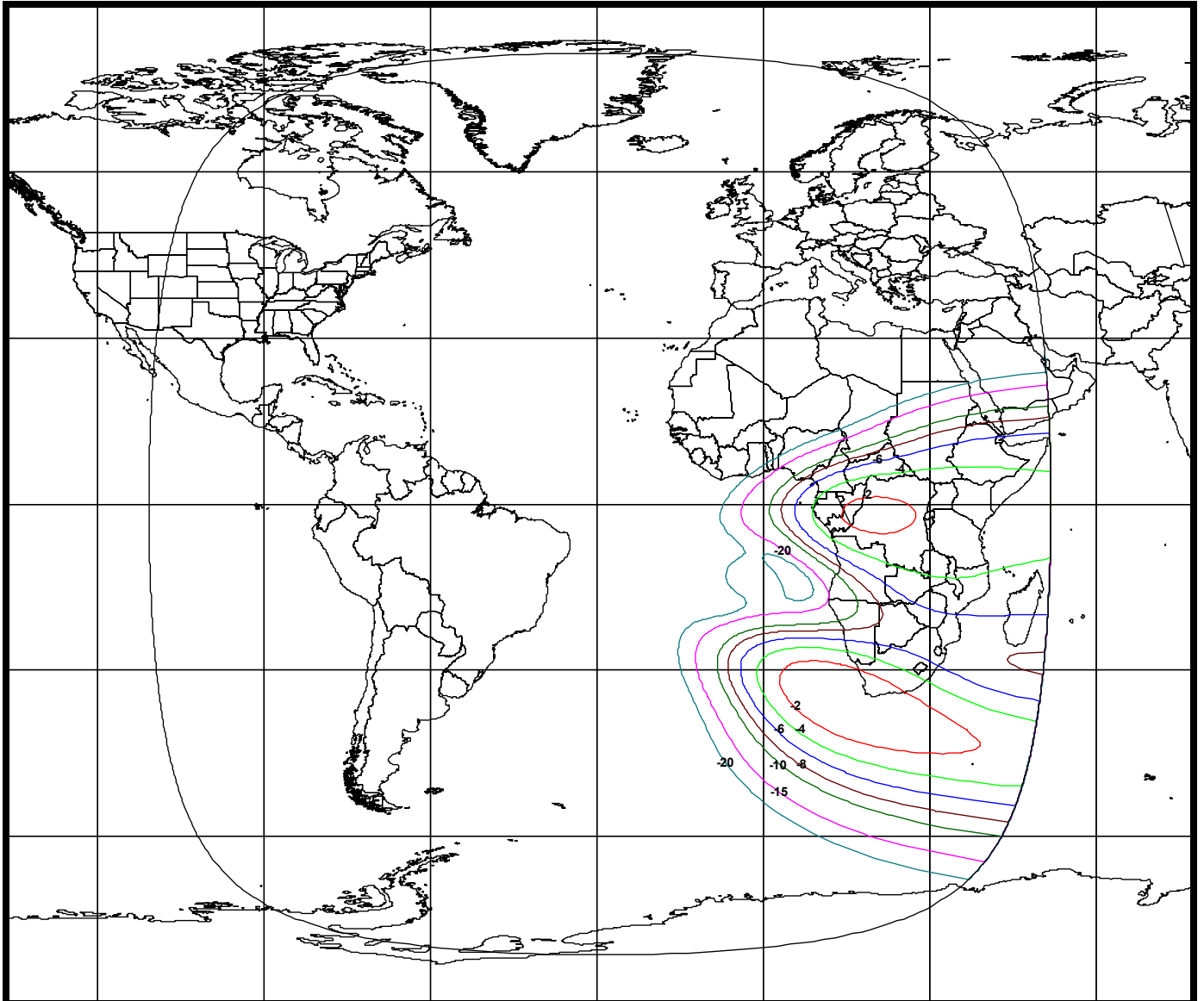


Exhibit 2-9: Ku-Band Spot 1 Uplink Beam
[Schedule S Beam Designation: S1UL]

Beam Peak Gain: 39.0 dBi

Beam Polarization: Horizontal

Beam Peak G/T: 10 dB/K

Saturated Flux Density @ Beam Peak G/T: -97.7 to -75.7 dBW/m²

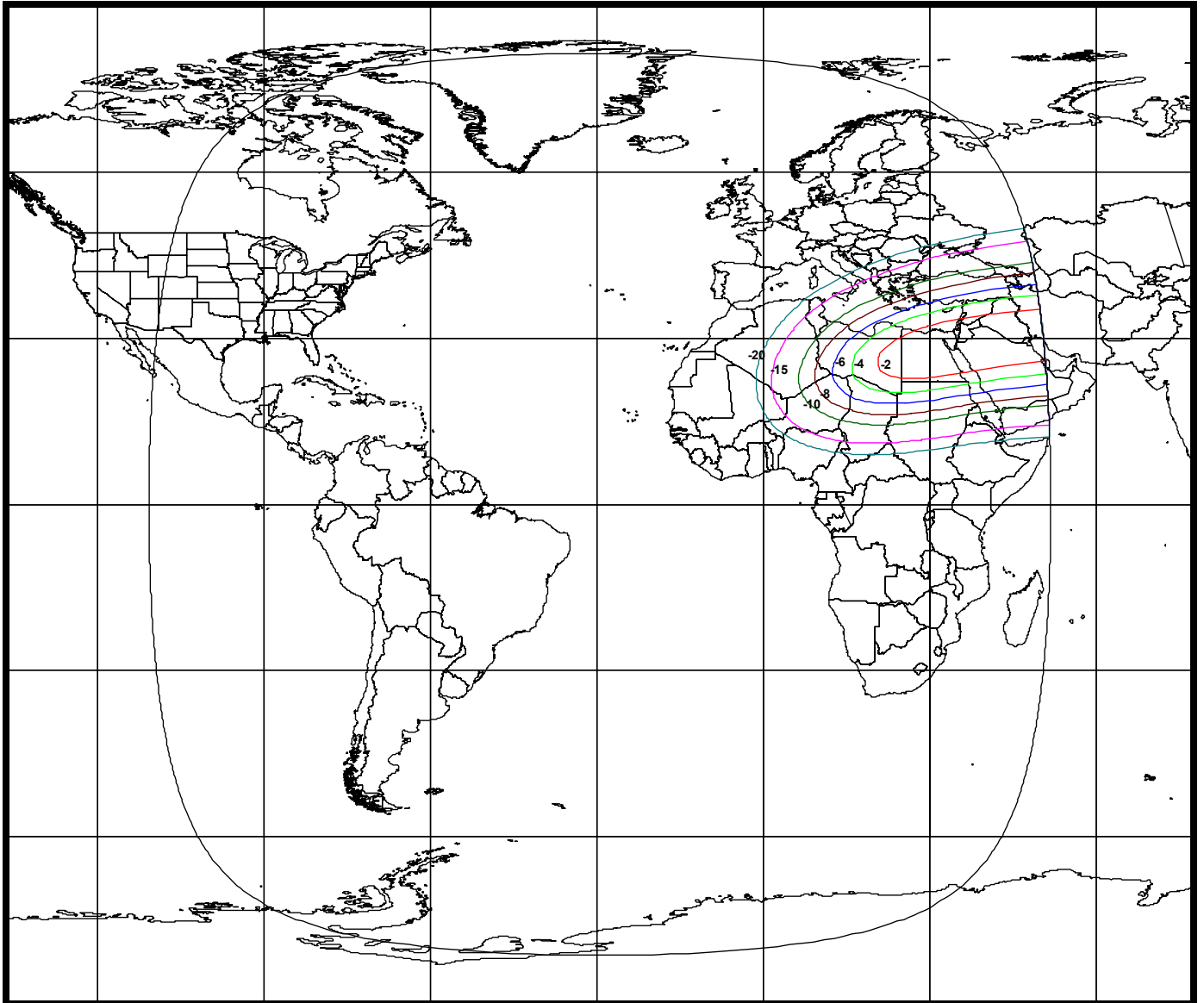


Exhibit 2-10: Ku-Band Spot 2 Uplink Beam
[Schedule S Beam Designation: S2UL]

Beam Peak Gain: 37.7 dBi
Beam Polarization: Vertical
Beam Peak G/T: 8.5 dB/K
Saturated Flux Density @ Beam Peak G/T: -98.4 to -76.4 dBW/m²

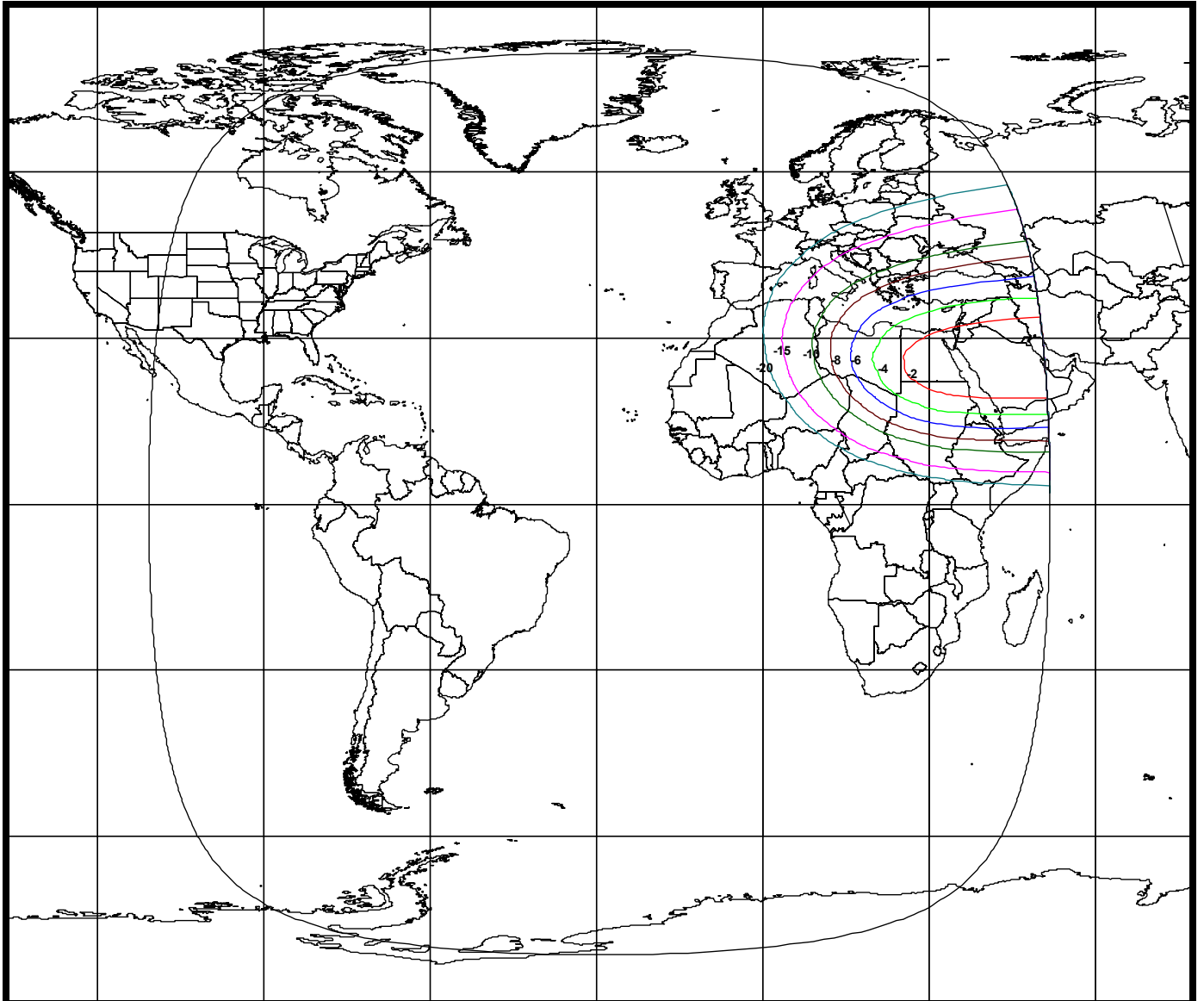


Exhibit 2-11: C-Band Global A Downlink Beam

[Schedule S Beam Designation: GADL]

Beam Peak Gain: 19.9 dBi
Beam Polarization: Right Hand Circular
Beam Peak EIRP: 32.5 dBW

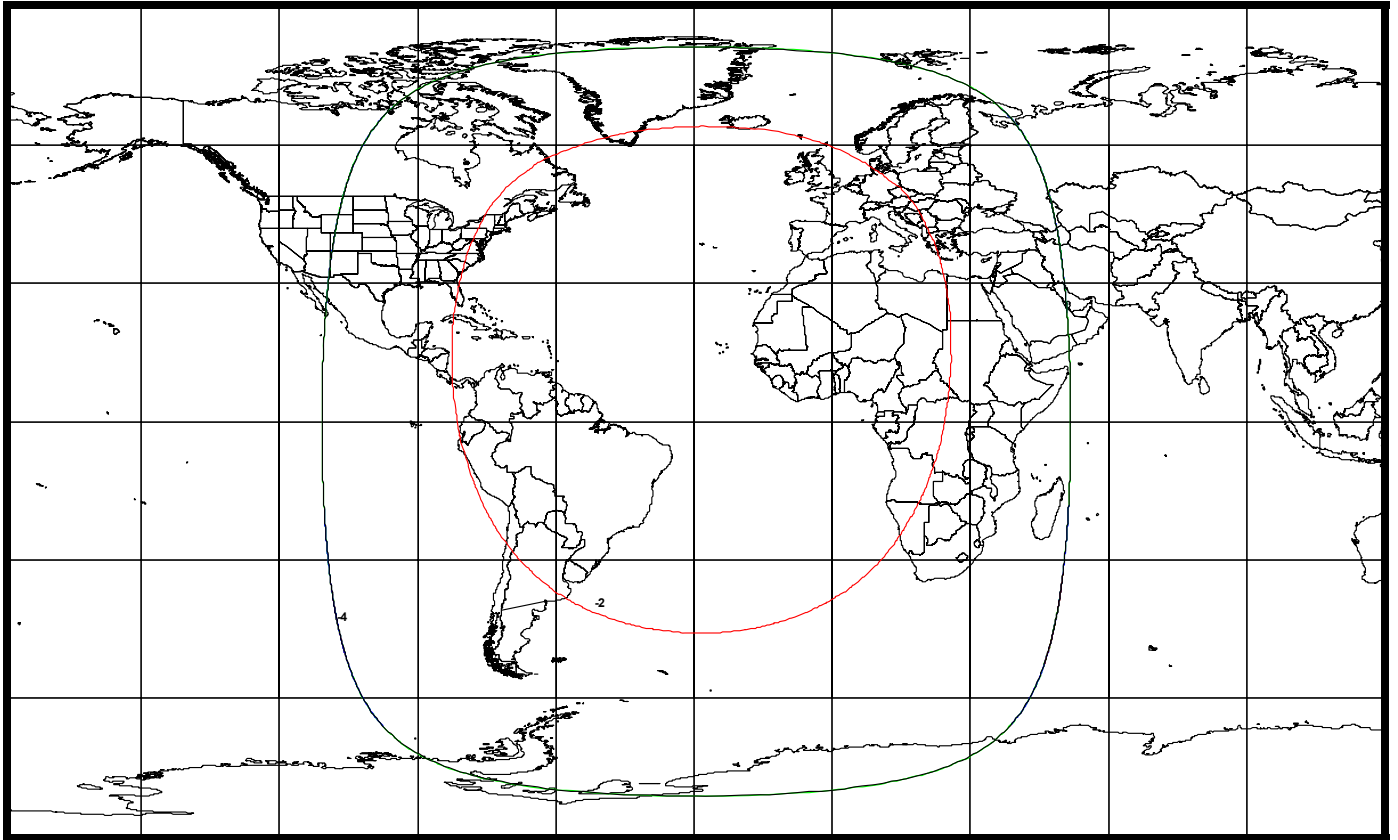


Exhibit 2-12: C-Band Global B Downlink Beam
[Schedule S Beam Designation: GBDL]

Beam Peak Gain: 19.9 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 32.5 dBW

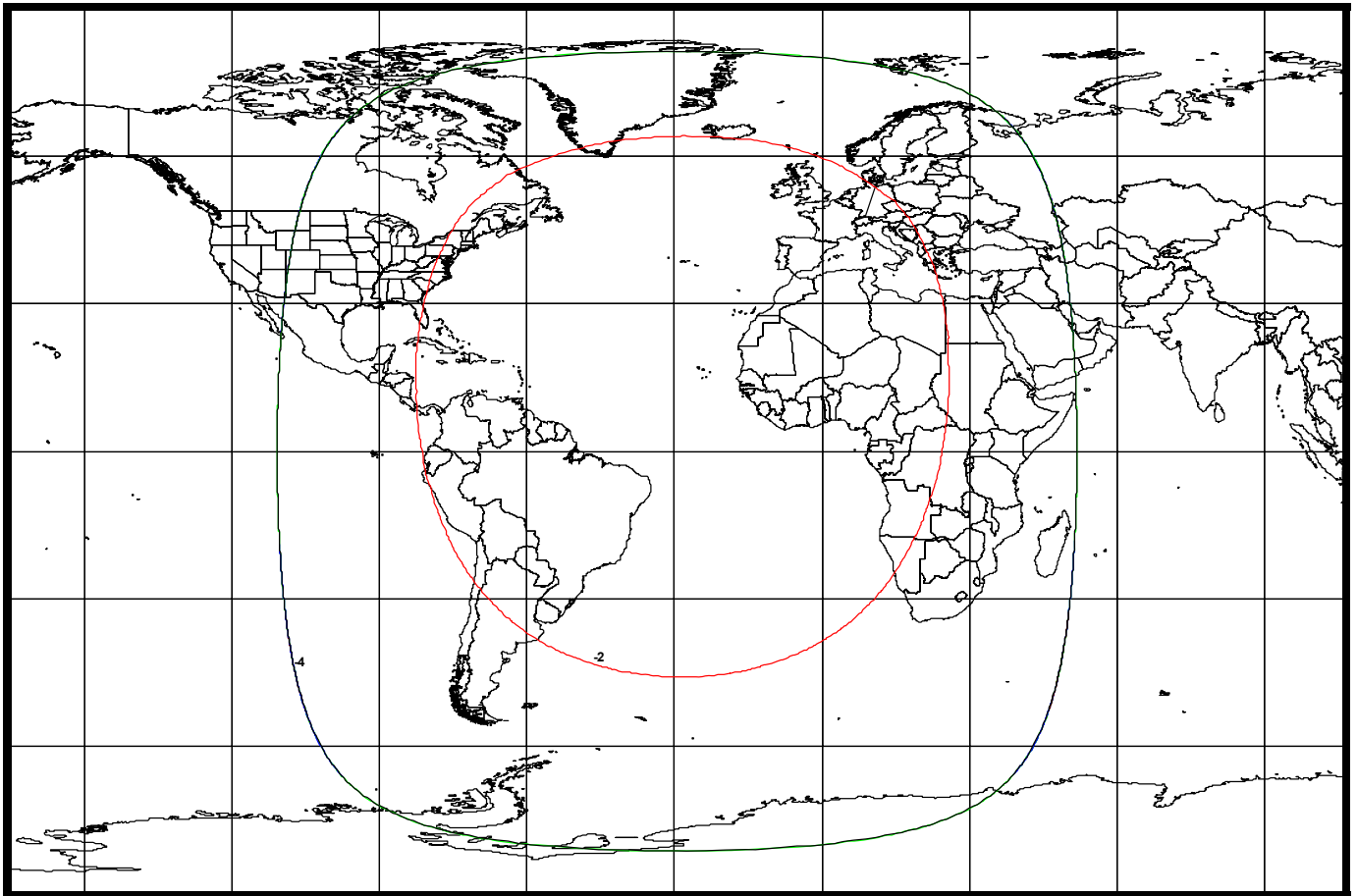


Exhibit 2-13: C-Band West Hemi Downlink Beam

[Schedule S Beam Designation: WHDL]

Beam Peak Gain: 26.0 dBi
Beam Polarization: Right Hand Circular
Beam Peak EIRP: 39.5 dBW

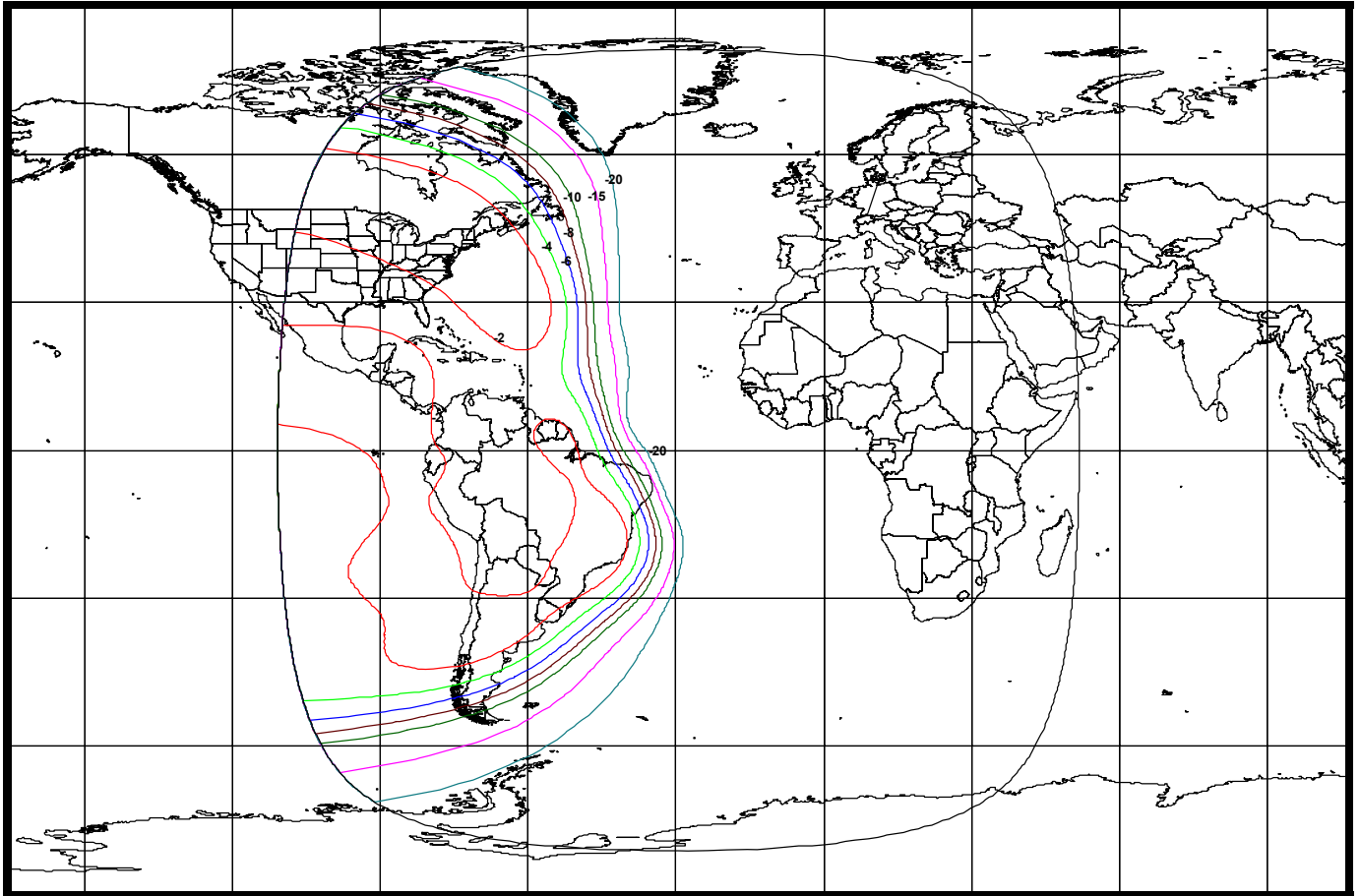


Exhibit 2-14: C-Band East Hemi Downlink Beam
[Schedule S Beam Designation: EHDL]

Beam Peak Gain: 25.8 dBi
Beam Polarization: Right Hand Circular
Beam Peak EIRP: 39.5 dBW

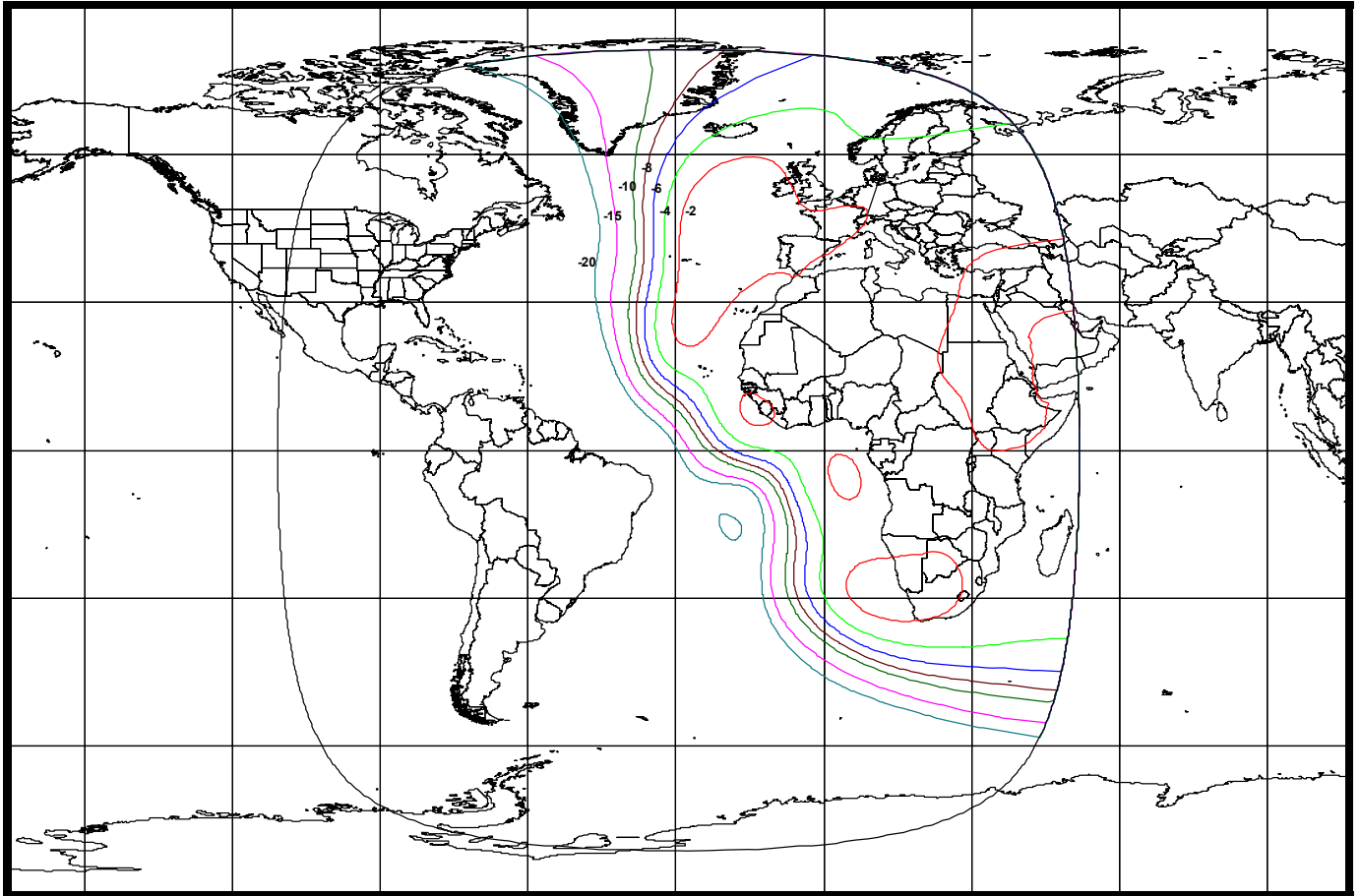
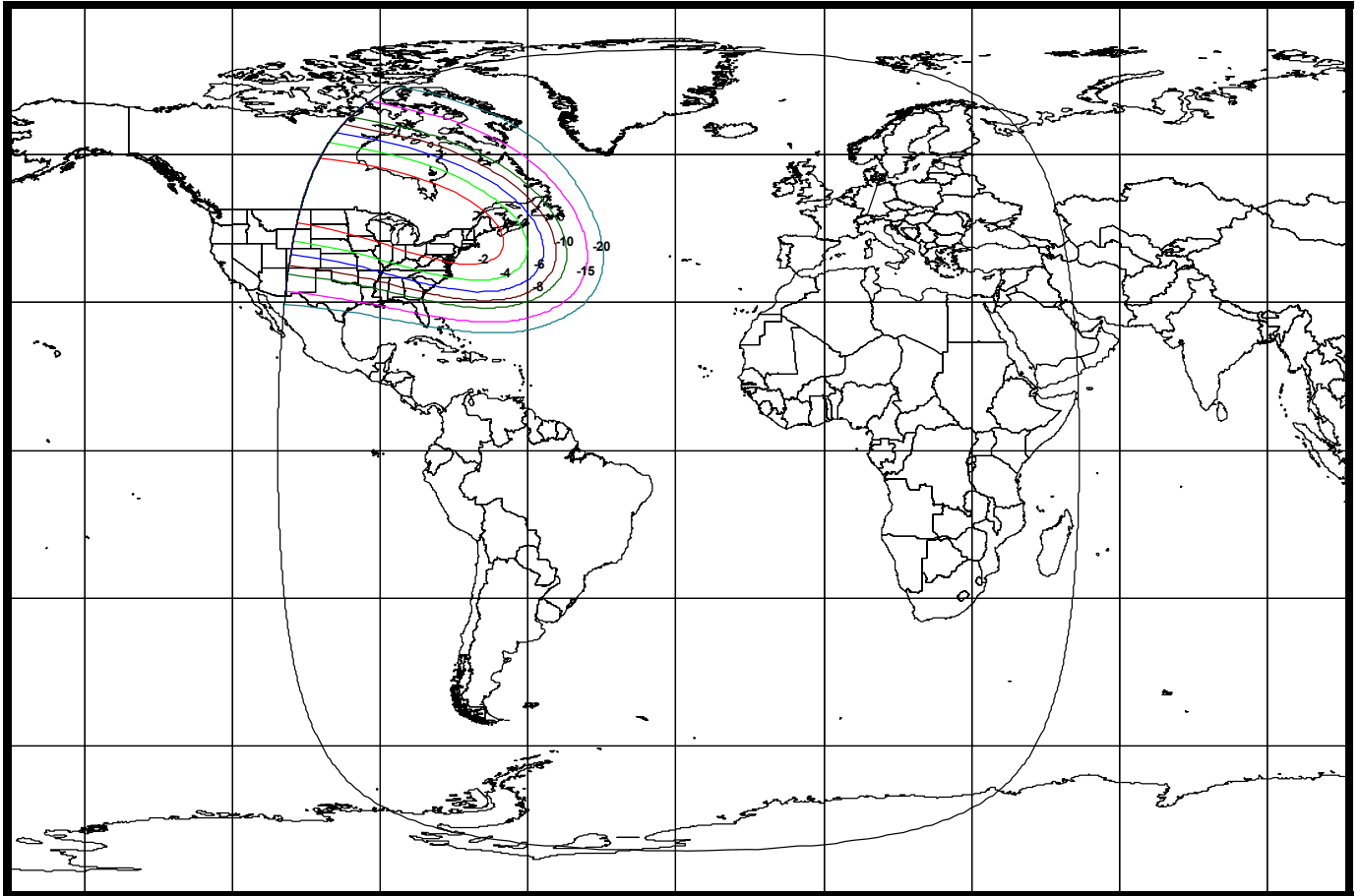


Exhibit 2-15: C-Band Northwest Downlink Beam

[Schedule S Beam Designation: NWDL]

Beam Peak Gain: 35.0 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 44.0 dBW



Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 42.5 dBW.

Exhibit 2-16: C-Band Northeast Downlink Beam
[Schedule S Beam Designation: NEDL]

Beam Peak Gain: 30.8 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 41.5 dBW

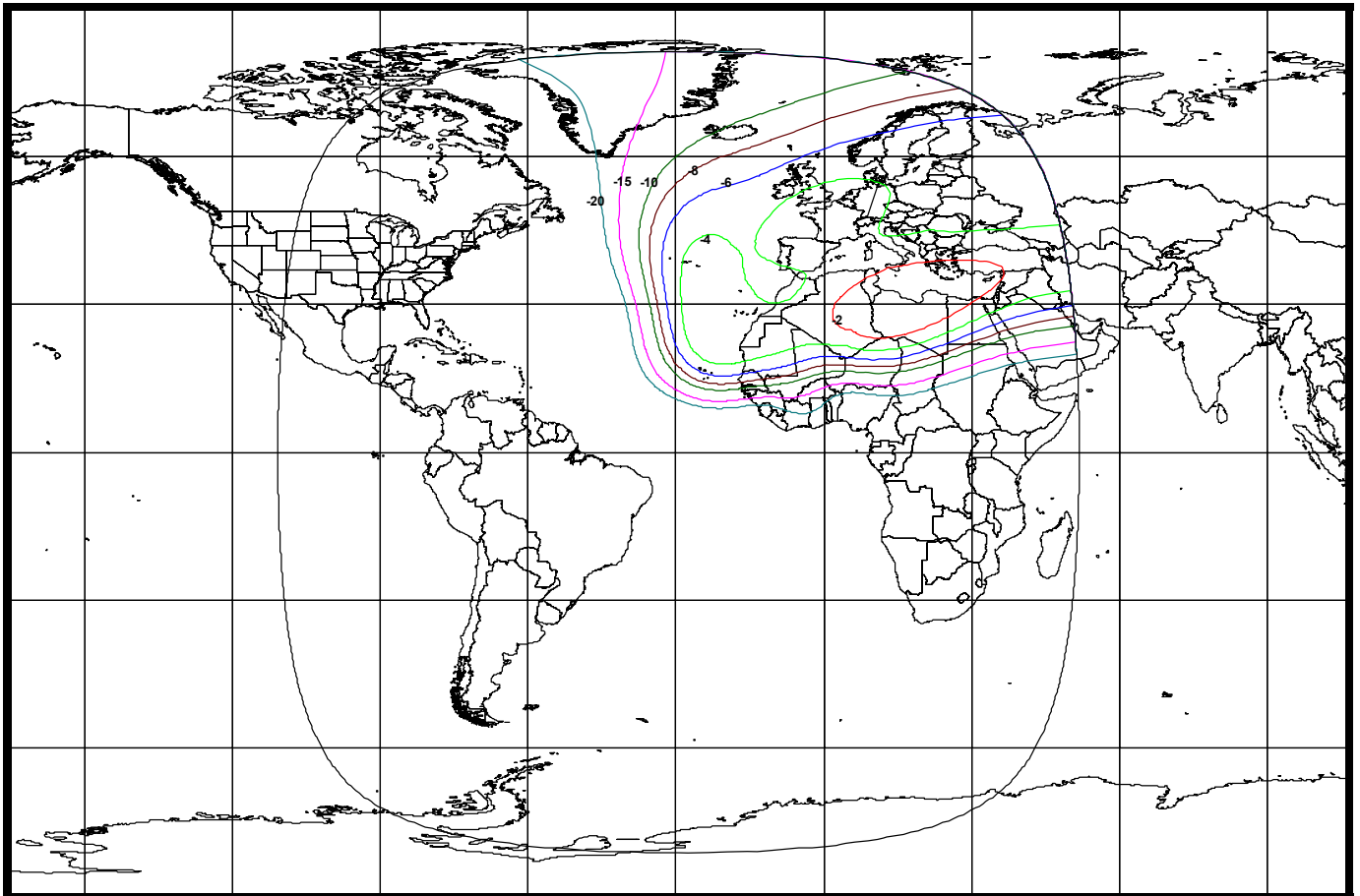
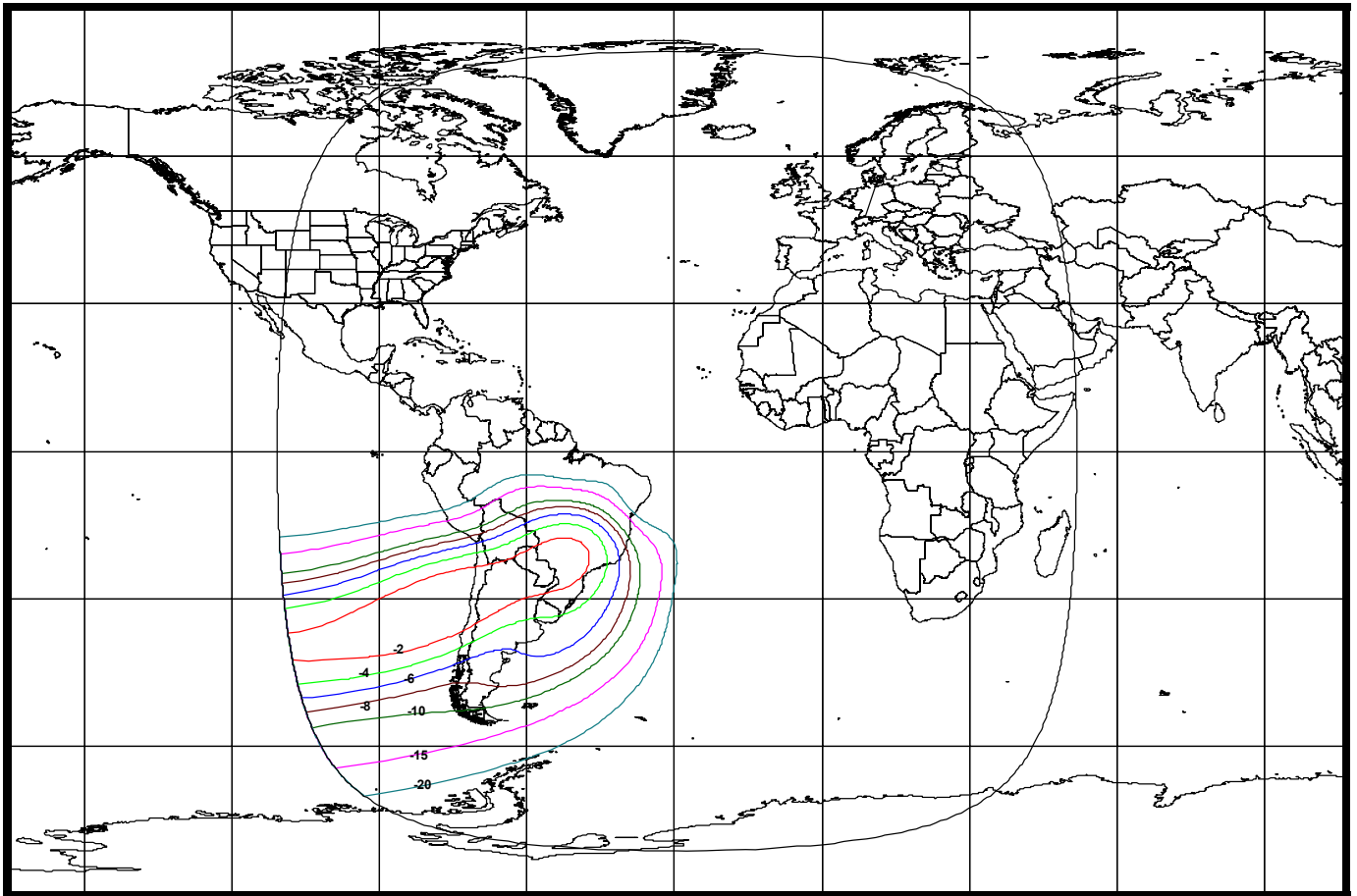


Exhibit 2-17: C-Band Southwest Downlink Beam
[Schedule S Beam Designation: SWDL]

Beam Peak Gain: 32.3 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 43.8 dBW



Note: This beam can also be operated in a low power mode with a corresponding beam peak EIRP of 40.5 dBW.

Exhibit 2-18: C-Band Southeast Downlink Beam
[Schedule S Beam Designation: SEDL]

Beam Peak Gain: 29.7 dBi
Beam Polarization: Left Hand Circular
Beam Peak EIRP: 41.0 dBW

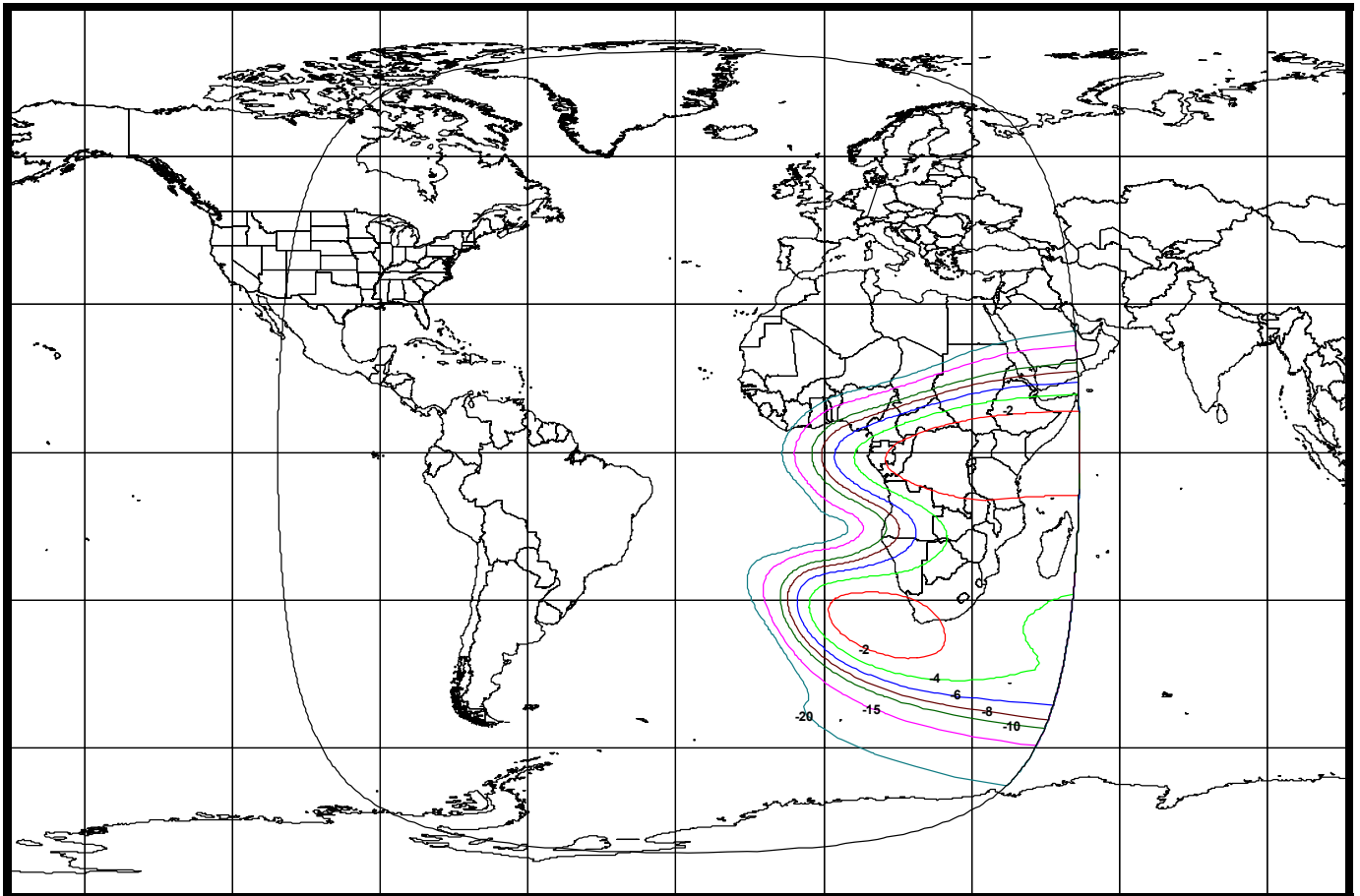


Exhibit 2-19: Ku-Band Spot 1 Downlink Beam

[Schedule S Beam Designation: S1DL]

Beam Peak Gain: 37.8 dBi
Beam Polarization: Vertical
Beam Peak EIRP: 52.0 dBW

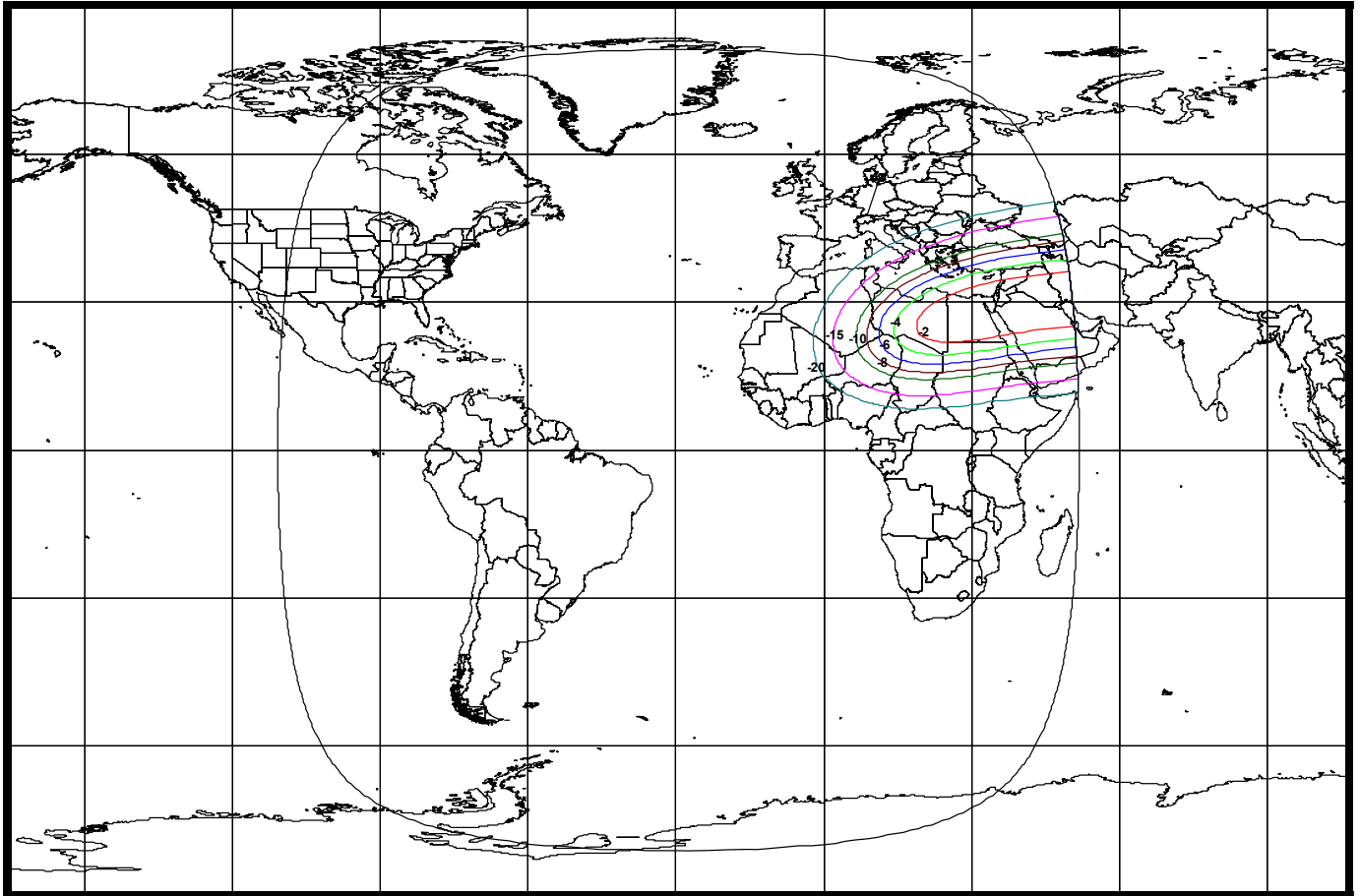


Exhibit 2-20: Ku-Band Spot 2 Downlink Beam
[Schedule S Beam Designation: S2DL]

Beam Peak Gain: 36.9 dBi
Beam Polarization: Horizontal
Beam Peak EIRP: 51.0 dBW

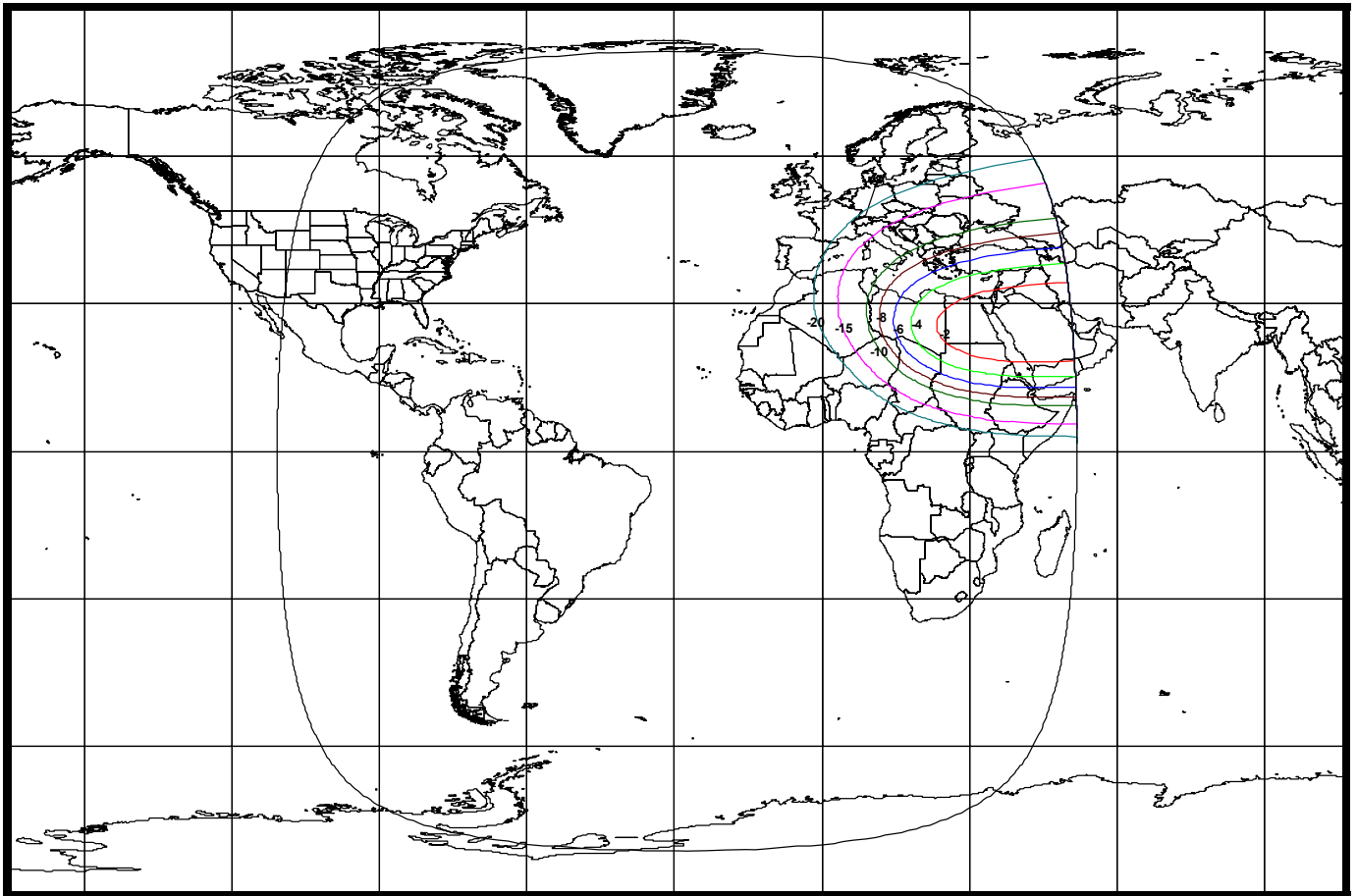


Exhibit 2-21: Command Uplink Beam (Transfer Orbit)

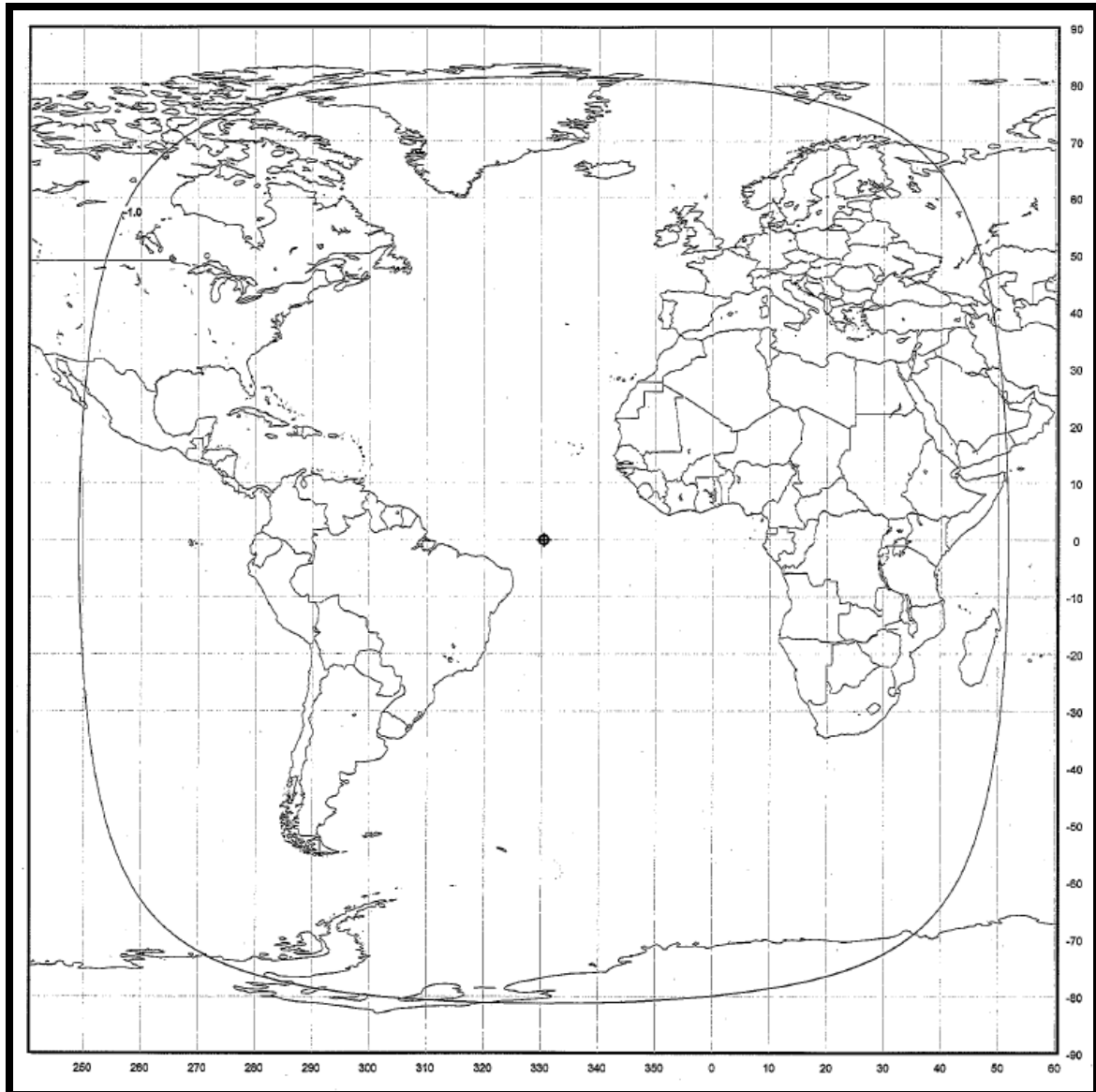
[Schedule S Beam Designation: CMDT]

Peak Beam Gain: 1.6 dBi

Polarization: Right Hand Circular

Peak G/T: -25.7 dB/K

Command Threshold Flux Density @ Peak G/T: -105.9 dBW/m²



Relative Gain Contours Shown: -1.0 dB

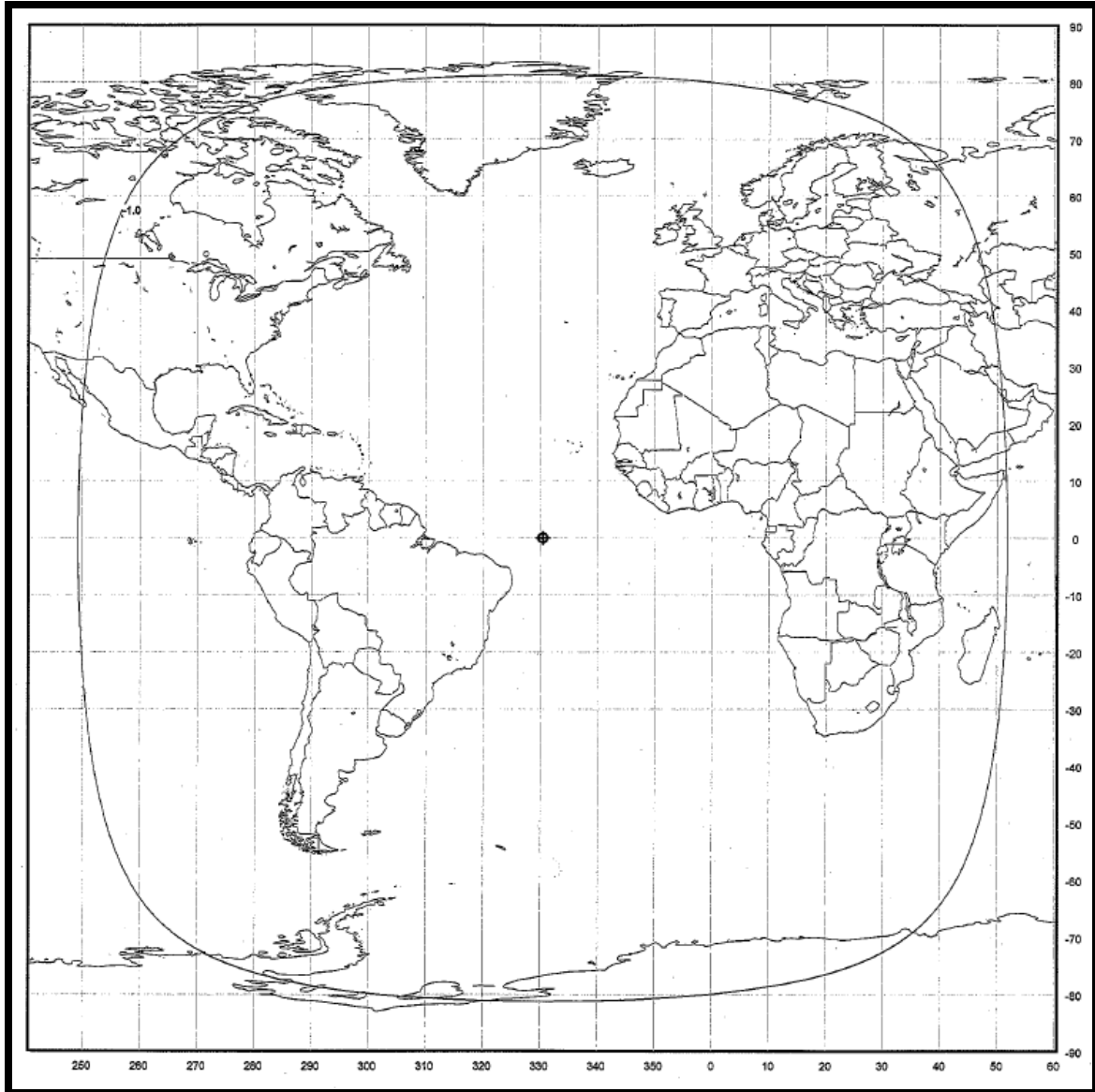
Exhibit 2-22: Command Uplink Beam (Emergency)
[Schedule S Beam Designation: CMDE]

Peak Beam Gain: 1.6 dBi

Polarization: Left Hand Circular

Peak G/T: -25.9 dB/K

Command Threshold Flux Density @ Peak G/T: -105.7 dBW/m²



Relative Gain Contours Shown: -1.0 dB

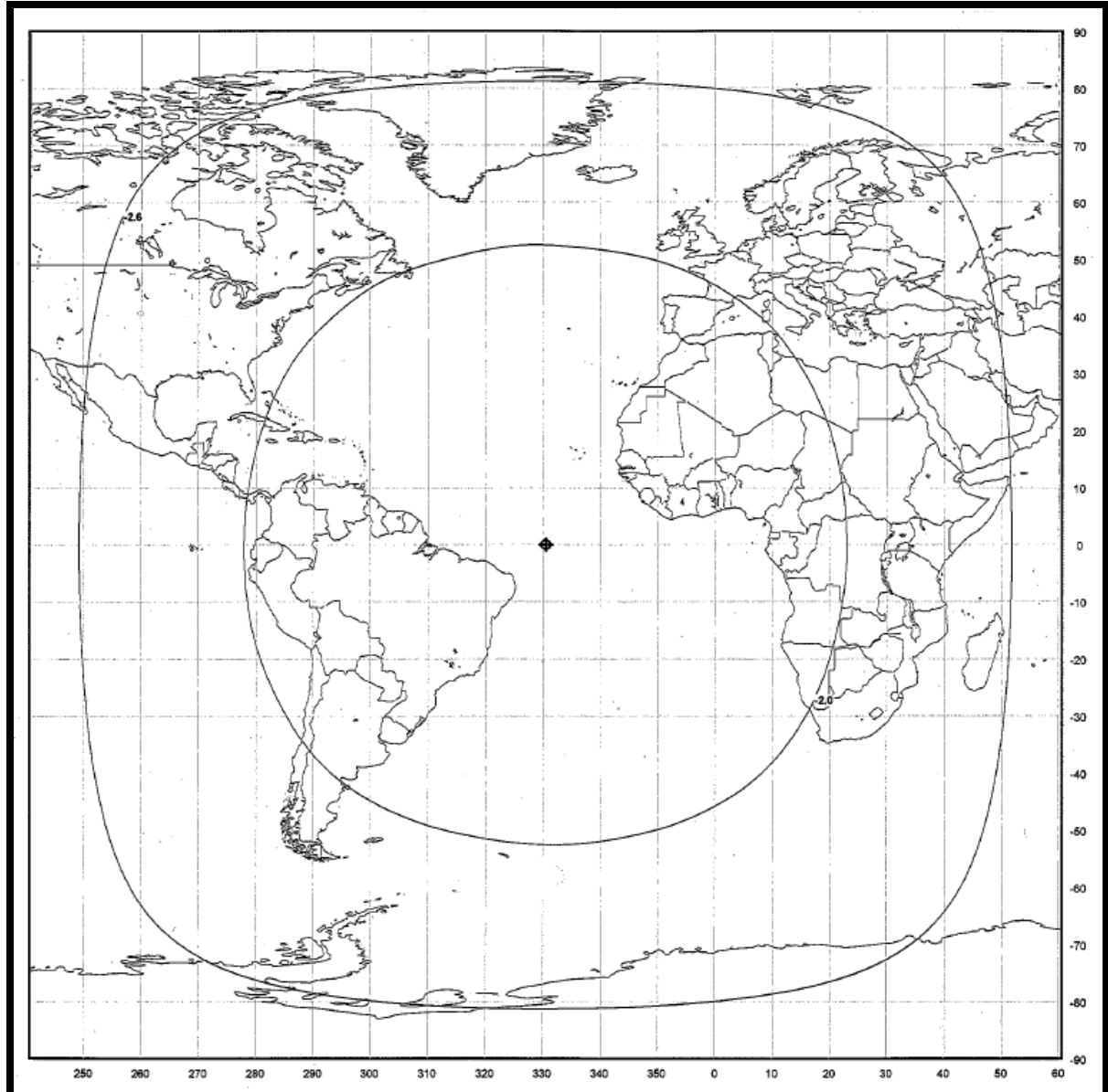
Exhibit 2-23: Command Uplink Beam (On-Station)
[Schedule S Beam Designation: CMDO]

Peak Beam Gain: 19.1 dBi

Polarization: Left Hand Circular

Peak G/T: -31.3 dB/K

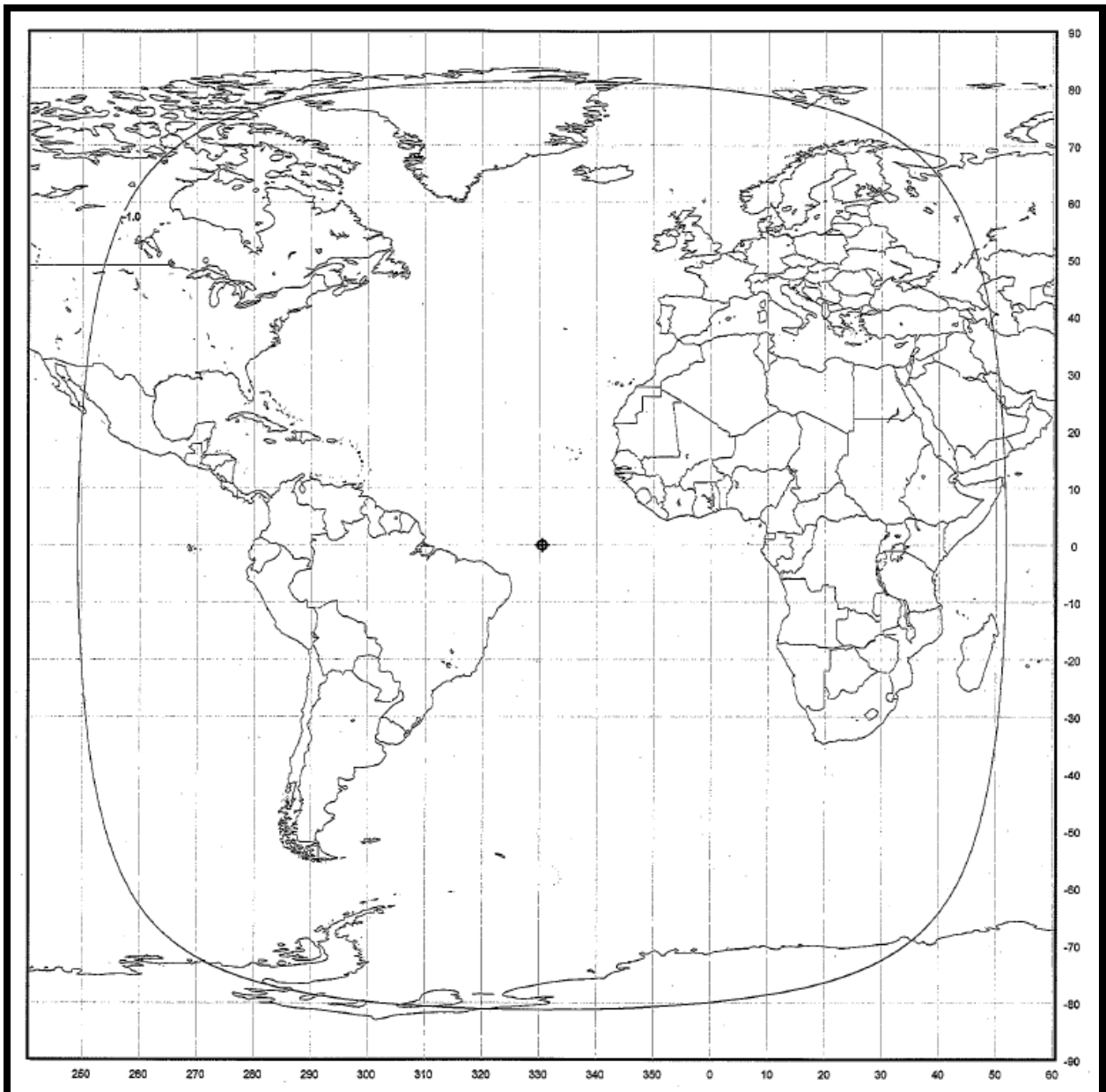
Command Threshold Flux Density @ Peak G/T: -99.9 dBW/m²



Relative Gain Contours Shown: -2.0, -2.6 dB

Exhibit 2-24: Telemetry Downlink Beam (Transfer Orbit)
[Schedule S Beam Designation: TLMT]

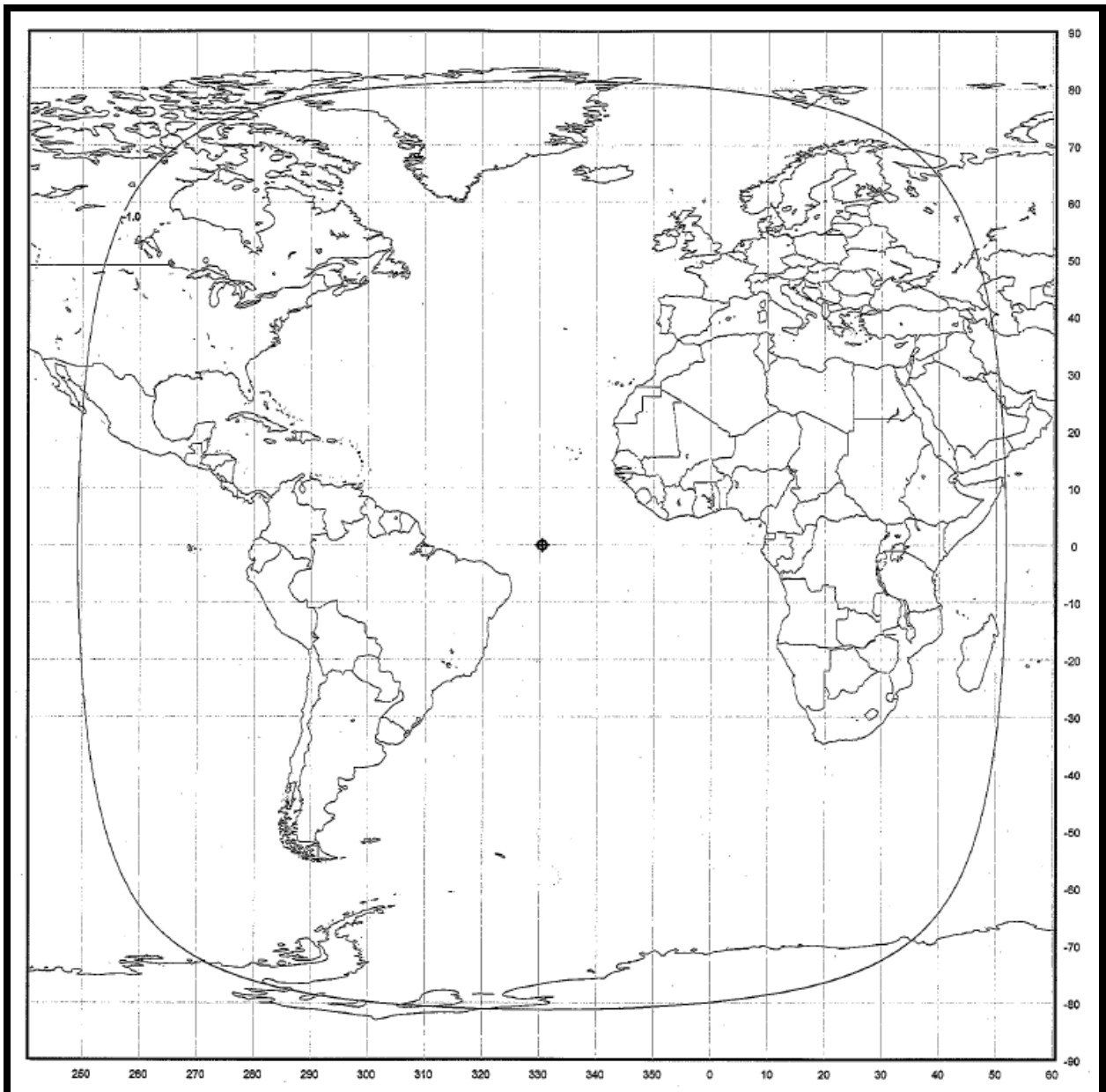
Peak Beam Gain: 1.5 dBi
Polarization: Right Hand Circular
Peak EIRP: 6.3 dBW



Relative Gain Contours Shown: -1.0 dB

Exhibit 2-25: Telemetry Downlink Beam (Emergency)
[Schedule S Beam Designation: TLME]

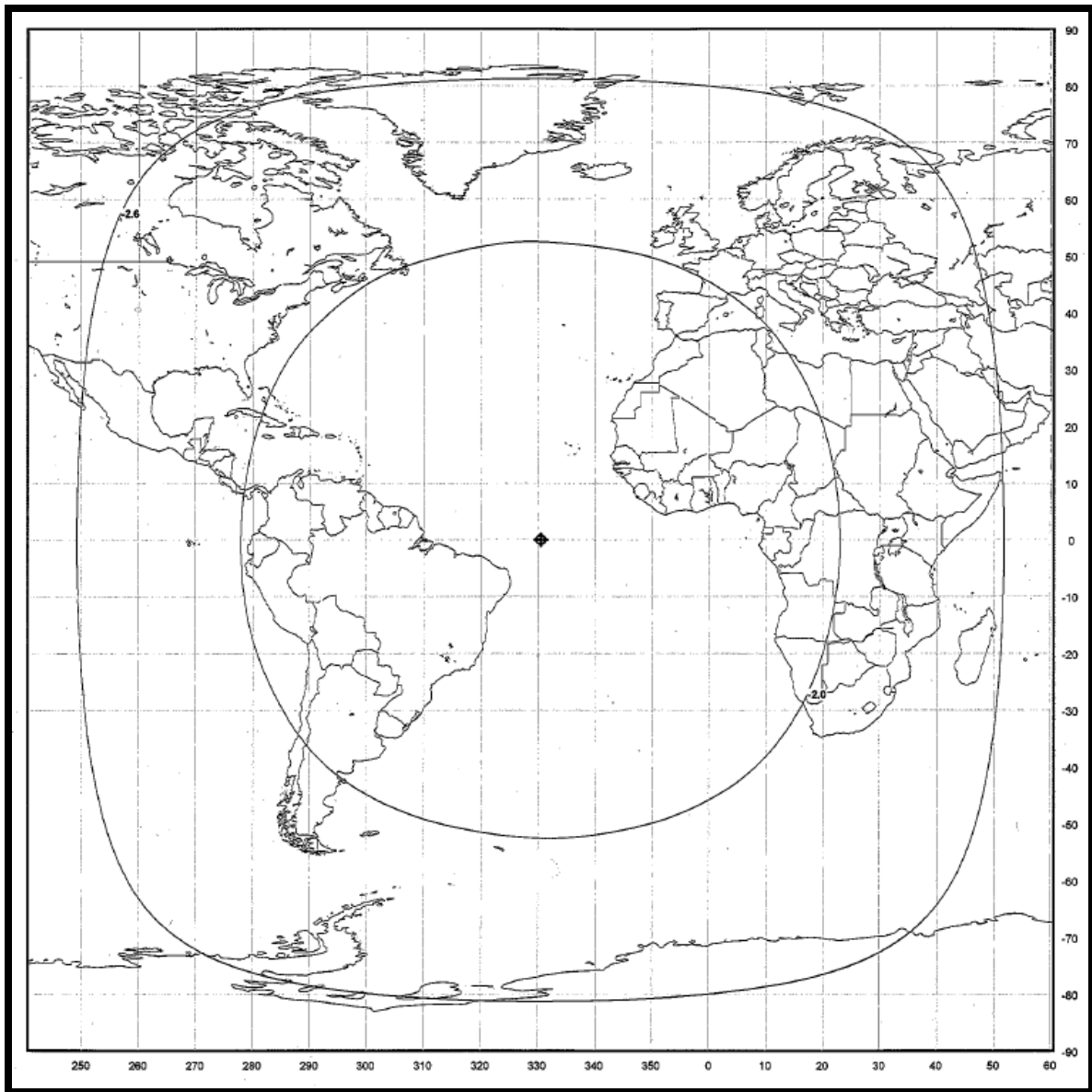
Peak Beam Gain: 1.5 dBi
Polarization: Right Hand Circular
Peak EIRP: 3.9 dBW



Relative Gain Contours Shown: -1.0 dB

Exhibit 2-26: Telemetry Downlink Beam (On-Station)
[Schedule S Beam Designation: TLMO]

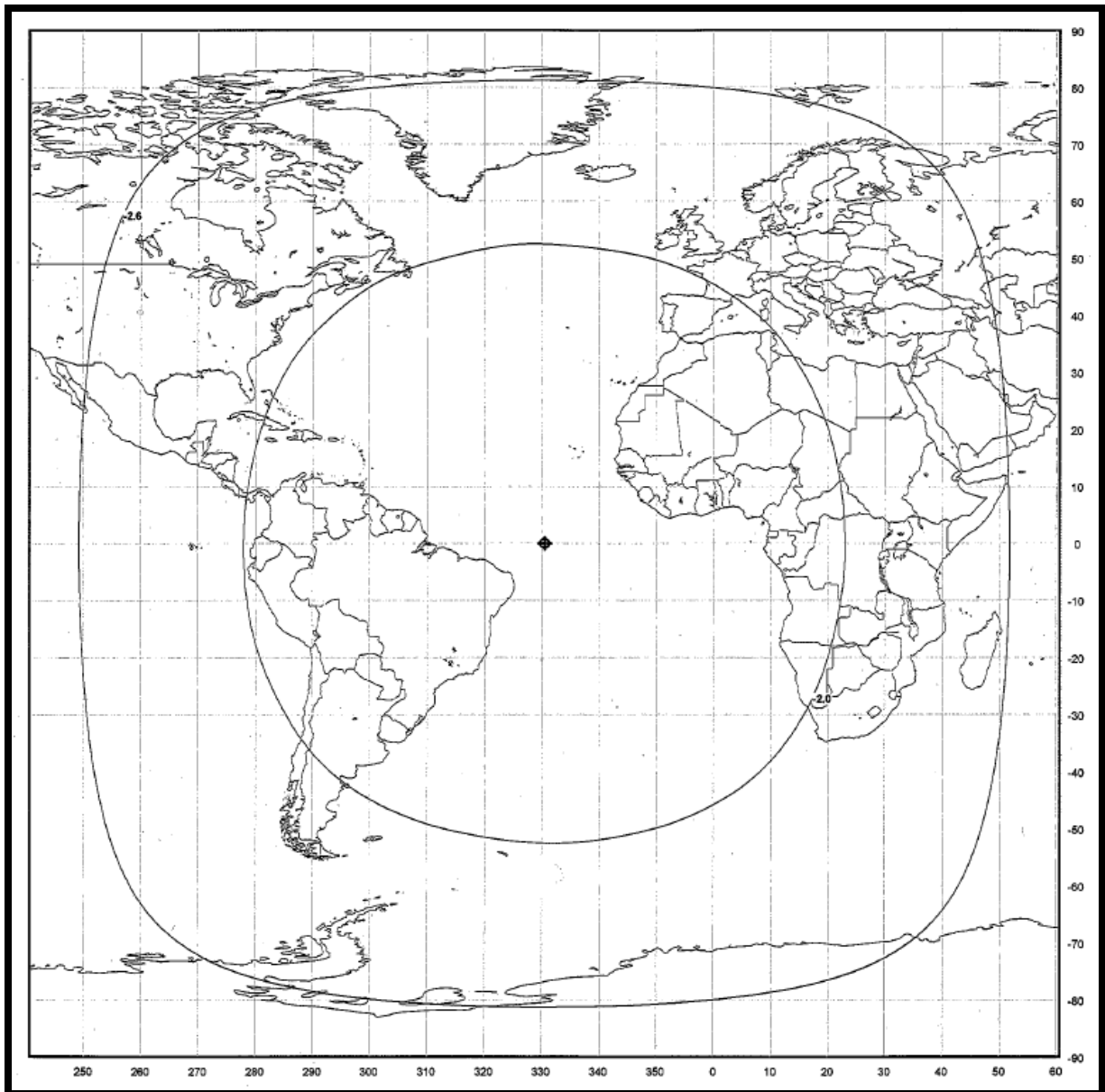
Peak Beam Gain: 13.9 dBi
Polarization: Right Hand Circular
Peak EIRP: 6.5 dBW



Relative Gain Contours Shown: -2.0, -2.6 dB

Exhibit 2-27: C-Band Uplink Power Control Downlink Beam
[Schedule S Beam Designation: BNC]

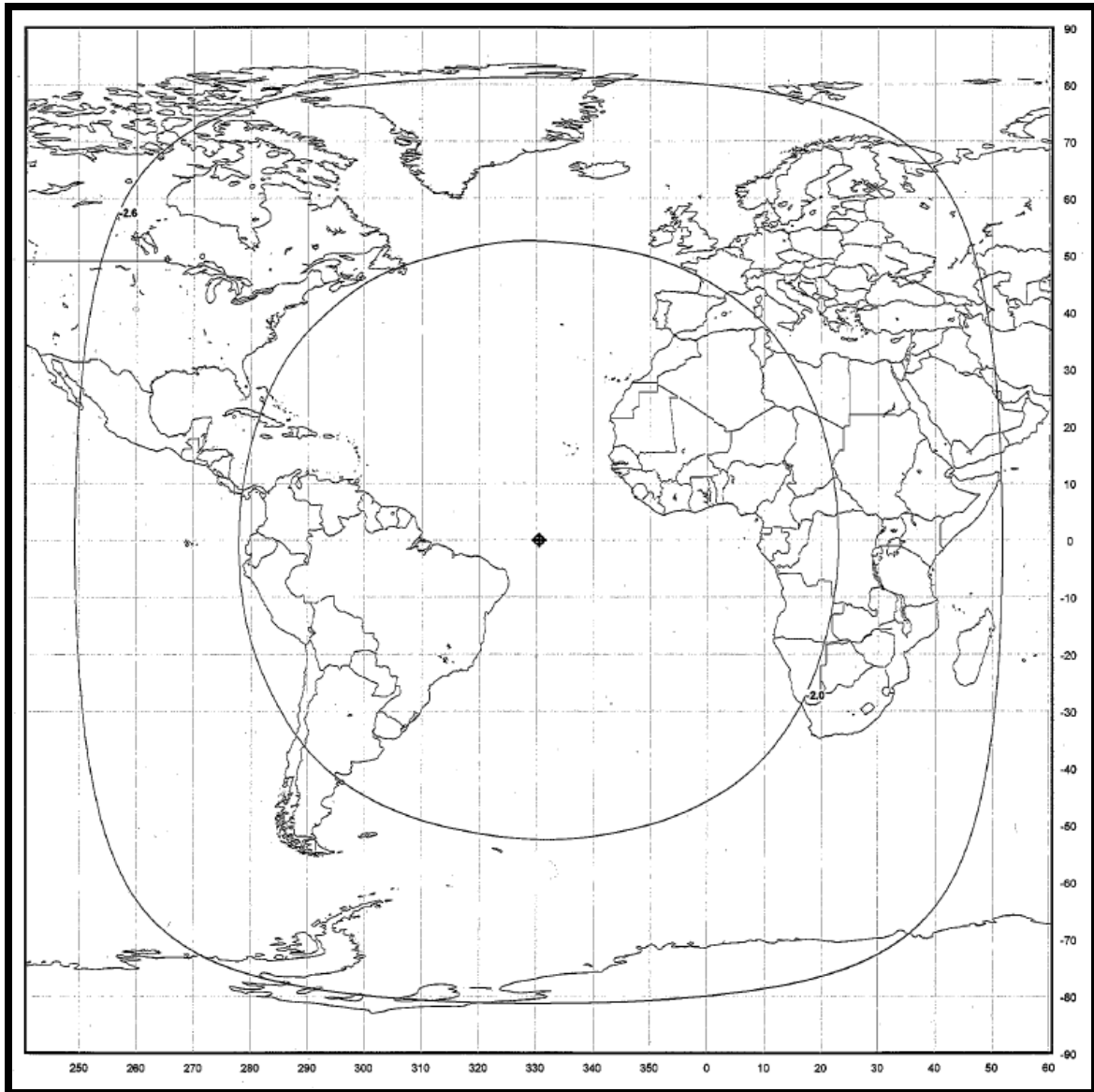
Peak Beam Gain: 17.1 dBi
Polarization: Vertical
Peak EIRP: 11.0 dBW



Relative Gain Contours Shown: -2.0, -2.6 dB

Exhibit 2-28: Ku-Band Uplink Power Control Downlink Beam
[Schedule S Beam Designation: BNK1]

Peak Beam Gain: 20.6 dBi
Polarization: Right Hand Circular
Peak EIRP: 13.6 dBW



Relative Gain Contours Shown: -2.0, -2.6 dB

Exhibit 2-29: Ku-Band Uplink Power Control Downlink Beam (Spot 1)
[Schedule S Beam Designation: BNK2]

Peak Beam Gain: 37.8 dBi
Polarization: Vertical
Peak EIRP: 19.8 dBW

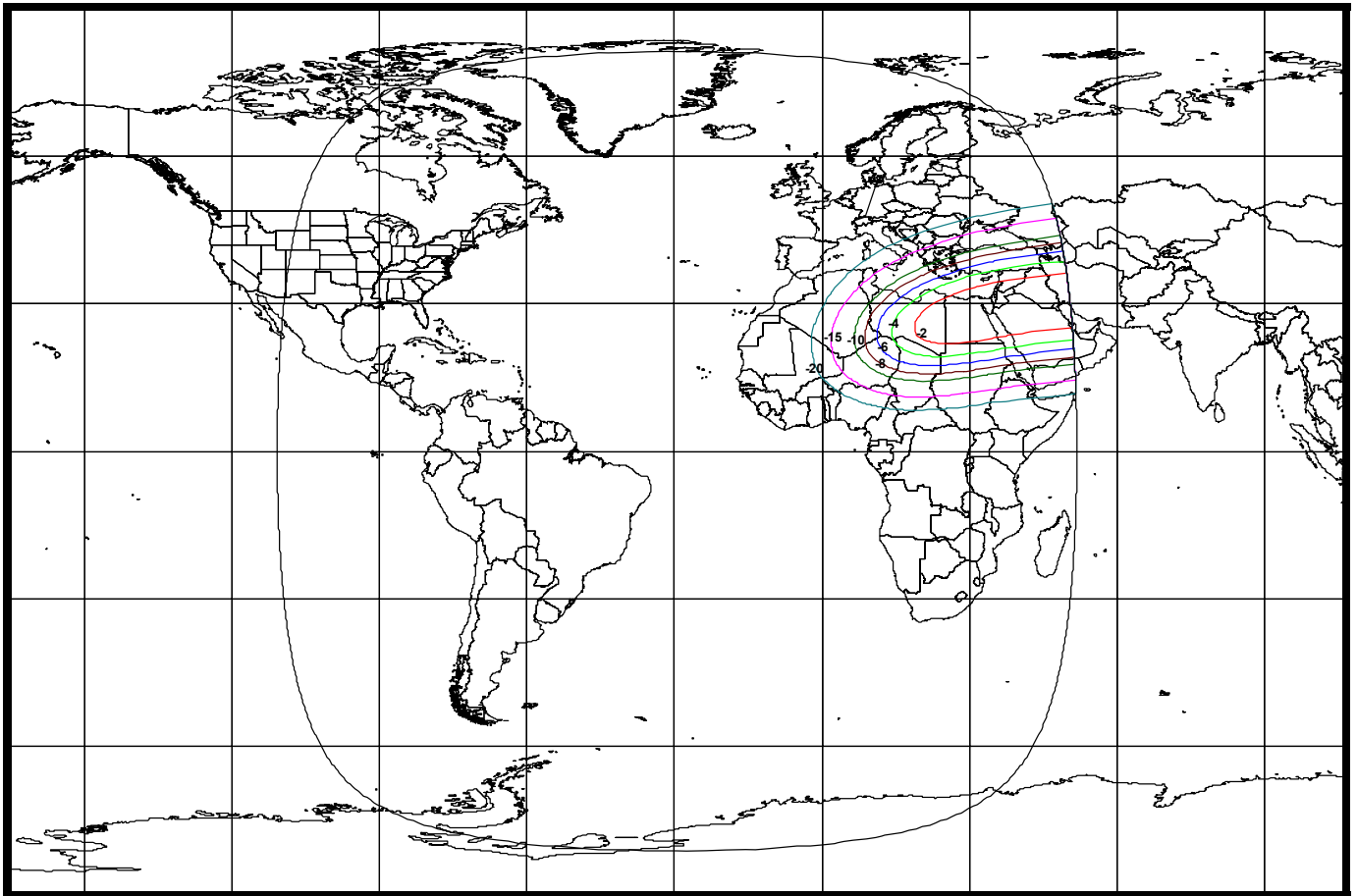


Exhibit 2-30: Ku-Band Uplink Power Control Downlink Beam (Spot 2)
[Schedule S Beam Designation: BNK3]

Peak Beam Gain: 36.9 dBi
Polarization: Horizontal
Peak EIRP: 18.9 dBW

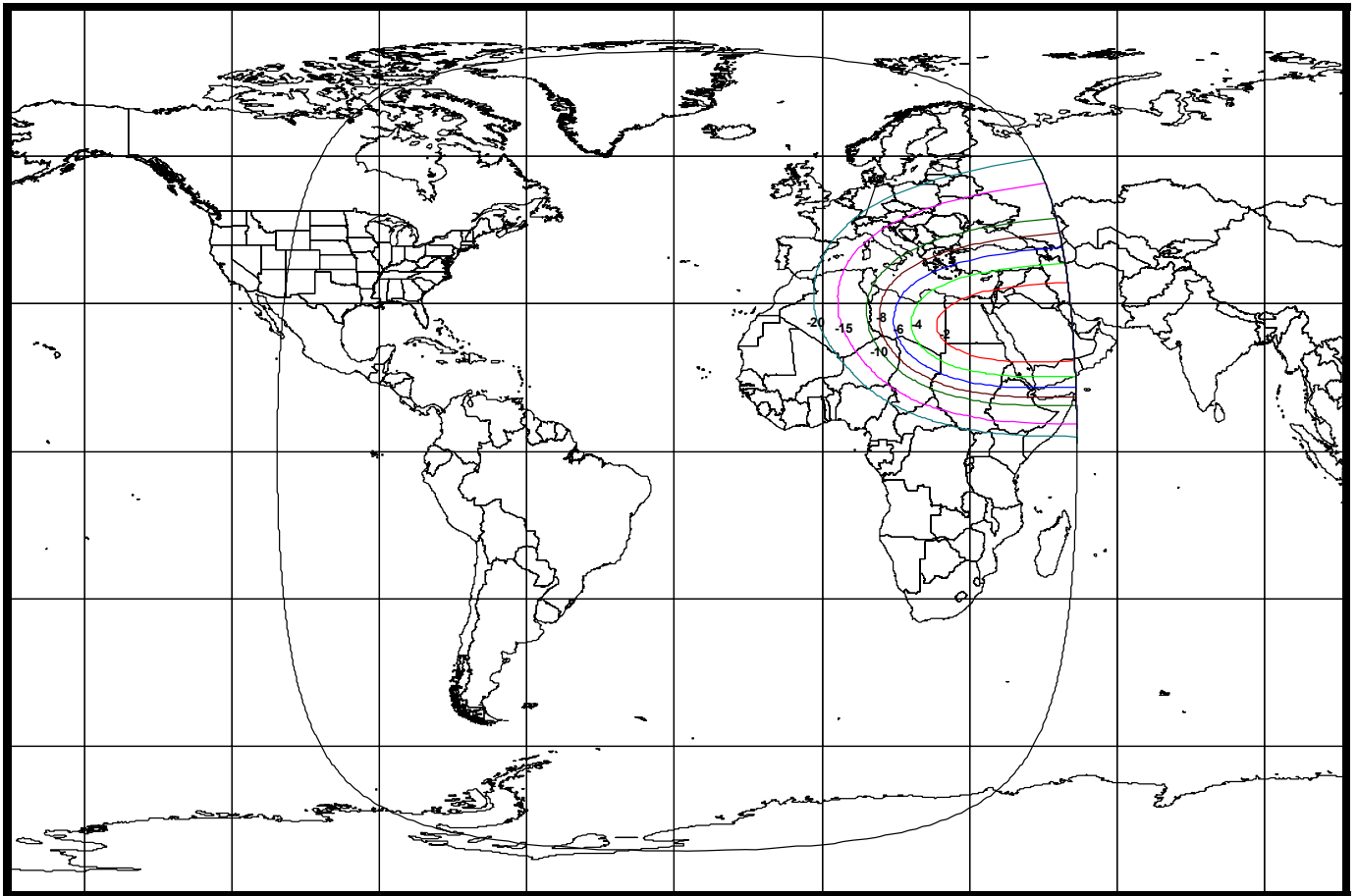


EXHIBIT 3: EMISSION DESIGNATORS

Signal Type	Emission Designator	Allocated Bandwidth (kHz)
Analog TV/FM Carrier	30M0F3F	30000
Analog TV/FM Carrier	36M0F3F	36000
76436 kbps Carrier	112MG7W	112000
52550 kbps Carrier	77M0G7W	77000
49138 kbps Carrier	72M0G7W	72000
27981 kbps Carrier	41M0G7W	41000
24575 kbps Carrier	36M0G7W	36000
23204 kbps Carrier	34M0G7W	34000
6000 kbps carrier	10M3G7W	10300
64 kbps Carrier	100KG7W	100
512 kbps Carrier	1M45G7W	1450
128 kbps Carrier	400KG7W	400

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS

FREQUENCY BAND : 3.7 - 4.2 GHz							
Global A Beam: 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	32.5	32.5	32.5	32.5	32.5	32.5	32.5
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)	-160.9	-160.8	-160.7	-160.5	-160.4	-160.3	-159.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.9	8.8	11.2	13.5	15.9	18.3	17.6
Global A Beam: 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	32.5	32.5	32.5	32.5	32.5	32.5	32.5
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)	-169.7	-169.5	-169.4	-169.3	-169.2	-169.1	-168.3
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	17.7	17.5	19.9	22.3	24.7	27.1	26.3
Global B Beam: 36M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	32.5	32.5	32.5	32.5	32.5	32.5	32.5
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)	-160.9	-160.8	-160.7	-160.5	-160.4	-160.3	-159.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.9	8.8	11.2	13.5	15.9	18.3	17.6
Global B Beam: 36M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	32.5	32.5	32.5	32.5	32.5	32.5	32.5
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)	-169.7	-169.5	-169.4	-169.3	-169.2	-169.1	-168.3
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	17.7	17.5	19.9	22.3	24.7	27.1	26.3

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3.7 – 4.2 GHz							
West Hemi Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	39.5	39.5	39.5	39.5	39.5	39.5	39.5
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)	-153.9	-153.8	-153.7	-153.5	-153.4	-153.3	-152.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.9	1.8	4.2	6.5	8.9	11.3	10.6
West Hemi Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-162.4	-162.3	-162.2	-162.1	-162.0	-161.8	-161.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.4	10.3	12.7	15.1	17.5	19.8	19.1
East Hemi Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	39.5	39.5	39.5	39.5	39.5	39.5	39.5
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)	-153.9	-153.8	-153.7	-153.5	-153.4	-153.3	-152.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.9	1.8	4.2	6.5	8.9	11.3	10.6
East Hemi Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	39.5	39.5	39.5	39.5	39.5	39.5	39.5
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-162.4	-162.3	-162.2	-162.1	-162.0	-161.8	-161.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.4	10.3	12.7	15.1	17.5	19.8	19.1

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3.7 – 4.2 GHz							
Northwest Zone Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.4*	41.3*	43.7*	44.0	44.0	44.0	44.0
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	-149.5	-149.0	-148.9	-148.8	-148.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	0.0	2.0	4.4	6.8	6.1
Northwest Zone Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	44.0	44.0	44.0	44.0	44.0	44.0	44.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-157.9	-157.8	-157.7	-157.6	-157.5	-157.3	-156.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	5.9	5.8	8.2	10.6	13.0	15.3	14.6
Northeast Zone Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.4*	41.3*	41.5	41.5	41.5	41.5	41.5
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	-151.7	-151.5	-151.4	-151.3	-150.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	2.2	4.5	6.9	9.3	8.6
Northeast Zone Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.5	41.5	41.5	41.5	41.5	41.5	41.5
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-160.4	-160.3	-160.2	-160.1	-160.0	-159.8	-159.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.4	8.3	10.7	13.1	15.5	17.8	17.1

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3.7 – 4.2 GHz							
Southwest Zone Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.4*	41.3*	43.7*	43.8	43.8	43.8	43.8
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	-149.5	-149.2	-149.1	-149.0	-148.3
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.0	0.0	0.0	2.2	4.6	7.0	6.3
Southwest Zone Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	43.8	43.8	43.8	43.8	43.8	43.8	43.8
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-158.1	-158.0	-157.9	-157.8	-157.7	-157.5	-156.8
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	6.1	6.0	8.4	10.8	13.2	15.5	14.8
Southeast Zone Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.0	41.0	41.0	41.0	41.0	41.0	41.0
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)	-152.4	-152.3	-152.2	-152.0	-151.9	-151.8	-151.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.4	0.3	2.7	5.0	7.4	9.8	9.1
Southeast Zone Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-160.9	-160.8	-160.7	-160.6	-160.5	-160.3	-159.6
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.9	8.8	11.2	13.6	16.0	18.3	17.6

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 3.7 – 4.2 GHz							
Telemetry - Global Beam (Transfer Orbit Operation)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Occupied Bandwidth (kHz)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
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)	-175.0	-174.9	-174.8	-174.7	-174.6	-174.5	-173.7
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	23.0	22.9	25.3	27.7	30.1	32.5	31.7
Telemetry - Global Beam (Emergency Operation)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Occupied Bandwidth (kHz)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
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)	-177.4	-177.3	-177.2	-177.1	-177.0	-176.9	-176.1
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	25.4	25.3	27.7	30.1	32.5	34.9	34.1
Telemetry - Global Beam (On-Station Operation)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Occupied Bandwidth (kHz)	250.0	250.0	250.0	250.0	250.0	250.0	250.0
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)	-174.8	-174.7	-174.6	-174.5	-174.4	-174.3	-173.5
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	22.8	22.7	25.1	27.5	29.9	32.3	31.5
C-Band ULPC -- Global Beam							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	11.0	11.0	11.0	11.0	11.0	11.0	11.0
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)	-160.3	-160.2	-160.1	-160.0	-159.9	-159.8	-159.0
PFD Limit (dBW/m ² /4kHz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	8.3	8.2	10.6	13.0	15.4	17.8	17.0

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 10.95 - 11.7 GHz & 11.45 - 11.70 GHz							
Spot 1 Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	43.4*	43.3*	45.7*	48.0*	50.4*	52.0	52.0
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)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.8	-140.1
PFD Limit (dBW/m ² /4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.8	0.1
Spot 1 Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	51.9*	51.8*	52.0	52.0	52.0	52.0	52.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-150.0	-150.0	-149.7	-149.6	-149.5	-149.3	-148.6
PFD Limit (dBW/m ² /4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	2.2	4.6	7.0	9.3	8.6
Spot 2 Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	43.4*	43.3*	45.7*	48.0*	50.4*	51.0	51.0
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)	-150.0	-150.0	-147.5	-145.0	-142.5	-141.8	-141.1
PFD Limit (dBW/m ² /4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	1.8	1.1
Spot 2 Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	51.0	51.0	51.0	51.0	51.0	51.0	51.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-150.9	-150.8	-150.7	-150.6	-150.5	-150.3	-149.6
PFD Limit (dBW/m ² /4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.9	0.8	3.2	5.6	8.0	10.3	9.6

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 10.95 - 11.7 GHz & 11.45 - 11.70 GHz							
Ku-Band ULPC (Global Beam)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	13.6	13.6	13.6	13.6	13.6	13.6	13.6
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)	-157.7	-157.6	-157.5	-157.4	-157.3	-157.2	-156.4
PFD Limit (dBW/m ² /4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	7.7	7.6	10.0	12.4	14.8	17.2	16.4
FREQUENCY BAND : 12.50 - 12.750 GHz							
Spot 1 Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	45.4*	45.3*	47.7*	50.0*	52.0	52.0	52.0
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	-140.9	-140.8	-140.1
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.4	2.8	2.1
Spot 1 Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	52.0	52.0	52.0	52.0	52.0	52.0	52.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-149.9	-149.8	-149.7	-149.6	-149.5	-149.3	-148.6
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	1.9	1.8	4.2	6.6	9.0	11.3	10.6
Spot 2 Beam: 30M0F3F							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	45.4*	45.3*	47.7*	50.0*	51.0	51.0	51.0
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	-141.9	-141.8	-141.1
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	1.4	3.8	3.1

EXHIBIT 4: POWER FLUX DENSITY CALCULATIONS (continued)

FREQUENCY BAND : 12.50 - 12.750 GHz							
Spot 2 Beam: 34M0G7W							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	51.0	51.0	51.0	51.0	51.0	51.0	51.0
Occupied Bandwidth (kHz)	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0	28452.0
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)	-150.9	-150.8	-150.7	-150.6	-150.5	-150.3	-149.6
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.9	2.8	5.2	7.6	10.0	12.3	11.6
Ku-Band ULPC (Spot 1)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	19.8	19.8	19.8	19.8	19.8	19.8	19.8
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)	-151.5	-151.4	-151.3	-151.2	-151.1	-151.0	-150.2
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	3.5	3.4	5.8	8.2	10.6	13.0	12.2
Ku-Band ULPC (Spot 2)							
Elevation Angle (degrees)	0.0	5.0	10.0	15.0	20.0	25.0	90.0
Assumed EIRP (dBW)	18.9	18.9	18.9	18.9	18.9	18.9	18.9
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)	-152.4	-152.3	-152.2	-152.1	-152.0	-151.9	-151.1
PFD Limit (dBW/m ² /4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	4.4	4.3	6.7	9.1	11.5	13.9	13.1

* This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the beam 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 5: Link Budgets

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	-12.0	-12.0	-12.0	-12.0
Uplink SFD (dBW/m2)	-82.3	-87.3	-83.3	-83.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	28.5	28.5	28.5	28.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-30.8	-30.8	-30.8	-30.8
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-30.8	-30.8	-30.8	-30.8
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)	15.2	7.0	7.0	7.0
Earth Station Gain (dBi)	58.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	6.1	7.0	7.0
Earth Station Gain (dBi)	55.0	46.5	47.5	47.5
Earth Station G/T (dB/K)	34.5	26.2	26.6	26.6
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	80.6	75.6	72.1	51.7
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)	-12.0	-12.0	-12.0	-12.0
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)	21.4	17.2	20.2	19.3
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.5	28.5	21.3	.9
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)	34.5	26.2	26.6	26.6
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)	19.2	11.7	11.4	10.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	21.4	17.2	20.2	19.3
C/N Downlink (dB)	19.2	11.7	11.4	10.5
C/I Intermodulation (dB)	N/A	N/A	20.3	19.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Uplink Adjacent Satellite 1 (dB)	21.7	17.5	20.5	19.6
C/I Downlink Adjacent Satellite 1 (dB)	16.9	8.5	9.0	8.1
C/I Uplink Adjacent Satellite 2 (dB)	21.7	17.5	20.5	19.6
C/I Downlink Adjacent Satellite 2 (dB)	17.6	10.4	10.6	9.7
C/(N+I) Composite (dB)				
Required System Margin (dB)	11.3	4.5	4.9	4.0
Net C/(N+I) Composite (dB)	-1.0	-1.0	-1.0	-1.0
Minimum Required C/N (dB)	10.3	3.5	3.9	3.0
Excess Link Margin (dB)	-10.0	-3.4	-3.9	-3.0
Number of Carriers	.3	.1	0.0	0.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	1	1.0	2.4	258.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-43.8	-50.2	-47.2	-48.1
	-33.5	-42.3	-43.0	-43.9

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	-12.0	-12.0	-12.0	-12.0
Uplink SFD (dBW/m2)	-84.3	-88.3	-88.3	-88.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	33.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
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)	11.0	7.0	7.0	7.0
Earth Station Gain (dBi)	55.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	3.0	3.0	3.0
Earth Station Gain (dBi)	46.5	39.7	39.7	39.7
Earth Station G/T (dB/K)	26.2	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	78.6	74.6	67.1	46.7
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)	-12.0	-12.0	-12.0	-12.0
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)	19.4	16.2	15.2	14.3
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	33.5	33.5	26.3	5.9
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)	26.2	19.2	19.2	19.2
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)	15.9	9.7	9.0	8.1
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.4	16.2	15.2	14.3
C/N Downlink (dB)	15.9	9.7	9.0	8.1
C/I Intermodulation (dB)	N/A	N/A	20.3	19.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.7	28.5
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.7	28.5
C/I Uplink Adjacent Satellite 1 (dB)	19.7	16.5	15.5	14.6
C/I Downlink Adjacent Satellite 1 (dB)	23.3	11.2	10.5	9.6
C/I Uplink Adjacent Satellite 2 (dB)	19.7	16.5	15.5	14.6
C/I Downlink Adjacent Satellite 2 (dB)	25.1	19.9	19.3	18.4
COMPOSITE LINK PERFORMANCE				
C/(N+I) Composite (dB)	11.5	5.7	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.5	4.7	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.5	1.4	0.0	0.0
Number of Carriers	1	1.0	2.3	257.6
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.8	-51.2	-52.2	-53.1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.5	-35.3	-36.0	-36.9

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	-12.0	-12.0	-12.0	-12.0
Uplink SFD (dBW/m2)	-81.3	-74.3	-85.3	-85.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	SPOT	SPOT	SPOT	SPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	45.0	45.0	45.0	45.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	41M0G7W	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	27981	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	34310	6771.1	75.4
Allocated Bandwidth(kHz)	36000	41000	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)	15.2	15.2	7.0	7.0
Earth Station Gain (dBi)	58.4	58.4	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	1.2	1.8	1.8
Earth Station Gain (dBi)	47.5	41.3	44.8	44.8
Earth Station G/T (dB/K)	25.0	18.8	22.3	22.3
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)	81.6	81.6	64.8	44.5
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)	-12.0	-12.0	-12.0	-12.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.4	-68.3	-48.8
Uplink C/N(dB)	22.4	22.6	12.9	12.1
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	45.0	43.4	35.3	15.0
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	25.0	18.8	22.3	22.3
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.4	-68.3	-48.8
Downlink C / N(dB)	16.6	9.0	11.4	10.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	22.4	22.6	12.9	12.1
C/N Downlink (dB)	16.6	9.0	11.4	10.7
C/I Intermodulation (dB)	N/A	N/A	26.3	25.6
C/I Uplink Co-Channel (dB)*	27.6	27.0	28.4	28.2
C/I Downlink Co-Channel (dB)*	27.6	27.0	28.4	28.2
C/I Uplink Adjacent Satellite 1 (dB)	22.7	22.9	13.2	12.4
C/I Downlink Adjacent Satellite 1 (dB)	20.6	11.9	15.2	14.4
C/I Uplink Adjacent Satellite 2 (dB)	22.7	22.9	13.2	12.4
C/I Downlink Adjacent Satellite 2 (dB)	22.2	15.3	17.3	16.5
C/(N+I) Composite (dB)	12.5	6.2	5.6	4.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.5	5.2	4.6	3.9
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	1.5	1.8	.8	.9
Number of Carriers	1	1.0	2.9	309.1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.8	-52.2	-54.5	-55.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-15.0	-26.0	-27.0	-27.8

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-6.5	-6.5	-6.5	-6.5
Uplink SFD (dBW/m2)	-81.4	-87.4	-82.4	-82.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	28.5	28.5	28.5	28.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-30.8	-30.8	-30.8	-30.8
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-30.8	-30.8	-30.8	-30.8
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)	15.2	7.0	7.0	7.0
Earth Station Gain (dBi)	58.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	6.1	7.0	7.0
Earth Station Gain (dBi)	55.0	46.5	47.5	47.5
Earth Station G/T (dB/K)	34.5	26.2	26.6	26.6
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	81.5	75.5	73.0	52.5
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)	-6.5	-6.5	-6.5	-6.5
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)	27.8	22.6	26.5	25.7
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.5	28.5	21.3	.9
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)	34.5	26.2	26.6	26.6
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)	19.2	11.7	11.4	10.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.8	22.6	26.5	25.7
C/N Downlink (dB)	19.2	11.7	11.4	10.5
C/I Intermodulation (dB)	N/A	N/A	20.2	19.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Uplink Adjacent Satellite 1 (dB)	20.6	15.4	19.4	18.5
C/I Downlink Adjacent Satellite 1 (dB)	16.9	8.5	9.0	8.1
C/I Uplink Adjacent Satellite 2 (dB)	20.6	15.4	19.4	18.5
C/I Downlink Adjacent Satellite 2 (dB)	17.6	10.4	10.5	9.6
C/N(I) Composite (dB)				
Required System Margin (dB)	11.4	4.4	4.9	4.0
Net C/(N+I) Composite (dB)	-1.0	-1.0	-1.0	-1.0
Minimum Required C/N (dB)	10.4	3.4	3.9	3.0
Excess Link Margin (dB)	-10.0	-3.4	-3.9	-3.0
Number of Carriers	.4	0.0	0.0	0.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	1	1.0	2.4	260.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-42.9	-50.3	-46.3	-47.2
	-33.5	-42.3	-43.0	-43.9

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-6.5	-6.5	-6.5	-6.5
Uplink SFD (dBW/m2)	-84.4	-90.4	-87.4	-87.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	33.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
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)	10.0	7.0	7.0	7.0
Earth Station Gain (dBi)	54.1	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	3.0	3.0	3.0
Earth Station Gain (dBi)	46.5	39.7	39.7	39.7
Earth Station G/T (dB/K)	26.2	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE				
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	78.5	72.5	67.9	47.5
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)	-6.5	-6.5	-6.5	-6.5
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)	24.8	19.6	21.5	20.6
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	33.5	33.5	26.2	5.8
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)	26.2	19.2	19.2	19.2
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)	15.9	9.7	8.9	8.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	24.8	19.6	21.5	20.6
C/N Downlink (dB)	15.9	9.7	8.9	8.0
C/I Intermodulation (dB)	N/A	N/A	20.2	19.3
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.6	28.4
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.6	28.4
C/I Uplink Adjacent Satellite 1 (dB)	17.6	12.4	14.3	13.4
C/I Downlink Adjacent Satellite 1 (dB)	23.3	11.2	10.4	9.5
C/I Uplink Adjacent Satellite 2 (dB)	17.6	12.4	14.3	13.4
C/I Downlink Adjacent Satellite 2 (dB)	25.1	19.9	19.2	18.3
C/N(I) Composite (dB)				
C/N(I) Composite (dB)	11.2	4.9	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.2	3.9	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.2	.5	0.0	0.0
Number of Carriers	1	1.0	2.4	263.3
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-41.6	-53.3	-51.4	-52.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.5	-35.3	-36.1	-37.0

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-6.5	-6.5	-6.5	-6.5
Uplink SFD (dBW/m2)	-82.4	-90.4	-88.4	-88.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35.0	35.0	35.0	35.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-39.8	-39.8	-39.8	-39.8
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-39.8	-39.8	-39.8	-39.8
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)	13.0	7.0	7.0	7.0
Earth Station Gain (dBi)	56.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
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)	80.5	72.5	66.7	46.3
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)	-6.5	-6.5	-6.5	-6.5
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)	26.8	19.6	20.3	19.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	35.0	27.5	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)	23.6	19.2	19.2	19.2
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)	14.8	11.2	10.2	9.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	26.8	19.6	20.3	19.4
C/N Downlink (dB)	14.8	11.2	10.2	9.3
C/I Intermodulation (dB)	N/A	N/A	20.0	19.1
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.4	28.1
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.4	28.1
C/I Uplink Adjacent Satellite 1 (dB)	19.6	12.4	13.1	12.2
C/I Downlink Adjacent Satellite 1 (dB)	20.3	11.2	10.2	9.3
C/I Uplink Adjacent Satellite 2 (dB)	19.6	12.4	13.1	12.2
C/I Downlink Adjacent Satellite 2 (dB)	22.8	19.9	18.9	18.0
C/N(I) Composite (dB)				
Required System Margin (dB)	11.2	5.3	4.9	4.0
Net C/(N+I) Composite (dB)	-1.0	-1.0	-1.0	-1.0
Minimum Required C/N (dB)	10.2	4.3	3.9	3.0
Excess Link Margin (dB)	-10.0	-3.4	-3.9	-3.0
Number of Carriers	2	1.0	0.0	0.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	1	1.0	2.5	277.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-53.3	-52.6	-53.5
	-25.0	-33.8	-34.8	-35.7

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	HEMI	HEMI	HEMI	HEMI
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-6.5	-6.5	-6.5	-6.5
Uplink SFD (dBW/m2)	-72.4	-88.4	-82.4	-82.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	SPOT	SPOT	SPOT	SPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950
Downlink Beam Polarization	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	45.0	45.0	45.0	45.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	77M0G7W	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	52550	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	64435	6771.1	75.4
Allocated Bandwidth(kHz)	36000	77000	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)	11.0	7.0	7.0	7.0
Earth Station Gain (dBi)	55.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	1.8	2.4	2.4
Earth Station Gain (dBi)	55.5	44.8	47.5	47.5
Earth Station G/T (dB/K)	33.1	22.3	25.0	25.0
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)	79.3	74.5	65.1	44.8
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)	-6.5	-6.5	-6.5	-6.5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Uplink C/N(dB)	25.6	18.3	18.7	17.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	38.8	45.0	32.8	12.4
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.1	22.3	25.0	25.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Downlink C / N(dB)	18.5	11.3	11.6	10.8
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25.6	18.3	18.7	17.9
C/N Downlink (dB)	18.5	11.3	11.6	10.8
C/I Intermodulation (dB)	N/A	N/A	26.5	25.7
C/I Uplink Co-Channel (dB)*	27.3	27.0	28.6	28.4
C/I Downlink Co-Channel (dB)*	27.3	27.0	28.6	28.4
C/I Uplink Adjacent Satellite 1 (dB)	18.4	11.1	11.5	10.8
C/I Downlink Adjacent Satellite 1 (dB)	23.0	15.1	15.6	14.9
C/I Uplink Adjacent Satellite 2 (dB)	18.4	11.1	11.5	10.8
C/I Downlink Adjacent Satellite 2 (dB)	23.6	17.2	17.2	16.4
C/(N+I) Composite (dB)	12.3	5.3	5.6	4.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.3	4.3	4.6	3.8
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	1.3	.9	.7	.8
Number of Carriers	2	1.0	5.2	558.9
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.1	-54.6	-54.2	-54.9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-21.2	-27.1	-29.6	-30.3

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	SPOT	SPOT	SPOT	SPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	4.0	4.0	4.0	4.0
Uplink SFD (dBW/m2)	-82.4	-82.4	-90.4	-90.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	GLOBAL	GLOBAL	GLOBAL	GLOBAL
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	28.5	28.5	28.5	28.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-46.8	-46.8	-46.8	-46.8
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-46.8	-46.8	-46.8	-46.8
CARRIER INFORMATION				
Carrier ID	36M0F3F	41M0G7W	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	27981	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	34310	6771.1	75.4
Allocated Bandwidth(kHz)	36000	41000	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)	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	4.5	4.5	4.5
Earth Station Gain (dBi)	49.3	43.9	43.9	43.9
Earth Station G/T (dB/K)	28.4	23.6	23.6	23.6
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)	80.5	80.5	64.2	44.2
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	4.0	4.0	4.0	4.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.4	-68.3	-48.8
Uplink C/N(dB)	30.1	30.3	21.1	20.6
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	28.5	28.5	20.6	.5
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	23.6	23.6	23.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.4	-68.3	-48.8
Downlink C / N(dB)	13.1	8.5	7.6	7.1
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	30.1	30.3	21.1	20.6
C/N Downlink (dB)	13.1	8.5	7.6	7.1
C/I Intermodulation (dB)	N/A	N/A	20.1	19.6
C/I Uplink Co-Channel (dB)*	27.6	27.0	28.5	28.6
C/I Downlink Co-Channel (dB)*	27.6	27.0	28.5	28.6
C/I Uplink Adjacent Satellite 1 (dB)	30.9	31.1	21.9	21.4
C/I Downlink Adjacent Satellite 1 (dB)	26.8	20.8	20.1	19.6
C/I Uplink Adjacent Satellite 2 (dB)	30.9	31.1	21.9	21.4
C/I Downlink Adjacent Satellite 2 (dB)	28.2	23.3	22.6	22.1
C/(N+I) Composite (dB)	12.3	8.0	6.6	6.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.3	7.0	5.6	5.1
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	1.3	3.6	1.7	2.1
Number of Carriers	1	1.0	2.8	280.8
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.4	-51.8	-61.0	-61.5
Downlink EIRP Density At Beam Peak (dBW/Hz)	-33.5	-42.9	-43.7	-44.2

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	SPOT	SPOT	SPOT	SPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	4.0	4.0	4.0	4.0
Uplink SFD (dBW/m2)	-80.4	-83.4	-83.4	-83.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	33.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-44.3	-44.3	-44.3	-44.3
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-44.3	-44.3	-44.3	-44.3
CARRIER INFORMATION				
Carrier ID	36M0F3F	72M0G7W	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	49138	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	60251	6771.1	75.4
Allocated Bandwidth(kHz)	36000	72000	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)	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	3.5	3.7	3.7
Earth Station Gain (dBi)	51.9	41.1	41.2	41.2
Earth Station G/T (dB/K)	31.0	21.0	20.9	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)	75.7	79.5	69.0	48.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	4.0	4.0	4.0	4.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-68.3	-48.8
Uplink C/N(dB)	25.3	26.8	25.8	25.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	27.5	33.5	23.3	3.2
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)	31.0	21.0	20.9	20.9
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-68.3	-48.8
Downlink C / N(dB)	14.7	8.5	7.7	7.1
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25.3	26.8	25.8	25.2
C/N Downlink (dB)	14.7	8.5	7.7	7.1
C/I Intermodulation (dB)	N/A	N/A	20.3	19.7
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.8	28.8
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.8	28.8
C/I Uplink Adjacent Satellite 1 (dB)	26.1	27.7	26.7	26.1
C/I Downlink Adjacent Satellite 1 (dB)	26.1	16.3	17.4	16.8
C/I Uplink Adjacent Satellite 2 (dB)	26.1	27.7	26.7	26.1
C/I Downlink Adjacent Satellite 2 (dB)	27.2	21.1	20.5	19.8
C/N(I) Composite (dB)				
Required System Margin (dB)	13.0	7.4	6.7	6.1
Net C/(N+I) Composite (dB)	-1.0	-1.0	-1.0	-1.0
Minimum Required C/N (dB)	12.0	6.4	5.7	5.1
Excess Link Margin (dB)	-10.0	-3.4	-3.9	-3.0
Number of Carriers	2	1.0	4.6	480.1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.2	-55.2	-56.2	-56.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-32.5	-38.3	-39.0	-39.6

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	SPOT	SPOT	SPOT	SPOT
Uplink Frequency (GHz)	14.250	14.250	14.250	14.250
Uplink Beam Polarization	Linear	Linear	Linear	Linear
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	4.0	4.0	4.0	4.0
Uplink SFD (dBW/m2)	-79.4	-83.4	-90.4	-90.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35	35	35	35
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-43.1	-43.1	-43.1	-43.1
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-50	-50	-50	-50
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-43.1	-43.1	-43.1	-43.1
CARRIER INFORMATION				
Carrier ID	36M0F3F	77M0G7W	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	52550	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	64435	6771.1	75.4
Allocated Bandwidth(kHz)	36000	77000	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)	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	9.2	3.0	3.5	3.5
Earth Station Gain (dBi)	50.3	39.7	41.1	41.1
Earth Station G/T (dB/K)	29.4	19.2	21.0	21.0
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)	76.7	79.5	61.7	41.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	4.0	4.0	4.0	4.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Uplink C/N(dB)	26.3	26.5	18.5	17.9
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	29.0	35.0	24.5	4.3
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)	29.4	19.2	21.0	21.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Downlink C / N(dB)	14.6	7.9	9.0	8.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	26.3	26.5	18.5	17.9
C/N Downlink (dB)	14.6	7.9	9.0	8.3
C/I Intermodulation (dB)	N/A	N/A	20.3	19.6
C/I Uplink Co-Channel (dB)*	27.3	27.0	28.7	28.7
C/I Downlink Co-Channel (dB)*	27.3	27.0	28.7	28.7
C/I Uplink Adjacent Satellite 1 (dB)	27.1	27.4	19.4	18.7
C/I Downlink Adjacent Satellite 1 (dB)	24.7	11.2	15.6	15.0
C/I Uplink Adjacent Satellite 2 (dB)	27.1	27.4	19.4	18.7
C/I Downlink Adjacent Satellite 2 (dB)	26.0	19.9	20.4	19.8
C/(N+I) Composite (dB)	13.0	5.9	6.7	6.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.0	4.9	5.7	5.1
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	2.0	1.5	1.8	2.1
Number of Carriers	2	1.0	5.0	524.3
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.2	-55.5	-63.5	-64.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-31.0	-37.1	-37.8	-38.4

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	SPOT	SPOT	SPOT	SPOT	SPOT	SPOT
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)	4.0	4.0	4.0	4.0	4.0	4.0
Uplink SFD (dBW/m2)	-70.4	-84.4	-80.4	-80.4	-80.4	-80.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	SPOT	SPOT	SPOT	SPOT	SPOT	SPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950	11.950	11.950
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)	45.0	45.0	45.0	45.0	45.0	45.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION						
Carrier ID	36M0F3F	112MG7W	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	76436	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	93724	6771.1	75.4	1229.0	307.0
Allocated Bandwidth(kHz)	36000	112000	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	2.4
Earth Station Gain (dBi)	56.9	56.9	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)	9.0	1.8	2.4	2.4	2.4	6.1
Earth Station Gain (dBi)	59.0	44.8	47.5	47.5	47.5	55.5
Earth Station G/T (dB/K)	36.6	22.3	25.0	25.0	25.0	33.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
Link Fade Type	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	79.5	78.5	65.4	45.1	57.2	44.7
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)	4.0	4.0	4.0	4.0	4.0	4.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-79.7	-68.3	-48.8	-60.9	-54.9
Uplink C/N(dB)	29.1	23.9	22.2	21.5	21.4	15.0
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	36.7	45.0	31.0	10.7	22.8	10.3
Antenna Pointing Error (dB)	-5	-5	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	36.6	22.3	25.0	25.0	25.0	33.1
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-79.7	-68.3	-48.8	-60.9	-54.9
Downlink C / N(dB)	19.9	9.7	9.9	9.1	9.0	10.7
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	29.1	23.9	22.2	21.5	21.4	15.0
C/N Downlink (dB)	19.9	9.7	9.9	9.1	9.0	10.7
C/I Intermodulation (dB)	16.8	N/A	26.4	25.7	25.6	19.1
C/I Uplink Co-Channel (dB)*	27.2	27.0	28.5	28.3	28.7	21.9
C/I Downlink Co-Channel (dB)*	27.2	27.0	28.5	28.3	28.7	21.9
C/I Uplink Adjacent Satellite 1 (dB)	30.0	24.8	23.1	22.4	22.3	15.8
C/I Downlink Adjacent Satellite 1 (dB)	24.4	13.5	13.9	13.2	13.1	15.1
C/I Uplink Adjacent Satellite 2 (dB)	30.0	24.8	23.1	22.4	22.3	15.8
C/I Downlink Adjacent Satellite 2 (dB)	24.9	15.6	15.5	14.7	14.6	15.7
COMPOSITE LINK PERFORMANCE						
C/(N+I) Composite (dB)	13.4	7.1	7.1	6.4	6.3	6.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.4	6.1	6.1	5.4	5.3	5.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0	-3.4	-3.4
Excess Link Margin (dB)	2.4	2.8	2.3	2.4	1.9	1.6
Number of Carriers	3	1.0	7.7	825.3	51.8	280.0
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-43.4	-58.1	-59.8	-60.5	-60.6	-59.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-23.3	-28.7	-31.3	-32.0	-32.1	-38.6

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-1.0	-1.0	-1.0	-1.0
Uplink SFD (dBW/m2)	-80.5	-89.5	-87.5	-87.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	HEMI	HEMI	HEMI
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	33.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-41.3	-41.3	-41.3	-41.3
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)	15.2	7.0	7.0	7.0
Earth Station Gain (dBi)	58.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
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)	82.4	73.4	67.8	47.3
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)	-1.0	-1.0	-1.0	-1.0
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)	34.2	26.0	26.8	26.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	33.5	33.5	26.2	5.8
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)	23.6	19.2	19.2	19.2
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)	13.3	9.7	8.8	8.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	34.2	26.0	26.8	26.0
C/N Downlink (dB)	13.3	9.7	8.8	8.0
C/I Intermodulation (dB)	N/A	N/A	20.1	19.3
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.6	28.3
C/I Uplink Adjacent Satellite 1 (dB)	21.5	13.3	14.2	13.3
C/I Downlink Adjacent Satellite 1 (dB)	20.3	11.2	10.4	9.5
C/I Uplink Adjacent Satellite 2 (dB)	21.5	13.3	14.2	13.3
C/I Downlink Adjacent Satellite 2 (dB)	22.8	19.9	19.1	18.2
C/(N+I) Composite (dB)	11.0	5.3	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.0	4.3	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	0.0	1.0	0.0	0.0
Number of Carriers	1	1.0	2.4	266.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.0	-52.4	-51.5	-52.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-26.5	-35.3	-36.1	-37.0

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-1.0	-1.0	-1.0	-1.0
Uplink SFD (dBW/m2)	-73.5	-88.5	-82.5	-82.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	SPOT	SPOT	SPOT	SPOT
Downlink Frequency (GHz)	11.950	11.950	11.950	11.950
Downlink Beam Polarization	Linear	Linear	Linear	Linear
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	45.0	45.0	45.0	45.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-26.0	-26.0	-26.0	-26.0
CARRIER INFORMATION				
Carrier ID	36M0F3F	77M0G7W	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	52550	6000	64
Code Rate	N/A	1/2x188/204	1/2x188/204	1/2x239/256
Occupied Bandwidth(kHz)	36000	64435	6771.1	75.4
Allocated Bandwidth(kHz)	36000	77000	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)	10.0	7.0	7.0	7.0
Earth Station Gain (dBi)	54.1	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	1.8	2.4	2.4
Earth Station Gain (dBi)	55.5	44.8	47.5	47.5
Earth Station G/T (dB/K)	33.1	22.3	25.0	25.0
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)	78.2	74.4	65.0	44.6
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)	-1.0	-1.0	-1.0	-1.0
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Uplink C/N(dB)	30.0	23.7	24.0	23.3
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	38.8	45.0	32.7	12.4
Antenna Pointing Error (dB)	-5	-5	-5	-5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	33.1	22.3	25.0	25.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-78.1	-68.3	-48.8
Downlink C / N(dB)	18.5	11.3	11.5	10.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	30.0	23.7	24.0	23.3
C/N Downlink (dB)	18.5	11.3	11.5	10.7
C/I Intermodulation (dB)	N/A	N/A	26.4	25.7
C/I Uplink Co-Channel (dB)*	27.3	27.0	28.5	28.3
C/I Downlink Co-Channel (dB)*	27.3	27.0	28.5	28.3
C/I Uplink Adjacent Satellite 1 (dB)	17.3	11.0	11.4	10.6
C/I Downlink Adjacent Satellite 1 (dB)	23.0	15.1	15.6	14.8
C/I Uplink Adjacent Satellite 2 (dB)	17.3	11.0	11.4	10.6
C/I Downlink Adjacent Satellite 2 (dB)	23.6	17.2	17.1	16.3
C/N(I) Composite (dB)				
C/N(I) Composite (dB)	11.9	5.4	5.6	4.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.9	4.4	4.6	3.9
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	.9	1.0	.8	.9
Number of Carriers	2	1.0	5.3	569.0
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-41.9	-54.7	-54.3	-55.1
Downlink EIRP Density At Beam Peak (dBW/Hz)	-21.2	-27.1	-29.6	-30.4

Exhibit 5: Link Budgets (continued)

UPLINK BEAM INFORMATION				
Uplink Beam Name	ZONE	ZONE	ZONE	ZONE
Uplink Frequency (GHz)	6.175	6.175	6.175	6.175
Uplink Beam Polarization	Circular	Circular	Circular	Circular
Uplink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Uplink Contour G/T (dB/K)	-1.0	-1.0	-1.0	-1.0
Uplink SFD (dBW/m2)	-83.5	-89.5	-89.5	-89.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	ZONE	ZONE	ZONE	ZONE
Downlink Frequency (GHz)	3.950	3.950	3.950	3.950
Downlink Beam Polarization	Circular	Circular	Circular	Circular
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	35.0	35.0	35.0	35.0
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	SAT-1	SAT-1	SAT-1	SAT-1
Uplink Power Density (dBW/Hz)	27.5W	27.5W	27.5W	27.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-39.8	-39.8	-39.8	-39.8
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	SAT-2	SAT-2	SAT-2	SAT-2
Uplink Power Density (dBW/Hz)	31.5W	31.5W	31.5W	31.5W
Uplink Polarization Advantage (dB)	-38.7	-38.7	-38.7	-38.7
Downlink EIRP Density (dBW/Hz)	0.0	0.0	0.0	0.0
Downlink Polarization Advantage (dB)	-39.8	-39.8	-39.8	-39.8
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)	11.0	7.0	7.0	7.0
Earth Station Gain (dBi)	55.4	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T (dB/K)	23.6	19.2	19.2	19.2
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)	79.4	73.4	65.9	45.5
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)	-1.0	-1.0	-1.0	-1.0
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)	31.2	26.0	25.0	24.1
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	35.0	35.0	27.8	7.4
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)	23.6	19.2	19.2	19.2
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)	14.8	11.2	10.4	9.6
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	31.2	26.0	25.0	24.1
C/N Downlink (dB)	14.8	11.2	10.4	9.6
C/I Intermodulation (dB)	N/A	N/A	20.2	19.4
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.7	28.4
C/I Uplink Adjacent Satellite 1 (dB)	18.5	13.3	12.3	11.4
C/I Downlink Adjacent Satellite 1 (dB)	20.3	11.2	10.5	9.6
C/I Uplink Adjacent Satellite 2 (dB)	18.5	13.3	12.3	11.4
C/I Downlink Adjacent Satellite 2 (dB)	22.8	19.9	19.2	18.3
C/(N+I) Composite (dB)	11.0	5.8	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.0	4.8	3.9	3.0
Minimum Required C/N (dB)	-10.0	-3.4	-3.9	-3.0
Excess Link Margin (dB)	0.0	1.5	0.0	0.0
Number of Carriers	1	1.0	2.4	259.7
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-42.0	-52.4	-53.4	-54.3
Downlink EIRP Density At Beam Peak (dBW/Hz)	-25.0	-33.8	-34.5	-35.4