

Engineering Statement

Intelsat License LLC (“Intelsat”) proposes to relocate the Intelsat 706 satellite to operate from the 157.0° E.L. orbital location. The spacecraft will utilize the frequency bands 5925 – 6425 MHz, 14000 – 14500 MHz, 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz, and 12500 – 12750 MHz to provide service to Asia, Australia, Northwestern North America, and the Pacific Islands.¹ Intelsat 706 will replace Intelsat 701, which currently operates under Special Temporary Authority (“STA”) at 157.0° E.L. (*see* FCC file number: SAT-STA-20120910-00145).²

In March 2011, the Commission authorized Intelsat 706 to operate at 72.1° E.L. (*see* FCC File No.: SAT-MOD-20100511-00098). Intelsat now requests that the license of Intelsat 706 be modified to specify operation from 157.0° E.L. Intelsat also requests that the Part 25 waivers originally granted to the Intelsat 706 spacecraft continue to apply at the 157.0° E.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.

This engineering statement provides, and in some cases updates, the following technical information:

1. Frequency Plan
2. Beam Performance and Gain Contours
3. Emission Designators
4. Power Flux Density Calculations
5. Intelsat 706 Link Budget and Interference Analysis
6. Adjacent Satellite Link Budget and Interference Analysis
7. Schedule S Information
8. Orbital Debris Mitigation Plan.
9. Arrangement For Telemetry, Tracking and Control

In all other respects, the characteristics of Intelsat 706 are the same as those specified in SAT-MOD-20100511-00098.

1 Frequency Plan

The Intelsat 706 frequency and polarization plan is provided in Exhibit 1. The plan details all of the transponder combinations, channel bandwidths and channel gains.

2 Beam Performance and Gain Contours

¹ Intelsat 706 also has the frequency band 11700 – 11950 MHz; however, this frequency band will not be used at 157.0° E.L.

² 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).

The coverage patterns for Intelsat 706 operating from 157.0° E.L are contained in Exhibit 2. The peak antenna gain, G/T, Saturation Flux Density (“SFD”) and EIRP levels for each uplink and downlink beam, as appropriate, are also provided in this exhibit. Given that the cross-polarization isolation performance of Intelsat 706 with respect to the axis of each satellite beam will not change as a result of the proposed relocation of Intelsat 706 to 157.0° E.L., no cross-polarization patterns are provided herein.

3 Emission Designators

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

4 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

The maximum PFD levels for the Intelsat 706 transmissions were calculated for a number of TV/FM and digital carriers listed in Exhibit 3 operating in the 3700 – 4200 MHz, 10950 – 11200 MHz, 11450 – 11700 MHz and 12500 – 12750 MHz bands. These carriers were chosen because they generally produce high PFD levels on the Earth’s surface. The maximum PFD levels for the Intelsat 706 telemetry and uplink power control beacons were also calculated. The results are provided in Exhibit 4 and show that the downlink power flux density levels of the Intelsat 706 carriers do not exceed the limits specified in Section 25.208 of the Commission’s rules or No. 21.16 of the ITU Radio Regulations.

5 Intelsat 706 Link Budget and Interference Analysis

Link analysis for Intelsat 706 was conducted for a number of representative carriers at C- and Ku-band frequencies. For the analysis it was assumed that the nearest satellites to Intelsat 706 were a hypothetical satellite operating at 155.0° E.L. and a hypothetical satellite operating at 159.0° E.L.³

In C-band, the uplink power density of emissions for each of the hypothetical satellites was assumed to be -38.7 dBW/Hz, the maximum level specified in Section 25.212(d)(2) of the Commission’s rules for digital C-Band carriers. The maximum downlink EIRP density of each of the hypothetical satellites was assumed to be -32 dBW/Hz. All other operational parameters for the hypothetical satellites were assumed to be the same as Intelsat 706.

³ Optus C1 and Optus D3 are co-located at 156° E.L. and provide Ku-band services but were not included in the analysis because they are only 1° away from Intelsat 706 and would not accurately reflect interference in a 2° spacing environment. Intelsat 706 will operate within the existing limits previously coordinated for the 157.0° E.L. location. The current constraints have been coordinated to protect services on Optus C1 and Optus D3 as well as Intelsat’s services at 157.0° E.L.

For Ku-band, the uplink power density of emissions for each of the hypothetical satellites was assumed to be -45 dBW/Hz. The maximum downlink EIRP density of each of the hypothetical satellites was assumed to be -20 dBW/Hz. All other operational parameters for the hypothetical satellites were assumed to be the same as those specified for Intelsat 706.

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

1. 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 Sections 25.209(a)(1) and 25.209(a)(2) of the FCC's rules.
2. All transmitting and receiving earth stations have a cross-polarization isolation value of at least 30 dB within their main beam lobe.
3. At C-band frequencies, degradation due to rain is not considered, given that rain (attenuation) effects are insignificant at C-band.
4. At Ku-band frequencies, rain attenuation predictions are derived using Recommendation ITU-R P.618.
5. At Ku-band frequencies, increase in noise temperature of the receiving earth station due to rain is taken into account.
6. 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 155.0° E.L. and 159.0° E.L on the transmissions of Intelsat 706 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 706 beam connectivities are extensive. In order to keep the number of Intelsat 706 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 706 uplink/downlink beam combinations. The worst-case beam performance for each Intelsat 706 beam type is provided in Table 1.

As shown in Exhibit 1, Intelsat 706 utilizes 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. 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 power density levels would typically be smaller (uplink and downlink) in comparison to those which would be transmitted through the 34

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	-7.2	-91.1 to -77.1	33.8
Global B				
C-Spot A	C-Spot	2.6	-93.1 to -79.1	40.5
C-Spot B				
West Hemi	Hemi	-1.7	-91.5 to -77.5	37.5
East Hemi				
Northwest Zone	Zone	1.0	-92.2 to -78.2	37.8
Northeast Zone				
Southwest Zone				
Southeast Zone				
Combined Northwest and Southeast Zone				
Combined Northeast and Southwest Zone				
Spot 1	Ku-Spot	9.6	-95.5 to 81.5	52.3
Spot 1X				
Spot 2				
Spot 2X				
Spot 2A				
Spot 3				

Table 1: Worst-Case Beam Performance

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 the difference between the interference levels 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). Also, link budgets for the C-band to Ku-band and the Ku-band to C-band transponders are not shown since the results are an amalgamation of the results of the C-band and Ku-band analyses.

As previously mentioned, at Ku-band, Intelsat 706 can utilize the downlink frequency bands of 10950 - 11200 MHz, 11450 - 11700 MHz and 12500 - 12750 MHz. In order to keep the number the Intelsat 706 link calculations to a manageable number, all C-band calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for

the downlink. At 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).

The results of the C-band and Ku-band analyses are shown in Exhibit 5 and demonstrate that operation of the Intelsat 706 satellite from 157.0° E.L. would permit the intended services to achieve their respective performance objectives while maintaining sufficient link margin. The Intelsat 706 transmissions considered in these calculations comply with the limits contained in Sections 25.212(c) and (d).

6 *Adjacent Satellite Link Budget and Interference Analysis*

The impact of the Intelsat 706 emissions on a hypothetical satellite located at 155.0° E.L. and a hypothetical satellite located 159.0° E.L. were analyzed. The hypothetical satellites were assumed to have the same operating characteristics as Intelsat 706. All calculations were conducted at the single representative frequency of 6175 MHz for the uplink and 3950 MHz for the downlink in C-band and 14250 MHz for the uplink and 11950 MHz for the downlink in Ku-band. As with the Intelsat 706 link budgets, link calculations for the hypothetical satellites at 155.0° E.L. and 159.0° E.L. were performed only for the channel size that would experience the highest adjacent satellite interference. The results of the analysis are found in Exhibits 6 and 7.

For the hypothetical satellite at 155.0° E.L., it was assumed that the nearest co-frequency satellites were Intelsat 706 at 157.0° E.L. and a hypothetical satellite located at 153.0° E.L.⁴ The hypothetical satellite located at 153.0° E.L. was assumed to have the same operational characteristics as Intelsat 706. In C-band, the maximum uplink power density of the carriers transmitted to Intelsat 706 and the hypothetical satellite at 153.0° E.L. was assumed to be -38.7 dBW/Hz, the maximum level specified in section 25.212(d)(2) of the Commission's rules for digital C-band carriers. On the downlink, the Intelsat 706 transmissions and those of the hypothetical satellite located at 153.0° E.L. were assumed to have a maximum EIRP density of -32 dBW/Hz. In Ku-band, the maximum uplink power density of the carriers transmitted to Intelsat 706 and the hypothetical satellite at 153.0° E.L. was assumed to be -45 dBW/Hz. On the downlink, the Intelsat 706 transmissions and those of the hypothetical satellite located at 153.0° E.L. were assumed to have a maximum EIRP density of -20 dBW/Hz.

For the hypothetical satellite at 159.0° E.L., it was assumed that the nearest co-frequency satellites were Intelsat 706 at 157.0° E.L. and a hypothetical satellite located at 161.0° E.L.⁵ The hypothetical satellite located at 161.0° E.L. was assumed to have the same operational characteristics as Intelsat 706. In C-band, the maximum uplink power density of the carriers transmitted to Intelsat 706 and the hypothetical satellite at 161.0° E.L. was assumed to be -38.7 dBW/Hz, the maximum level specified in section 25.212(d)(2) of the Commission's rules for digital C-band carriers. On the downlink, the Intelsat 706 transmissions and those of the

⁴ JCSAT 2A located at 154° E.L. and Optus C1 and Optus D3 co-located at 156° E.L. were not used in the analysis of the hypothetical 155° E.L. satellite because the satellites are only 1° apart and would not effectively show the impact of adjacent satellite interference in a 2° environment.

⁵ Optus D1 located at 160° E.L. was not used in the analysis of the hypothetical 159.0° E.L. because the satellites are only 1° apart and would not effectively show the impact of adjacent satellite interference in a 2° environment.

hypothetical satellite located at 161.0° E.L. were assumed to have a maximum EIRP density of -32 dBW/Hz. In Ku-band, the maximum uplink power density of the carriers transmitted to Intelsat 706 and the hypothetical satellite at 161.0° E.L. was assumed to be -45 dBW/Hz. On the downlink, the Intelsat 706 transmissions and those of the hypothetical satellite located at 161.0° E.L. were assumed to have a maximum EIRP density of -20 dBW/Hz.

The results of the C- and Ku-band analyses are shown in Exhibits 6 and 7. The EIRP density levels of the interfered-with carriers considered in these exhibits comply with the FCC limits contained in Sections 25.212(c) and 25.212(d) of the Commission's rules.

The Intelsat 706 transmissions will be limited to those levels contained in Sections 25.212(c) and (d), unless higher levels are coordinated with affected adjacent satellite operators. In any case, the uplink power density of the Intelsat 706 digital carriers operating in the 5925 – 6425 MHz and 14000 – 14500 MHz band will not exceed -38.7 dBW/Hz and -45 dBW/Hz, respectively; and within the 3700 – 4200 MHz band the downlink EIRP density of the Intelsat 706 digital carriers will not exceed -32 dBW/Hz; and within the 10950 – 11200 MHz, 11450 – 11700 MHz, and 12500 – 12750 MHz bands the downlink EIRP density of the Intelsat 706 digital carriers will not exceed -20 dBW/Hz.

7 Schedule S Submission

Intelsat is providing with its application a Schedule S for the operations of Intelsat 706 from 157.0° E.L. The Schedule S contains only those Intelsat 706 data items that have changed as a result of the proposed modification and 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).

8 Orbital Debris Mitigation Plan

Intelsat is proactive in ensuring safe operation and disposal of this and all spacecraft under its control. The four elements of debris mitigation are addressed below.

8.1 Spacecraft Hardware Design

The spacecraft is designed such that no debris will be released during normal operations. Intelsat has assessed the probability of collision with meteoroids and other small debris (<1 cm diameter) and has taken the following steps to limit the effects of such collisions:

1. Critical spacecraft components are located inside the protective body of the spacecraft and properly shielded
2. All spacecraft subsystems have redundant components to ensure no single-point failures.

The spacecraft does not use any subsystems for end-of-life disposal that are not used for normal operations.

8.2 Minimizing Accidental Explosions

Intelsat has assessed the probability of accidental explosions during and after completion of mission operations. The spacecraft is designed in a manner to minimize the potential for such explosions. Propellant tanks and thrusters are isolated using redundant valves and electrical power systems are shielded in accordance with standard industry practices. At the completion of the mission, and upon disposal of the spacecraft, Intelsat will ensure the removal of all stored energy on the spacecraft by depleting all propellant tanks, venting all pressurized systems, and turning off all active units.

8.3 Safe Flight Profiles

Intelsat has assessed and limited the probability of the space station becoming a source of debris as a result of collisions with large debris or other operational space stations. With the exception of Intelsat 701, Intelsat is not aware of any other FCC licensed system, or any other system applied for and under consideration by the FCC, having an overlapping stationkeeping volume with Intelsat 706. Intelsat is also not aware of any non-Intelsat system with an overlapping stationkeeping volume with Intelsat 706 that is the subject of an ITU filing and that is either in orbit or progressing towards launch. During the brief period in which traffic from Intelsat 701 is transferred to Intelsat 706, Intelsat shall take all necessary measures in order to minimize the probability of collision of the two spacecraft and becoming a source of orbital debris.

8.4 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.⁶ 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 706, would be designated as grandfathered satellites not subject to a specific disposal altitude. Therefore, the Intelsat 706 planned disposal orbit complies with the FCC's rules.

In addition, Intelsat provides the following information:

⁶ Intelsat has reserved 32.97 kilograms of fuel for this purpose. The fuel gauging uncertainty has been taken into account in these calculations.

- 1) Planned orbital eccentricity: 0.0003698 (This is a best estimate of optimal eccentricity to match the natural eccentricity circle due to Sun and Moon perturbations after decommission.)⁷
- 2) Planned apogee altitude: 181.31km
- 3) Information concerning the methods that will be used to assess and provide adequate margins concerning fuel gauging uncertainty:

For the Intelsat 706 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.

9 Arrangement For Telemetry, Tracking and Control

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

⁷ 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.

Certification Statement

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

/s/ Jose Albuquerque

Jose Albuquerque
Intelsat
Senior Director
Spectrum Strategy

October 25, 2012

Date

Exhibit 1: Frequency and Beam Assignments

Exhibit 1-1: C-Band

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	120.8
AUB	Global A	LHCP	6320	ADB	Global A	RHCP	4095	36	120.8
AUC	Global A	LHCP	6360	ADC	Global A	RHCP	4135	36	120.8
AUD	Global A	LHCP	6402.5	ADD	Global A	RHCP	4177.5	41	120.8
AUA	Global A	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	120.6
AUB	Global A	LHCP	6320	CDB	C-Spot A	RHCP	4095	36	120.6
AUC	Global A	LHCP	6360	CDC	C-Spot A	RHCP	4135	36	120.6
AUD	Global A	LHCP	6402.5	CDD	C-Spot A	RHCP	4177.5	41	120.6
AUA	Global A	LHCP	6280	EDA	West Hemi	RHCP	4055	36	121.2
BUA	Global B	RHCP	6280	BDA	Global B	LHCP	4055	36	121.1
BUB	Global B	RHCP	6320	BDB	Global B	LHCP	4095	36	121.1
BUC	Global B	RHCP	6360	BDC	Global B	LHCP	4135	36	121.1
BUD	Global B	RHCP	6402.5	BDD	Global B	LHCP	4177.5	41	121.1
BUA	Global B	RHCP	6280	DDA	C-Spot B	LHCP	4055	36	120.6
BUB	Global B	RHCP	6320	DDB	C-Spot B	LHCP	4095	36	120.6
BUC	Global B	RHCP	6360	DDC	C-Spot B	LHCP	4135	36	120.6
BUD	Global B	RHCP	6402.5	DDD	C-Spot B	LHCP	4177.5	41	120.6
BUA	Global B	LHCP	6280	FDA	East Hemi	RHCP	4055	36	120.2
CUA	C-Spot A	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	113.3
CUB	C-Spot A	LHCP	6320	CDB	C-Spot A	RHCP	4095	36	113.3
CUC	C-Spot A	LHCP	6360	CDC	C-Spot A	RHCP	4135	36	113.3
CUD	C-Spot A	LHCP	6402.5	CDD	C-Spot A	RHCP	4177.5	41	113.3
CUA	C-Spot A	LHCP	6280	ADA	Global A	RHCP	4055	36	113.5
CUB	C-Spot A	LHCP	6320	ADB	Global A	RHCP	4095	36	113.5
CUC	C-Spot A	LHCP	6360	ADC	Global A	RHCP	4135	36	113.5
CUD	C-Spot A	LHCP	6402.5	ADD	Global A	RHCP	4177.5	41	113.5
CUA	C-Spot A	LHCP	6280	EDA	West Hemi	RHCP	4055	36	113.9
DUA	C-Spot B	RHCP	6280	DDA	C-Spot B	LHCP	4055	36	112.2
DUB	C-Spot B	RHCP	6320	DDB	C-Spot B	LHCP	4095	36	112.2
DUC	C-Spot B	RHCP	6360	DDC	C-Spot B	LHCP	4135	36	112.2
DUD	C-Spot B	RHCP	6402.5	DDD	C-Spot B	LHCP	4177.5	41	112.2
DUA	C-Spot B	RHCP	6280	ADA	Global B	LHCP	4055	36	112.7
DUB	C-Spot B	RHCP	6320	ADB	Global B	LHCP	4095	36	112.7
DUC	C-Spot B	RHCP	6360	ADC	Global B	LHCP	4135	36	112.7
DUD	C-Spot B	RHCP	6402.5	ADD	Global B	LHCP	4177.5	41	112.7
DUA	C-Spot B	RHCP	6280	EDA	East Hemi	RHCP	4055	36	111.8
EU1	West Hemi	LHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	118.8
EU2	West Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	118.8
EU3	West Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	118.8
EU4	West Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	118.8
EU5	West Hemi	LHCP	6130	ED5	West Hemi	RHCP	3905	72	118.8
EU6	West Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	118.8
EUA	West Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	118.8
EU1	West Hemi	LHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	117.1
EU2	West Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	117.1
EU3	West Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	117.1
EU4	West Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	117.1

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
EU5	West Hemi	LHCP	6130	FD5	East Hemi	RHCP	3905	72	117.1
EU6	West Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	117.1
EUA	West Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	117.1
EU1	West Hemi	LHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	115.6
EU2	West Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	115.6
EU3	West Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	115.6
EU4	West Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	115.6
EU5	West Hemi	LHCP	6130	GD5	NW Zone	LHCP	3905	72	115.6
EU6	West Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	115.6
EUA	West Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	115.6
EU1	West Hemi	LHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	115.8
EU2	West Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	115.8
EU3	West Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	115.8
EU4	West Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	115.8
EU5	West Hemi	LHCP	6130	JD5	SE Zone	LHCP	3905	72	115.8
EU6	West Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	115.8
EUA	West Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	115.8
EU1	West Hemi	LHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	114.6
EU2	West Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	114.6
EU3	West Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	114.6
EU4	West Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	114.6
EU5	West Hemi	LHCP	6130	HD5	NE Zone	LHCP	3905	72	114.6
EU6	West Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	114.6
EUA	West Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	114.6
EU1	West Hemi	LHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	114.5
EU2	West Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	114.5
EU3	West Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	114.5
EU4	West Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	114.5
EU5	West Hemi	LHCP	6130	ID5	SW Zone	LHCP	3905	72	114.5
EU6	West Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	114.5
EUA	West Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	114.5
EUA	West Hemi	LHCP	6280	ADA	Global A	RHCP	4055	36	118.4
EUA	West Hemi	LHCP	6280	CDA	C-Spot A	RHCP	4055	36	118.2
FU1	East Hemi	LHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.8
FU2	East Hemi	LHCP	6050	FD2	East Hemi	RHCP	3825	72	114.8
FU3	East Hemi	LHCP	6111	FD3	East Hemi	RHCP	3886	34	114.8
FU4	East Hemi	LHCP	6149	FD4	East Hemi	RHCP	3924	34	114.8
FU5	East Hemi	LHCP	6130	FD5	East Hemi	RHCP	3905	72	114.8
FU6	East Hemi	LHCP	6220	FD6	East Hemi	RHCP	3995	72	114.8
FUA	East Hemi	LHCP	6280	FDA	East Hemi	RHCP	4055	36	114.8
FU1	East Hemi	LHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	116.5
FU2	East Hemi	LHCP	6050	ED2	West Hemi	RHCP	3825	72	116.5
FU3	East Hemi	LHCP	6111	ED3	West Hemi	RHCP	3886	34	116.5
FU4	East Hemi	LHCP	6149	ED4	West Hemi	RHCP	3924	34	116.5
FU5	East Hemi	LHCP	6130	ED5	West Hemi	RHCP	3905	72	116.5
FU6	East Hemi	LHCP	6220	ED6	West Hemi	RHCP	3995	72	116.5
FUA	East Hemi	LHCP	6280	EDA	West Hemi	RHCP	4055	36	116.5
FU1	East Hemi	LHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	113.3
FU2	East Hemi	LHCP	6050	GD2	NW Zone	LHCP	3825	72	113.3
FU3	East Hemi	LHCP	6111	GD3	NW Zone	LHCP	3886	34	113.3
FU4	East Hemi	LHCP	6149	GD4	NW Zone	LHCP	3924	34	113.3
FU5	East Hemi	LHCP	6130	GD5	NW Zone	LHCP	3905	72	113.3
FU6	East Hemi	LHCP	6220	GD6	NW Zone	LHCP	3995	72	113.3
FUA	East Hemi	LHCP	6280	GDA	NW Zone	LHCP	4055	36	113.3

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
FU1	East Hemi	LHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	113.5
FU2	East Hemi	LHCP	6050	JD2	SE Zone	LHCP	3825	72	113.5
FU3	East Hemi	LHCP	6111	JD3	SE Zone	LHCP	3886	34	113.5
FU4	East Hemi	LHCP	6149	JD4	SE Zone	LHCP	3924	34	113.5
FU5	East Hemi	LHCP	6130	JD5	SE Zone	LHCP	3905	72	113.5
FU6	East Hemi	LHCP	6220	JD6	SE Zone	LHCP	3995	72	113.5
FUA	East Hemi	LHCP	6280	JDA	SE Zone	LHCP	4055	36	113.5
FU1	East Hemi	LHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	112.3
FU2	East Hemi	LHCP	6050	HD2	NE Zone	LHCP	3825	72	112.3
FU3	East Hemi	LHCP	6111	HD3	NE Zone	LHCP	3886	34	112.3
FU4	East Hemi	LHCP	6149	HD4	NE Zone	LHCP	3924	34	112.3
FU5	East Hemi	LHCP	6130	HD5	NE Zone	LHCP	3905	72	112.3
FU6	East Hemi	LHCP	6220	HD6	NE Zone	LHCP	3995	72	112.3
FUA	East Hemi	LHCP	6280	HDA	NE Zone	LHCP	4055	36	112.3
FU1	East Hemi	LHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	112.2
FU2	East Hemi	LHCP	6050	ID2	SW Zone	LHCP	3825	72	112.2
FU3	East Hemi	LHCP	6111	ID3	SW Zone	LHCP	3886	34	112.2
FU4	East Hemi	LHCP	6149	ID4	SW Zone	LHCP	3924	34	112.2
FU5	East Hemi	LHCP	6130	ID5	SW Zone	LHCP	3905	72	112.2
FU6	East Hemi	LHCP	6220	ID6	SW Zone	LHCP	3995	72	112.2
FUA	East Hemi	LHCP	6280	IDA	SW Zone	LHCP	4055	36	112.2
FUA	East Hemi	LHCP	6280	BDA	Global B	LHCP	4055	36	115.7
FUA	East Hemi	LHCP	6280	DDA	C-Spot B	LHCP	4055	36	115.2
GU1	NW Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	113.2
GU2	NW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	113.2
GU3	NW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	113.2
GU4	NW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	113.2
GU5	NW Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	113.2
GU6	NW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	113.2
GUA	NW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	113.2
GU1	NW Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	113.4
GU2	NW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	113.4
GU3	NW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	113.4
GU4	NW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	113.4
GU5	NW Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	113.4
GU6	NW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	113.4
GUA	NW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	113.4
GU1	NW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	112.2
GU2	NW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	112.2
GU3	NW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	112.2
GU4	NW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	112.2
GU5	NW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	112.2
GU6	NW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	112.2
GUA	NW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	112.2
GU1	NW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	112.1
GU2	NW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	112.1
GU3	NW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	112.1
GU4	NW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	112.1
GU5	NW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	112.1
GU6	NW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	112.1
GUA	NW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	112.1
GU1	NW Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	116.4
GU2	NW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	116.4
GU3	NW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	116.4
GU4	NW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	116.4

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
GU5	NW Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	116.4
GU6	NW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	116.4
GUA	NW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	116.4
GU1	NW Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	114.7
GU2	NW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	114.7
GU3	NW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	114.7
GU4	NW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	114.7
GU5	NW Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	114.7
GU6	NW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	114.7
GUA	NW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	114.7
JU1	SE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	110.8
JU2	SE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	110.8
JU3	SE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	110.8
JU4	SE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	110.8
JU5	SE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	110.8
JU6	SE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	110.8
JUA	SE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	110.8
JU1	SE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	111.0
JU2	SE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	111.0
JU3	SE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	111.0
JU4	SE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	111.0
JU5	SE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	111.0
JU6	SE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	111.0
JUA	SE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	111.0
JU1	SE Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	109.8
JU2	SE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	109.8
JU3	SE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	109.8
JU4	SE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	109.8
JU5	SE Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	109.8
JU6	SE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	109.8
JUA	SE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	109.8
JU1	SE Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	109.7
JU2	SE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	109.7
JU3	SE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	109.7
JU4	SE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	109.7
JU5	SE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	109.7
JU6	SE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	109.7
JUA	SE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	109.7
JU1	SE Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	114.0
JU2	SE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	114.0
JU3	SE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	114.0
JU4	SE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	114.0
JU5	SE Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	114.0
JU6	SE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	114.0
JUA	SE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	114.0
JU1	SE Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	112.3
JU2	SE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	112.3
JU3	SE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	112.3
JU4	SE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	112.3
JU5	SE Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	112.3
JU6	SE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	112.3
JUA	SE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	112.3
HU1	NE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	111.8
HU2	NE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	111.8
HU3	NE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	111.8
HU4	NE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	111.8

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
HU5	NE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	111.8
HU6	NE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	111.8
HUA	NE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	111.8
HU1	NE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	112.0
HU2	NE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	112.0
HU3	NE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	112.0
HU4	NE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	112.0
HU5	NE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	112.0
HU6	NE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	112.0
HUA	NE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	112.0
HU1	NE Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	110.8
HU2	NE Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	110.8
HU3	NE Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	110.8
HU4	NE Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	110.8
HU5	NE Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	110.8
HU6	NE Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	110.8
HUA	NE Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	110.8
HU1	NE Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	110.7
HU2	NE Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	110.7
HU3	NE Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	110.7
HU4	NE Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	110.7
HU5	NE Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	110.7
HU6	NE Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	110.7
HUA	NE Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	110.7
HU1	NE Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	115.0
HU2	NE Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	115.0
HU3	NE Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	115.0
HU4	NE Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	115.0
HU5	NE Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	115.0
HU6	NE Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	115.0
HUA	NE Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	115.0
HU1	NE Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	113.3
HU2	NE Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	113.3
HU3	NE Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	113.3
HU4	NE Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	113.3
HU5	NE Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	113.3
HU6	NE Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	113.3
HUA	NE Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	113.3
IU1	SW Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	111.9
IU2	SW Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	111.9
IU3	SW Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	111.9
IU4	SW Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	111.9
IU5	SW Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	111.9
IU6	SW Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	111.9
IUA	SW Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	111.9
IU1	SW Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	112.1
IU2	SW Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	112.1
IU3	SW Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	112.1
IU4	SW Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	112.1
IU5	SW Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	112.1
IU6	SW Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	112.1
IUA	SW Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	112.1
IU1	SW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	110.9
IU2	SW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	110.9
IU3	SW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	110.9
IU4	SW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	110.9

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
IU5	SW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	110.9
IU6	SW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	110.9
IUA	SW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	110.9
IU1	SW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	110.8
IU2	SW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	110.8
IU3	SW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	110.8
IU4	SW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	110.8
IU5	SW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	110.8
IU6	SW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	110.8
IUA	SW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	110.8
IU1	SW Zone	RHCP	5967.5	ED1	West Hemi	RHCP	3742.5	77	115.1
IU2	SW Zone	RHCP	6050	ED2	West Hemi	RHCP	3825	72	115.1
IU3	SW Zone	RHCP	6111	ED3	West Hemi	RHCP	3886	34	115.1
IU4	SW Zone	RHCP	6149	ED4	West Hemi	RHCP	3924	34	115.1
IU5	SW Zone	RHCP	6130	ED5	West Hemi	RHCP	3905	72	115.1
IU6	SW Zone	RHCP	6220	ED6	West Hemi	RHCP	3995	72	115.1
IUA	SW Zone	RHCP	6280	EDA	West Hemi	RHCP	4055	36	115.1
IU1	SW Zone	RHCP	5967.5	FD1	East Hemi	RHCP	3742.5	77	113.4
IU2	SW Zone	RHCP	6050	FD2	East Hemi	RHCP	3825	72	113.4
IU3	SW Zone	RHCP	6111	FD3	East Hemi	RHCP	3886	34	113.4
IU4	SW Zone	RHCP	6149	FD4	East Hemi	RHCP	3924	34	113.4
IU5	SW Zone	RHCP	6130	FD5	East Hemi	RHCP	3905	72	113.4
IU6	SW Zone	RHCP	6220	FD6	East Hemi	RHCP	3995	72	113.4
IUA	SW Zone	RHCP	6280	FDA	East Hemi	RHCP	4055	36	113.4
KU1	Combined NW+SE Zone	RHCP	5967.5	GD1	NW Zone	LHCP	3742.5	77	115.9
KU2	Combined NW+SE Zone	RHCP	6050	GD2	NW Zone	LHCP	3825	72	115.9
KU3	Combined NW+SE Zone	RHCP	6111	GD3	NW Zone	LHCP	3886	34	115.9
KU4	Combined NW+SE Zone	RHCP	6149	GD4	NW Zone	LHCP	3924	34	115.9
KU5	Combined NW+SE Zone	RHCP	6130	GD5	NW Zone	LHCP	3905	72	115.9
KU6	Combined NW+SE Zone	RHCP	6220	GD6	NW Zone	LHCP	3995	72	115.9
KUA	Combined NW+SE Zone	RHCP	6280	GDA	NW Zone	LHCP	4055	36	115.9
KU1	Combined NW+SE Zone	RHCP	5967.5	JD1	SE Zone	LHCP	3742.5	77	116.1
KU2	Combined NW+SE Zone	RHCP	6050	JD2	SE Zone	LHCP	3825	72	116.1
KU3	Combined NW+SE Zone	RHCP	6111	JD3	SE Zone	LHCP	3886	34	116.1
KU4	Combined NW+SE Zone	RHCP	6149	JD4	SE Zone	LHCP	3924	34	116.1
KU5	Combined NW+SE Zone	RHCP	6130	JD5	SE Zone	LHCP	3905	72	116.1
KU6	Combined NW+SE Zone	RHCP	6220	JD6	SE Zone	LHCP	3995	72	116.1
KUA	Combined NW+SE Zone	RHCP	6280	JDA	SE Zone	LHCP	4055	36	116.1
LU1	Combined NE+SW Zone	RHCP	5967.5	HD1	NE Zone	LHCP	3742.5	77	113.2
LU2	Combined NE+SW Zone	RHCP	6050	HD2	NE Zone	LHCP	3825	72	113.2
LU3	Combined NE+SW Zone	RHCP	6111	HD3	NE Zone	LHCP	3886	34	113.2

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
LU4	Combined NE+SW Zone	RHCP	6149	HD4	NE Zone	LHCP	3924	34	113.2
LU5	Combined NE+SW Zone	RHCP	6130	HD5	NE Zone	LHCP	3905	72	113.2
LU6	Combined NE+SW Zone	RHCP	6220	HD6	NE Zone	LHCP	3995	72	113.2
LUA	Combined NE+SW Zone	RHCP	6280	HDA	NE Zone	LHCP	4055	36	113.2
LU1	Combined NE+SW Zone	RHCP	5967.5	ID1	SW Zone	LHCP	3742.5	77	113.1
LU2	Combined NE+SW Zone	RHCP	6050	ID2	SW Zone	LHCP	3825	72	113.1
LU3	Combined NE+SW Zone	RHCP	6111	ID3	SW Zone	LHCP	3886	34	113.1
LU4	Combined NE+SW Zone	RHCP	6149	ID4	SW Zone	LHCP	3924	34	113.1
LU5	Combined NE+SW Zone	RHCP	6130	ID5	SW Zone	LHCP	3905	72	113.1
LU6	Combined NE+SW Zone	RHCP	6220	ID6	SW Zone	LHCP	3995	72	113.1
LUA	Combined NE+SW Zone	RHCP	6280	IDA	SW Zone	LHCP	4055	36	113.1

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

Exhibit 1-2: Ku-Band 10.95-11.2 GHz & 11.45-11.7 GHz Downlink

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)
SU1	Spot 1	H	14042.5	S1D1	Spot 1	V	10992.5	77	120.0
SU2	Spot 1	H	14125	S1D2	Spot 1	V	11075	72	120.0
SU3	Spot 1	H	14186	S1D3	Spot 1	V	11136	34	120.0
SU4	Spot 1	H	14224	S1D4	Spot 1	V	11174	34	120.0
SU5	Spot 1	H	14205	S1D5	Spot 1	V	11155	72	120.0
SU6	Spot 1	H	14314	S1D6	Spot 1	V	11514	112	120.0
SU7	Spot 1	H	14438	S1D7	Spot 1	V	11638	112	120.0
SU1	Spot 1	H	14042.5	U1D1	Spot 2	H	10992.5	77	121.1
SU2	Spot 1	H	14125	U1D2	Spot 2	H	11075	72	121.1
SU3	Spot 1	H	14186	U1D3	Spot 2	H	11136	34	121.1
SU4	Spot 1	H	14224	U1D4	Spot 2	H	11174	34	121.1
SU5	Spot 1	H	14205	U1D5	Spot 2	H	11155	72	121.1
SU6	Spot 1	H	14314	U1D6	Spot 2	H	11514	112	121.1
SU7	Spot 1	H	14438	U1D7	Spot 2	H	11638	112	121.1
SU1	Spot 1	H	14042.5	Y1D1	Spot 2A	H	10992.5	77	121.1
SU2	Spot 1	H	14125	Y1D2	Spot 2A	H	11075	72	121.1
SU3	Spot 1	H	14186	Y1D3	Spot 2A	H	11136	34	121.1
SU4	Spot 1	H	14224	Y1D4	Spot 2A	H	11174	34	121.1
SU5	Spot 1	H	14205	Y1D5	Spot 2A	H	11155	72	121.1
SU6	Spot 1	H	14314	Y1D6	Spot 2A	H	11514	112	121.1
SU7	Spot 1	H	14438	Y1D7	Spot 2A	H	11638	112	121.1
SU1	Spot 1	H	14042.5	W1D1	Spot 3	V	10992.5	77	119.7
SU2	Spot 1	H	14125	W1D2	Spot 3	V	11075	72	119.7
SU3	Spot 1	H	14186	W1D3	Spot 3	V	11136	34	119.7
SU4	Spot 1	H	14224	W1D4	Spot 3	V	11174	34	119.7
SU5	Spot 1	H	14205	W1D5	Spot 3	V	11155	72	119.7
SU6	Spot 1	H	14314	W1D6	Spot 3	V	11514	112	119.7
SU7	Spot 1	H	14438	W1D7	Spot 3	V	11638	112	119.7
TUA	Spot 1X	V	14060	T1DA	Spot 1X	H	11010	112	119.7
TUB	Spot 1X	V	14185	T1DB	Spot 1X	H	11135	112	119.7
SU6	Spot 1X	V	14314	T1D6	Spot 1X	H	11514	112	119.7
SU7	Spot 1X	V	14438	T1D7	Spot 1X	H	11638	112	119.7
TUA	Spot 1X	V	14060	V1DA	Spot 2X	V	11010	112	121.4
TUB	Spot 1X	V	14185	V1DB	Spot 2X	V	11135	112	121.4
SU6	Spot 1X	V	14314	V1D6	Spot 2X	V	11514	112	121.4
SU7	Spot 1X	V	14438	V1D7	Spot 2X	V	11638	112	121.4
TUA	Spot 1X	V	14060	W1DE	Spot 3	V	10992.5	72	120.0
TUB	Spot 1X	V	14185	W1DC	Spot 3	V	11155	72	120.0
SU6	Spot 1X	V	14314	W1D6	Spot 3	V	11514	112	120.0
SU7	Spot 1X	V	14438	W1D7	Spot 3	V	11638	112	120.0
UU1	Spot 2	V	14042.5	S1D1	Spot 1	V	10992.5	77	122.7
UU2	Spot 2	V	14125	S1D2	Spot 1	V	11075	72	122.7
UU3	Spot 2	V	14186	S1D3	Spot 1	V	11136	34	122.7
UU4	Spot 2	V	14224	S1D4	Spot 1	V	11174	34	122.7
UU5	Spot 2	V	14205	S1D5	Spot 1	V	11155	72	122.7
UU6	Spot 2	V	14314	S1D6	Spot 1	V	11514	112	122.7
UU7	Spot 2	V	14438	S1D7	Spot 1	V	11638	112	122.7
UU1	Spot 2	V	14042.5	U1D1	Spot 2	H	10992.5	77	123.8
UU2	Spot 2	V	14125	U1D2	Spot 2	H	11075	72	123.8
UU3	Spot 2	V	14186	U1D3	Spot 2	H	11136	34	123.8
UU4	Spot 2	V	14224	U1D4	Spot 2	H	11174	34	123.8
UU5	Spot 2	V	14205	U1D5	Spot 2	H	11155	72	123.8
UU6	Spot 2	V	14314	U1D6	Spot 2	H	11514	112	123.8
UU7	Spot 2	V	14438	U1D7	Spot 2	H	11638	112	123.8

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

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)
UU1	Spot 2	V	14042.5	W1D1	Spot 3	V	10992.5	77	122.4
UU2	Spot 2	V	14125	W1D2	Spot 3	V	11075	72	122.4
UU3	Spot 2	V	14186	W1D3	Spot 3	V	11136	34	122.4
UU4	Spot 2	V	14224	W1D4	Spot 3	V	11174	34	122.4
UU5	Spot 2	V	14205	W1D5	Spot 3	V	11155	72	122.4
UU6	Spot 2	V	14314	W1D6	Spot 3	V	11514	112	122.4
UU7	Spot 2	V	14438	W1D7	Spot 3	V	11638	112	122.4
VUA	Spot 2X	H	14060	T1DA	Spot 1X	H	11010	112	123.0
VUB	Spot 2X	H	14185	T1DB	Spot 1X	H	11135	112	123.0
TU6	Spot 2X	H	14314	T1D6	Spot 1X	H	11514	112	123.0
TU7	Spot 2X	H	14438	T1D7	Spot 1X	H	11638	112	123.0
VUA	Spot 2X	H	14060	V1DA	Spot 2X	V	11010	112	124.7
VUB	Spot 2X	H	14185	V1DB	Spot 2X	V	11135	112	124.7
TU6	Spot 2X	H	14314	V1D6	Spot 2X	V	11514	112	124.7
TU7	Spot 2X	H	14438	V1D7	Spot 2X	V	11638	112	124.7
VUA	Spot 2X	H	14060	W1DE	Spot 3	V	10992.5	72	123.3
VUB	Spot 2X	H	14185	W1DC	Spot 3	V	11155	72	123.3
TU6	Spot 2X	H	14314	W1D6	Spot 3	V	11514	112	123.3
TU7	Spot 2X	H	14438	W1D7	Spot 3	V	11638	112	123.3
YU1	Spot 2A	V	14042.5	S1D1	Spot 1	V	10992.5	77	124.7
YU2	Spot 2A	V	14125	S1D2	Spot 1	V	11075	72	124.7
YU3	Spot 2A	V	14186	S1D3	Spot 1	V	11136	34	124.7
YU4	Spot 2A	V	14224	S1D4	Spot 1	V	11174	34	124.7
YU5	Spot 2A	V	14205	S1D5	Spot 1	V	11155	72	124.7
YU6	Spot 2A	V	14314	S1D6	Spot 1	V	11514	112	124.7
YU7	Spot 2A	V	14438	S1D7	Spot 1	V	11638	112	124.7
YU1	Spot 2A	V	14042.5	Y1D1	Spot 2A	H	10992.5	77	125.8
YU2	Spot 2A	V	14125	Y1D2	Spot 2A	H	11075	72	125.8
YU3	Spot 2A	V	14186	Y1D3	Spot 2A	H	11136	34	125.8
YU4	Spot 2A	V	14224	Y1D4	Spot 2A	H	11174	34	125.8
YU5	Spot 2A	V	14205	Y1D5	Spot 2A	H	11155	72	125.8
YU6	Spot 2A	V	14314	Y1D6	Spot 2A	H	11514	112	125.8
YU7	Spot 2A	V	14438	Y1D7	Spot 2A	H	11638	112	125.8
YU1	Spot 2A	V	14042.5	W1D1	Spot 3	V	10992.5	77	124.4
YU2	Spot 2A	V	14125	W1D2	Spot 3	V	11075	72	124.4
YU3	Spot 2A	V	14186	W1D3	Spot 3	V	11136	34	124.4
YU4	Spot 2A	V	14224	W1D4	Spot 3	V	11174	34	124.4
YU5	Spot 2A	V	14205	W1D5	Spot 3	V	11155	72	124.4
YU6	Spot 2A	V	14314	W1D6	Spot 3	V	11514	112	124.4
YU7	Spot 2A	V	14438	W1D7	Spot 3	V	11638	112	122.1
WU1	Spot 3	H	14042.5	S1D1	Spot 1	V	10992.5	77	123.2
WU2	Spot 3	H	14125	S1D2	Spot 1	V	11075	72	123.2
WU3	Spot 3	H	14186	S1D3	Spot 1	V	11136	34	123.2
WU4	Spot 3	H	14224	S1D4	Spot 1	V	11174	34	123.2
WU5	Spot 3	H	14205	S1D5	Spot 1	V	11155	72	123.2
WU6	Spot 3	H	14314	S1D6	Spot 1	V	11514	112	123.2
WU7	Spot 3	H	14438	S1D7	Spot 1	V	11638	112	123.2
WU1	Spot 3	H	14042.5	U1D1	Spot 2	H	10992.5	77	124.3
WU2	Spot 3	H	14125	U1D2	Spot 2	H	11075	72	124.3
WU3	Spot 3	H	14186	U1D3	Spot 2	H	11136	34	124.3
WU4	Spot 3	H	14224	U1D4	Spot 2	H	11174	34	124.3
WU5	Spot 3	H	14205	U1D5	Spot 2	H	11155	72	124.3
WU6	Spot 3	H	14314	U1D6	Spot 2	H	11514	112	124.3
WU7	Spot 3	H	14438	U1D7	Spot 2	H	11638	112	124.3
WU1	Spot 3	H	14042.5	Y1D1	Spot 2A	H	10992.5	77	124.3
WU2	Spot 3	H	14125	Y1D2	Spot 2A	H	11075	72	124.3

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
WU3	Spot 3	H	14186	Y1D3	Spot 2A	H	11136	34	124.3
WU4	Spot 3	H	14224	Y1D4	Spot 2A	H	11174	34	124.3
WU5	Spot 3	H	14205	Y1D5	Spot 2A	H	11155	72	124.3
WU6	Spot 3	H	14314	Y1D6	Spot 2A	H	11514	112	124.3
WU7	Spot 3	H	14438	Y1D7	Spot 2A	H	11638	112	124.3
WU1	Spot 3	H	14042.5	W1D1	Spot 3	V	10992.5	77	122.9
WU2	Spot 3	H	14125	W1D2	Spot 3	V	11075	72	122.9
WU3	Spot 3	H	14186	W1D3	Spot 3	V	11136	34	122.9
WU4	Spot 3	H	14224	W1D4	Spot 3	V	11174	34	122.9
WU5	Spot 3	H	14205	W1D5	Spot 3	V	11155	72	122.9
WU6	Spot 3	H	14314	W1D6	Spot 3	V	11514	112	122.9
WU7	Spot 3	H	14438	W1D7	Spot 3	V	11638	112	122.9
WU1	Spot 3	H	14042.5	T1DA	Spot 1X	H	10992.5	77	122.6
WU5	Spot 3	H	14205	T1DB	Spot 1X	H	11155	72	122.6
WU6	Spot 3	H	14314	T1D6	Spot 1X	H	11514	112	122.6
WU7	Spot 3	H	14438	T1D7	Spot 1X	H	11638	112	122.6
WU1	Spot 3	H	14042.5	V1DA	Spot 2X	V	10992.5	77	124.3
WU5	Spot 3	H	14205	V1DB	Spot 2X	V	11155	72	124.3
WU6	Spot 3	H	14314	V1D6	Spot 2X	V	11514	112	124.3
WU7	Spot 3	H	14438	V1D7	Spot 2X	V	11638	112	124.3

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 1-3: Ku-Band 12.5-12.75 GHz Downlink

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)
SU1	Spot 1	H	14042.5	S2D1	Spot 1	V	12547.5	77	120.0
SU2	Spot 1	H	14125	S2D2	Spot 1	V	12630	72	120.0
SU3	Spot 1	H	14186	S2D3	Spot 1	V	12691	34	120.0
SU4	Spot 1	H	14224	S2D4	Spot 1	V	12729	34	120.0
SU5	Spot 1	H	14205	S2D5	Spot 1	V	12710	72	120.0
SU1	Spot 1	H	14042.5	U2D1	Spot 2	H	12547.5	77	121.1
SU2	Spot 1	H	14125	U2D2	Spot 2	H	12630	72	121.1
SU3	Spot 1	H	14186	U2D3	Spot 2	H	12691	34	121.1
SU4	Spot 1	H	14224	U2D4	Spot 2	H	12729	34	121.1
SU5	Spot 1	H	14205	U2D5	Spot 2	H	12710	72	121.1
SU1	Spot 1	H	14042.5	Y2D1	Spot 2A	H	12547.5	77	121.1
SU2	Spot 1	H	14125	Y2D2	Spot 2A	H	12630	72	121.1
SU3	Spot 1	H	14186	Y2D3	Spot 2A	H	12691	34	121.1
SU4	Spot 1	H	14224	Y2D4	Spot 2A	H	12729	34	121.1
SU5	Spot 1	H	14205	Y2D5	Spot 2A	H	12710	72	121.1
SU1	Spot 1	H	14042.5	W2DA	Spot 3	V	12547.5	77	119.7
SU2	Spot 1	H	14125	W2D2	Spot 3	V	12630	72	119.7
SU3	Spot 1	H	14186	W2D3	Spot 3	V	12691	34	119.7
SU4	Spot 1	H	14224	W2D4	Spot 3	V	12729	34	119.7
SU5	Spot 1	H	14205	W2D5	Spot 3	V	12710	72	119.7
TUA	Spot 1X	V	14060	T2DA	Spot 1X	H	12565	112	119.7
TUB	Spot 1X	V	14185	T2DB	Spot 1X	H	12690	112	119.7
TUA	Spot 1X	V	14060	V2DA	Spot 2X	V	12565	112	121.4
TUB	Spot 1X	V	14185	V2DB	Spot 2X	V	12690	112	121.4
TUA	Spot 1X	V	14060	W2DE	Spot 3	V	12565	72	120.0
TUB	Spot 1X	V	14185	W2DC	Spot 3	V	12690	72	120.0
UU1	Spot 2	V	14042.5	S2D1	Spot 1	V	12547.5	77	122.7
UU2	Spot 2	V	14125	S2D2	Spot 1	V	12630	72	122.7
UU3	Spot 2	V	14186	S2D3	Spot 1	V	12691	34	122.7
UU4	Spot 2	V	14224	S2D4	Spot 1	V	12729	34	122.7
UU5	Spot 2	V	14205	S2D5	Spot 1	V	12710	72	122.7
UU1	Spot 2	V	14042.5	U2D1	Spot 2	H	12547.5	77	123.8
UU2	Spot 2	V	14125	U2D2	Spot 2	H	12630	72	123.8
UU3	Spot 2	V	14186	U2D3	Spot 2	H	12691	34	123.8
UU4	Spot 2	V	14224	U2D4	Spot 2	H	12729	34	123.8
UU5	Spot 2	V	14205	U2D5	Spot 2	H	12710	72	123.8
UU1	Spot 2	V	14042.5	W2D1	Spot 3	V	12547.5	77	122.4
UU2	Spot 2	V	14125	W2D2	Spot 3	V	12630	72	122.4
UU3	Spot 2	V	14186	W2D3	Spot 3	V	12691	34	122.4
UU4	Spot 2	V	14224	W2D4	Spot 3	V	12729	34	122.4
UU5	Spot 2	V	14205	W2D5	Spot 3	V	12710	72	122.4
VUA	Spot 2X	H	14060	T2DA	Spot 1X	H	12565	112	123.0
VUB	Spot 2X	H	14185	T2DB	Spot 1X	H	12690	112	123.0
VUA	Spot 2X	H	14060	V2DA	Spot 2X	V	12565	112	124.7
VUB	Spot 2X	H	14185	V2DB	Spot 2X	V	12690	112	124.7
VUA	Spot 2X	H	14060	W2DE	Spot 3	V	12565	72	123.3
VUB	Spot 2X	H	14185	W2DC	Spot 3	V	12690	72	123.3
YU1	Spot 2A	V	14042.5	S2D1	Spot 1	V	12547.5	77	124.7

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
YU2	Spot 2A	V	14125	S2D2	Spot 1	V	12630	72	124.7
YU3	Spot 2A	V	14186	S2D3	Spot 1	V	12691	34	124.7
YU4	Spot 2A	V	14224	S2D4	Spot 1	V	12729	34	124.7
YU5	Spot 2A	V	14205	S2D5	Spot 1	V	12710	72	124.7
YU1	Spot 2A	V	14042.5	Y2D1	Spot 2A	H	12547.5	77	125.8
YU2	Spot 2A	V	14125	Y2D2	Spot 2A	H	12630	72	125.8
YU3	Spot 2A	V	14186	Y2D3	Spot 2A	H	12691	34	125.8
YU4	Spot 2A	V	14224	Y2D4	Spot 2A	H	12729	34	125.8
YU5	Spot 2A	V	14205	Y2D5	Spot 2A	H	12710	72	125.8
YU1	Spot 2A	V	14042.5	W2D1	Spot 3	V	12547.5	77	124.4
YU2	Spot 2A	V	14125	W2D2	Spot 3	V	12630	72	124.4
YU3	Spot 2A	V	14186	W2D3	Spot 3	V	12691	34	124.4
YU4	Spot 2A	V	14224	W2D4	Spot 3	V	12729	34	124.4
YU5	Spot 2A	V	14205	W2D5	Spot 3	V	12710	72	124.4
WU1	Spot 3	H	14042.5	S2D1	Spot 1	V	12547.5	77	123.2
WU2	Spot 3	H	14125	S2D2	Spot 1	V	12630	72	123.2
WU3	Spot 3	H	14186	S2D3	Spot 1	V	12691	34	123.2
WU4	Spot 3	H	14224	S2D4	Spot 1	V	12729	34	123.2
WU5	Spot 3	H	14205	S2D5	Spot 1	V	12710	72	123.2
WU1	Spot 3	H	14042.5	U2D1	Spot 2	H	12547.5	77	124.3
WU2	Spot 3	H	14125	U2D2	Spot 2	H	12630	72	124.3
WU3	Spot 3	H	14186	U2D3	Spot 2	H	12691	34	124.3
WU4	Spot 3	H	14224	U2D4	Spot 2	H	12729	34	124.3
WU5	Spot 3	H	14205	U2D5	Spot 2	H	12710	72	124.3
WU1	Spot 3	H	14042.5	Y2D1	Spot 2A	H	12547.5	77	124.3
WU2	Spot 3	H	14125	Y2D2	Spot 2A	H	12630	72	124.3
WU3	Spot 3	H	14186	Y2D3	Spot 2A	H	12691	34	124.3
WU4	Spot 3	H	14224	Y2D4	Spot 2A	H	12729	34	124.3
WU5	Spot 3	H	14205	Y2D5	Spot 2A	H	12710	72	124.3
WU1	Spot 3	H	14042.5	W2D1	Spot 3	V	12547.5	77	122.9
WU2	Spot 3	H	14125	W2D2	Spot 3	V	12630	72	122.9
WU3	Spot 3	H	14186	W2D3	Spot 3	V	12691	34	122.9
WU4	Spot 3	H	14224	W2D4	Spot 3	V	12729	34	122.9
WU5	Spot 3	H	14205	W2D5	Spot 3	V	12710	72	122.9
WU1	Spot 3	H	14042.5	T2DA	Spot 1X	H	12547.5	77	122.6
WU5	Spot 3	H	14205	T2DB	Spot 1X	H	12710	72	122.6
WU1	Spot 3	H	14042.5	V2DA	Spot 2X	V	12547.5	77	124.3
WU5	Spot 3	H	14205	V2DB	Spot 2X	V	12710	72	124.3

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 1-4: C-Band Uplink/Ku-Band 10.95-11.2GHz & 11.45-11.7GHz Downlink

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)
EU1	West Hemi	LHCP	5967.5	S1D1	Spot 1	V	10992.5	77	124.1
EU2	West Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	124.1
EU3	West Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	124.1
EU4	West Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	124.1
EU5	West Hemi	LHCP	6130	S1D5	Spot 1	V	11155	72	124.1
EU6	West Hemi	LHCP	6220	S1DC	Spot 1	V	11495	72	124.1
EU1	West Hemi	LHCP	5967.5	U1D1	Spot 2	H	10992.5	77	125.2
EU2	West Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	125.2
EU3	West Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	125.2
EU4	West Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	125.2
EU5	West Hemi	LHCP	6130	U1D5	Spot 2	H	11155	72	125.2
EU6	West Hemi	LHCP	6220	U1DC	Spot 2	H	11495	72	125.2
EU1	West Hemi	LHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	125.2
EU2	West Hemi	LHCP	6050	Y1D2	Spot 2A	H	11075	72	125.2
EU3	West Hemi	LHCP	6111	Y1D3	Spot 2A	H	11136	34	125.2
EU4	West Hemi	LHCP	6149	Y1D4	Spot 2A	H	11174	34	125.2
EU5	West Hemi	LHCP	6130	Y1D5	Spot 2A	H	11155	72	125.2
EU6	West Hemi	LHCP	6220	Y1DC	Spot 2A	H	11495	72	125.2
EU1	West Hemi	LHCP	5967.5	W1D1	Spot 3	V	10992.5	77	123.8
EU2	West Hemi	LHCP	6050	W1D2	Spot 3	V	11075	72	123.8
EU3	West Hemi	LHCP	6111	W1D3	Spot 3	V	11136	34	123.8
EU4	West Hemi	LHCP	6149	W1D4	Spot 3	V	11174	34	123.8
EU5	West Hemi	LHCP	6130	W1D5	Spot 3	V	11155	72	123.8
EU6	West Hemi	LHCP	6220	W1DC	Spot 3	V	11495	72	123.8
FU1	East Hemi	LHCP	5967.5	S1D1	Spot 1	V	10992.5	77	121.8
FU2	East Hemi	LHCP	6050	S1D2	Spot 1	V	11075	72	121.8
FU3	East Hemi	LHCP	6111	S1D3	Spot 1	V	11136	34	121.8
FU4	East Hemi	LHCP	6149	S1D4	Spot 1	V	11174	34	121.8
FU5	East Hemi	LHCP	6130	S1D5	Spot 1	V	11155	72	121.8
FU6	East Hemi	LHCP	6220	S1DC	Spot 1	V	11495	72	121.8
FU1	East Hemi	LHCP	5967.5	U1D1	Spot 2	H	10992.5	77	122.9
FU2	East Hemi	LHCP	6050	U1D2	Spot 2	H	11075	72	122.9
FU3	East Hemi	LHCP	6111	U1D3	Spot 2	H	11136	34	122.9
FU4	East Hemi	LHCP	6149	U1D4	Spot 2	H	11174	34	122.9
FU5	East Hemi	LHCP	6130	U1D5	Spot 2	H	11155	72	122.9
FU6	East Hemi	LHCP	6220	U1DC	Spot 2	H	11495	72	122.9
FU1	East Hemi	LHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	122.9
FU2	East Hemi	LHCP	6050	Y1D2	Spot 2A	H	11075	72	122.9
FU3	East Hemi	LHCP	6111	Y1D3	Spot 2A	H	11136	34	122.9
FU4	East Hemi	LHCP	6149	Y1D4	Spot 2A	H	11174	34	122.9
FU5	East Hemi	LHCP	6130	Y1D5	Spot 2A	H	11155	72	122.9
FU6	East Hemi	LHCP	6220	Y1DC	Spot 2A	H	11495	72	122.9
FU1	East Hemi	LHCP	5967.5	W1D1	Spot 3	V	10992.5	77	121.5
FU2	East Hemi	LHCP	6050	W1D2	Spot 3	V	11075	72	121.5
FU3	East Hemi	LHCP	6111	W1D3	Spot 3	V	11136	34	121.5
FU4	East Hemi	LHCP	6149	W1D4	Spot 3	V	11174	34	121.5
FU5	East Hemi	LHCP	6130	W1D5	Spot 3	V	11155	72	121.5
FU6	East Hemi	LHCP	6220	W1DC	Spot 3	V	11495	72	121.5
GU1	NW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	121.7
GU2	NW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	121.7
GU3	NW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	121.7
GU4	NW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	121.7
GU5	NW Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	121.7

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

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)
GU6	NW Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	121.7
GU1	NW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	122.8
GU2	NW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	122.8
GU3	NW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	122.8
GU4	NW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	122.8
GU5	NW Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	122.8
GU6	NW Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	122.8
GU1	NW Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	122.8
GU2	NW Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	122.8
GU3	NW Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	122.8
GU4	NW Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	122.8
GU5	NW Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	122.8
GU6	NW Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	122.8
GU1	NW Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	121.4
GU2	NW Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	121.4
GU3	NW Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	121.4
GU4	NW Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	121.4
GU5	NW Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	121.4
GU6	NW Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	121.4
JU1	SE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	119.3
JU2	SE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	119.3
JU3	SE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	119.3
JU4	SE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	119.3
JU5	SE Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	119.3
JU6	SE Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	119.3
JU1	SE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	120.4
JU2	SE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	120.4
JU3	SE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	120.4
JU4	SE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	120.4
JU5	SE Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	120.4
JU6	SE Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	120.4
JU1	SE Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	120.4
JU2	SE Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	120.4
JU3	SE Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	120.4
JU4	SE Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	120.4
JU5	SE Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	120.4
JU6	SE Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	120.4
JU1	SE Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	119.0
JU2	SE Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	119.0
JU3	SE Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	119.0
JU4	SE Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	119.0
JU5	SE Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	119.0
JU6	SE Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	119.0
HU1	NE Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	120.3
HU2	NE Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	120.3
HU3	NE Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	120.3
HU4	NE Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	120.3
HU5	NE Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	120.3
HU6	NE Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	120.3
HU1	NE Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	121.4
HU2	NE Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	121.4
HU3	NE Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	121.4
HU4	NE Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	121.4
HU5	NE Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	121.4
HU6	NE Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	121.4

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
HU1	NE Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	121.4
HU2	NE Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	121.4
HU3	NE Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	121.4
HU4	NE Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	121.4
HU5	NE Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	121.4
HU6	NE Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	121.4
HU1	NE Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	120.0
HU2	NE Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	120.0
HU3	NE Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	120.0
HU4	NE Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	120.0
HU5	NE Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	120.0
HU6	NE Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	120.0
IU1	SW Zone	RHCP	5967.5	S1D1	Spot 1	V	10992.5	77	120.4
IU2	SW Zone	RHCP	6050	S1D2	Spot 1	V	11075	72	120.4
IU3	SW Zone	RHCP	6111	S1D3	Spot 1	V	11136	34	120.4
IU4	SW Zone	RHCP	6149	S1D4	Spot 1	V	11174	34	120.4
IU5	SW Zone	RHCP	6130	S1D5	Spot 1	V	11155	72	120.4
IU6	SW Zone	RHCP	6220	S1DC	Spot 1	V	11495	72	120.4
IU1	SW Zone	RHCP	5967.5	U1D1	Spot 2	H	10992.5	77	121.5
IU2	SW Zone	RHCP	6050	U1D2	Spot 2	H	11075	72	121.5
IU3	SW Zone	RHCP	6111	U1D3	Spot 2	H	11136	34	121.5
IU4	SW Zone	RHCP	6149	U1D4	Spot 2	H	11174	34	121.5
IU5	SW Zone	RHCP	6130	U1D5	Spot 2	H	11155	72	121.5
IU6	SW Zone	RHCP	6220	U1DC	Spot 2	H	11495	72	121.5
IU1	SW Zone	RHCP	5967.5	Y1D1	Spot 2A	H	10992.5	77	121.5
IU2	SW Zone	RHCP	6050	Y1D2	Spot 2A	H	11075	72	121.5
IU3	SW Zone	RHCP	6111	Y1D3	Spot 2A	H	11136	34	121.5
IU4	SW Zone	RHCP	6149	Y1D4	Spot 2A	H	11174	34	121.5
IU5	SW Zone	RHCP	6130	Y1D5	Spot 2A	H	11155	72	121.5
IU6	SW Zone	RHCP	6220	Y1DC	Spot 2A	H	11495	72	121.5
IU1	SW Zone	RHCP	5967.5	W1D1	Spot 3	V	10992.5	77	120.1
IU2	SW Zone	RHCP	6050	W1D2	Spot 3	V	11075	72	120.1
IU3	SW Zone	RHCP	6111	W1D3	Spot 3	V	11136	34	120.1
IU4	SW Zone	RHCP	6149	W1D4	Spot 3	V	11174	34	120.1
IU5	SW Zone	RHCP	6130	W1D5	Spot 3	V	11155	72	120.1
IU6	SW Zone	RHCP	6220	W1DC	Spot 3	V	11495	72	120.1

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 1-5: C-Band Uplink/Ku-Band 12.5-12.75GHz Downlink

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)
EU1	West Hemi	LHCP	5967.5	S2D1	Spot 1	V	12547.5	77	124.1
EU2	West Hemi	LHCP	6050	S2D2	Spot 1	V	12630	72	124.1
EU3	West Hemi	LHCP	6111	S2D3	Spot 1	V	12691	34	124.1
EU4	West Hemi	LHCP	6149	S2D4	Spot 1	V	12729	34	124.1
EU5	West Hemi	LHCP	6130	S2D5	Spot 1	V	12710	72	124.1
EU1	West Hemi	LHCP	5967.5	U2D1	Spot 2	H	12547.5	77	125.2
EU2	West Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	125.2
EU3	West Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	125.2
EU4	West Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	125.2
EU5	West Hemi	LHCP	6130	U2D5	Spot 2	H	12710	72	125.2
EU1	West Hemi	LHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	125.2
EU2	West Hemi	LHCP	6050	Y2D2	Spot 2A	H	12630	72	125.2
EU3	West Hemi	LHCP	6111	Y2D3	Spot 2A	H	12691	34	125.2
EU4	West Hemi	LHCP	6149	Y2D4	Spot 2A	H	12729	34	125.2
EU5	West Hemi	LHCP	6130	Y2D5	Spot 2A	H	12710	72	125.2
EU1	West Hemi	LHCP	5967.5	W2D1	Spot 3	V	12547.5	77	123.8
EU2	West Hemi	LHCP	6050	W2D2	Spot 3	V	12630	72	123.8
EU3	West Hemi	LHCP	6111	W2D3	Spot 3	V	12691	34	123.8
EU4	West Hemi	LHCP	6149	W2D4	Spot 3	V	12729	34	123.8
EU5	West Hemi	LHCP	6130	W2D5	Spot 3	V	12710	72	123.8
FU1	East Hemi	LHCP	5967.5	S2D1	Spot 1	V	12547.5	77	121.8
FU2	East Hemi	LHCP	6050	S2D2	Spot 1	V	12630	72	121.8
FU3	East Hemi	LHCP	6111	S2D3	Spot 1	V	12691	34	121.8
FU4	East Hemi	LHCP	6149	S2D4	Spot 1	V	12729	34	121.8
FU5	East Hemi	LHCP	6130	S2D5	Spot 1	V	12710	72	121.8
FU1	East Hemi	LHCP	5967.5	U2D1	Spot 2	H	12547.5	77	122.9
FU2	East Hemi	LHCP	6050	U2D2	Spot 2	H	12630	72	122.9
FU3	East Hemi	LHCP	6111	U2D3	Spot 2	H	12691	34	122.9
FU4	East Hemi	LHCP	6149	U2D4	Spot 2	H	12729	34	122.9
FU5	East Hemi	LHCP	6130	U2D5	Spot 2	H	12710	72	122.9
FU1	East Hemi	LHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	122.9
FU2	East Hemi	LHCP	6050	Y2D2	Spot 2A	H	12630	72	122.9
FU3	East Hemi	LHCP	6111	Y2D3	Spot 2A	H	12691	34	122.9
FU4	East Hemi	LHCP	6149	Y2D4	Spot 2A	H	12729	34	122.9
FU5	East Hemi	LHCP	6130	Y2D5	Spot 2A	H	12710	72	122.9
FU1	East Hemi	LHCP	5967.5	W2D1	Spot 3	V	12547.5	77	121.5
FU2	East Hemi	LHCP	6050	W2D2	Spot 3	V	12630	72	121.5
FU3	East Hemi	LHCP	6111	W2D3	Spot 3	V	12691	34	121.5
FU4	East Hemi	LHCP	6149	W2D4	Spot 3	V	12729	34	121.5
FU5	East Hemi	LHCP	6130	W2D5	Spot 3	V	12710	72	121.5
GU1	NW Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	121.7
GU2	NW Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	121.7
GU3	NW Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	121.7
GU4	NW Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	121.7
GU5	NW Zone	RHCP	6130	S2D5	Spot 1	V	12710	72	121.7
GU1	NW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	122.8
GU2	NW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	122.8
GU3	NW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	122.8
GU4	NW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	122.8
GU5	NW Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	122.8
GU1	NW Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	122.8

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

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)
GU2	NW Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	122.8
GU3	NW Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	122.8
GU4	NW Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	122.8
GU5	NW Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	122.8
GU1	NW Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	121.4
GU2	NW Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	121.4
GU3	NW Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	121.4
GU4	NW Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	121.4
GU5	NW Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	121.4
JU1	SE Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	119.3
JU2	SE Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	119.3
JU3	SE Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	119.3
JU4	SE Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	119.3
JU5	SE Zone	RHCP	6130	S2D5	Spot 1	V	12710	72	119.3
JU1	SE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	120.4
JU2	SE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	120.4
JU3	SE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	120.4
JU4	SE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	120.4
JU5	SE Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	120.4
JU1	SE Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	120.4
JU2	SE Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	120.4
JU3	SE Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	120.4
JU4	SE Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	120.4
JU5	SE Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	120.4
JU1	SE Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	119.0
JU2	SE Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	119.0
JU3	SE Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	119.0
JU4	SE Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	119.0
JU5	SE Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	119.0
HU1	NE Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	120.3
HU2	NE Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	120.3
HU3	NE Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	120.3
HU4	NE Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	120.3
HU5	NE Zone	RHCP	6130	S2D5	Spot 1	V	12710	72	120.3
HU1	NE Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	121.4
HU2	NE Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	121.4
HU3	NE Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	121.4
HU4	NE Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	121.4
HU5	NE Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	121.4
HU1	NE Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	121.4
HU2	NE Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	121.4
HU3	NE Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	121.4
HU4	NE Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	121.4
HU5	NE Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	121.4
HU1	NE Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	120.0
HU2	NE Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	120.0
HU3	NE Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	120.0
HU4	NE Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	120.0
HU5	NE Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	120.0
IU1	SW Zone	RHCP	5967.5	S2D1	Spot 1	V	12547.5	77	120.4
IU2	SW Zone	RHCP	6050	S2D2	Spot 1	V	12630	72	120.4
IU3	SW Zone	RHCP	6111	S2D3	Spot 1	V	12691	34	120.4
IU4	SW Zone	RHCP	6149	S2D4	Spot 1	V	12729	34	120.4
IU5	SW Zone	RHCP	6130	S2D5	Spot 1	V	12710	72	120.4

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

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)
IU1	SW Zone	RHCP	5967.5	U2D1	Spot 2	H	12547.5	77	121.5
IU2	SW Zone	RHCP	6050	U2D2	Spot 2	H	12630	72	121.5
IU3	SW Zone	RHCP	6111	U2D3	Spot 2	H	12691	34	121.5
IU4	SW Zone	RHCP	6149	U2D4	Spot 2	H	12729	34	121.5
IU5	SW Zone	RHCP	6130	U2D5	Spot 2	H	12710	72	121.5
IU1	SW Zone	RHCP	5967.5	Y2D1	Spot 2A	H	12547.5	77	121.5
IU2	SW Zone	RHCP	6050	Y2D2	Spot 2A	H	12630	72	121.5
IU3	SW Zone	RHCP	6111	Y2D3	Spot 2A	H	12691	34	121.5
IU4	SW Zone	RHCP	6149	Y2D4	Spot 2A	H	12729	34	121.5
IU5	SW Zone	RHCP	6130	Y2D5	Spot 2A	H	12710	72	121.5
IU1	SW Zone	RHCP	5967.5	W2D1	Spot 3	V	12547.5	77	120.1
IU2	SW Zone	RHCP	6050	W2D2	Spot 3	V	12630	72	120.1
IU3	SW Zone	RHCP	6111	W2D3	Spot 3	V	12691	34	120.1
IU4	SW Zone	RHCP	6149	W2D4	Spot 3	V	12729	34	120.1
IU5	SW Zone	RHCP	6130	W2D5	Spot 3	V	12710	72	120.1

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 1-6: Ku-Band Uplink/C-Band Downlink

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)
SU1	Spot 1	H	14042.5	ED1	West Hemi	RHCP	3742.5	77	114.7
SU2	Spot 1	H	14125	ED2	West Hemi	RHCP	3825	72	114.7
SU3	Spot 1	H	14186	ED3	West Hemi	RHCP	3886	34	114.7
SU4	Spot 1	H	14224	ED4	West Hemi	RHCP	3924	34	114.7
SU5	Spot 1	H	14205	ED5	West Hemi	RHCP	3905	72	114.7
SUC	Spot 1	H	14295	ED6	West Hemi	RHCP	3995	72	114.7
SU1	Spot 1	H	14042.5	FD1	East Hemi	RHCP	3742.5	77	113.0
SU2	Spot 1	H	14125	FD2	East Hemi	RHCP	3825	72	113.0
SU3	Spot 1	H	14186	FD3	East Hemi	RHCP	3886	34	113.0
SU4	Spot 1	H	14224	FD4	East Hemi	RHCP	3924	34	113.0
SU5	Spot 1	H	14205	FD5	East Hemi	RHCP	3905	72	113.0
SUC	Spot 1	H	14295	FD6	East Hemi	RHCP	3995	72	113.0
SU1	Spot 1	H	14042.5	GD1	NW Zone	LHCP	3742.5	77	111.5
SU2	Spot 1	H	14125	GD2	NW Zone	LHCP	3825	72	111.5
SU3	Spot 1	H	14186	GD3	NW Zone	LHCP	3886	34	111.5
SU4	Spot 1	H	14224	GD4	NW Zone	LHCP	3924	34	111.5
SU5	Spot 1	H	14205	GD5	NW Zone	LHCP	3905	72	111.5
SUC	Spot 1	H	14295	GD6	NW Zone	LHCP	3995	72	111.5
SU1	Spot 1	H	14042.5	JD1	SE Zone	LHCP	3742.5	77	111.7
SU2	Spot 1	H	14125	JD2	SE Zone	LHCP	3825	72	111.7
SU3	Spot 1	H	14186	JD3	SE Zone	LHCP	3886	34	111.7
SU4	Spot 1	H	14224	JD4	SE Zone	LHCP	3924	34	111.7
SU5	Spot 1	H	14205	JD5	SE Zone	LHCP	3905	72	111.7
SUC	Spot 1	H	14295	JD6	SE Zone	LHCP	3995	72	111.7
SU1	Spot 1	H	14042.5	HD1	NE Zone	LHCP	3742.5	77	110.5
SU2	Spot 1	H	14125	HD2	NE Zone	LHCP	3825	72	110.5
SU3	Spot 1	H	14186	HD3	NE Zone	LHCP	3886	34	110.5
SU4	Spot 1	H	14224	HD4	NE Zone	LHCP	3924	34	110.5
SU5	Spot 1	H	14205	HD5	NE Zone	LHCP	3905	72	110.5
SUC	Spot 1	H	14295	HD6	NE Zone	LHCP	3995	72	110.5
SU1	Spot 1	H	14042.5	ID1	SW Zone	LHCP	3742.5	77	110.4
SU2	Spot 1	H	14125	ID2	SW Zone	LHCP	3825	72	110.4
SU3	Spot 1	H	14186	ID3	SW Zone	LHCP	3886	34	110.4
SU4	Spot 1	H	14224	ID4	SW Zone	LHCP	3924	34	110.4
SU5	Spot 1	H	14205	ID5	SW Zone	LHCP	3905	72	110.4
SUC	Spot 1	H	14295	ID6	SW Zone	LHCP	3995	72	110.4
UU1	Spot 2	V	14042.5	ED1	West Hemi	RHCP	3742.5	77	117.4
UU2	Spot 2	V	14125	ED2	West Hemi	RHCP	3825	72	117.4
UU3	Spot 2	V	14186	ED3	West Hemi	RHCP	3886	34	117.4
UU4	Spot 2	V	14224	ED4	West Hemi	RHCP	3924	34	117.4
UU5	Spot 2	V	14205	ED5	West Hemi	RHCP	3905	72	117.4
UUC	Spot 2	V	14295	ED6	West Hemi	RHCP	3995	72	117.4
UU1	Spot 2	V	14042.5	FD1	East Hemi	RHCP	3742.5	77	115.7
UU2	Spot 2	V	14125	FD2	East Hemi	RHCP	3825	72	115.7
UU3	Spot 2	V	14186	FD3	East Hemi	RHCP	3886	34	115.7
UU4	Spot 2	V	14224	FD4	East Hemi	RHCP	3924	34	115.7
UU5	Spot 2	V	14205	FD5	East Hemi	RHCP	3905	72	115.7
UUC	Spot 2	V	14295	FD6	East Hemi	RHCP	3995	72	115.7
UU1	Spot 2	V	14042.5	GD1	NW Zone	LHCP	3742.5	77	114.2
UU2	Spot 2	V	14125	GD2	NW Zone	LHCP	3825	72	114.2
UU3	Spot 2	V	14186	GD3	NW Zone	LHCP	3886	34	114.2
UU4	Spot 2	V	14224	GD4	NW Zone	LHCP	3924	34	114.2
UU5	Spot 2	V	14205	GD5	NW Zone	LHCP	3905	72	114.2

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

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)
UUC	Spot 2	V	14295	GD6	NW Zone	LHCP	3995	72	114.2
UU1	Spot 2	V	14042.5	JD1	SE Zone	LHCP	3742.5	77	114.4
UU2	Spot 2	V	14125	JD2	SE Zone	LHCP	3825	72	114.4
UU3	Spot 2	V	14186	JD3	SE Zone	LHCP	3886	34	114.4
UU4	Spot 2	V	14224	JD4	SE Zone	LHCP	3924	34	114.4
UU5	Spot 2	V	14205	JD5	SE Zone	LHCP	3905	72	114.4
UUC	Spot 2	V	14295	JD6	SE Zone	LHCP	3995	72	114.4
UU1	Spot 2	V	14042.5	HD1	NE Zone	LHCP	3742.5	77	113.2
UU2	Spot 2	V	14125	HD2	NE Zone	LHCP	3825	72	113.2
UU3	Spot 2	V	14186	HD3	NE Zone	LHCP	3886	34	113.2
UU4	Spot 2	V	14224	HD4	NE Zone	LHCP	3924	34	113.2
UU5	Spot 2	V	14205	HD5	NE Zone	LHCP	3905	72	113.2
UUC	Spot 2	V	14295	HD6	NE Zone	LHCP	3995	72	113.2
UU1	Spot 2	V	14042.5	ID1	SW Zone	LHCP	3742.5	77	113.1
UU2	Spot 2	V	14125	ID2	SW Zone	LHCP	3825	72	113.1
UU3	Spot 2	V	14186	ID3	SW Zone	LHCP	3886	34	113.1
UU4	Spot 2	V	14224	ID4	SW Zone	LHCP	3924	34	113.1
UU5	Spot 2	V	14205	ID5	SW Zone	LHCP	3905	72	113.1
UUC	Spot 2	V	14295	ID6	SW Zone	LHCP	3995	72	113.1
YU1	Spot 2A	V	14042.5	ED1	West Hemi	RHCP	3742.5	77	119.4
YU2	Spot 2A	V	14125	ED2	West Hemi	RHCP	3825	72	119.4
YU3	Spot 2A	V	14186	ED3	West Hemi	RHCP	3886	34	119.4
YU4	Spot 2A	V	14224	ED4	West Hemi	RHCP	3924	34	119.4
YU5	Spot 2A	V	14205	ED5	West Hemi	RHCP	3905	72	119.4
YUC	Spot 2A	V	14295	ED6	West Hemi	RHCP	3995	72	119.4
YU1	Spot 2A	V	14042.5	FD1	East Hemi	RHCP	3742.5	77	117.7
YU2	Spot 2A	V	14125	FD2	East Hemi	RHCP	3825	72	117.7
YU3	Spot 2A	V	14186	FD3	East Hemi	RHCP	3886	34	117.7
YU4	Spot 2A	V	14224	FD4	East Hemi	RHCP	3924	34	117.7
YU5	Spot 2A	V	14205	FD5	East Hemi	RHCP	3905	72	117.7
YUC	Spot 2A	V	14295	FD6	East Hemi	RHCP	3995	72	117.7
YU1	Spot 2A	V	14042.5	GD1	NW Zone	LHCP	3742.5	77	116.2
YU2	Spot 2A	V	14125	GD2	NW Zone	LHCP	3825	72	116.2
YU3	Spot 2A	V	14186	GD3	NW Zone	LHCP	3886	34	116.2
YU4	Spot 2A	V	14224	GD4	NW Zone	LHCP	3924	34	116.2
YU5	Spot 2A	V	14205	GD5	NW Zone	LHCP	3905	72	116.2
YUC	Spot 2A	V	14295	GD6	NW Zone	LHCP	3995	72	116.2
YU1	Spot 2A	V	14042.5	JD1	SE Zone	LHCP	3742.5	77	116.4
YU2	Spot 2A	V	14125	JD2	SE Zone	LHCP	3825	72	116.4
YU3	Spot 2A	V	14186	JD3	SE Zone	LHCP	3886	34	116.4
YU4	Spot 2A	V	14224	JD4	SE Zone	LHCP	3924	34	116.4
YU5	Spot 2A	V	14205	JD5	SE Zone	LHCP	3905	72	116.4
YUC	Spot 2A	V	14295	JD6	SE Zone	LHCP	3995	72	116.4
YU1	Spot 2A	V	14042.5	HD1	NE Zone	LHCP	3742.5	77	115.2
YU2	Spot 2A	V	14125	HD2	NE Zone	LHCP	3825	72	115.2
YU3	Spot 2A	V	14186	HD3	NE Zone	LHCP	3886	34	115.2
YU4	Spot 2A	V	14224	HD4	NE Zone	LHCP	3924	34	115.2
YU5	Spot 2A	V	14205	HD5	NE Zone	LHCP	3905	72	115.2
YUC	Spot 2A	V	14295	HD6	NE Zone	LHCP	3995	72	115.2
YU1	Spot 2A	V	14042.5	ID1	SW Zone	LHCP	3742.5	77	115.1
YU2	Spot 2A	V	14125	ID2	SW Zone	LHCP	3825	72	115.1
YU3	Spot 2A	V	14186	ID3	SW Zone	LHCP	3886	34	115.1
YU4	Spot 2A	V	14224	ID4	SW Zone	LHCP	3924	34	115.1
YU5	Spot 2A	V	14205	ID5	SW Zone	LHCP	3905	72	115.1
YUC	Spot 2A	V	14295	ID6	SW Zone	LHCP	3995	72	115.1

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

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)
WU1	Spot 3	H	14042.5	ED1	West Hemi	RHCP	3742.5	77	117.9
WU2	Spot 3	H	14125	ED2	West Hemi	RHCP	3825	72	117.9
WU3	Spot 3	H	14186	ED3	West Hemi	RHCP	3886	34	117.9
WU4	Spot 3	H	14224	ED4	West Hemi	RHCP	3924	34	117.9
WU5	Spot 3	H	14205	ED5	West Hemi	RHCP	3905	72	117.9
WUC	Spot 3	H	14295	ED6	West Hemi	RHCP	3995	72	117.9
WU1	Spot 3	H	14042.5	FD1	East Hemi	RHCP	3742.5	77	116.2
WU2	Spot 3	H	14125	FD2	East Hemi	RHCP	3825	72	116.2
WU3	Spot 3	H	14186	FD3	East Hemi	RHCP	3886	34	116.2
WU4	Spot 3	H	14224	FD4	East Hemi	RHCP	3924	34	116.2
WU5	Spot 3	H	14205	FD5	East Hemi	RHCP	3905	72	116.2
WUC	Spot 3	H	14295	FD6	East Hemi	RHCP	3995	72	116.2
WU1	Spot 3	H	14042.5	GD1	NW Zone	LHCP	3742.5	77	114.7
WU2	Spot 3	H	14125	GD2	NW Zone	LHCP	3825	72	114.7
WU3	Spot 3	H	14186	GD3	NW Zone	LHCP	3886	34	114.7
WU4	Spot 3	H	14224	GD4	NW Zone	LHCP	3924	34	114.7
WU5	Spot 3	H	14205	GD5	NW Zone	LHCP	3905	72	114.7
WUC	Spot 3	H	14295	GD6	NW Zone	LHCP	3995	72	114.7
WU1	Spot 3	H	14042.5	JD1	SE Zone	LHCP	3742.5	77	114.9
WU2	Spot 3	H	14125	JD2	SE Zone	LHCP	3825	72	114.9
WU3	Spot 3	H	14186	JD3	SE Zone	LHCP	3886	34	114.9
WU4	Spot 3	H	14224	JD4	SE Zone	LHCP	3924	34	114.9
WU5	Spot 3	H	14205	JD5	SE Zone	LHCP	3905	72	114.9
WUC	Spot 3	H	14295	JD6	SE Zone	LHCP	3995	72	114.9
WU1	Spot 3	H	14042.5	HD1	NE Zone	LHCP	3742.5	77	113.7
WU2	Spot 3	H	14125	HD2	NE Zone	LHCP	3825	72	113.7
WU3	Spot 3	H	14186	HD3	NE Zone	LHCP	3886	34	113.7
WU4	Spot 3	H	14224	HD4	NE Zone	LHCP	3924	34	113.7
WU5	Spot 3	H	14205	HD5	NE Zone	LHCP	3905	72	113.7
WUC	Spot 3	H	14295	HD6	NE Zone	LHCP	3995	72	113.7
WU1	Spot 3	H	14042.5	ID1	SW Zone	LHCP	3742.5	77	113.6
WU2	Spot 3	H	14125	ID2	SW Zone	LHCP	3825	72	113.6
WU3	Spot 3	H	14186	ID3	SW Zone	LHCP	3886	34	113.6
WU4	Spot 3	H	14224	ID4	SW Zone	LHCP	3924	34	113.6
WU5	Spot 3	H	14205	ID5	SW Zone	LHCP	3905	72	113.6
WUC	Spot 3	H	14295	ID6	SW Zone	LHCP	3995	72	113.6
WUD	Spot 3	H	14477.5	ADD	Global A	RHCP	4177.5	41	117.5
WUD	Spot 3	H	14477.5	BDD	Global B	LHCP	4177.5	41	117.1
WUD	Spot 3	H	14477.5	CDD	C-Spot A	RHCP	4177.5	41	117.3
WUD	Spot 3	H	14477.5	DDD	C-Spot B	LHCP	4177.5	41	116.6

Polarization Designations

V: Linear vertical polarization

H: Linear horizontal polarization

RHCP: Right hand circular polarization

LHCP: Left hand circular polarization

Exhibit 1-7: Telemetry, Tracking and Command

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)
CMD1	Global	LHCP	6173.7					1.0
CMD2	Global	LHCP	6176.3					1.0
				TM1	Global	RHCP	3947.5	0.5
				TM2	Global	RHCP	3952.5	0.5
				TM3	Global	RHCP	3948	0.5
				TM4	Global	RHCP	3952	0.5
				BN1	Global	V	3950	0.025
				BN2	Global	RHCP	11198	0.025
				BN3	Global	RHCP	11452	0.025
				BN4	Spot 1	V	11701	0.025
				BN5	Spot 1X	H	11701	0.025
				BN6	Spot 2	H	11701	0.025
				BN7	Spot 2X	V	11701	0.025
				BN8	Spot 3	V	11701	0.025
				BN10	Spot 1	V	12501	0.025
				BN11	Spot 1X	H	12501	0.025
				BN12	Spot 2	H	12501	0.025
				BN13	Spot 2X	V	12501	0.025
				BN14	Spot 3	V	12501	0.025

Polarization Designations

V: Linear vertical polarization
H: Linear horizontal polarization

RHCP: Right hand circular polarization
LHCP: Left hand circular polarization

Exhibit 2: Beam Performane and Gain Contours

Exhibit 2-1: Global A Uplink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 20.3 dBi

Peak G/T: -7.2 dB/K

Saturated Flux Density @ Peak G/T: -90.4 to -76.4 dBW/m²

[Schedule S Beam Designation: GAUL]

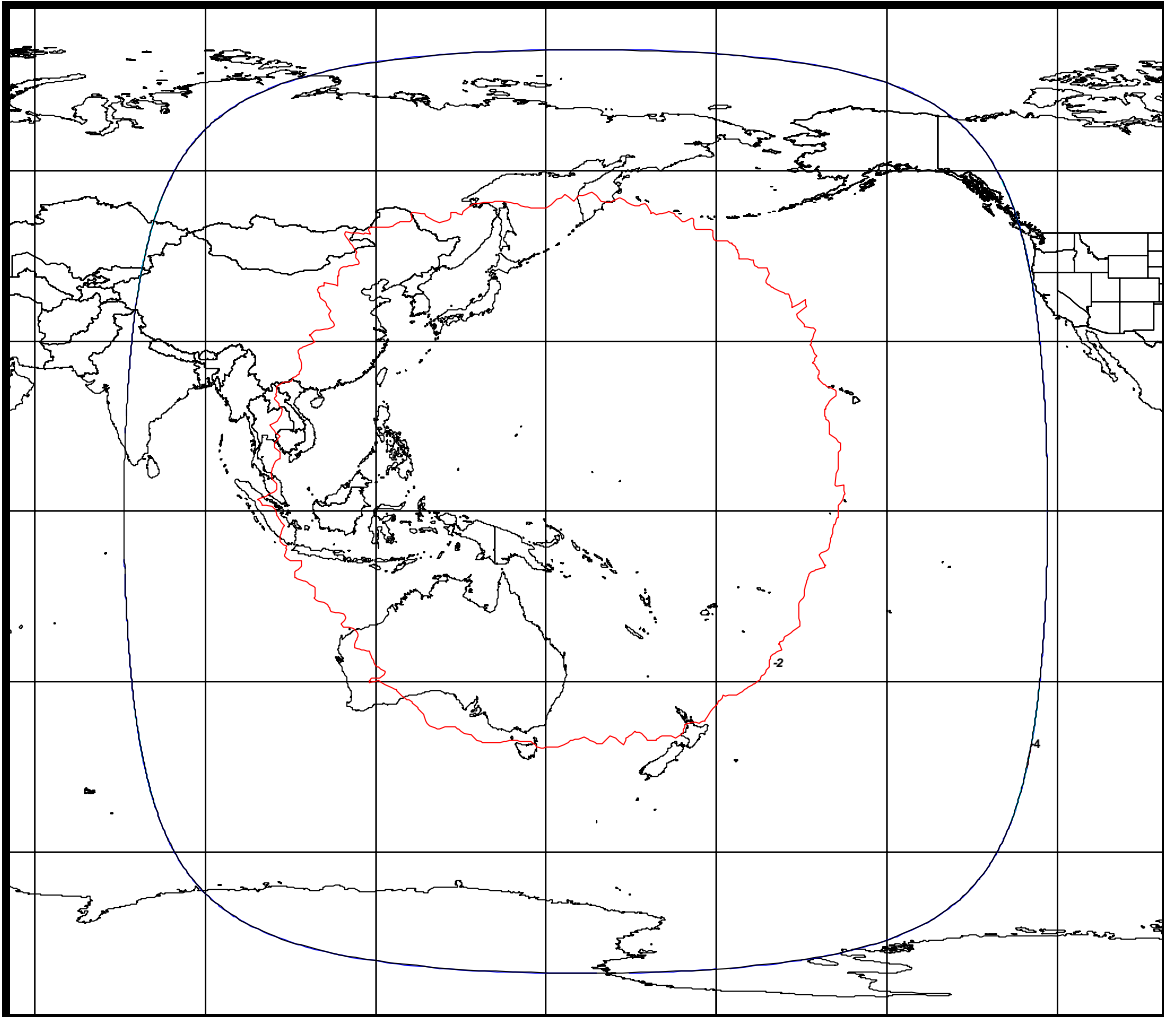


Exhibit 2-2: Global B Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 20.3 dBi

Peak G/T: -7.2 dB/K

Saturated Flux Density @ Peak G/T: -91.1 to -77.1 dBW/m²

[Schedule S Beam Designation: GBUL]

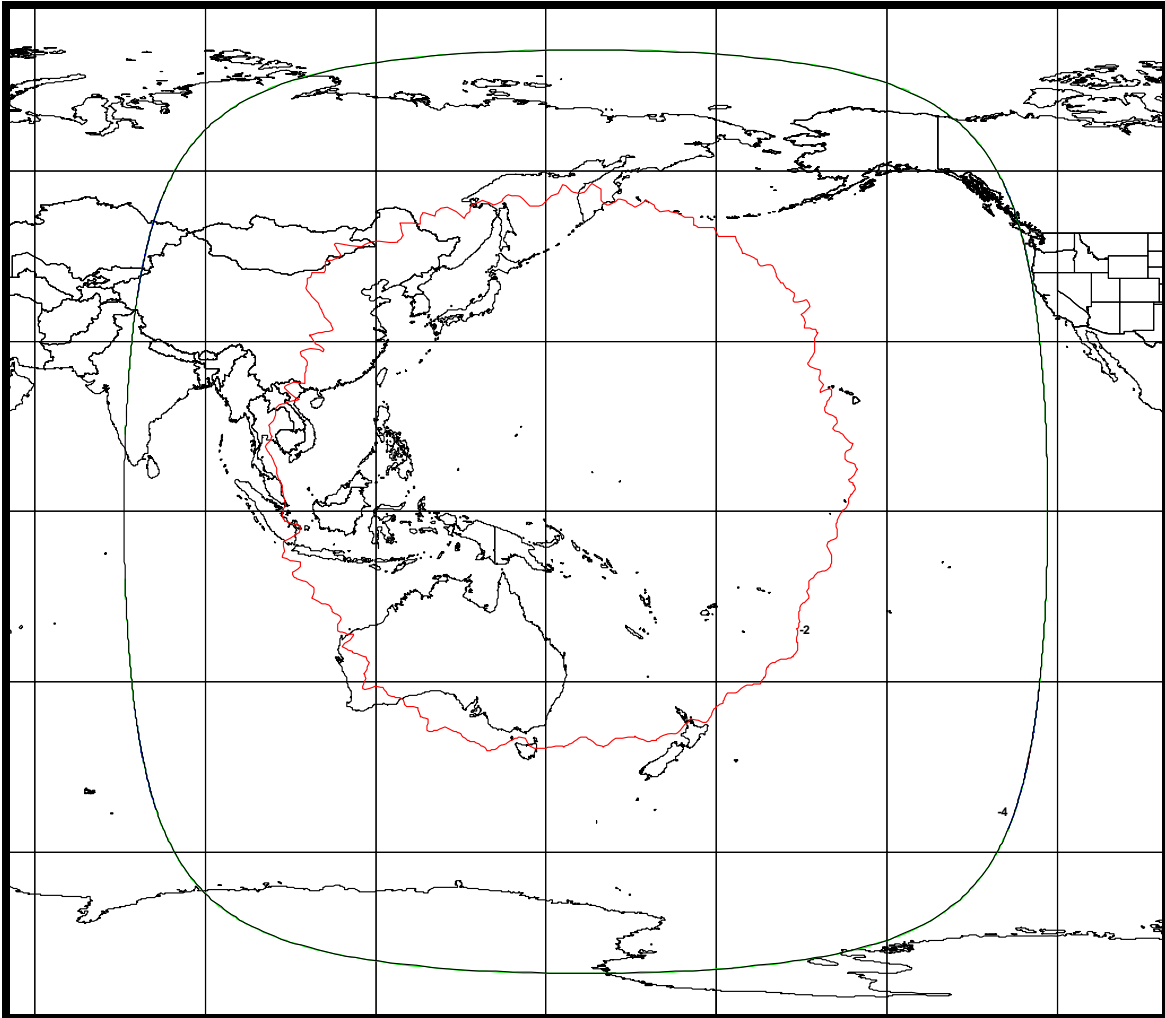


Exhibit 2-3: West Hemi Uplink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 23.8 dBi

Peak G/T: -3.7 dB/K

Saturated Flux Density @ Peak G/T: -91.5 to -77.5 dBW/m²

[Schedule S Beam Designation: WHUL]

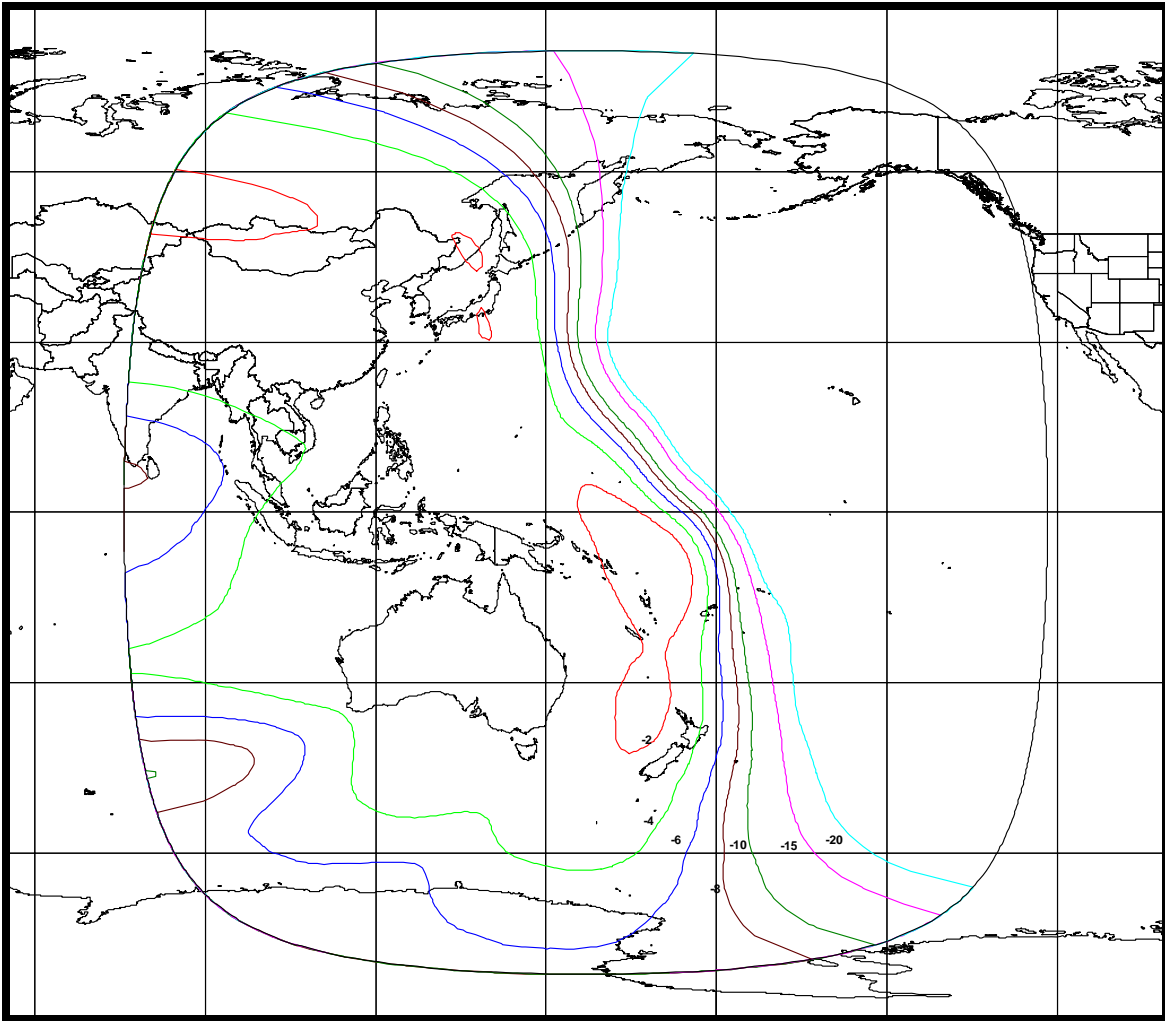


Exhibit 2-4: East Hemi Uplink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 26.0 dBi

Peak G/T: -1.7 dB/K

Saturated Flux Density @ Peak G/T: -91.4 to -77.4 dBW/m²

[Schedule S Beam Designation: EHUL]

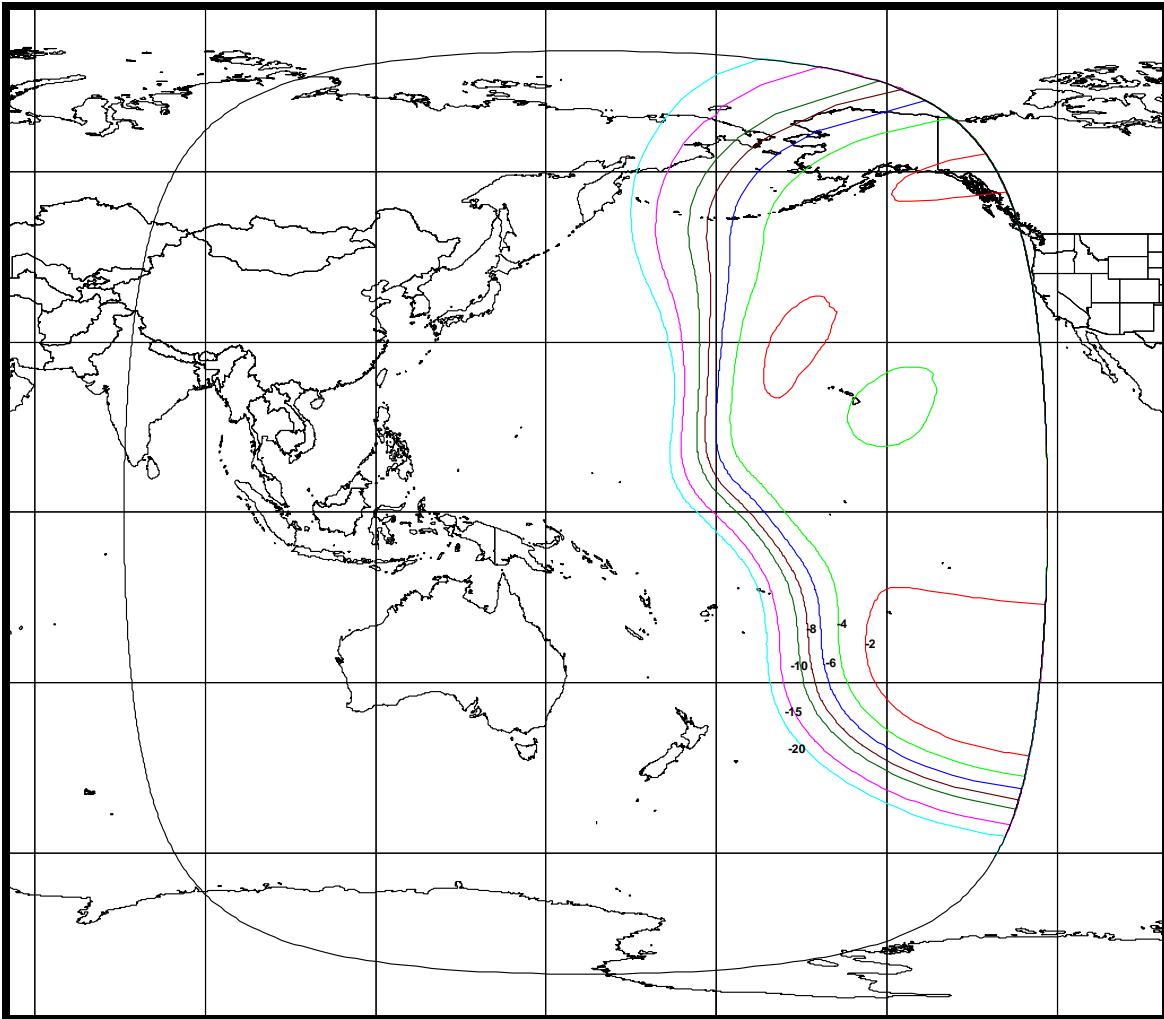


Exhibit 2-5: Northwest Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 26.6 dBi

Peak G/T: -0.8 dB/K

Saturated Flux Density @ Peak G/T: -91.9 to -77.9 dBW/m²

[Schedule S Beam Designation: NWUL]

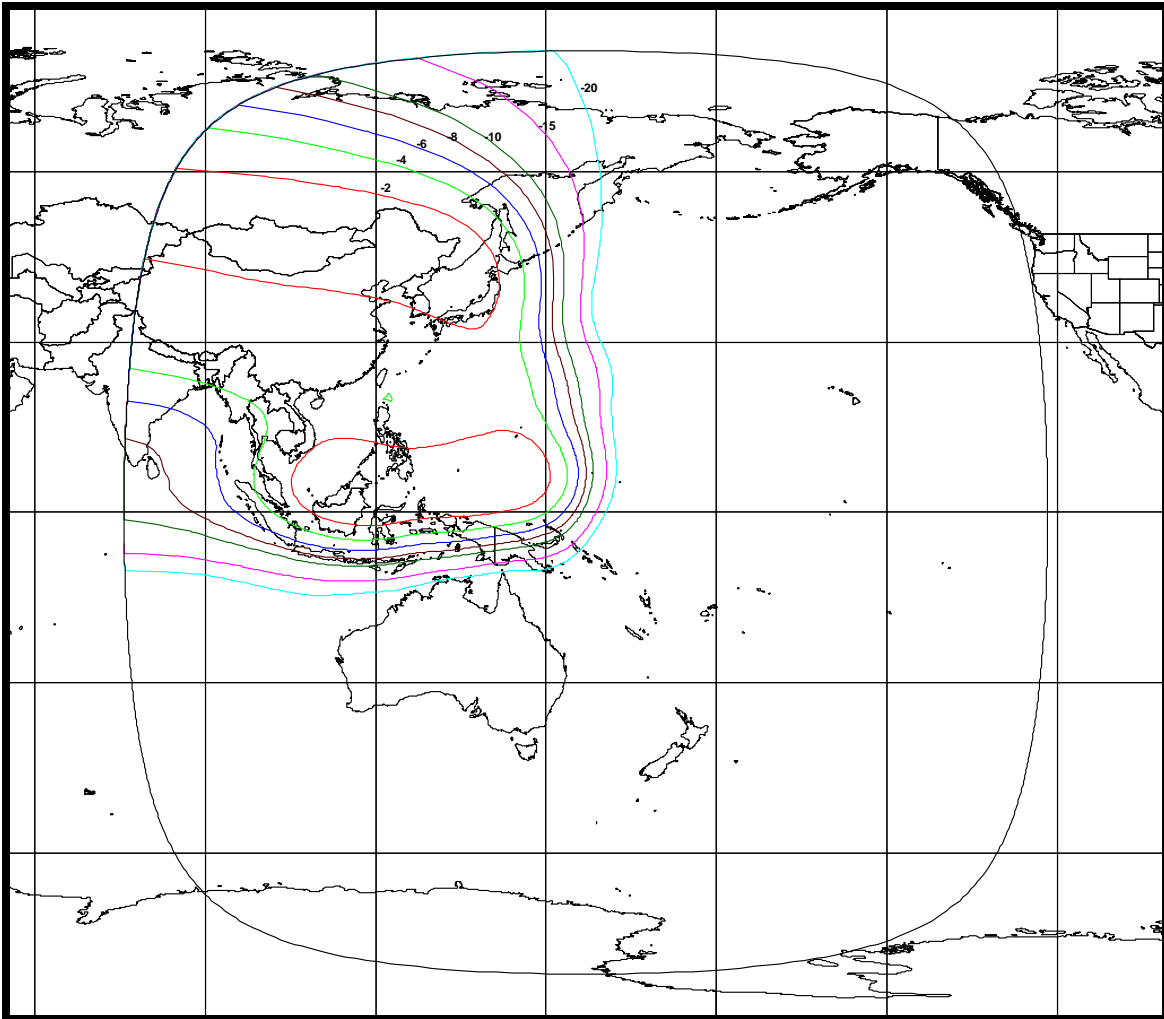


Exhibit 2-6: Northeast Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 28.3 dBi

Peak G/T: 1.0 dB/K

Saturated Flux Density @ Peak G/T: -92.2 to -78.2 dBW/m²

[Schedule S Beam Designation: NEUL]

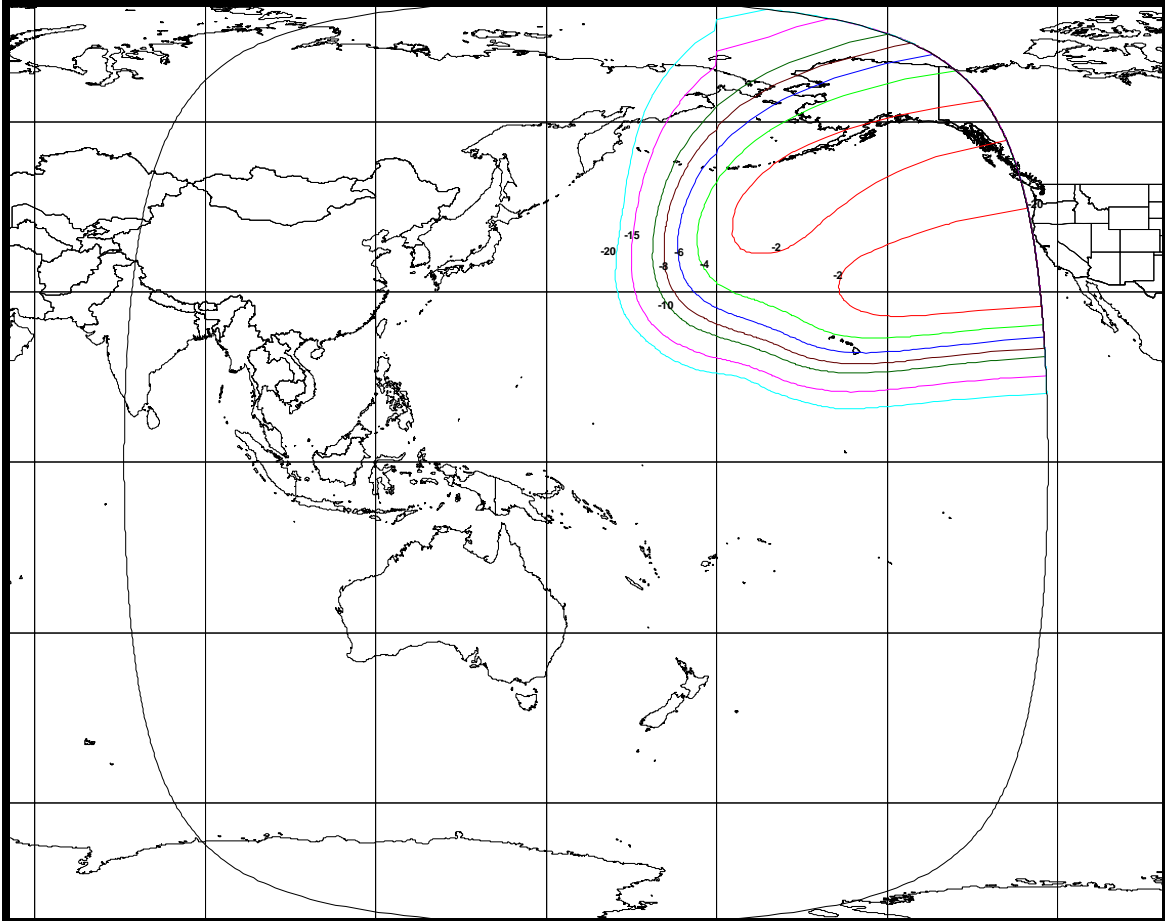


Exhibit 2-7: Southwest Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 28.0 dBi

Peak G/T: 0.7 dB/K

Saturated Flux Density @ Peak G/T: -92.0 to -78.0 dBW/m²

[Schedule S Beam Designation: SWUL]

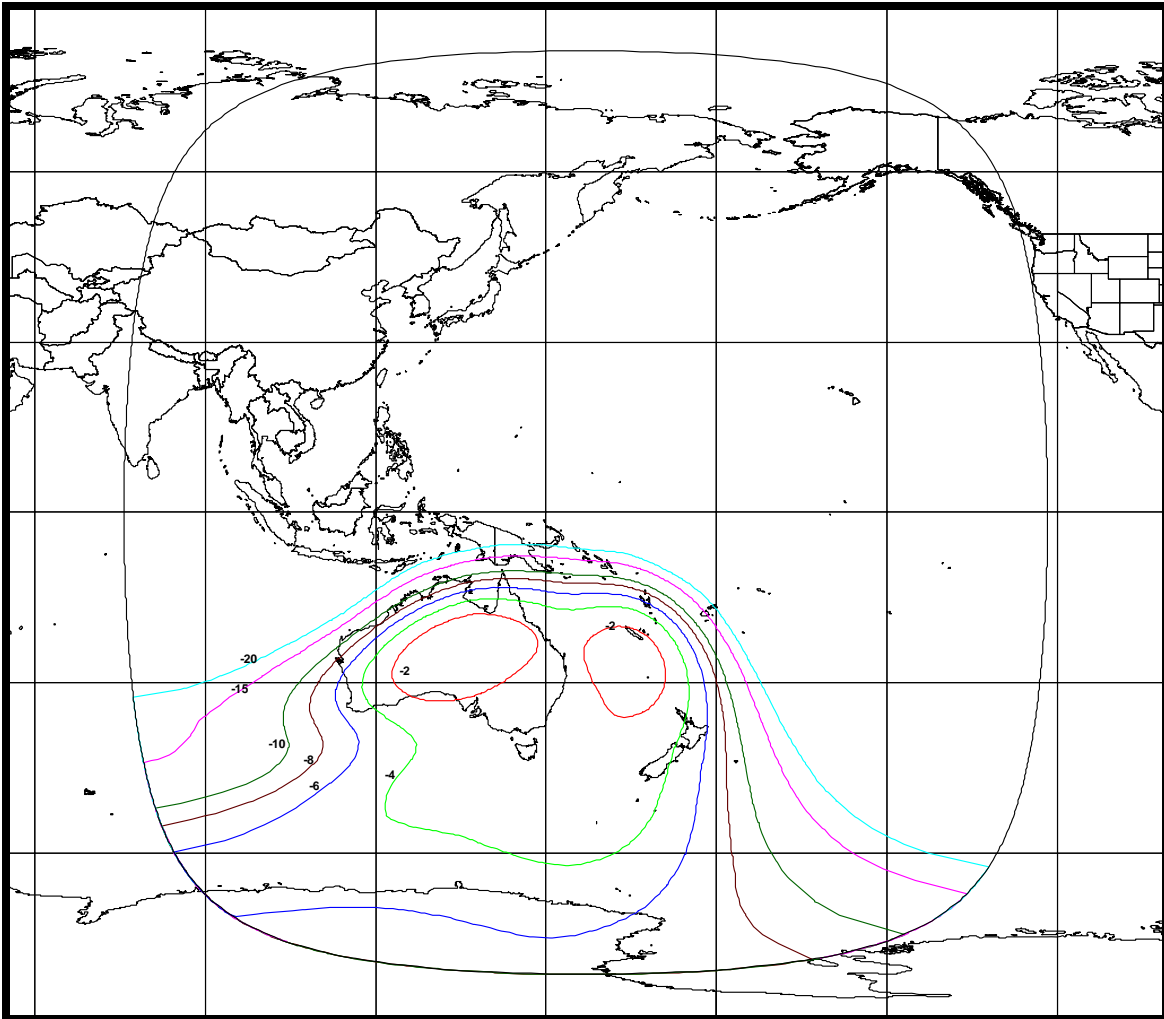


Exhibit 2-8: Southeast Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 27.0 dBi

Peak G/T: -0.4 dB/K

Saturated Flux Density @ Peak G/T: -89.9 to -75.9 dBW/m²

[Schedule S Beam Designation: SEUL]

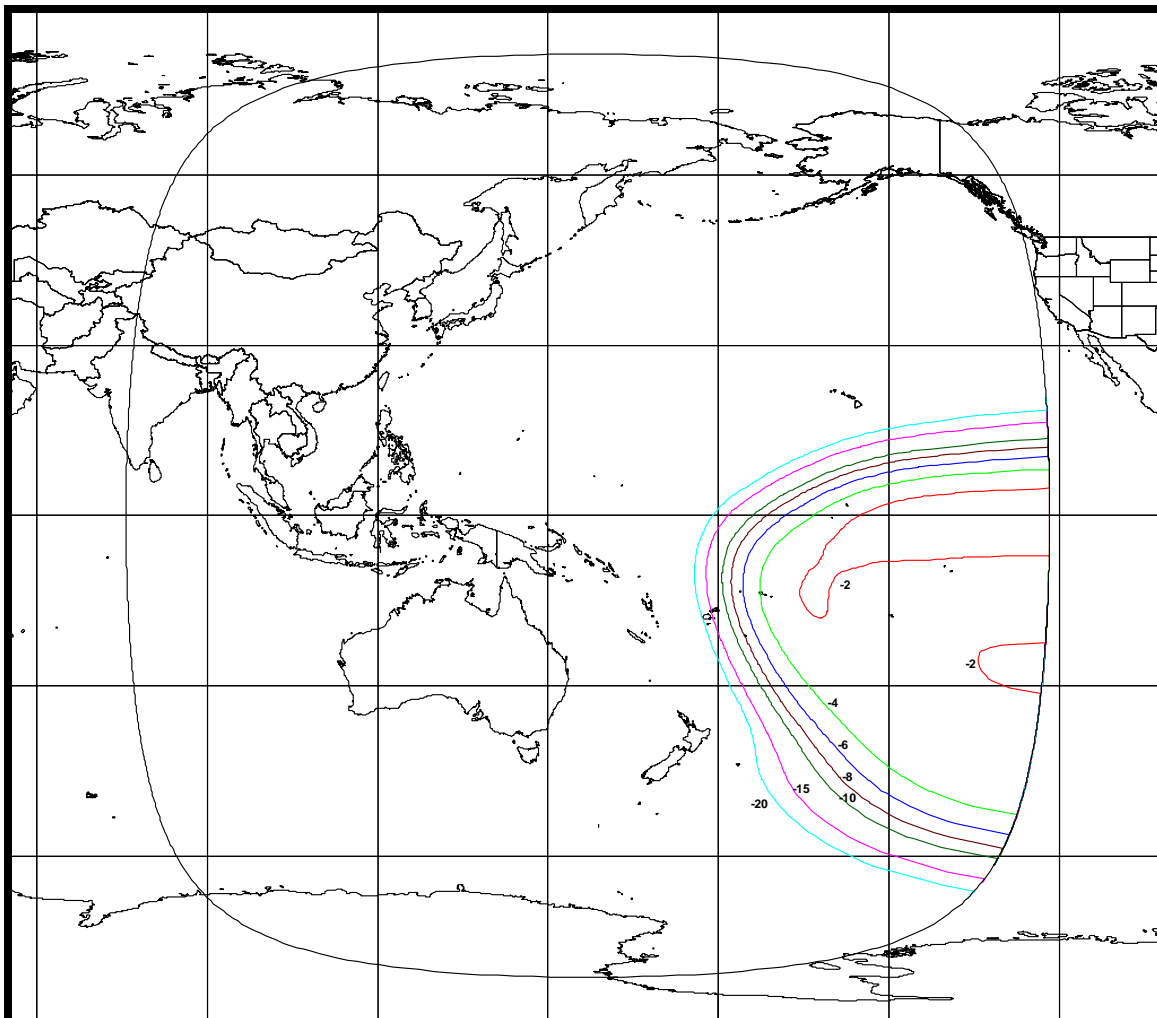


Exhibit 2-9: Combined Northwest and Southeast Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 23.6 dBi

Peak G/T: -3.8 dB/K

Saturated Flux Density @ Peak G/T: -91.6 to -77.6 dBW/m²

[Schedule S Beam Designation: X1UL]

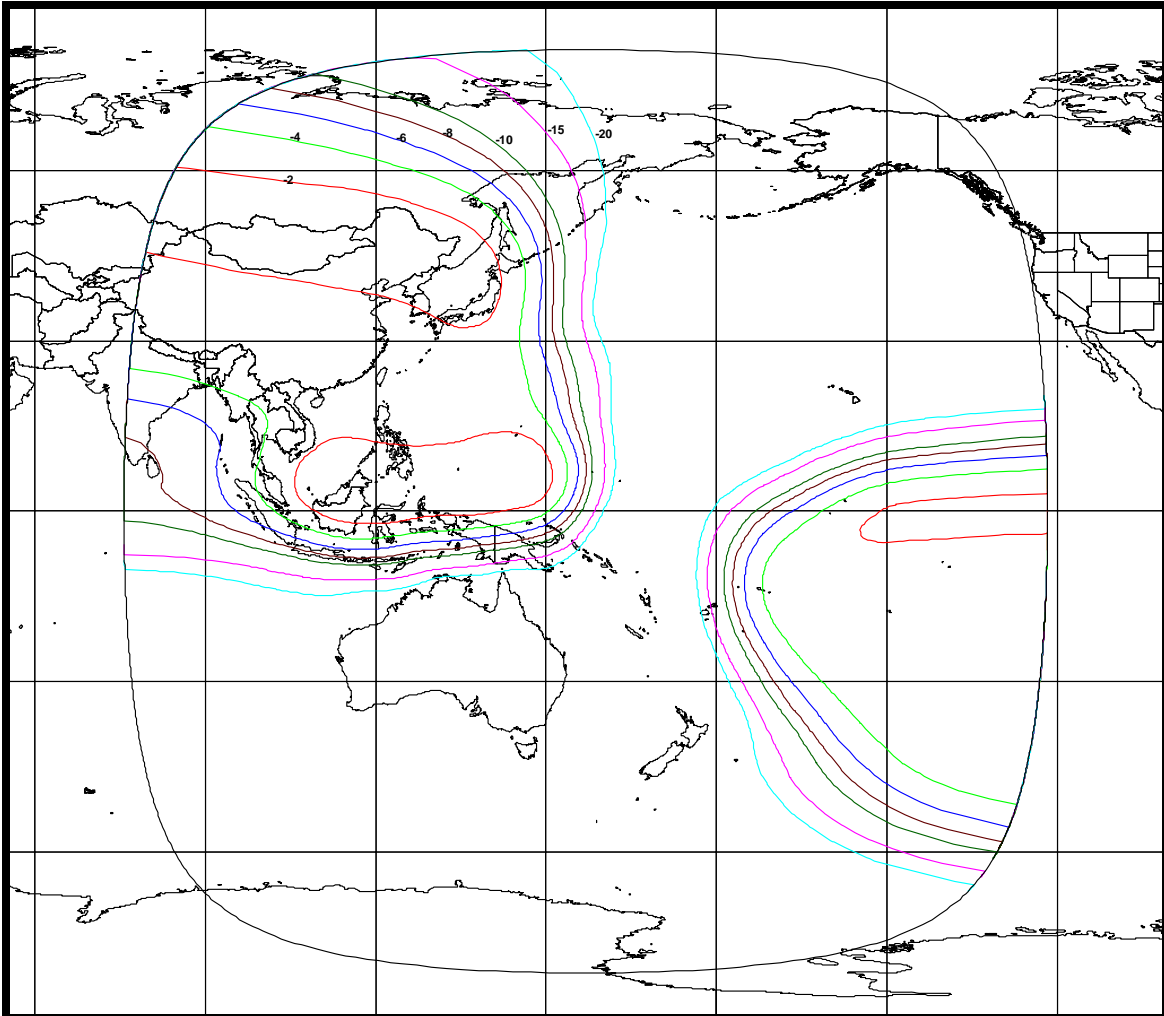


Exhibit 2-10: Combined Northeast and Southwest Zone Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 24.9 dBi

Peak G/T: -2.5 dB/K

Saturated Flux Density @ Peak G/T: -91.2 to -77.2 dBW/m²

[Schedule S Beam Designation: X2UL]

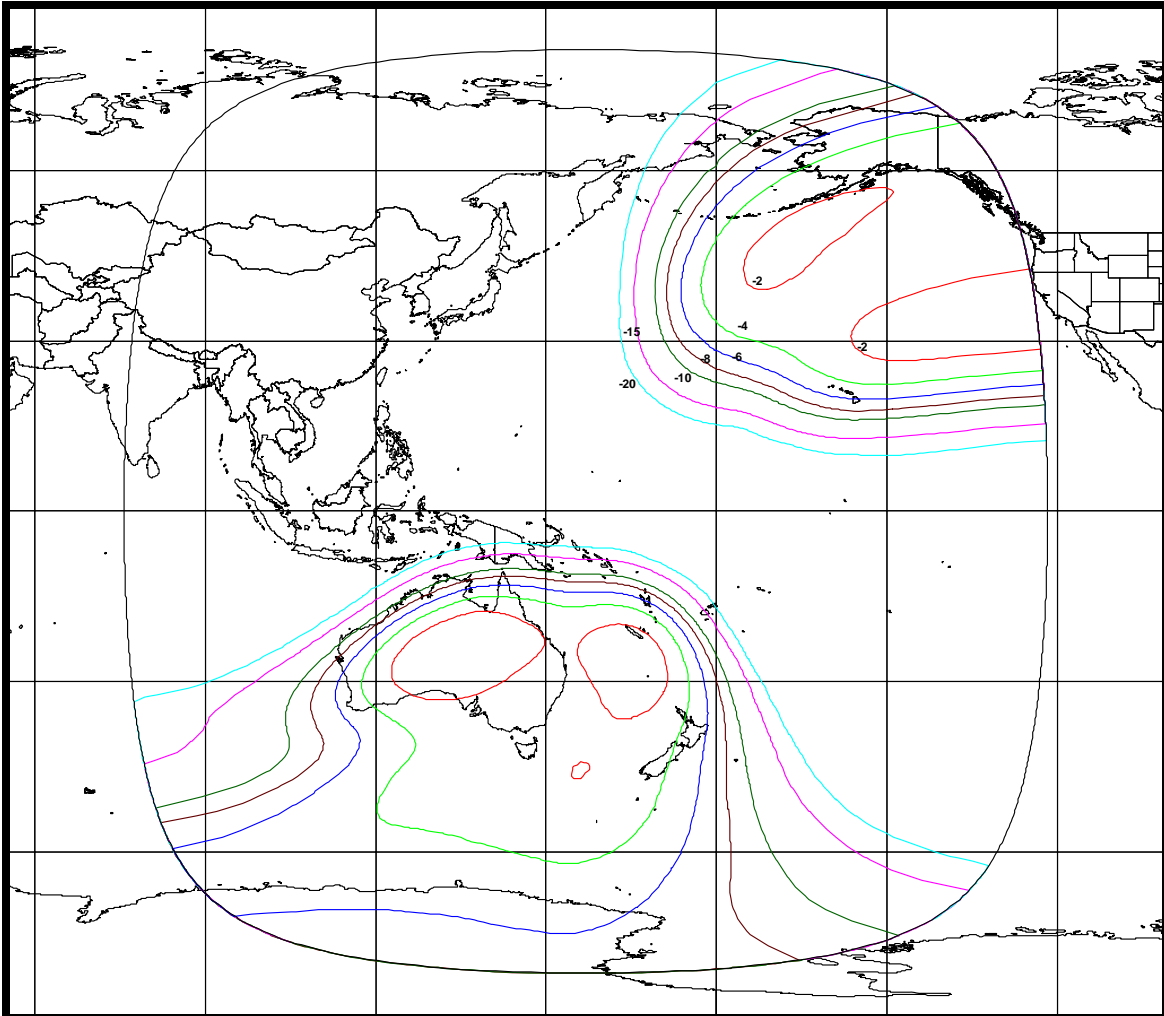


Exhibit 2-11: C-Spot A Uplink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 30.3 dBi

Peak G/T: 2.6 dB/K

Saturated Flux Density @ Peak G/T: -93.1 to -79.1 dBW/m²

[Schedule S Beam Designation: CAUL]

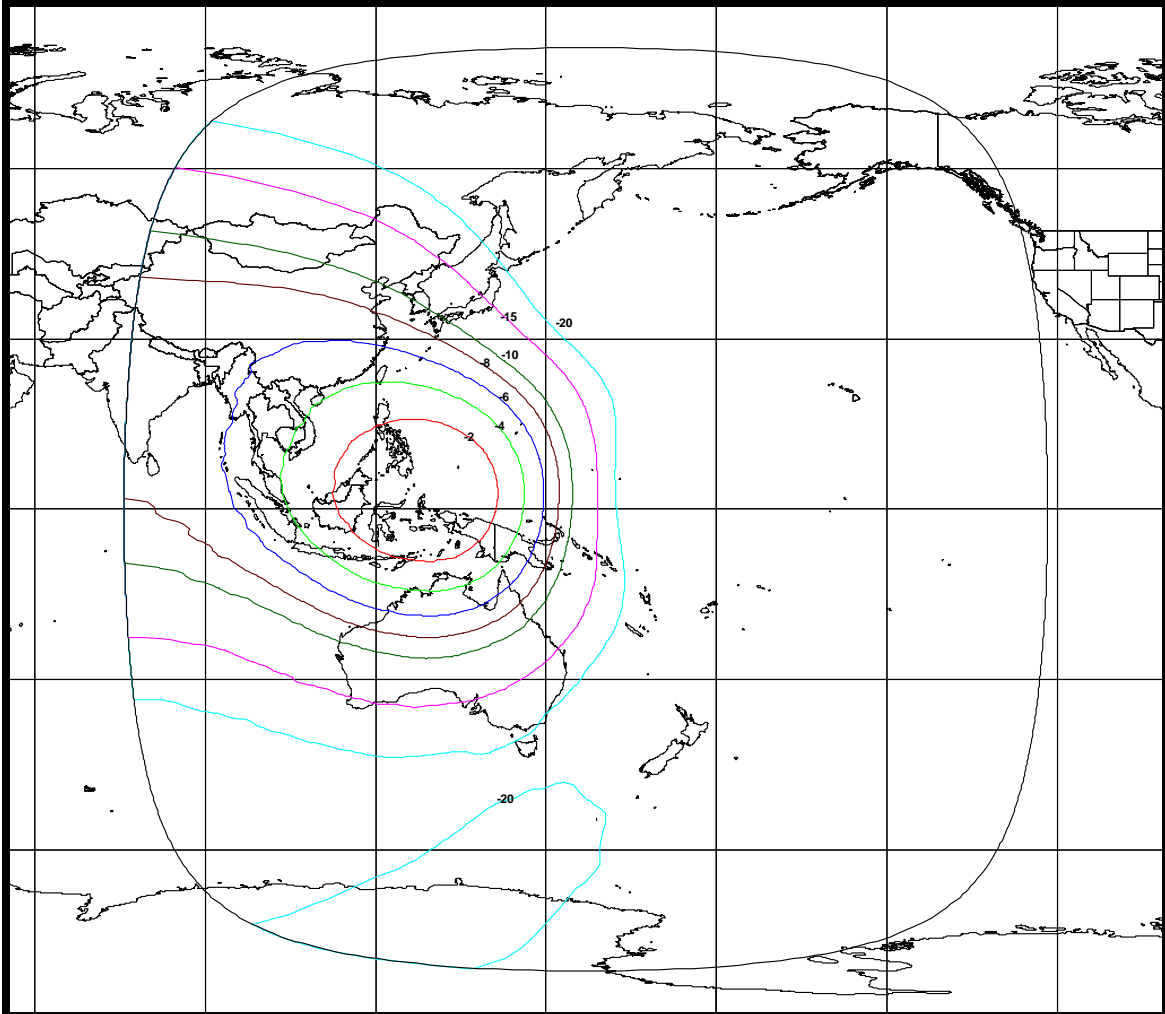


Exhibit 2-12: C-Spot B Uplink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 30.3 dBi

Peak G/T: 2.6 dB/K

Saturated Flux Density @ Peak G/T: -92.7 to -78.7 dBW/m²

[Schedule S Beam Designation: CBUL]

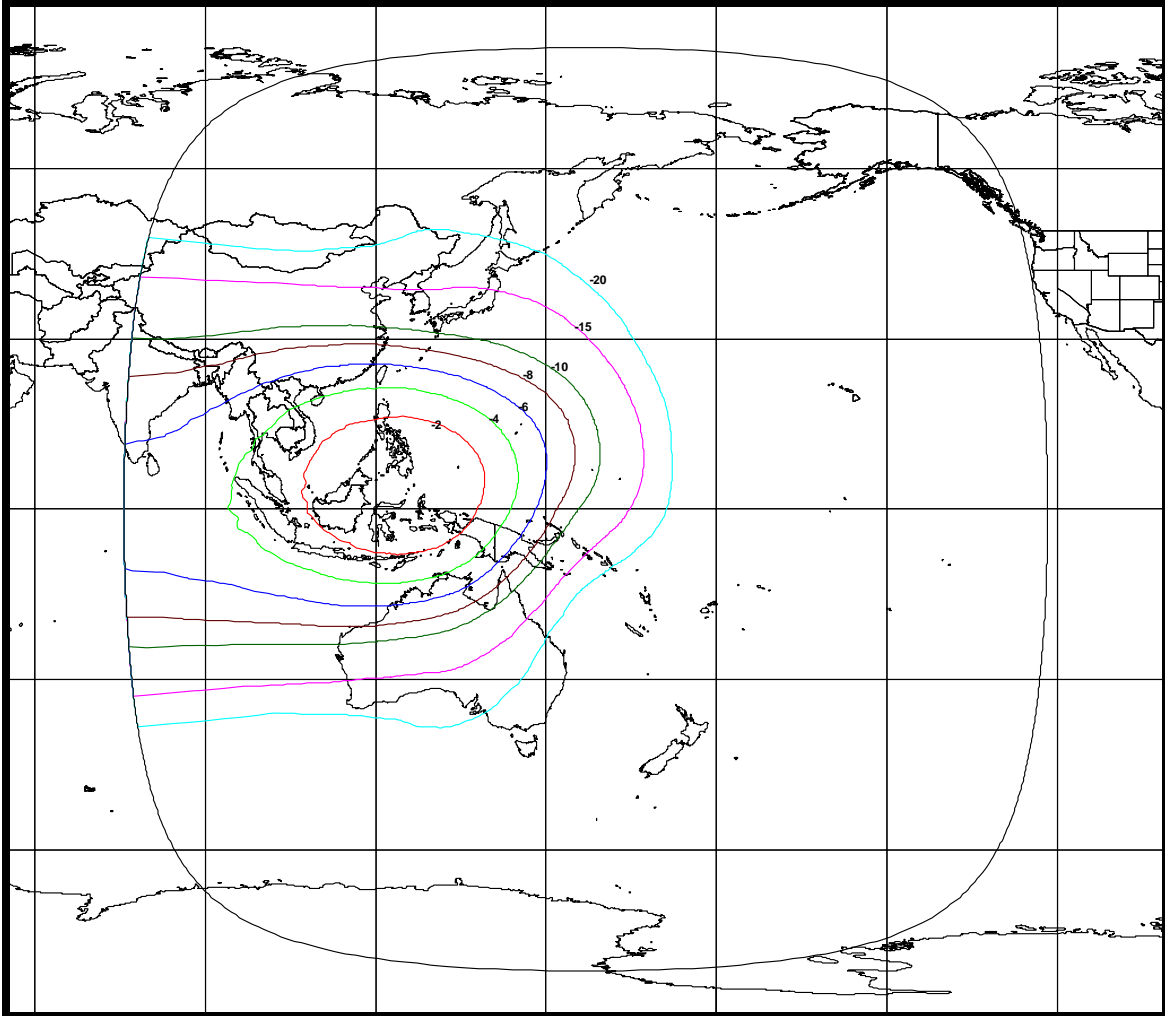


Exhibit 2-13: Spot 1 Uplink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 37.6 dBi

Peak G/T: 9.6 dB/K

Saturated Flux Density @ Peak G/T: -94.1 to -80.1 dBW/m²

[Schedule S Beam Designation: S1UL]

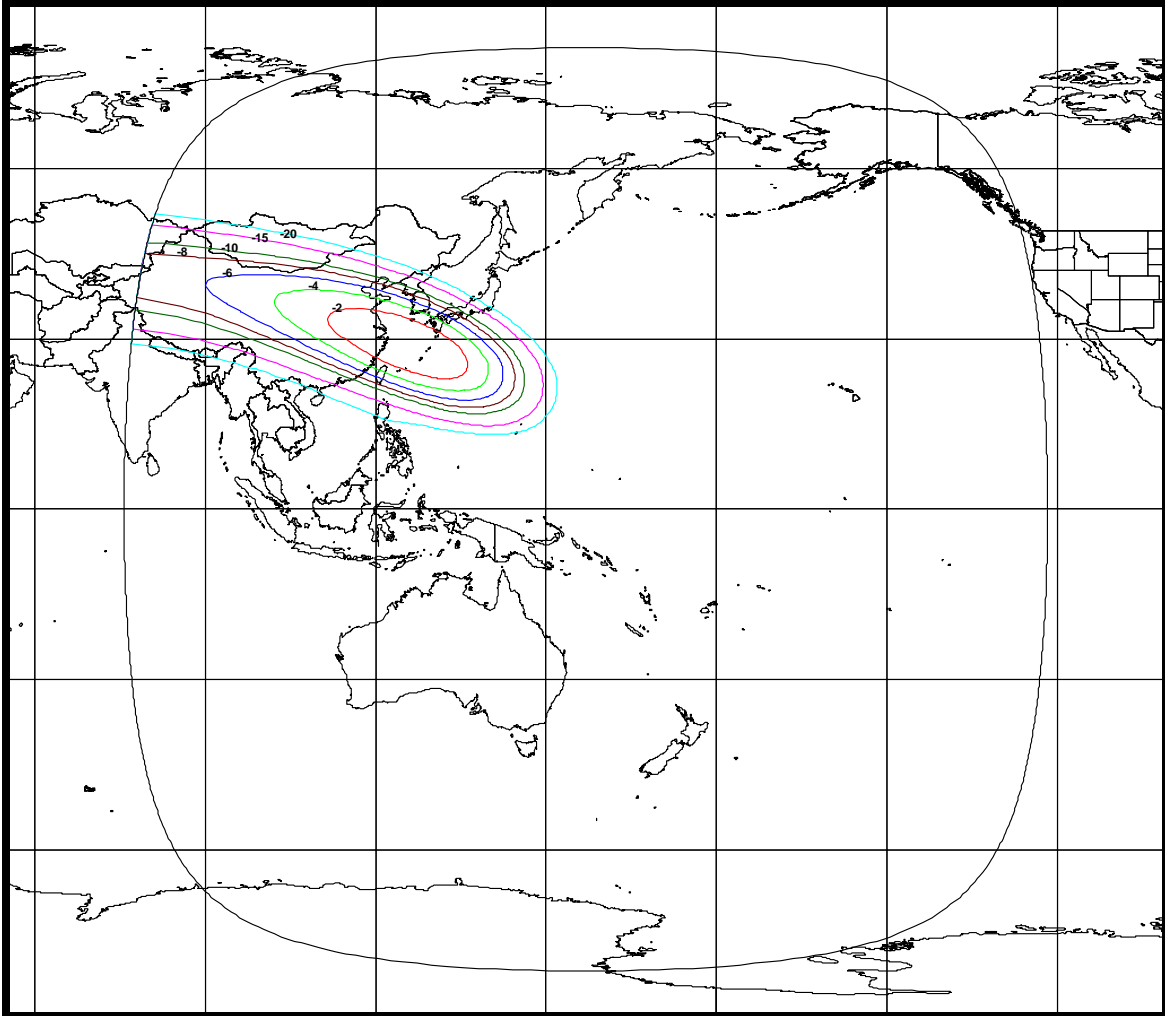


Exhibit 2-14: Spot 1X Uplink Beam

Polarization: Linear Vertical

Peak Beam Gain: 37.4 dBi

Peak G/T: 9.3 dB/K

Saturated Flux Density @ Peak G/T: -94.2 to -80.2 dBW/m²

[Schedule S Beam Designation: S1XU]

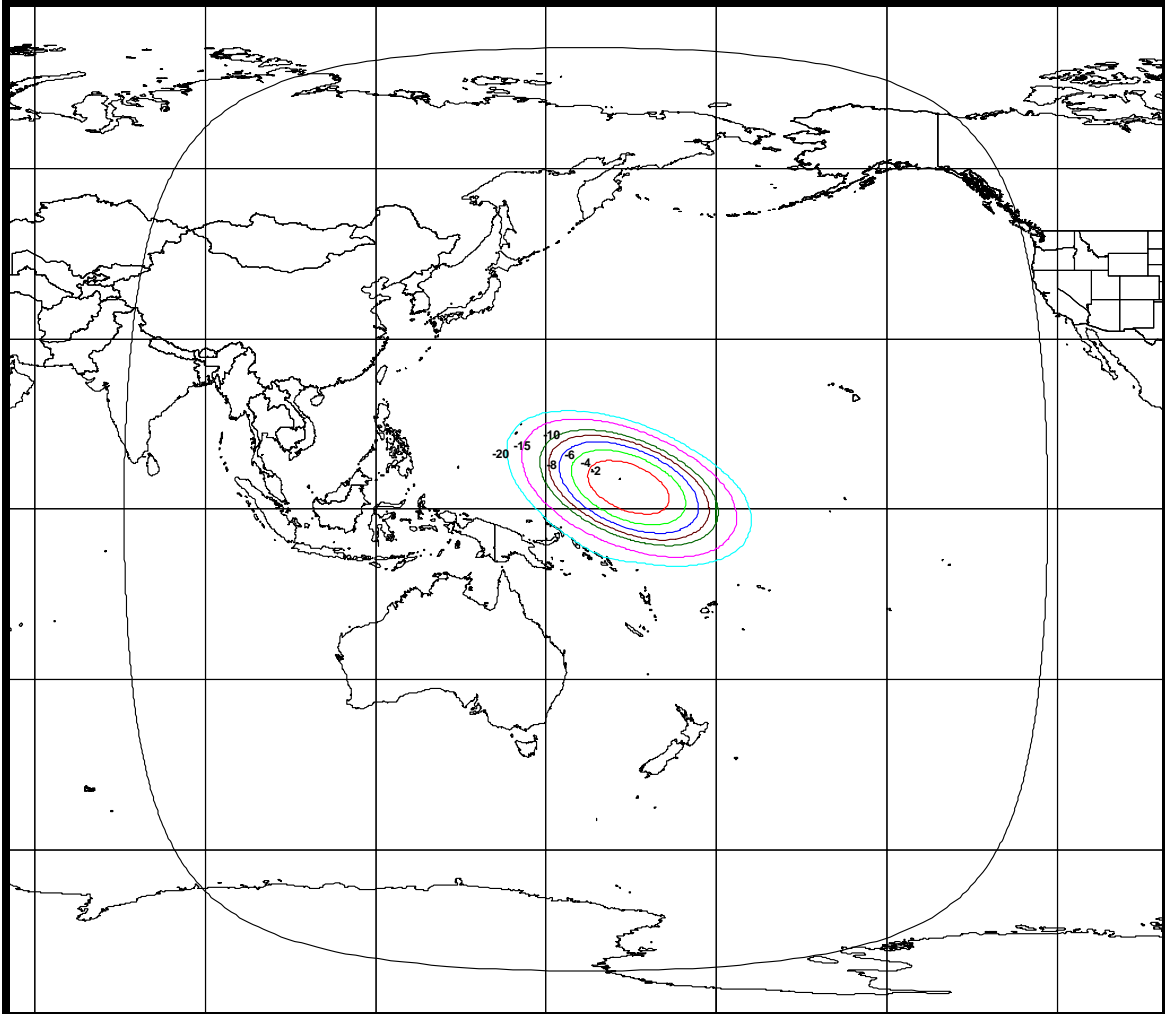


Exhibit 2-15: Spot 2 Uplink Beam

Polarization: Linear Vertical

Peak Beam Gain: 34.6 dBi

Peak G/T: 6.3 dB/K

Saturated Flux Density @ Peak G/T: -93.8 to -79.8 dBW/m²

[Schedule S Beam Designation: S2UL]

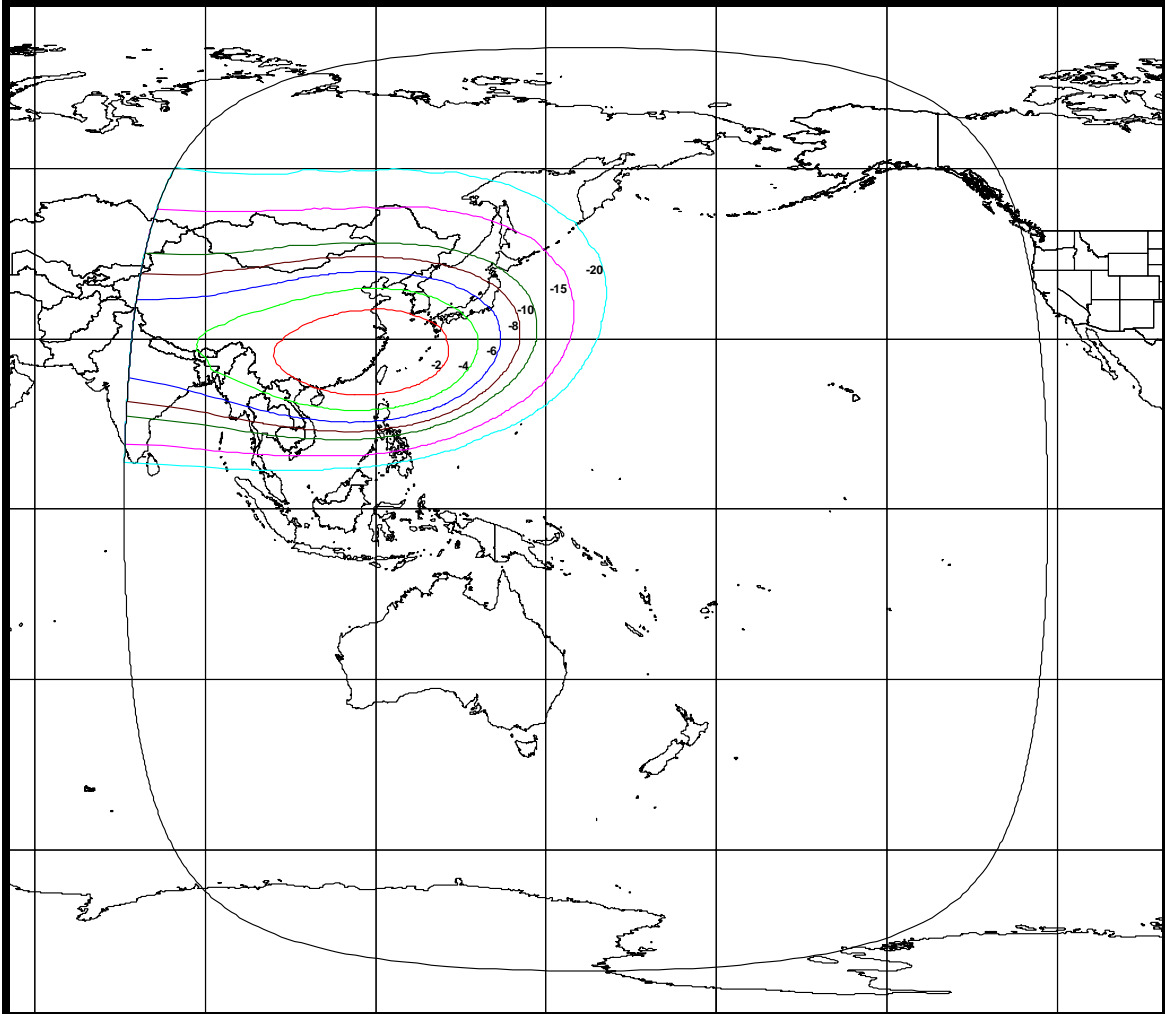


Exhibit 2-16: Spot 2X Uplink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 35.4 dBi

Peak G/T: 7.4 dB/K

Saturated Flux Density @ Peak G/T: -95.5 to -81.5 dBW/m²

[Schedule S Beam Designation: S2XU]

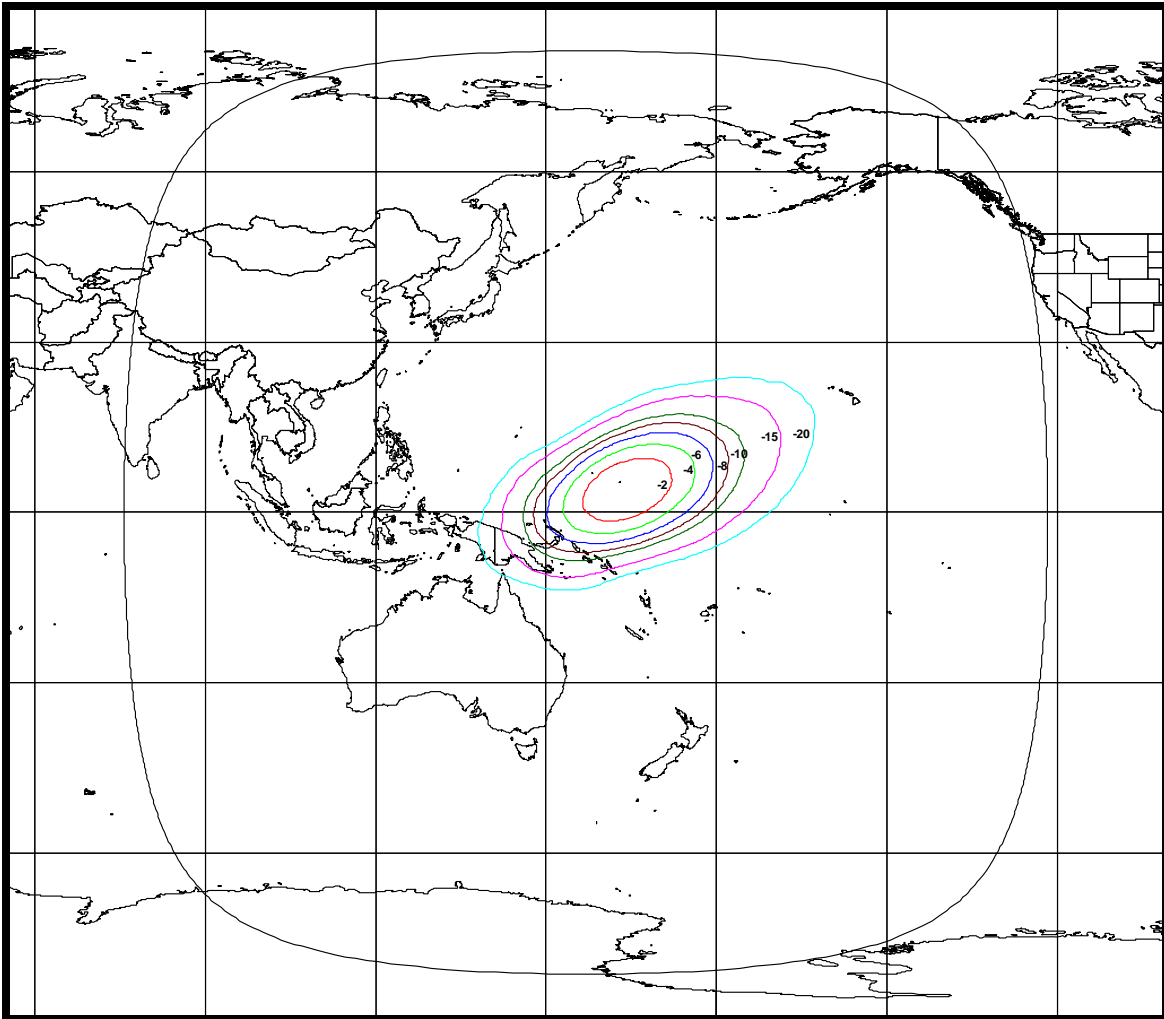


Exhibit 2-17: Spot 2A Uplink Beam

Polarization: Linear Vertical

Peak Beam Gain: 32.6 dBi

Peak G/T: 4.3 dB/K

Saturated Flux Density @ Peak G/T: -93.8 to -79.8 dBW/m²

[Schedule S Beam Designation: S2AU]

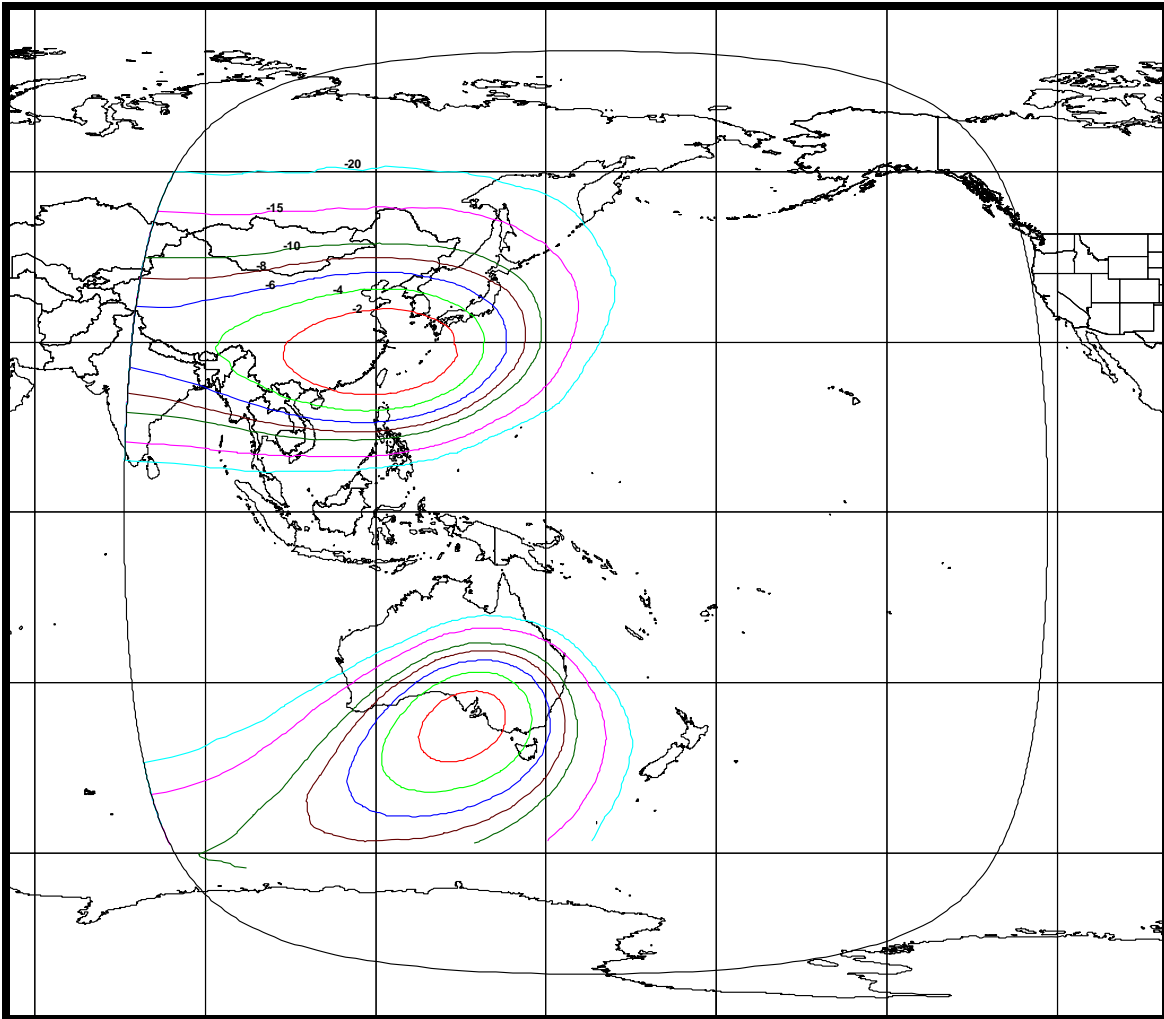


Exhibit 2-18: Spot 3 Uplink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 35.3 dBi

Peak G/T: 7.2 dB/K

Saturated Flux Density @ Peak G/T: -95.0 to -81.0 dBW/m²

[Schedule S Beam Designation: S3UL]

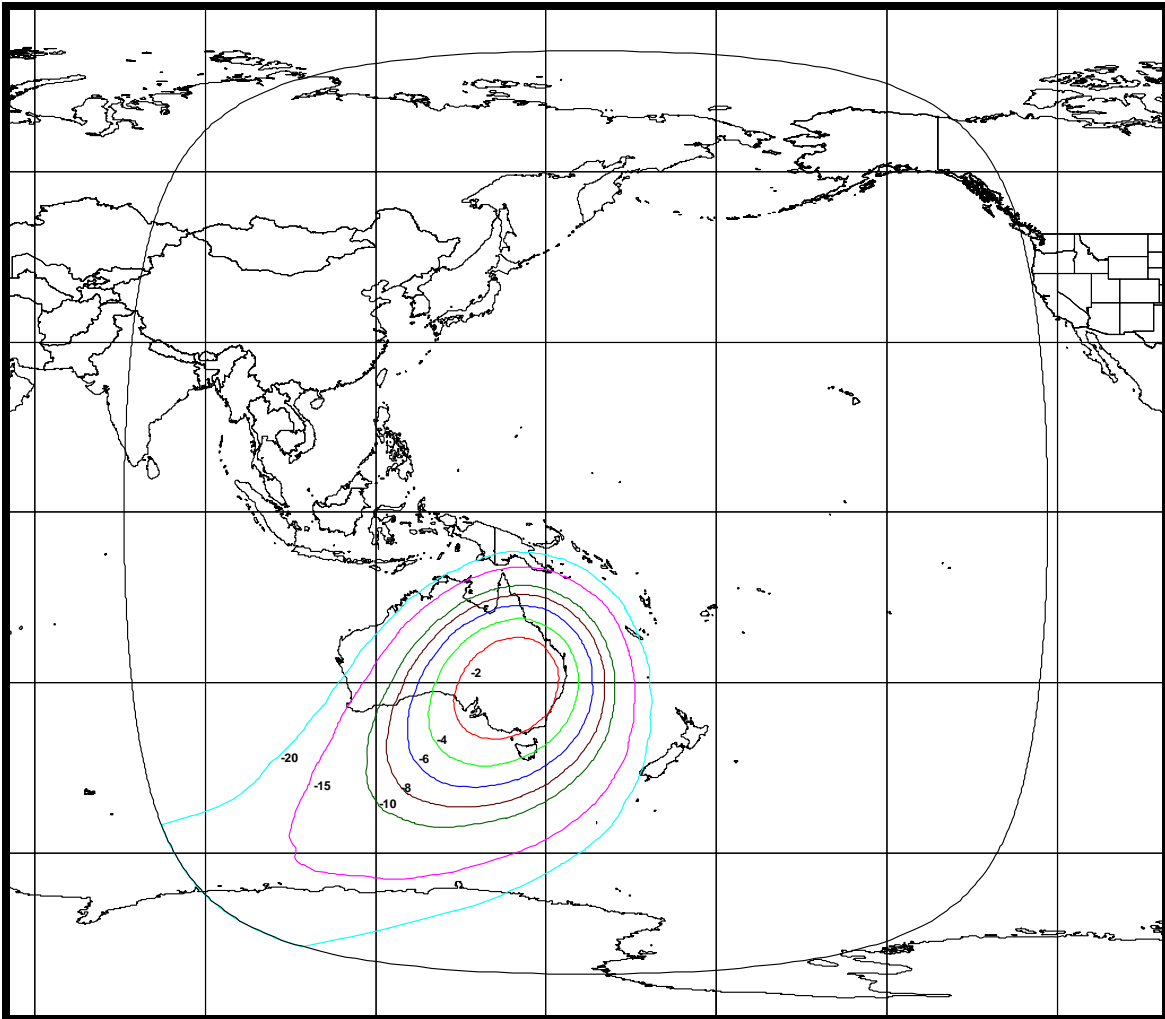


Exhibit 2-19: Global A Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 20.5 dBi

Peak EIRP: 34.0 dBW

[Schedule S Beam Designation: GADL]

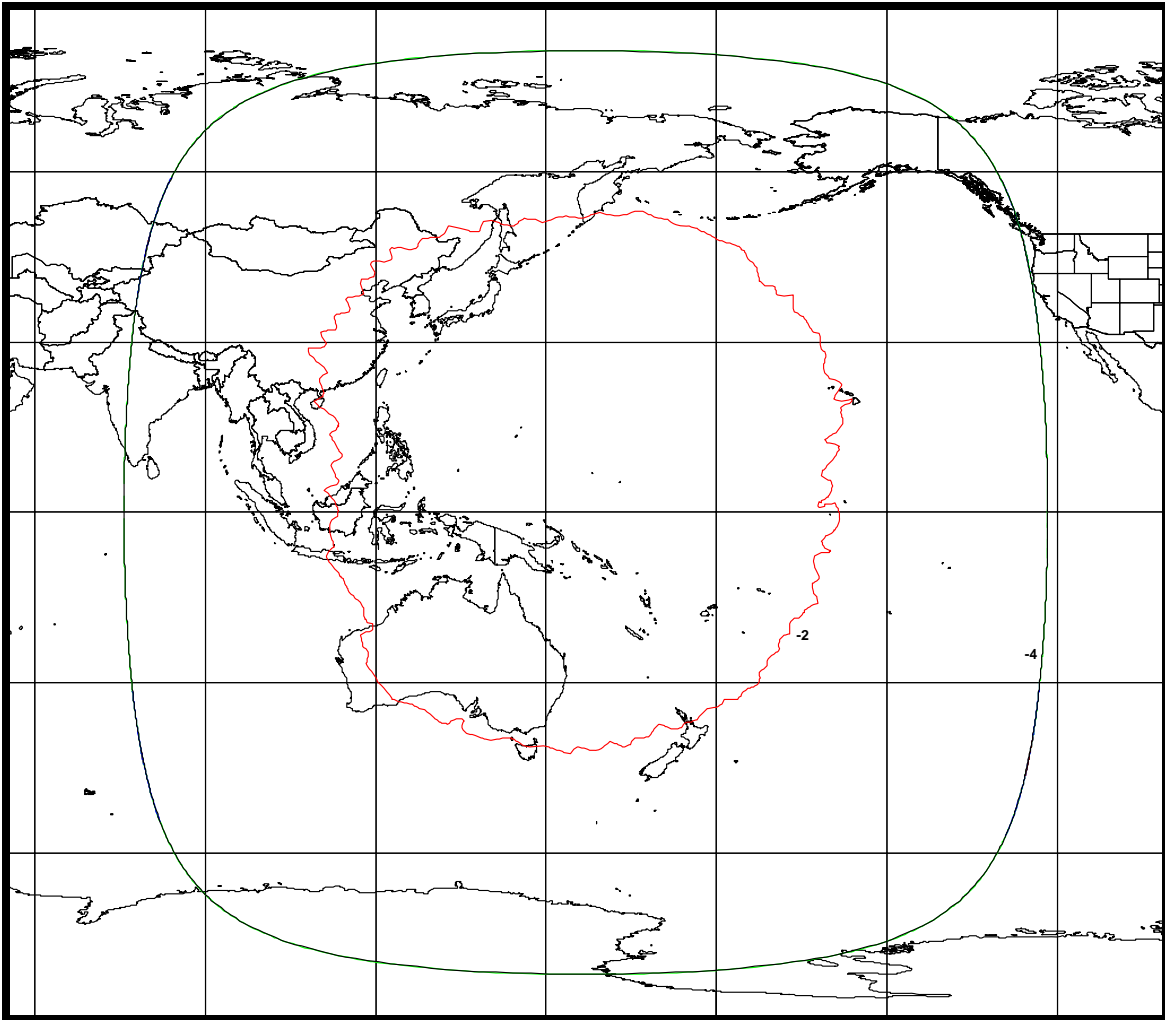


Exhibit 2-20: Global B Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 20.5 dBi

Peak EIRP: 33.8 dBW

[Schedule S Beam Designation: GBDL]

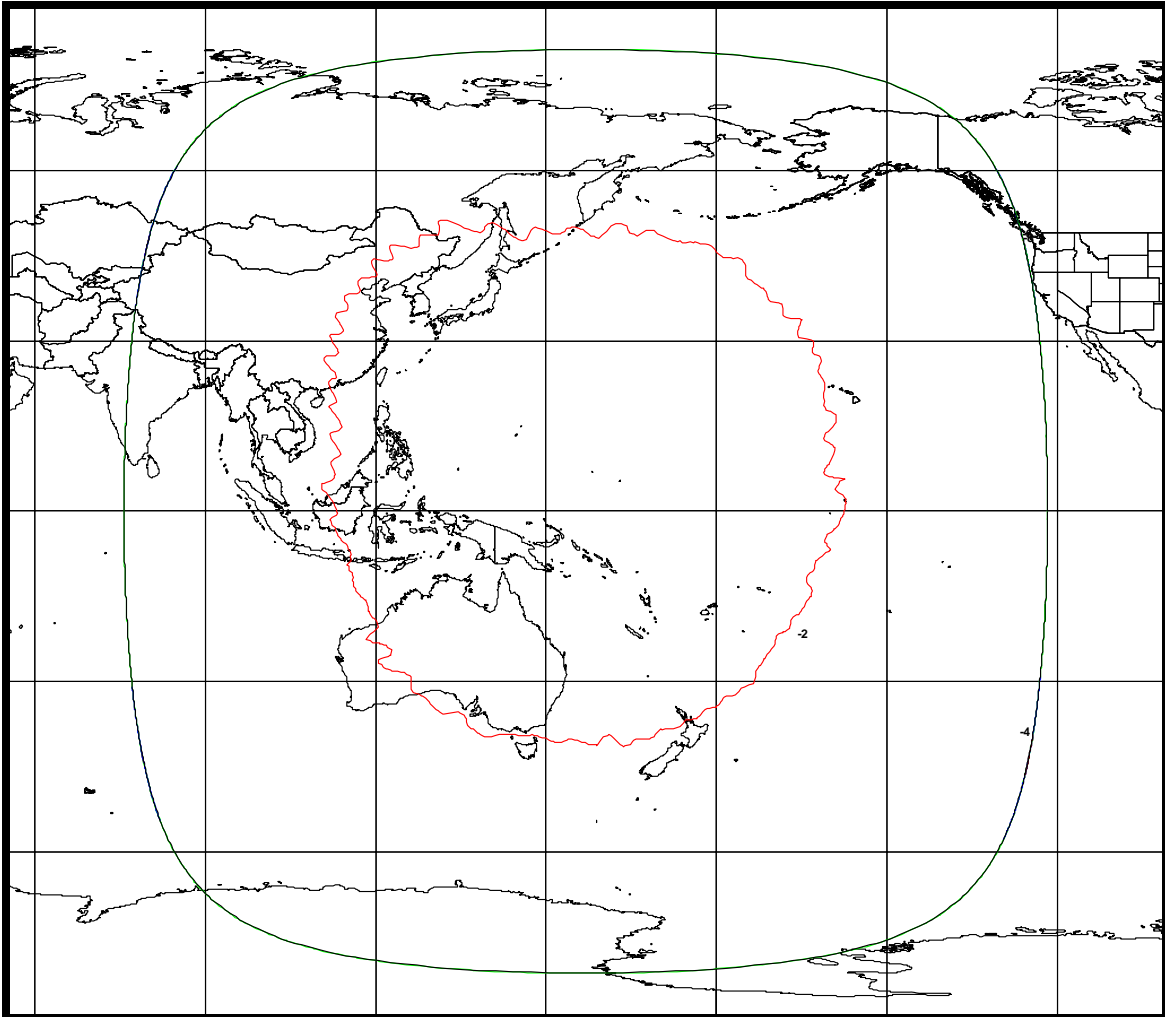


Exhibit 2-21: West Hemi Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 23.7 dBi

Peak EIRP: 37.5 dBW

[Schedule S Beam Designation: WHDL]

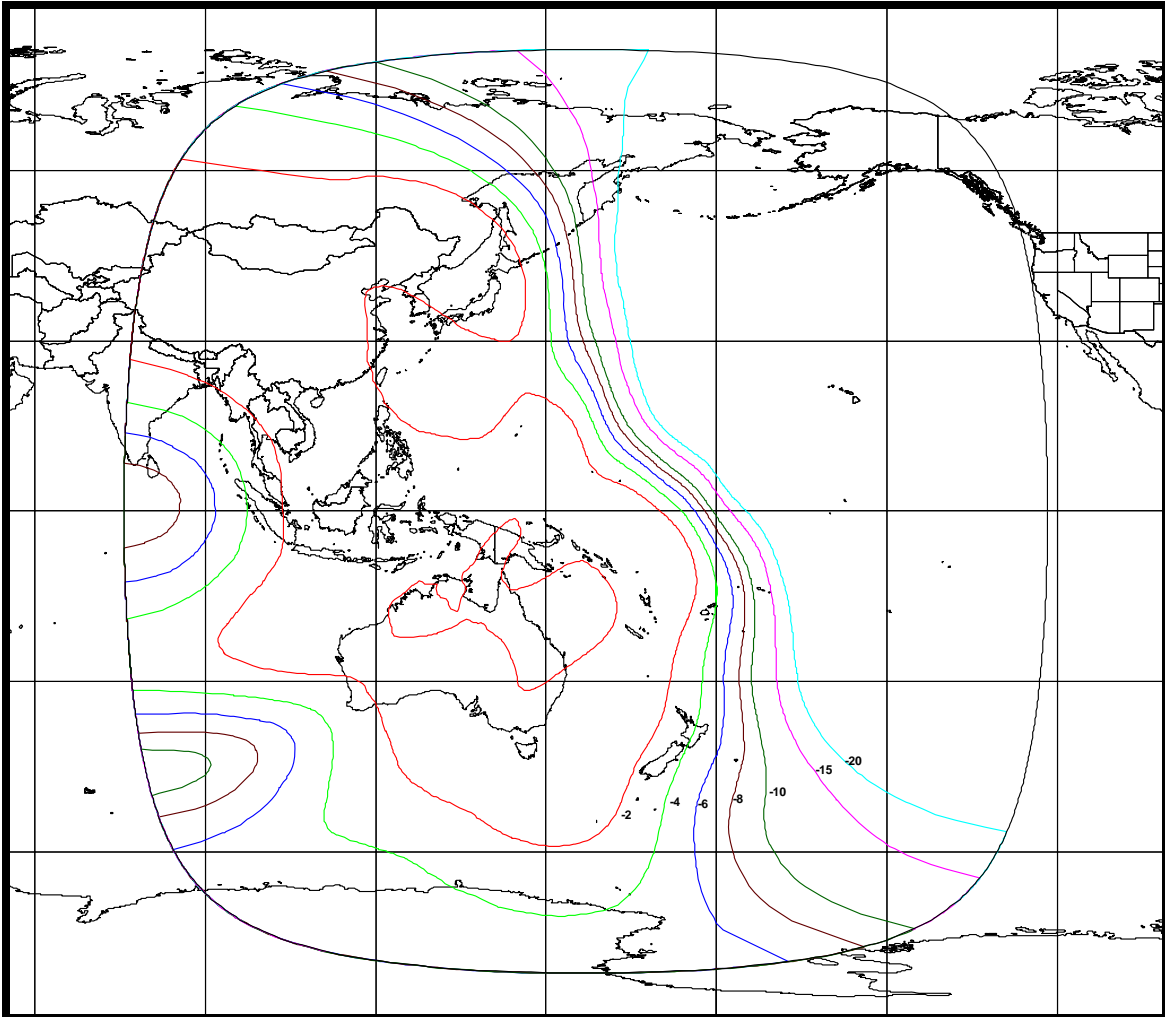


Exhibit 2-22: East Hemi Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 27.4 dBi

Peak EIRP: 39.6 dBW

[Schedule S Beam Designation: EHDL]

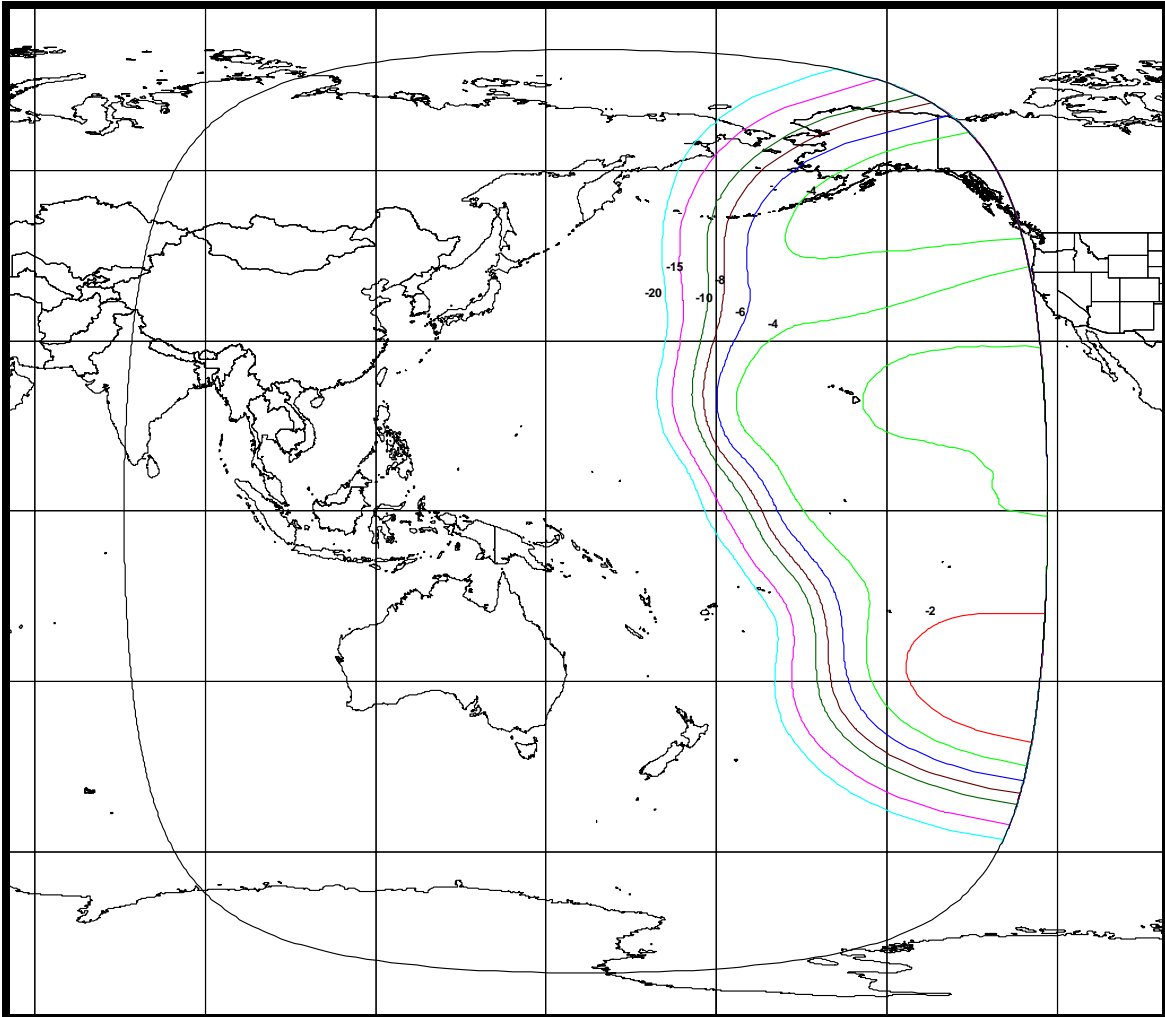


Exhibit 2-23: Northwest Zone Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 28.1 dBi

Peak EIRP: 38.6 dBW

[Schedule S Beam Designation: NWDL]

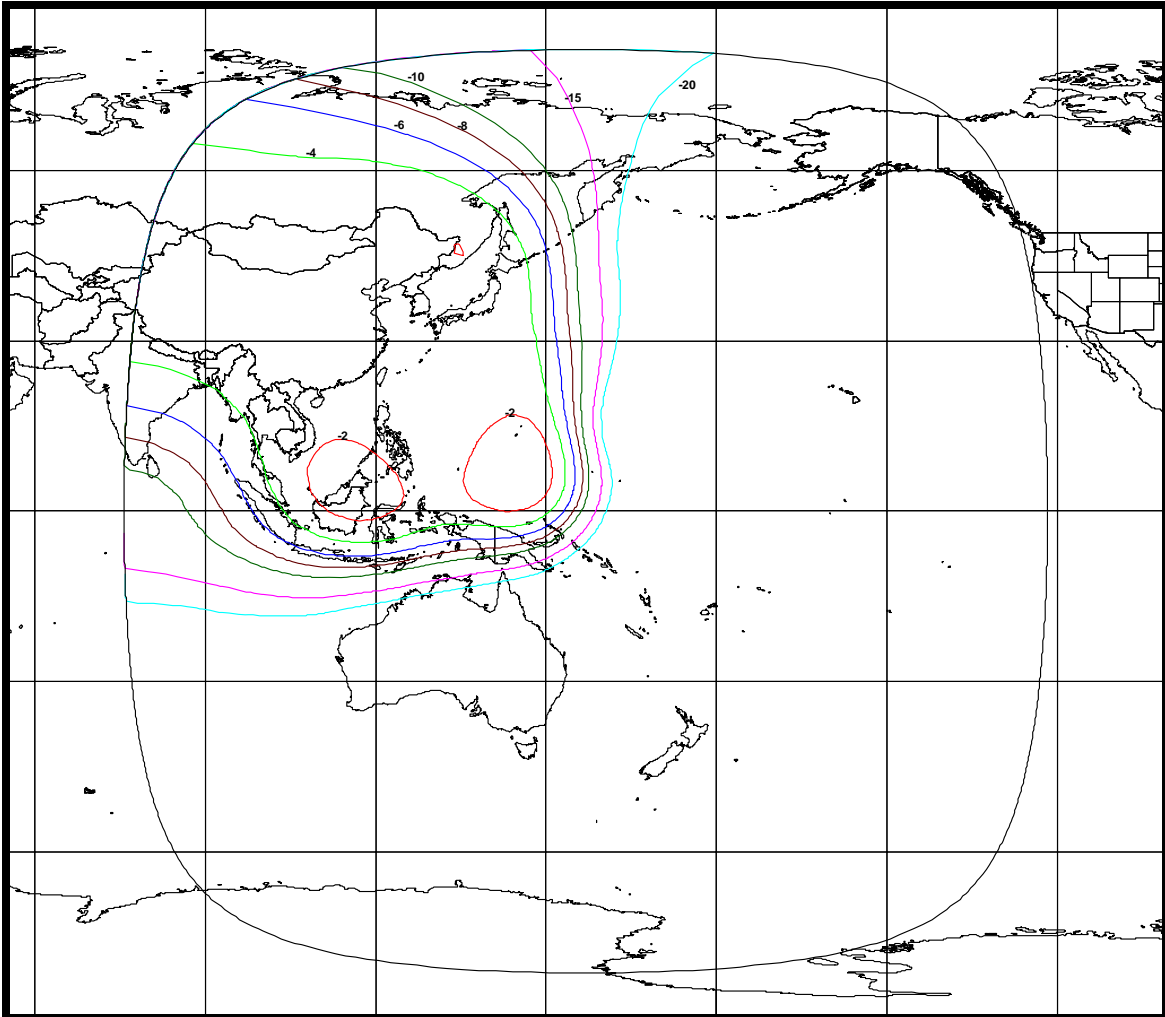


Exhibit 2-24: Northeast Zone Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 30.8 dBi

Peak EIRP: 40.3 dBW

[Schedule S Beam Designation: NEDL]

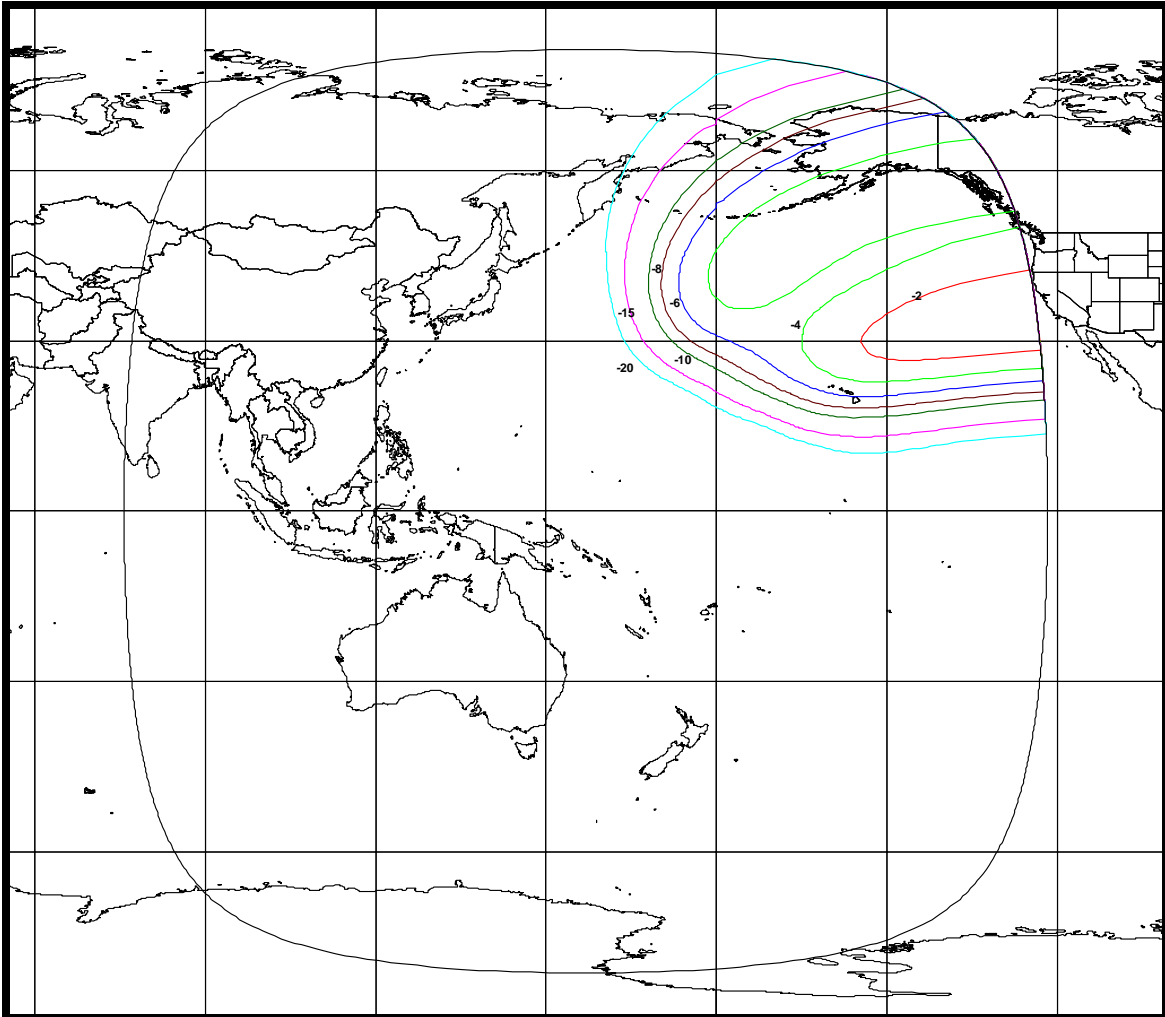


Exhibit 2-25: Southwest Zone Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 28.3 dBi

Peak EIRP: 37.8 dBW

[Schedule S Beam Designation: SWDL]

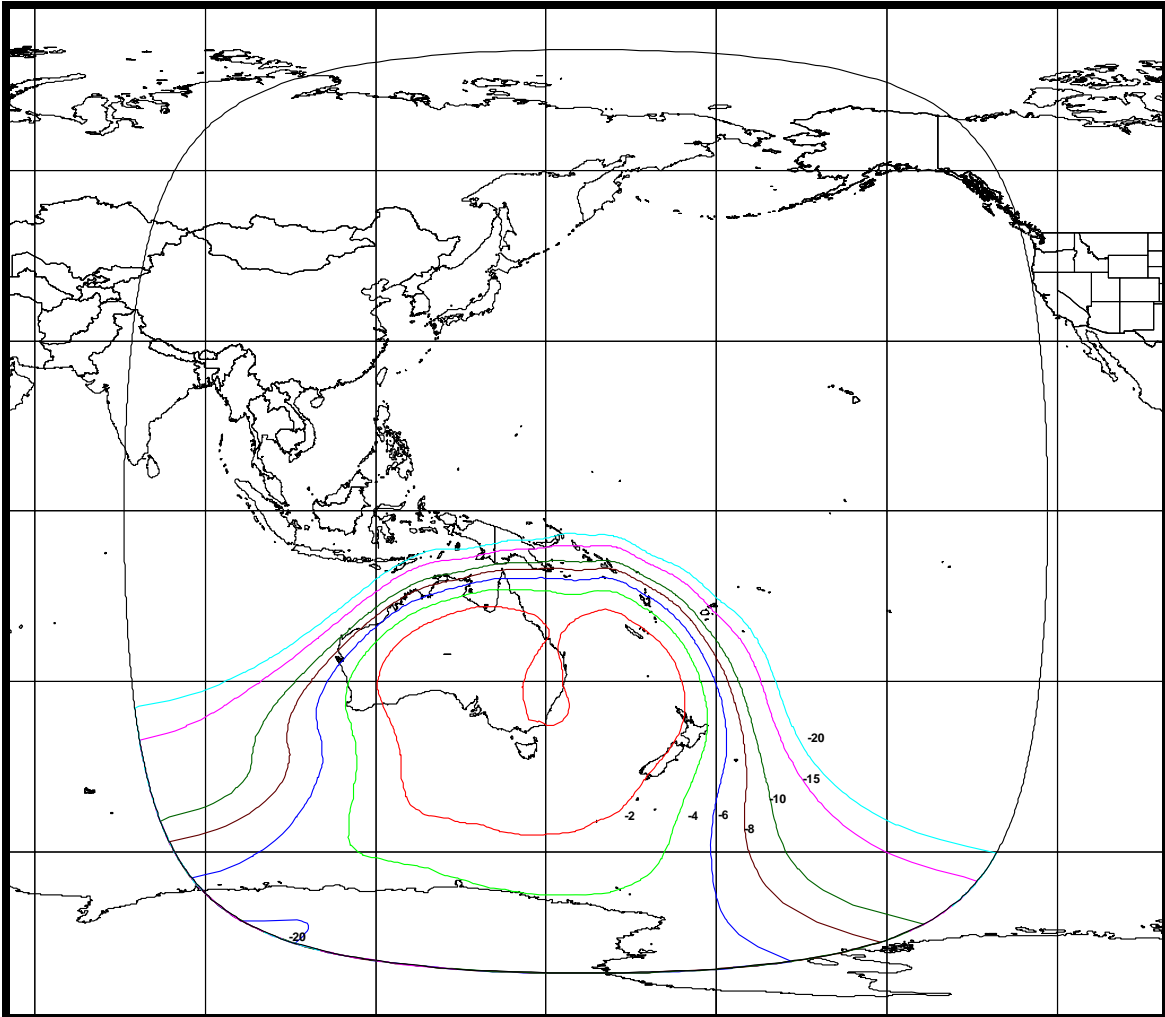


Exhibit 2-26: Southeast Zone Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 28.3 dBi

Peak EIRP: 39.0 dBW

[Schedule S Beam Designation: SEDL]

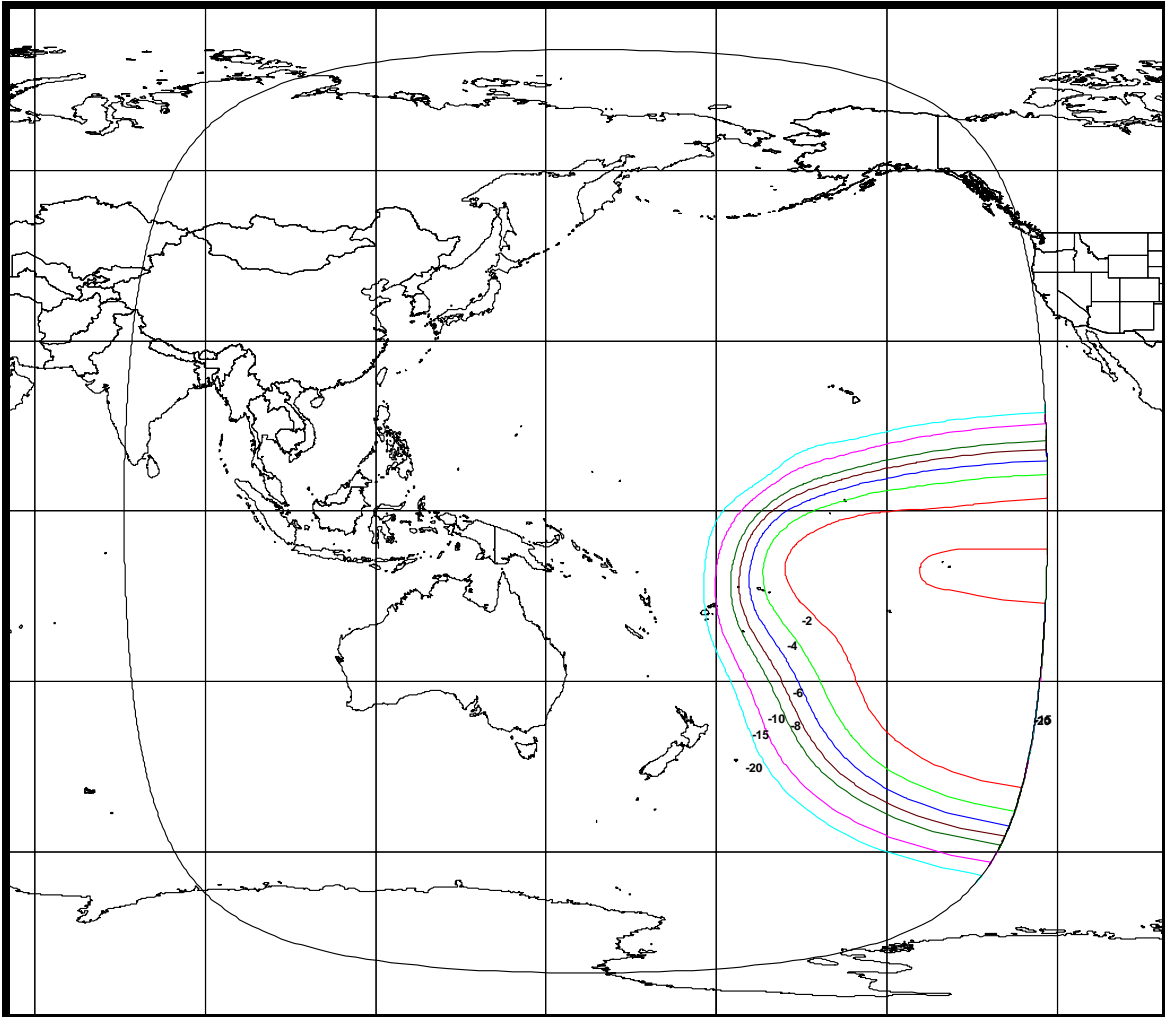


Exhibit 2-27: C-Spot A Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 27.8 dBi

Peak EIRP: 41.0 dBW

[Schedule S Beam Designation: CADL]

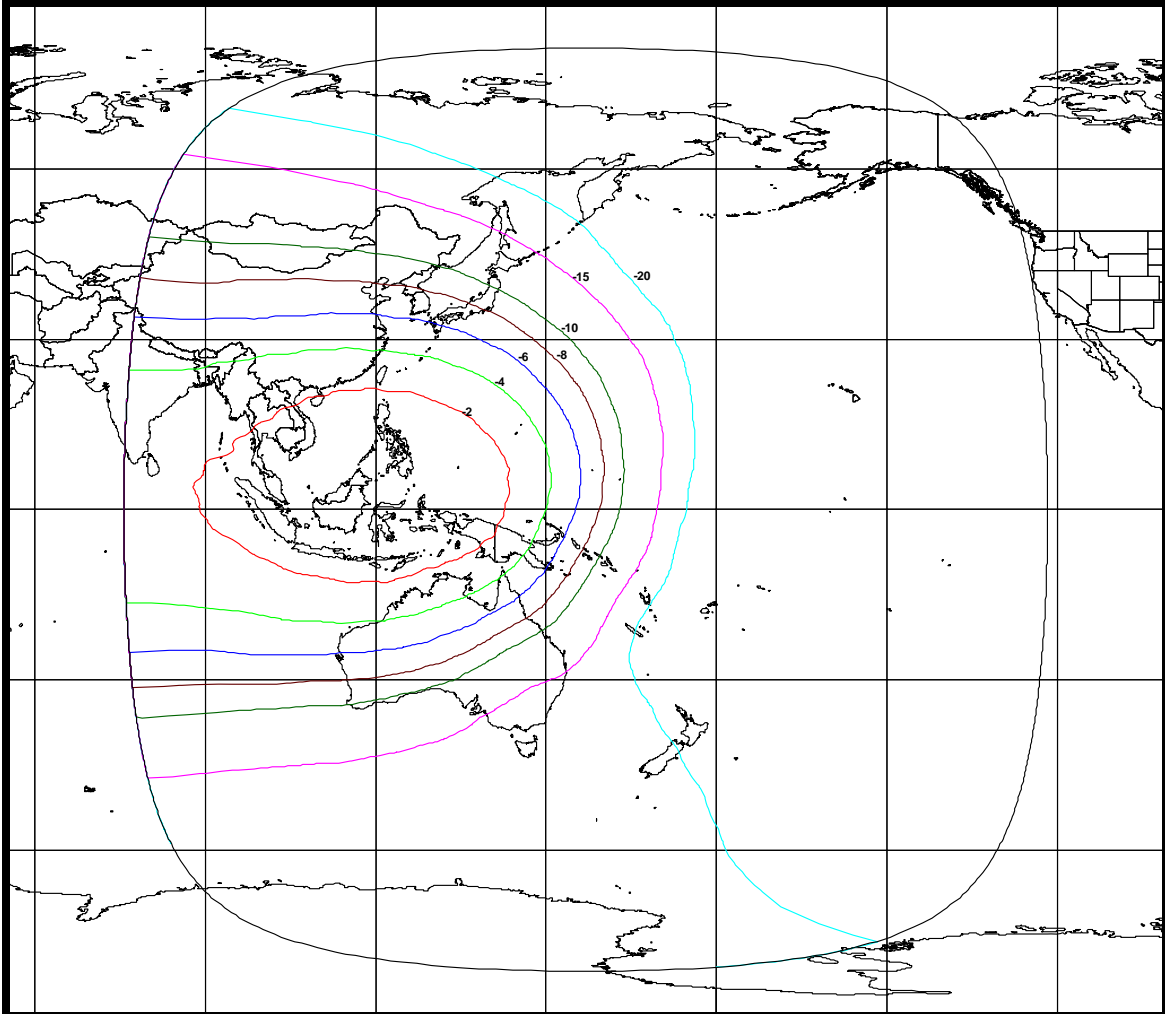


Exhibit 2-28: C-Spot B Downlink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 27.8 dBi

Peak EIRP: 40.5 dBW

[Schedule S Beam Designation: CBDL]

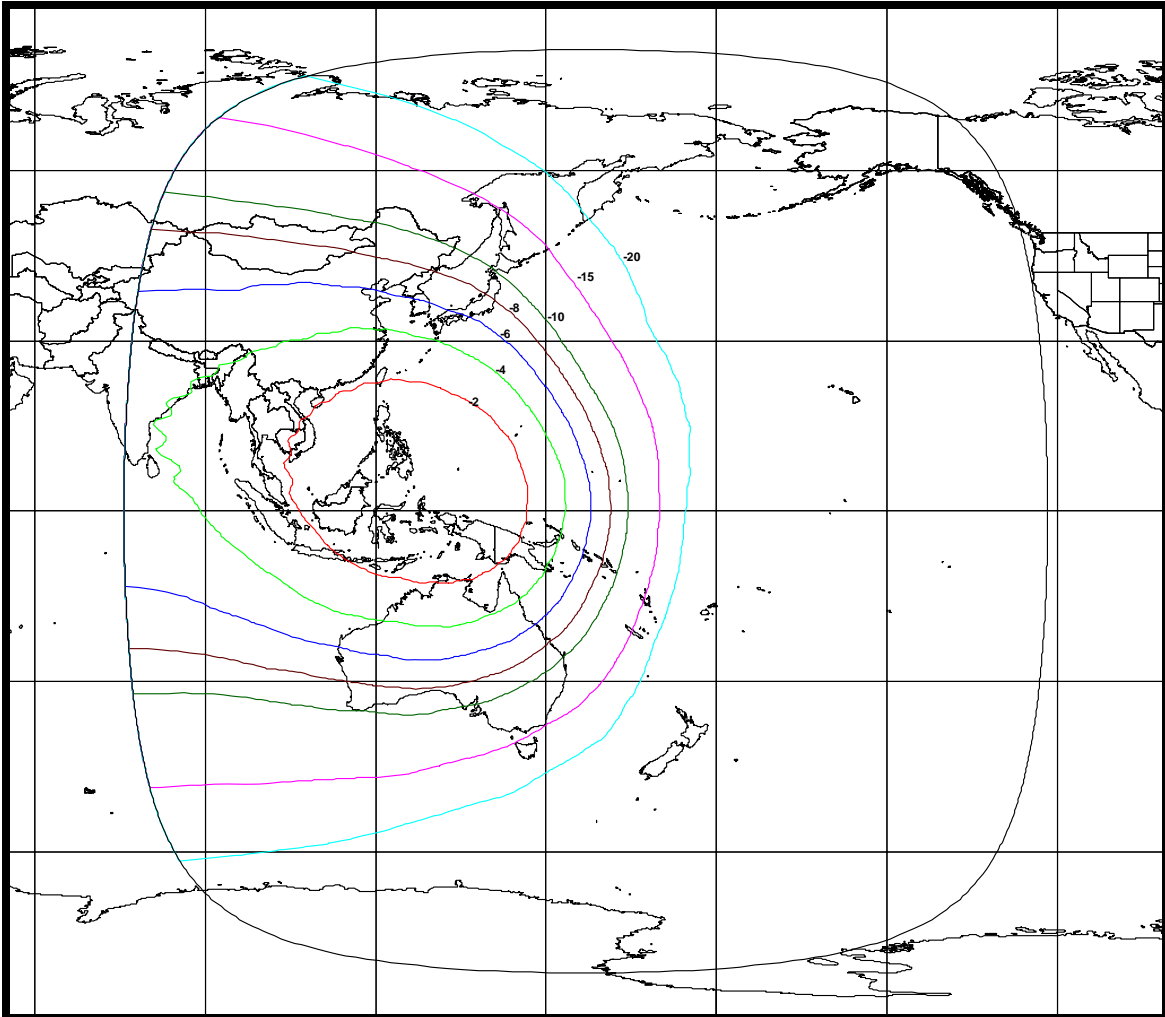


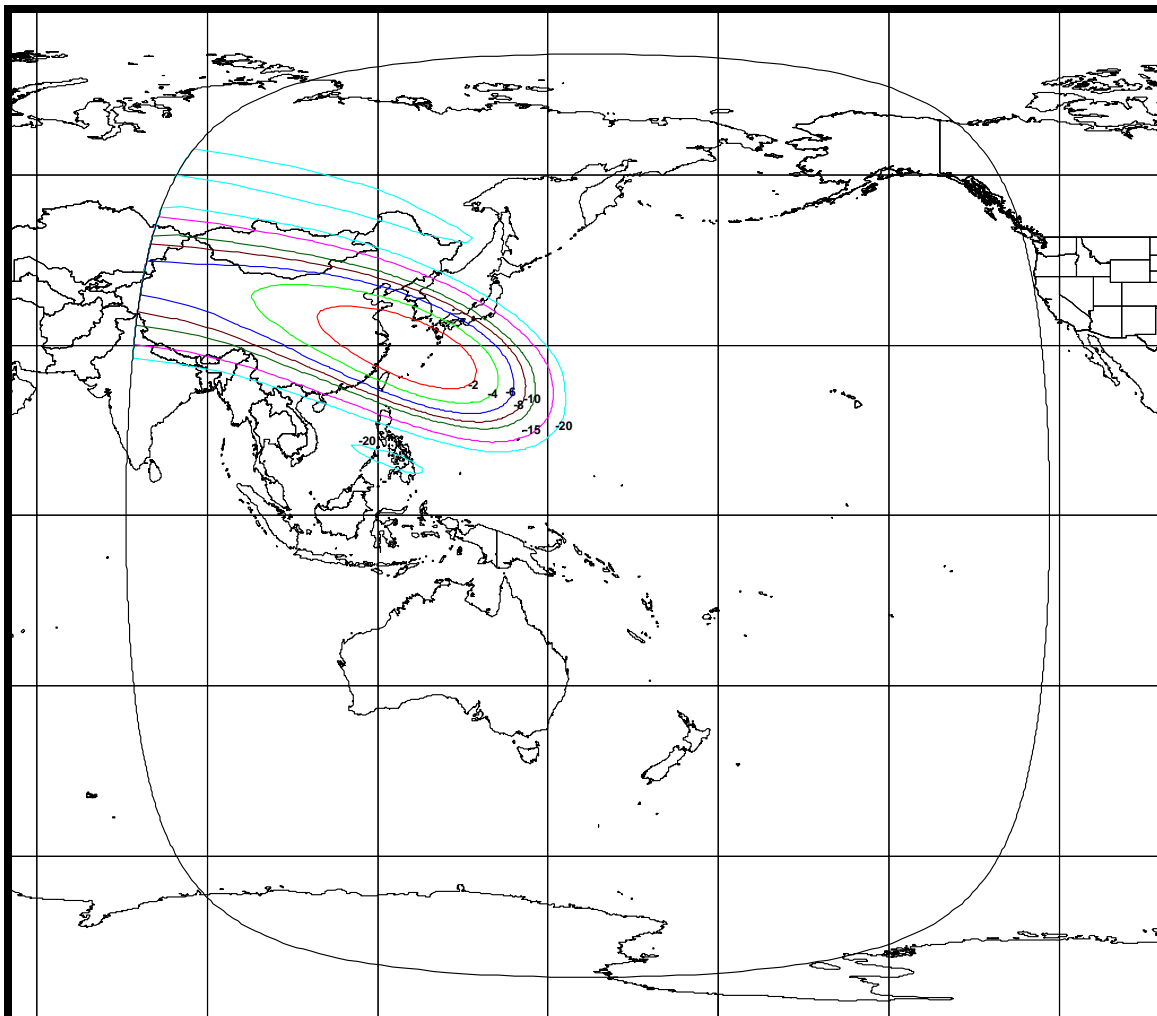
Exhibit 2-29: Spot 1 Downlink Beam

Polarization: Linear Vertical

Peak Beam Gain: 35.2 dBi

Peak EIRP: 54.5 dBW

[Schedule S Beam Designation: S1DL]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 51.5 dBW.

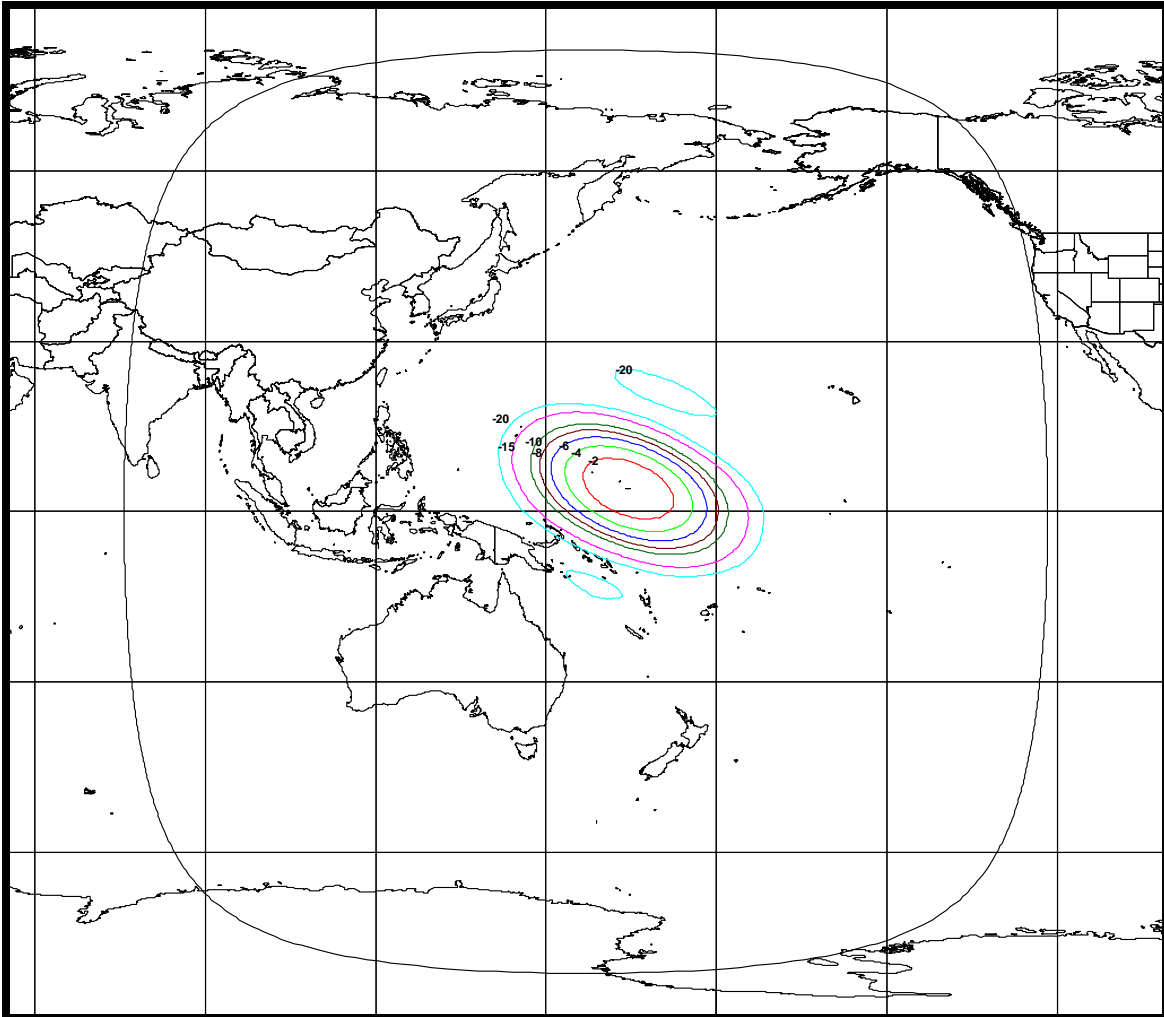
Exhibit 2-30: Spot 1X Downlink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 35.9 dBi

Peak EIRP: 54.6 dBW

[Schedule S Beam Designation: S1XD]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 51.6 dBW.

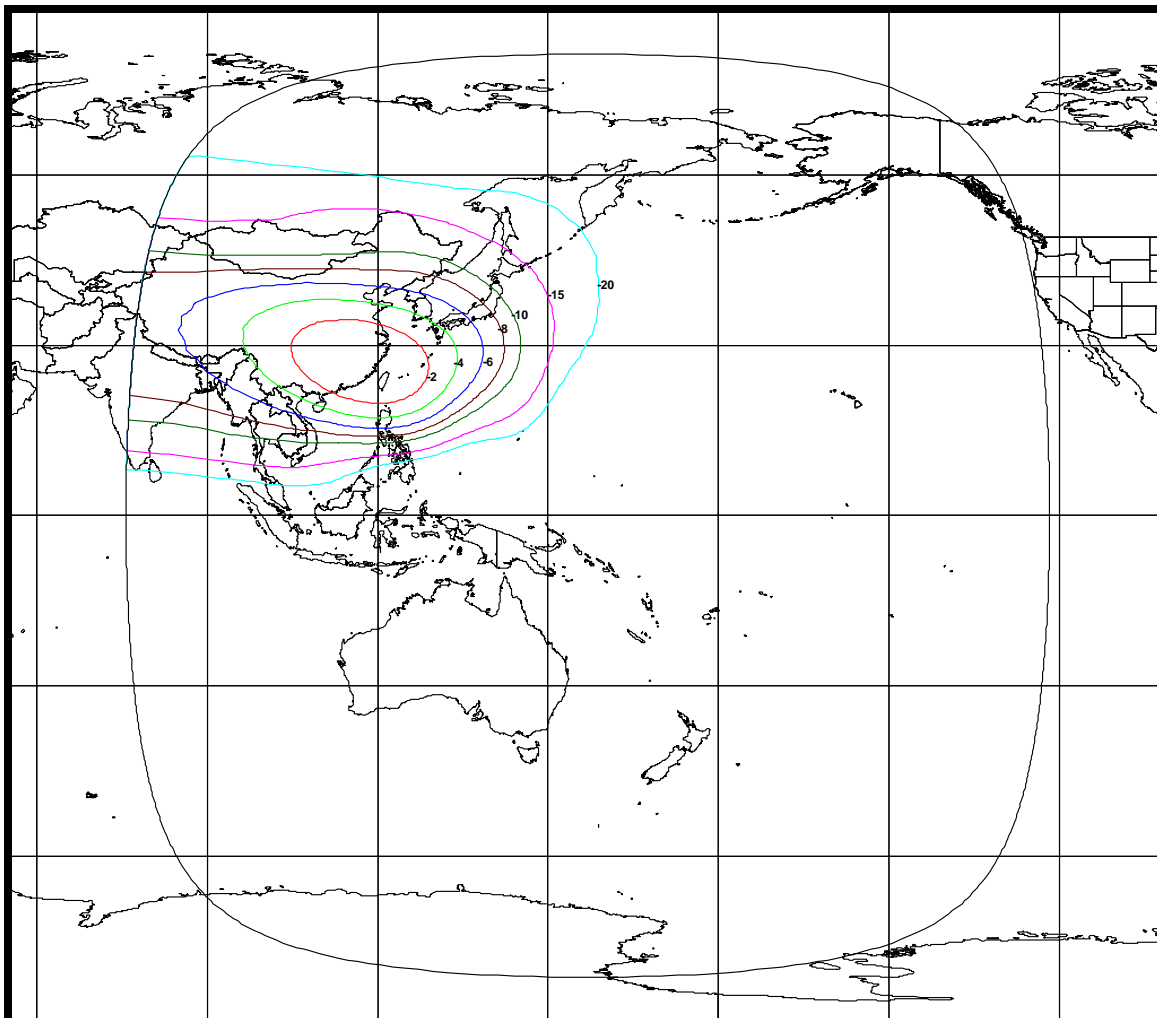
Exhibit 2-31: Spot 2 Downlink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 34.7 dBi

Peak EIRP: 54.9 dBW

[Schedule S Beam Designation: S2DL]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 52.0 dBW.

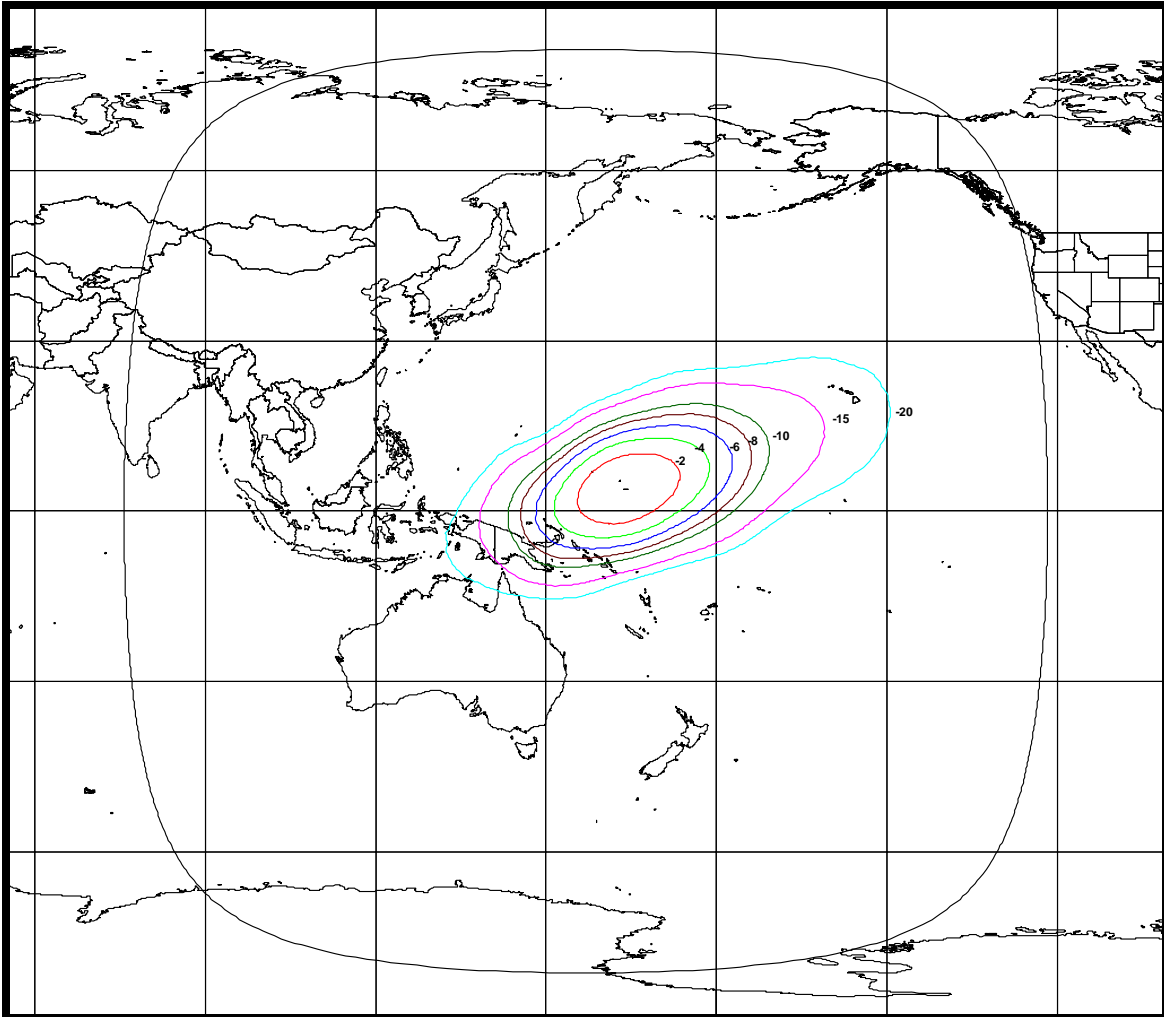
Exhibit 2-32: Spot 2X Downlink Beam

Polarization: Linear Vertical

Peak Beam Gain: 34.2 dBi

Peak EIRP: 54.3 dBW

[Schedule S Beam Designation: S2XD]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 51.5 dBW.

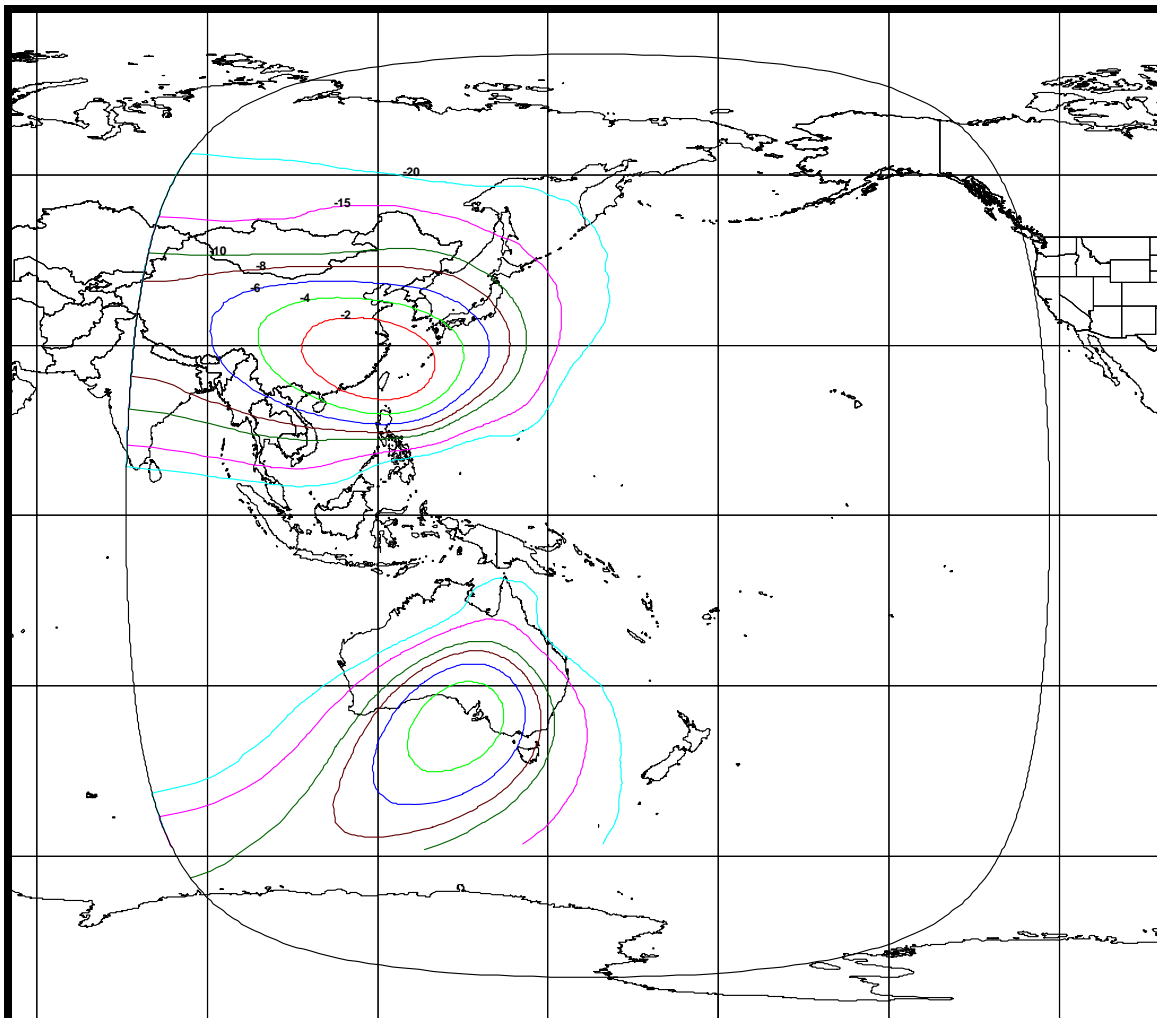
Exhibit 2-33: Spot 2A Downlink Beam

Polarization: Linear Horizontal

Peak Beam Gain: 32.9 dBi

Peak EIRP: 53.1 dBW

[Schedule S Beam Designation: S2AD]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 50.1 dBW.

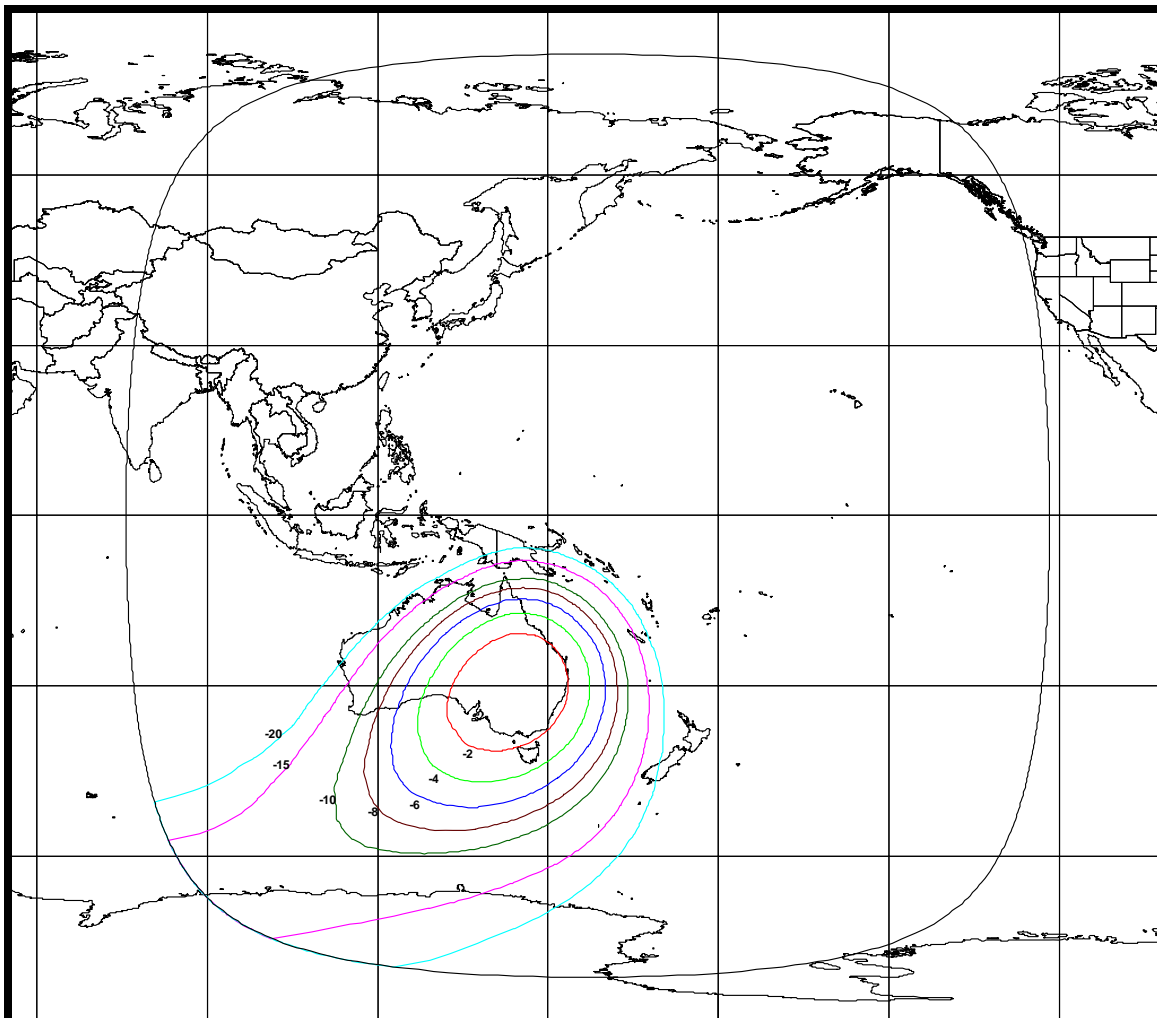
Exhibit 2-34: Spot 3 Downlink Beam

Polarization: Linear Vertical

Peak Beam Gain: 33.7 dBi

Peak EIRP: 52.3 dBW

[Schedule S Beam Designation: S3DL]



Note: This beam can be operated in either a high power mode or a low power mode. The maximum EIRP listed above corresponds to the operation of the beam in the high power mode. When operating in the low power mode, the beam peak EIRP is 49.7 dBW.

Exhibit 2-35: Command Uplink Beam

Polarization: Left Hand Circular

Peak Beam Gain: 8.3 dBi

Peak G/T: -28.5 dB/K

Command Threshold Flux Density @ Peak G/T: -107.4 dBW/m²

[Schedule S Beam Designation: CMD]

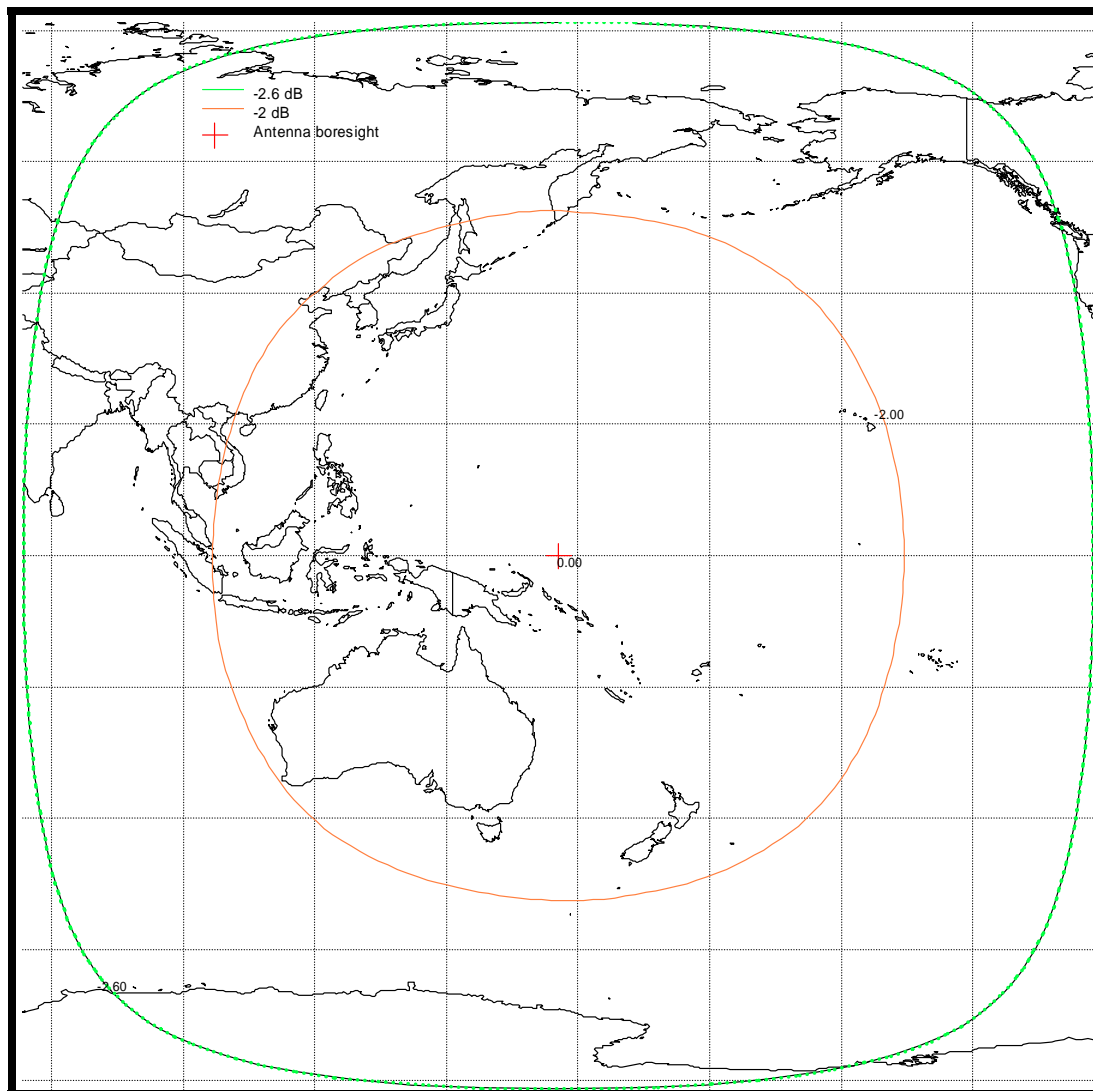


Exhibit 2-36: On-Station Telemetry Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 16.5 dBi

Peak EIRP: 8.2 dBW

[Schedule S Beam Designation: TLMO]

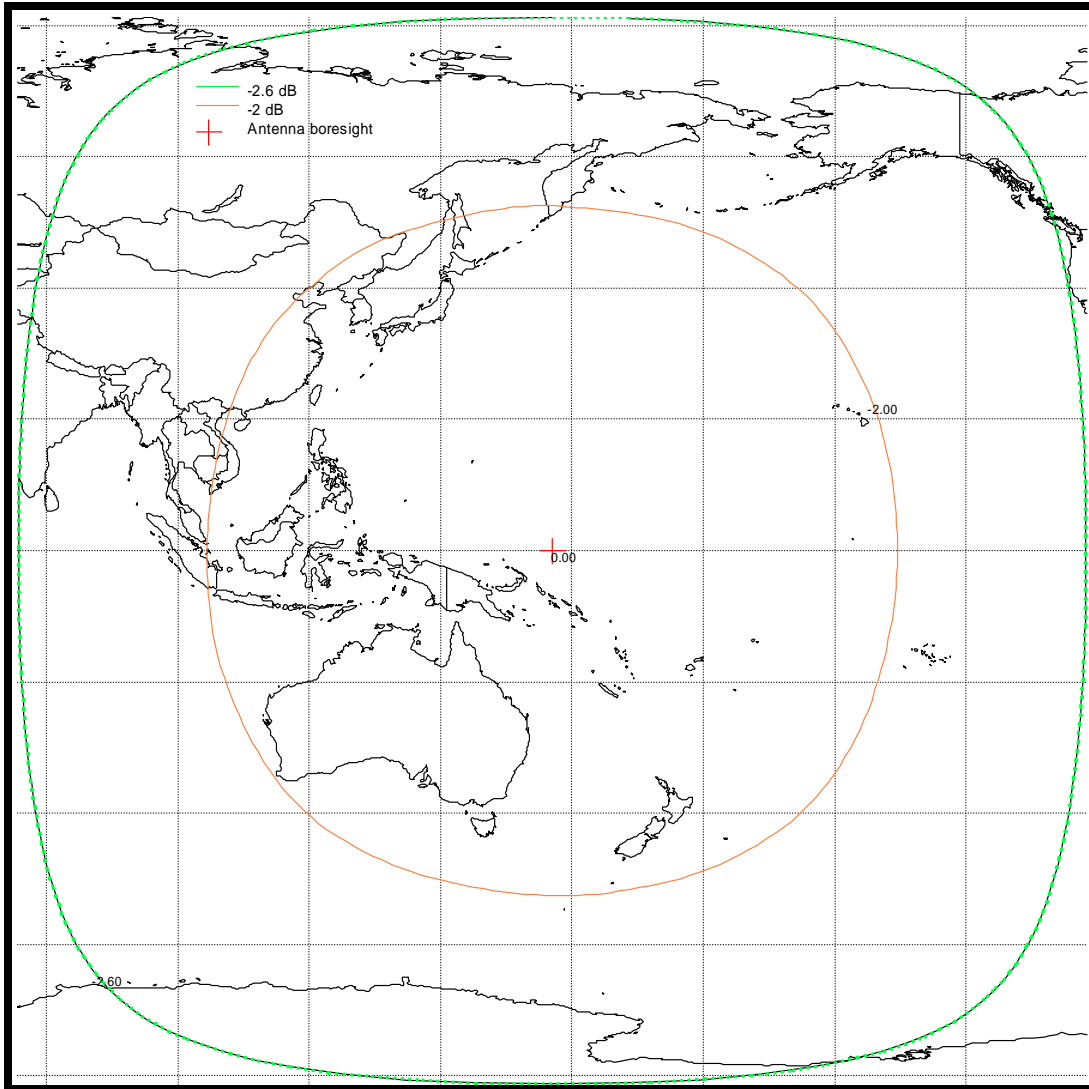


Exhibit 2-37: Back-up Telemetry Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: -5.3 dBi

Peak EIRP: 0.7 dBW

[Schedule S Beam Designation: TLMB]

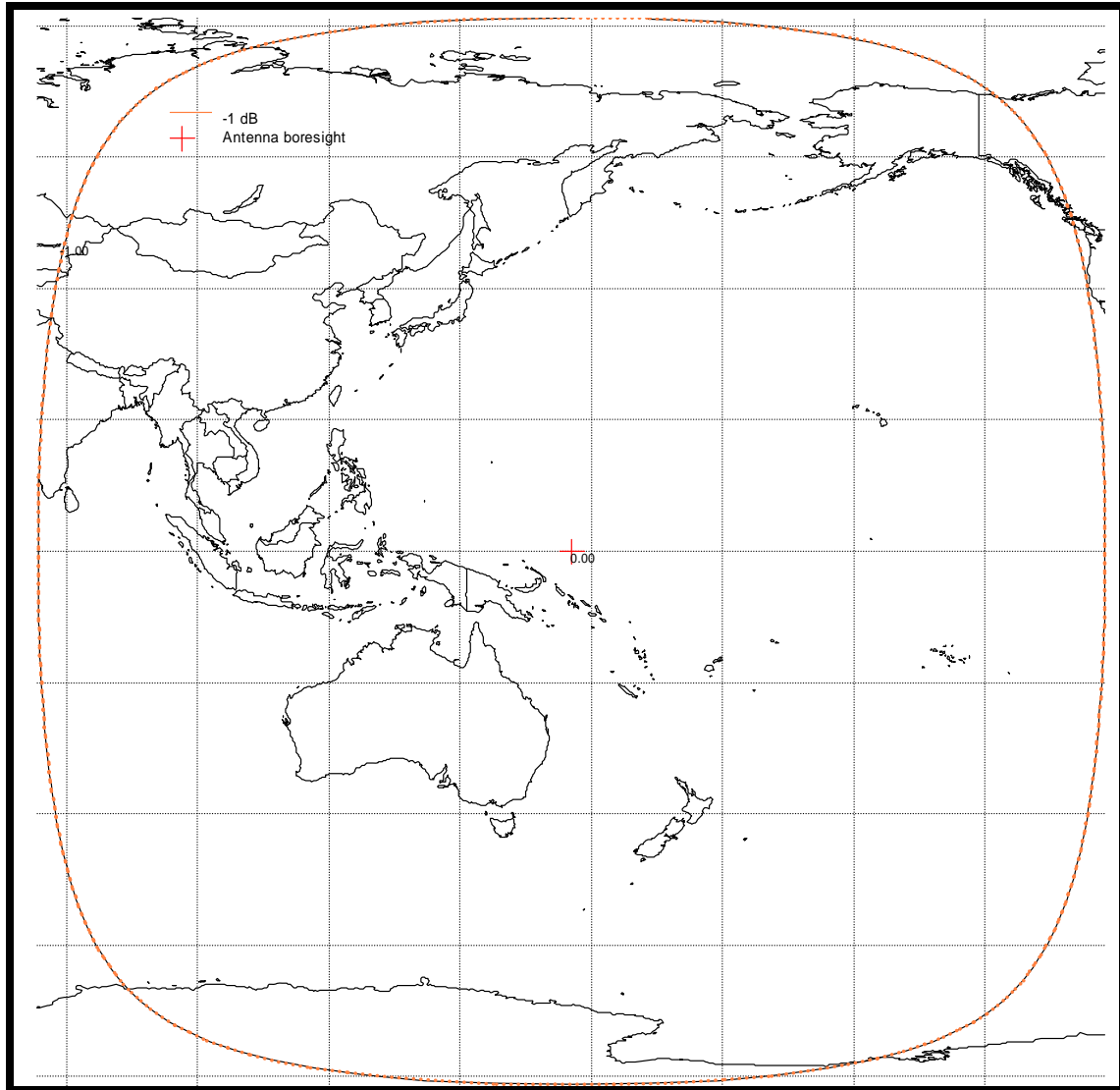


Exhibit 2-38: C-Band Uplink Power Control Downlink Beam

Polarization: Linear Vertical

Peak Beam Gain: 10.7 dBi

Peak EIRP: 11.7 dBW

[Schedule S Beam Designation: BN1]

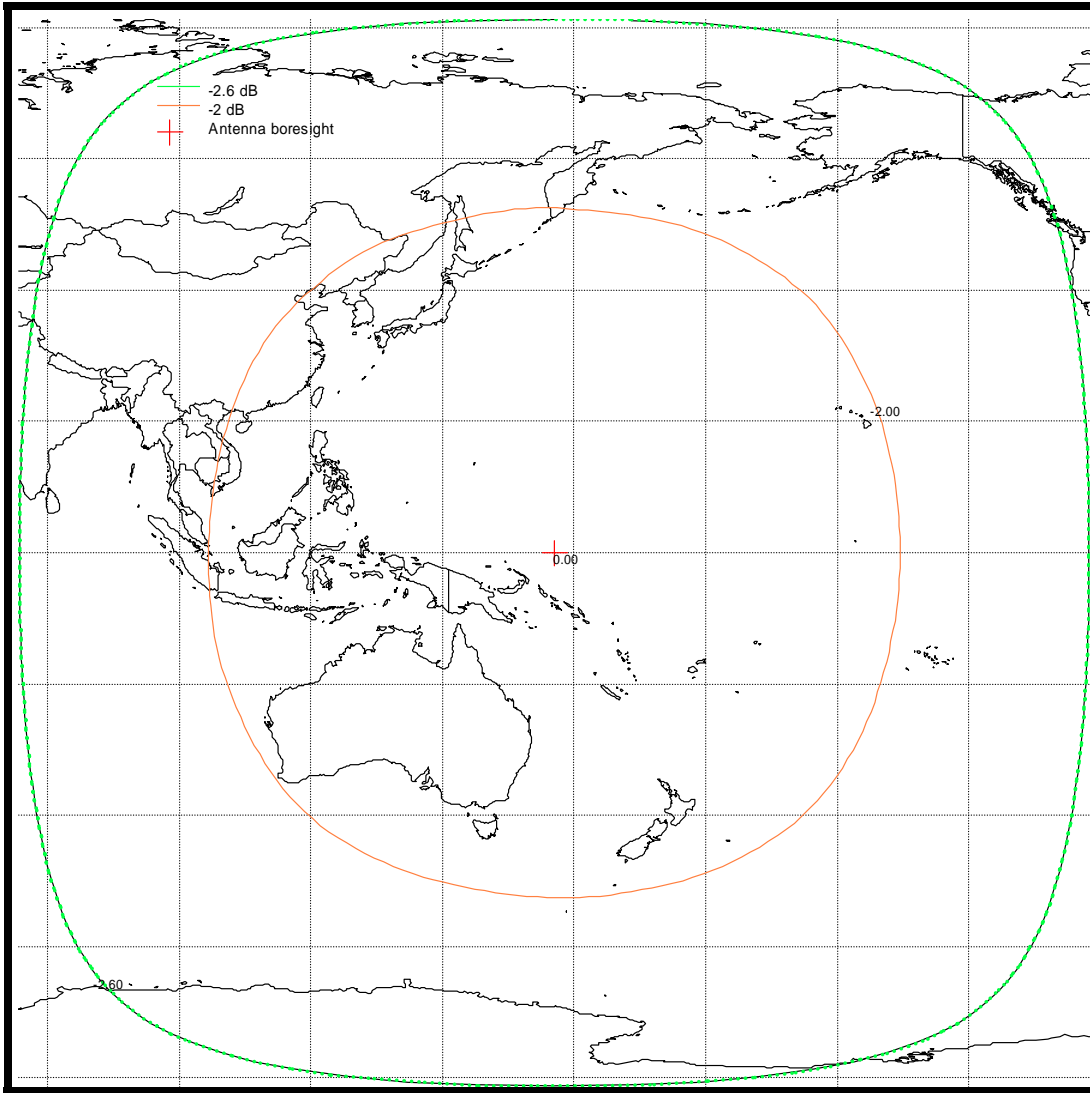


Exhibit 2-39: Ku-Band Uplink Power Control Downlink Beam

Polarization: Right Hand Circular

Peak Beam Gain: 16.7 dBi

Peak EIRP: 8.0 dBW

[Schedule S Beam Designation: BN2, BN3]

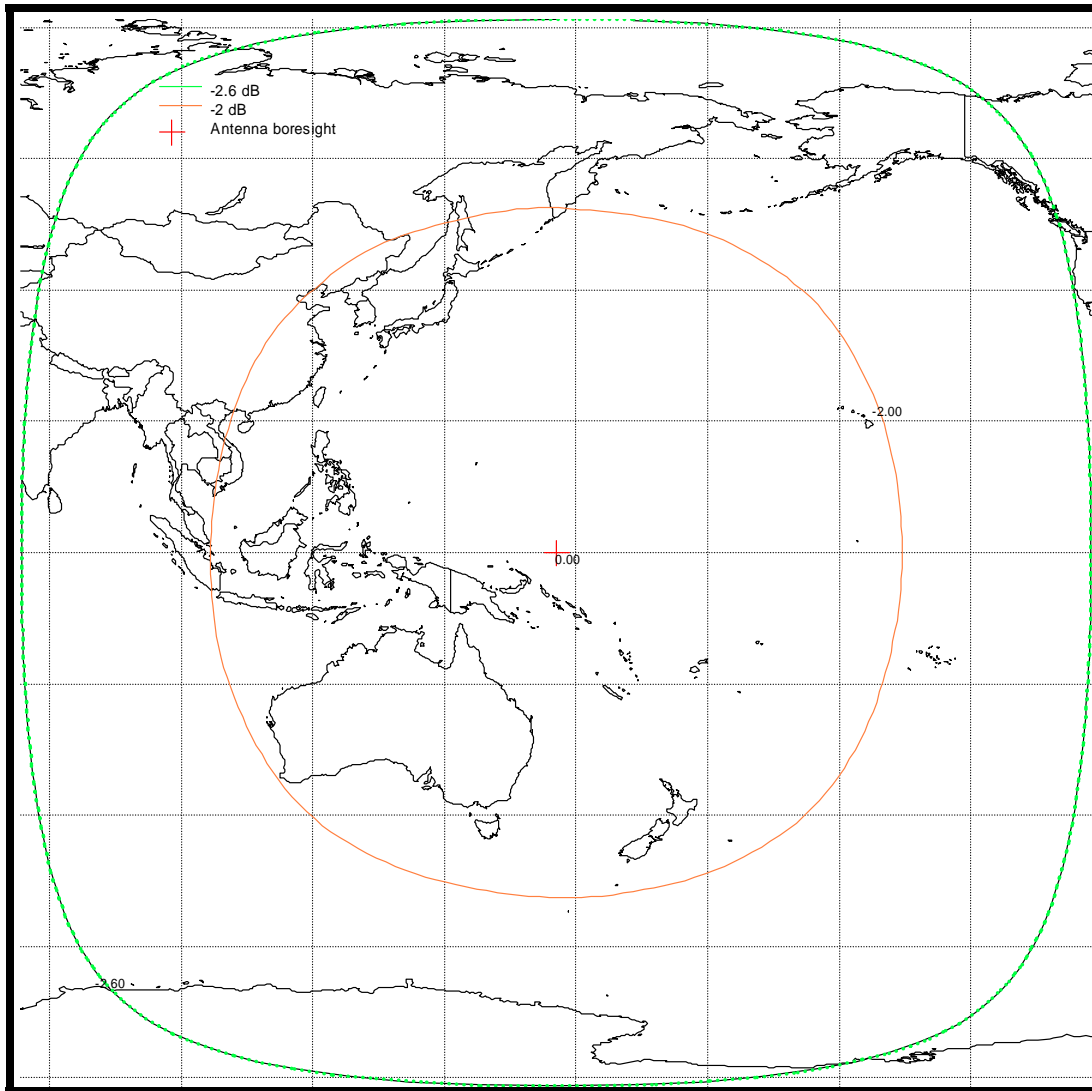


Exhibit 2-40: Ku-Band Uplink Power Control Downlink Beam

(Spot 1 Downlink)

Polarization: Linear Vertical

Peak Beam Gain: 35.2 dBi

Peak EIRP: 11.7 dBW

[Schedule S Beam Designation: BN4, BN10]

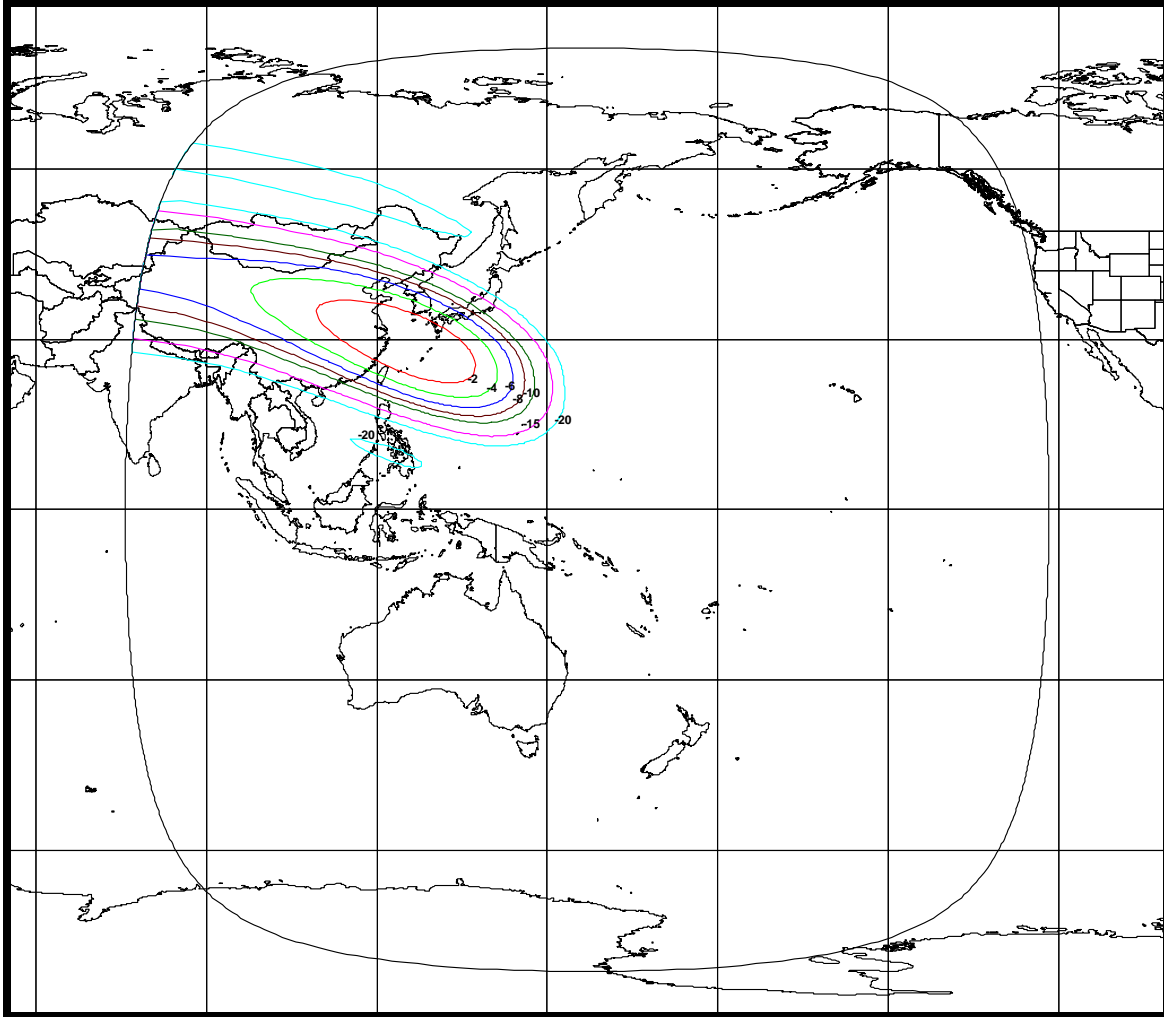


Exhibit 2-41: Ku-Band Uplink Power Control Downlink Beam

(Spot 1X Downlink)

Polarization: Linear Horizontal

Peak Beam Gain: 35.9 dBi

Peak EIRP: 11.7 dBW

[Schedule S Beam Designation: BN5, BN11]

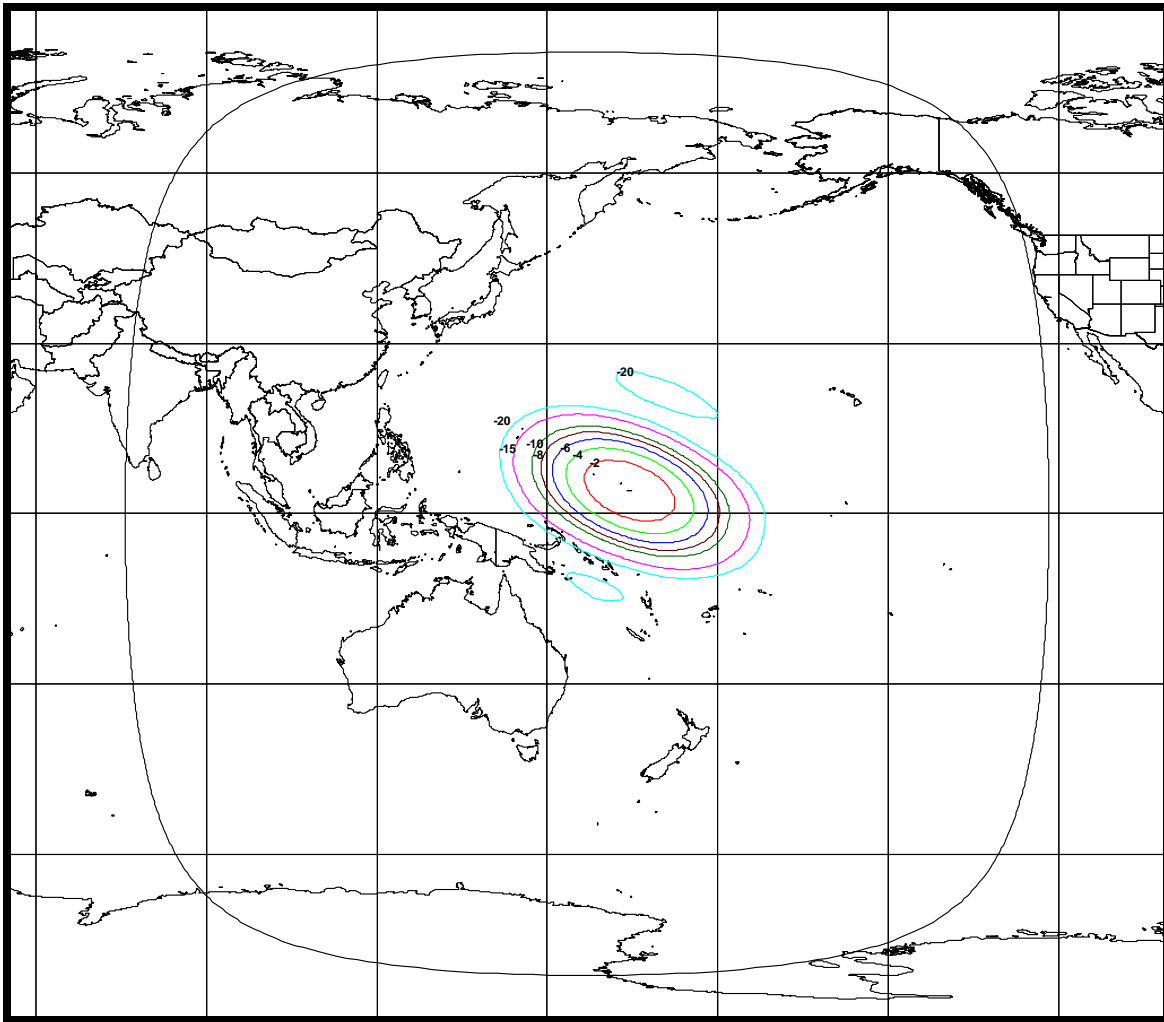


Exhibit 2-42: Ku-Band Uplink Power Control Downlink Beam

(Spot 2 Downlink)

Polarization: Linear Horizontal

Peak Beam Gain: 34.7 dBi

Peak EIRP: 10.3 dBW

[Schedule S Beam Designation: BN6, BN12]

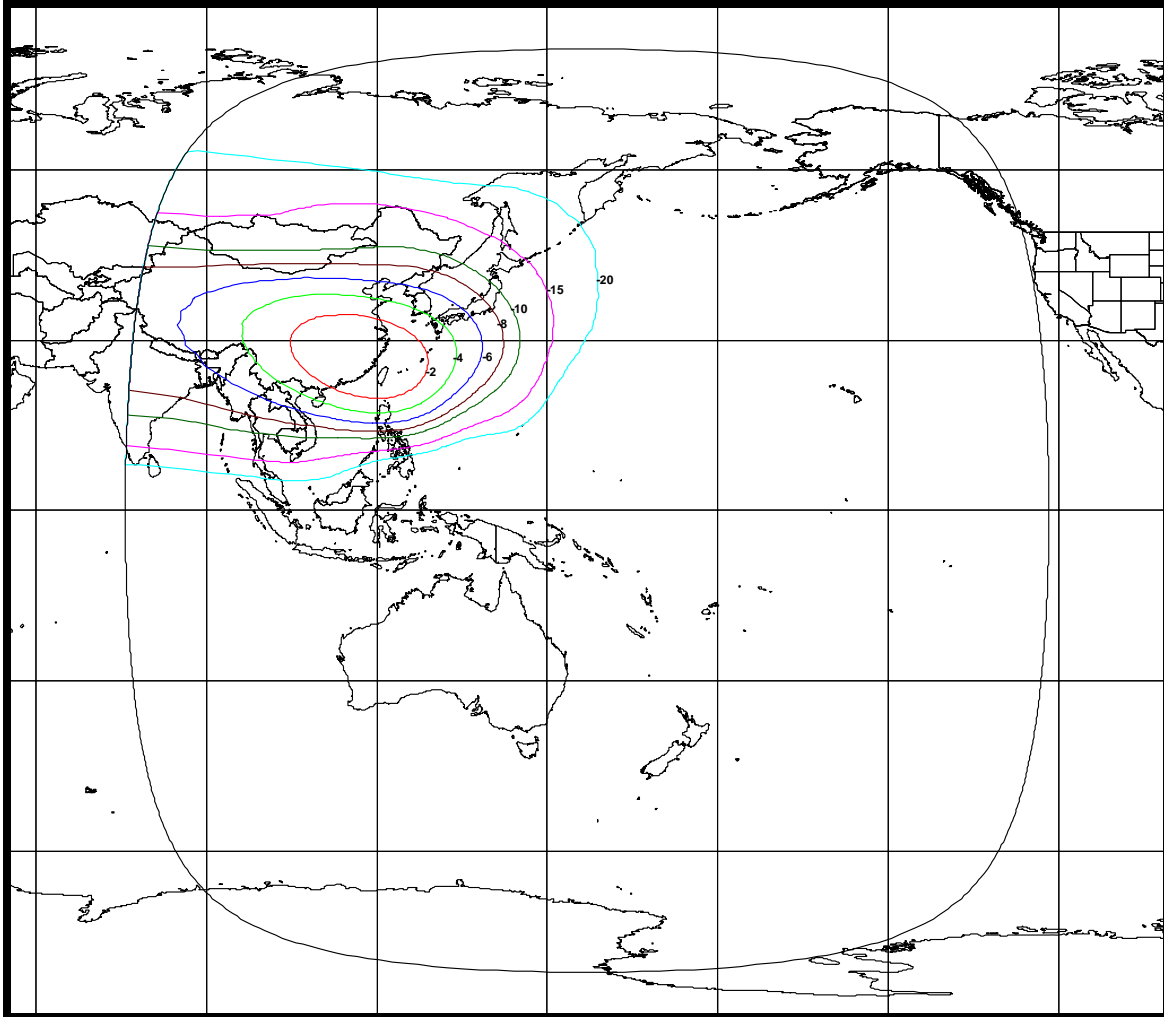


Exhibit 2-43: Ku-Band Uplink Power Control Downlink Beam

(Spot 2X Downlink)

Polarization: Linear Vertical

Peak Beam Gain: 34.2 dBi

Peak EIRP: 10.3 dBW

[Schedule S Beam Designation: BN7, BN13]

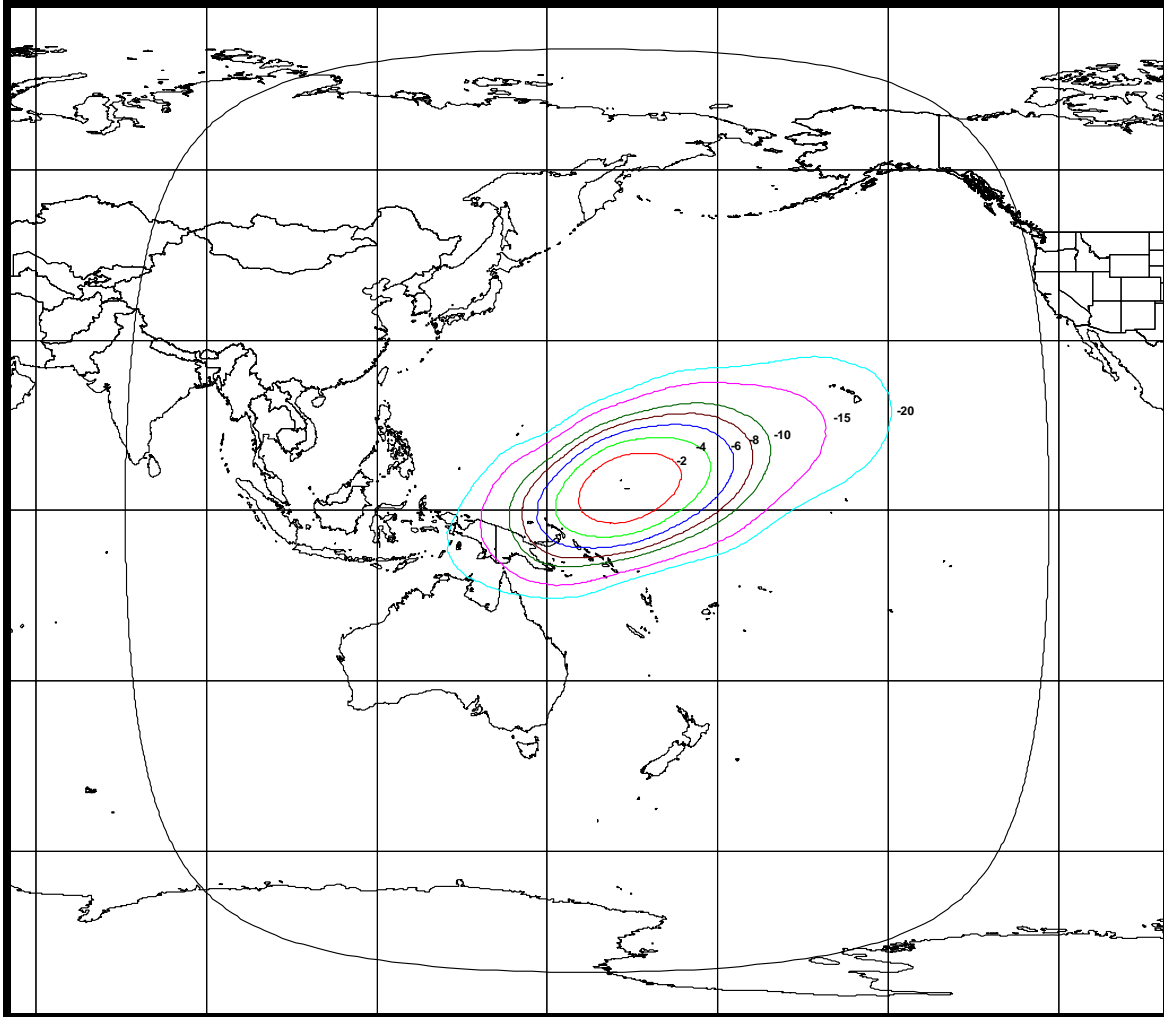


Exhibit 2-44: Ku-Band Uplink Power Control Downlink Beam

(Spot 3 Downlink)

Polarization: Linear Vertical

Peak Beam Gain: 33.7 dBi

Peak EIRP: 12.3 dBW

[Schedule S Beam Designation: BN8, BN14]

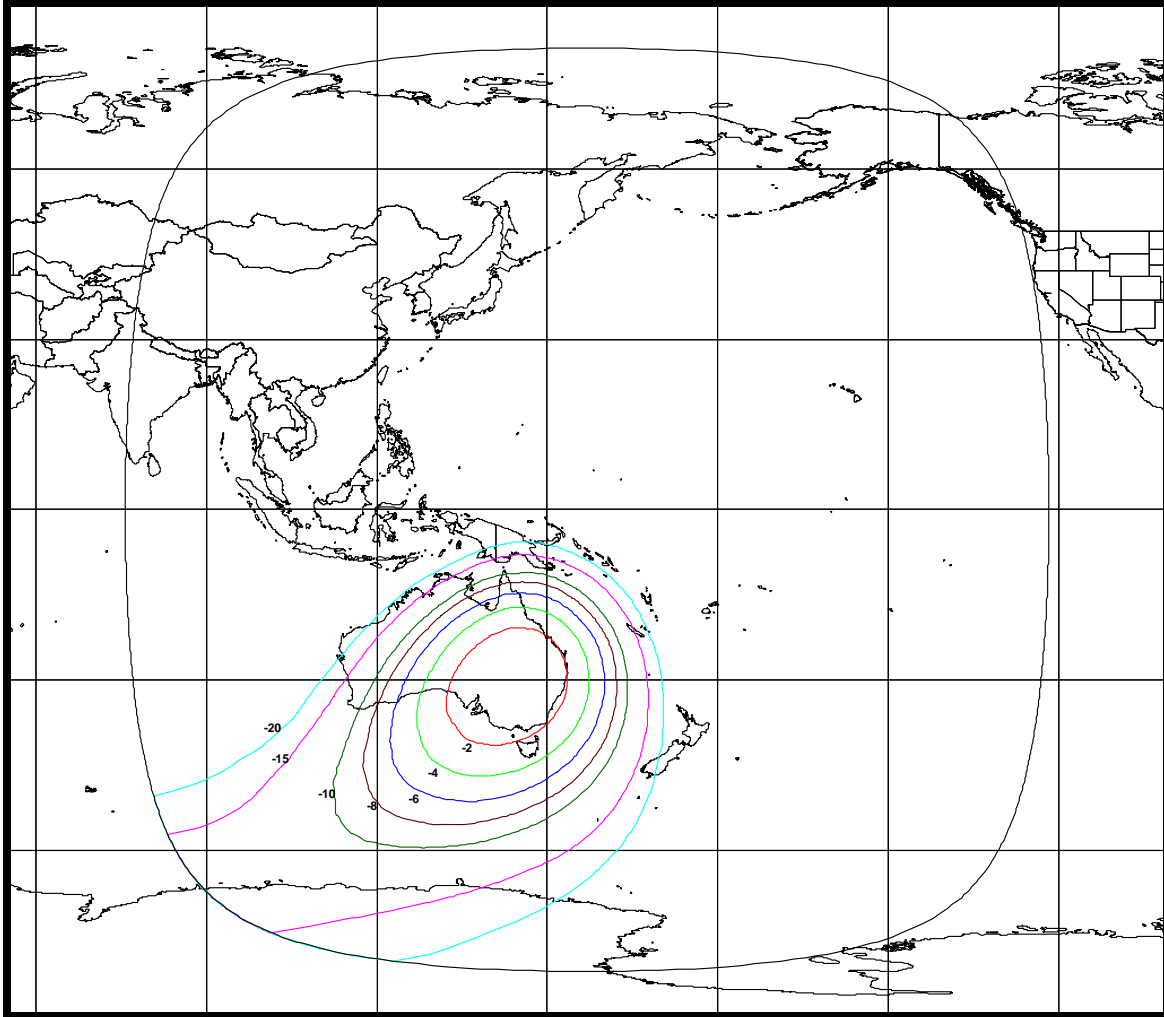


Exhibit 3: Emission Designators

Designator	Carrier Mode	Occupied BW (kHz)	Allocated BW (kHz)
36M0F3F	TV/FM	36000	36000
112MG7W	QPSK	93334	112000
72MG7W	QPSK	60000	72000
41M0G7W	QPSK	34166	41000
36M0G7W	QPSK	30133	36000
10M3G7W	QPSK	6771	10300
100KG7W	QPSK	75.4	100
1M45G7W	BPSK	1229	1450
400KG7W	BPSK	307	400

Exhibit 4: Power Flux Density Calculations

Exhibit 4-1: 3700 – 4200 MHz Downlink PFD Calculations

Global A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²) - (4π*(Slant Range) ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.4	-159.3	-159.2	-159.0	-158.9	-158.8	-158.1
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.4	7.3	9.7	12.0	14.4	16.8	16.1
Global A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-168.2	-168.0	-167.9	-167.8	-167.7	-167.6	-166.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	16.2	16.0	18.4	20.8	23.2	25.6	24.8
Global B Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.6	-159.5	-159.4	-159.2	-159.1	-159.0	-158.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.6	7.5	9.9	12.2	14.6	17.0	16.3
Global B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-168.4	-168.2	-168.1	-168.0	-167.9	-167.8	-167.0
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	16.4	16.2	18.6	21.0	23.4	25.8	25.0
C-Spot A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Carrier Occupied Bandwidth (kHz)	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0	4000.0
Spreading Loss (dB/m ²) - (4π*(Slant Range) 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
FCC Limit (dBW/m ² /4Hz)	-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
C-Spot A Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	41.0	41.0	41.0	41.0	41.0	41.0	41.0
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.2	-161.0	-160.9	-160.8	-160.7	-160.6	-159.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.2	9.0	11.4	13.8	16.2	18.6	17.8

C-Spot B Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	40.5	40.5	40.5	40.5	40.5	40.5	40.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-152.9	-152.8	-152.7	-152.5	-152.4	-152.3	-151.6
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	0.9	0.8	3.2	5.5	7.9	10.3	9.6
C-Spot B Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	40.5	40.5	40.5	40.5	40.5	40.5	40.5
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.7	-161.5	-161.4	-161.3	-161.2	-161.1	-160.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.7	9.5	11.9	14.3	16.7	19.1	18.3
West Hemi Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²) - (4 π *(Slant Range) ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-155.9	-155.8	-155.7	-155.5	-155.4	-155.3	-154.6
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	3.9	3.8	6.2	8.5	10.9	13.3	12.6
West Hemi Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-164.7	-164.5	-164.4	-164.3	-164.2	-164.1	-163.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	12.7	12.5	14.9	17.3	19.7	22.1	21.3
East Hemi Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.6	39.6	39.6	39.6	39.6	39.6	39.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-153.8	-153.7	-153.6	-153.4	-153.3	-153.2	-152.5
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.8	1.7	4.1	6.4	8.8	11.2	10.5
East Hemi Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.6	39.6	39.6	39.6	39.6	39.6	39.6
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-162.6	-162.4	-162.3	-162.2	-162.1	-162.0	-161.2
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	10.6	10.4	12.8	15.2	17.6	20.0	19.2

Northwest Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.6	38.6	38.6	38.6	38.6	38.6	38.6
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²) - (4π*(Slant Range) ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-154.8	-154.7	-154.6	-154.4	-154.3	-154.2	-153.5
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.8	2.7	5.1	7.4	9.8	12.2	11.5
Northwest Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	38.6	38.6	38.6	38.6	38.6	38.6	38.6
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-163.6	-163.4	-163.3	-163.2	-163.1	-163.0	-162.2
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.6	11.4	13.8	16.2	18.6	21.0	20.2
Southeast Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-154.4	-154.3	-154.2	-154.0	-153.9	-153.8	-153.1
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	2.4	2.3	4.7	7.0	9.4	11.8	11.1
Southeast Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-163.2	-163.0	-162.9	-162.8	-162.7	-162.6	-161.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	11.2	11.0	13.4	15.8	18.2	20.6	19.8
Northeast Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	40.3	40.3	40.3	40.3	40.3	40.3	40.3
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-153.1	-153.0	-152.9	-152.7	-152.6	-152.5	-151.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	1.1	1.0	3.4	5.7	8.1	10.5	9.8
Northeast Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	40.3	40.3	40.3	40.3	40.3	40.3	40.3
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.9	-161.7	-161.6	-161.5	-161.4	-161.3	-160.5
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	9.9	9.7	12.1	14.5	16.9	19.3	18.5

Southwest Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.8	37.8	37.8	37.8	37.8	37.8	37.8
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-155.6	-155.5	-155.4	-155.2	-155.1	-155.0	-154.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	3.6	3.5	5.9	8.2	10.6	13.0	12.3
Southwest Beam - 36M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	37.8	37.8	37.8	37.8	37.8	37.8	37.8
Carrier Occupied Bandwidth (kHz)	30133	30133	30133	30133	30133	30133	30133
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)	-164.4	-164.2	-164.1	-164.0	-163.9	-163.8	-163.0
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	12.4	12.2	14.6	17.0	19.4	21.8	21.0

Exhibit 4-2: 10.95-11.2 GHz & 11.45-11.7 GHz Downlink PFD Calculations

Spot 1 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.0	0.0
Spot 1 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.5	54.5	54.5	54.5	54.5	54.5	54.5
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.7	-150.5	-150.4	-150.3	-150.2	-150.1	-149.3
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.7	0.5	2.9	5.3	7.7	10.1	9.3
Spot 1X Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.0	0.0
Spot 1X Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.6	54.6	54.6	54.6	54.6	54.6	54.6
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.6	-150.4	-150.3	-150.2	-150.1	-150.0	-149.2
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.6	0.4	2.8	5.2	7.6	10.0	9.2
Spot 2 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.0	0.0
Spot 2 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.9	54.9	54.9	54.9	54.9	54.9	54.9
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.3	-150.1	-150.0	-149.9	-149.8	-149.7	-148.9
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.3	0.1	2.5	4.9	7.3	9.7	8.9

* 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.

Spot 2X Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.0	0.0
Spot 2X Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.3	54.3	54.3	54.3	54.3	54.3	54.3
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.9	-150.7	-150.6	-150.5	-150.4	-150.3	-149.5
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	0.9	0.7	3.1	5.5	7.9	10.3	9.5
Spot 2A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.8*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.0	0.0
Spot 2A Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-152.1	-151.9	-151.8	-151.7	-151.6	-151.5	-150.7
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	2.1	1.9	4.3	6.7	9.1	11.5	10.7
Spot 3 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	43.4*	43.3*	45.7*	48.0*	50.4*	52.3*	52.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.5	-140.0
FCC Limit (dBW/m2/4Hz)	-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	0.5	0.0
Spot 3 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	52.3	52.3	52.3	52.3	52.3	52.3	52.3
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-152.9	-152.7	-152.6	-152.5	-152.4	-152.3	-151.5
FCC Limit (dBW/m2/4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	2.9	2.7	5.1	7.5	9.9	12.3	11.5

* 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 4-3: 12.5-12.75 GHz Downlink PFD Calculations

Spot 1 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4*	54.5	54.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.3	-138.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Spot 1 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.5	54.5	54.5	54.5	54.5	54.5	54.5
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.7	-150.5	-150.4	-150.3	-150.2	-150.1	-149.3
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.7	2.5	4.9	7.3	9.7	12.1	11.3
Spot 1X Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4*	54.6	54.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.2	-138.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Spot 1X Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.6	54.6	54.6	54.6	54.6	54.6	54.6
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.6	-150.4	-150.3	-150.2	-150.1	-150.0	-149.2
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.6	2.4	4.8	7.2	9.6	12.0	11.2
Spot 2 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4*	54.8*	54.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spot 2 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.9	54.9	54.9	54.9	54.9	54.9	54.9
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.3	-150.1	-150.0	-149.9	-149.8	-149.7	-148.9
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.3	2.1	4.5	6.9	9.3	11.7	10.9

* 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.

Spot 2X Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4*	54.3	54.1*
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.5	-138.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Spot 2X Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	54.3	54.3	54.3	54.3	54.3	54.3	54.3
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-150.9	-150.7	-150.6	-150.5	-150.4	-150.3	-149.5
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	2.9	2.7	5.1	7.5	9.9	12.3	11.5
Spot 2A Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.4*	53.1	53.1
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.5	-139.7	-139.0
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.0	1.7	1.0
Spot 2A Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-152.1	-151.9	-151.8	-151.7	-151.6	-151.5	-150.7
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	4.1	3.9	6.3	8.7	11.1	13.5	12.7
Spot 3 Beam - 36M0F3F							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	45.4*	45.3*	47.7*	50.0*	52.3	52.3	52.3
Carrier Occupied Bandwidth (kHz)	4000	4000	4000	4000	4000	4000	4000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-148.0	-148.0	-145.5	-143.0	-140.6	-140.5	-139.8
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	0.0	0.0	0.0	0.0	0.1	2.5	1.8
Spot 3 Beam - 72M0G7W							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	52.3	52.3	52.3	52.3	52.3	52.3	52.3
Carrier Occupied Bandwidth (kHz)	60000	60000	60000	60000	60000	60000	60000
Spreading Loss (dB/m2)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m2/4kHz)	-152.9	-152.7	-152.6	-152.5	-152.4	-152.3	-151.5
ITU Limit (dBW/m2/4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	4.9	4.7	7.1	9.5	11.9	14.3	13.5

* This is the maximum allowable EIRP level at the specified elevation angle. The actual EIRP level of the 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 4-4: Telemetry & ULPC PFD Calculations

Telemetry - Global Beam							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Carrier Occupied Bandwidth (kHz)	500	500	500	500	500	500	500
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)	-176.2	-176.0	-175.9	-175.8	-175.7	-175.6	-174.8
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	24.2	24.0	26.4	28.8	31.2	33.6	32.8
Telemetry - Global Beam (Back-up Operation)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Carrier Occupied Bandwidth (kHz)	500	500	500	500	500	500	500
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)	-183.7	-183.5	-183.4	-183.3	-183.2	-183.1	-182.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	31.7	31.5	33.9	36.3	38.7	41.1	40.3
C-Band ULPC - Global Beam							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.6	-159.5	-159.4	-159.3	-159.2	-159.1	-158.3
FCC Limit (dBW/m ² /4Hz)	-152.0	-152.0	-149.5	-147.0	-144.5	-142.0	-142.0
Margin (dB)	7.6	7.5	9.9	12.3	14.7	17.1	16.3
Ku-Band ULPC - Global Beam							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-163.3	-163.2	-163.1	-163.0	-162.9	-162.8	-162.0
FCC Limit (dBW/m ² /4Hz)	-150.0	-150.0	-147.5	-145.0	-142.5	-140.0	-140.0
Margin (dB)	13.3	13.2	15.6	18.0	20.4	22.8	22.0
Ku-Band ULPC - Spot 1 (12501 MHz)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.6	-159.5	-159.4	-159.3	-159.2	-159.1	-158.3
ITU Limit (dBW/m ² /4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	11.6	11.5	13.9	16.3	18.7	21.1	20.3
Ku-Band ULPC - Spot 1X (12501 MHz)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.6	-159.5	-159.4	-159.3	-159.2	-159.1	-158.3
ITU Limit (dBW/m ² /4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	11.6	11.5	13.9	16.3	18.7	21.1	20.3

Ku-Band ULPC - Spot 2 (12501 MHz)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.0	-160.9	-160.8	-160.7	-160.6	-160.5	-159.7
ITU Limit (dBW/m ² /4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	13.0	12.9	15.3	17.7	20.1	22.5	21.7
Ku-Band ULPC - Spot 2X (12501 MHz)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-161.0	-160.9	-160.8	-160.7	-160.6	-160.5	-159.7
ITU Limit (dBW/m ² /4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	13.0	12.9	15.3	17.7	20.1	22.5	21.7
Ku-Band ULPC - Spot 3 (12501 MHz)							
Elevation Angle (degrees)	0	5	10	15	20	25	90
Assumed EIRP	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Carrier Occupied Bandwidth (kHz)	25	25	25	25	25	25	25
Spreading Loss (dB/m ²)	163.4	163.3	163.2	163.0	162.9	162.8	162.1
Maximum EIRP Spectral Density (dBW/m ² /4kHz)	-159.0	-158.9	-158.8	-158.7	-158.6	-158.5	-157.7
ITU Limit (dBW/m ² /4Hz)	-148.0	-148.0	-145.5	-143.0	-140.5	-138.0	-138.0
Margin (dB)	11.0	10.9	13.3	15.7	18.1	20.5	19.7

Exhibit 5: Intelsat 706 Link Budgets

Exhibit 5-1: C-BAND – Global Uplink/Global Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m ²)	-82.1	-82.1	-86.1	-82.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.2	15.2
Earth Station Gain (dBi)	41.9	41.9	53.5	58.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	9.2	9.2	11.0	13.1
Earth Station Gain (dBi)	50.3	50.3	51.9	53.5
Earth Station G/T (dB/K)	29.4	29.4	31.0	33.0
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)	45.7	65.8	76.8	80.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	14.1	14.7	18.7	22.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-4	19.7	29.8	29.8
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)	29.4	29.4	31.0	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	12.0	12.5	17.3	19.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	14.1	14.7	18.7	22.4
C/N Downlink (dB)	12.0	12.5	17.3	19.0
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 1 (dB)	10.9	11.5	16.3	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 2 (dB)	12.2	12.8	17.4	18.6
C/(N+I) Composite (dB)	4.6	5.2	9.6	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.6	4.2	8.6	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.6	.3	.3	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.0	-44.4	-52.0	-43.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 5-2: C-BAND – Global Uplink/C-band Spot Dowlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-83.1	-83.1	-85.1	-83.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	13.0
Earth Station Gain (dBi)	41.9	41.9	54.1	56.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	4.5	6.1	7.0
Earth Station Gain (dBi)	43.9	43.9	46.5	47.5
Earth Station G/T (dB/K)	23.6	23.6	26.2	26.6
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)	45.2	65.3	77.8	79.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	13.6	14.2	19.7	21.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	23.6	23.6	26.2	26.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	13.5	14.1	19.2	19.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.6	14.2	19.7	21.4
C/N Downlink (dB)	13.5	14.1	19.2	19.3
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 1 (dB)	11.2	11.8	17.2	18.1
C/I Uplink Adjacent Satellite 2 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 2 (dB)	13.7	14.3	19.1	19.7
C/(N+I) Composite (dB)	4.9	5.5	10.8	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.9	4.5	9.8	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.9	.6	1.5	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.5	-44.9	-51.6	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 5-3: C-BAND – Global Uplink/Hemi Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-82.1	-82.1	-87.1	-84.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	3.0	8.1	11.0
Earth Station Gain (dBi)	41.9	43.2	52.8	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	7.0	6.1	11.0
Earth Station Gain (dBi)	49.3	47.5	46.5	51.9
Earth Station G/T (dB/K)	28.4	26.6	26.2	31.0
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)	45.2	66.0	75.8	78.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	13.7	14.9	18.2	20.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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	26.6	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.3	11.8	14.7	18.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.7	14.9	18.2	20.4
C/N Downlink (dB)	12.3	11.8	14.7	18.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 1 (dB)	11.2	10.6	12.7	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 2 (dB)	12.6	12.1	14.6	18.8
C/(N+I) Composite (dB)	4.7	4.8	7.6	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.7	3.8	6.6	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.7	0.0	.4	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.4	-45.5	-51.8	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 5-4: C-BAND – C-band Spot Uplink/C-band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-87.1	-87.1	-89.1	-88.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	11.0
Earth Station Gain (dBi)	46.5	46.5	46.5	51.9
Earth Station G/T (dB/K)	26.2	26.2	26.2	31.0
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)	41.2	61.3	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	19.4	20.0	25.5	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	26.2	26.2	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	16.1	16.7	19.2	23.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.4	20.0	25.5	26.2
C/N Downlink (dB)	16.1	16.7	19.2	23.7
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 1 (dB)	14.1	14.7	17.2	22.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.0	16.6	19.1	23.8
C/(N+I) Composite (dB)	4.4	5.0	9.5	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.0	8.5	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.4	.1	.2	.5
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.5	-48.9	-52.5	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 5-5: C-BAND – C-band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-87.1	-87.1	-89.1	-87.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	8.1
Earth Station Gain (dBi)	41.9	41.9	51.0	52.8
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	15.2	13.1	15.2
Earth Station Gain (dBi)	55.0	55.0	53.5	55.0
Earth Station G/T (dB/K)	34.5	34.5	33.0	34.5
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)	40.7	60.8	73.8	75.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	18.9	19.5	25.5	27.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-4	19.7	29.8	29.8
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)	34.5	34.5	33.0	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	17.1	17.6	19.3	20.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	18.9	19.5	25.5	27.2
C/N Downlink (dB)	17.1	17.6	19.3	20.5
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 1 (dB)	15.9	16.5	18.0	19.4
C/I Uplink Adjacent Satellite 2 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 2 (dB)	16.6	17.2	18.9	20.1
C/(N+I) Composite (dB)	4.3	4.9	9.7	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	3.9	8.7	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.3	0.0	.4	.2
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50.0	-49.4	-52.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 5-6: C-BAND – C-band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m ²)	-88.1	-88.1	-89.1	-88.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100K.G7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	8.1	6.1	18.3
Earth Station Gain (dBi)	51.9	49.3	46.5	56.0
Earth Station G/T (dB/K)	31.0	28.4	26.2	35.5
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)	40.7	61.5	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	19.0	20.2	26.0	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	2.4	23.2	31.5	31.5
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)	31.0	28.4	26.2	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	16.5	15.1	14.7	23.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.0	20.2	26.0	26.2
C/N Downlink (dB)	16.5	15.1	14.7	23.2
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 1 (dB)	15.5	14.0	12.7	22.1
C/I Uplink Adjacent Satellite 2 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.6	15.4	14.6	22.7
C/(N+I) Composite (dB)	4.3	4.9	7.4	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	3.9	6.4	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	0.0	.3	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.9	-48.7	-52.0	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-40.3	-39.1	-37.3	-28.5

Exhibit 5-7: C-BAND – Hemi Uplink/Hemi Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	28.4	28.4	26.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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	28.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.3	13.6	14.7	20.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	12.3	13.6	14.7	20.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.2	12.5	12.7	19.5
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.6	13.8	14.6	20.3
C/(N+I) Composite (dB)	4.1	5.4	7.8	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.1	4.4	6.8	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.1	.5	.6	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 5-8: C-BAND – Hemi Uplink/Zone Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159 0E	159 0E	159 0E	159 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	29.2	29.2	27.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	29.2	29.2	27.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	13.4	14.7	15.9	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	13.4	14.7	15.9	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.5	12.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.9	14.1	14.9	20.6
C/(N+I) Composite (dB)	4.4	5.6	8.1	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.6	7.1	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.4	.7	1.0	.5
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 5-9: C-BAND – Hemi Uplink/Global Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-84.5	-84.5	-85.5	-83.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	27.8	27.8	27.8	27.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159 0E	159 0E	159 0E	159 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	13.1	13.1	9.2	18.3
Earth Station Gain (dBi)	53.5	53.5	50.3	56.0
Earth Station G/T (dB/K)	33.0	33.0	29.4	35.5
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)	43.8	64.6	77.4	79.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	15.8	17.0	23.3	24.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-1.9	18.9	27.8	27.8
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)	33.0	33.0	29.4	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.1	15.4	14.2	19.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	15.8	17.0	23.3	24.5
C/N Downlink (dB)	14.1	15.4	14.2	19.5
C/I Intermodulation (dB)	19.7	21.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 1 (dB)	12.9	14.2	13.2	18.4
C/I Uplink Adjacent Satellite 2 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 2 (dB)	13.8	15.0	14.4	19.0
C/(N+I) Composite (dB)	4.2	5.4	7.7	11.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.4	6.7	10.3
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.2	.5	.6	.3
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.8	-45.6	-51.5	-42.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44.7	-43.4	-41.0	-32.2

Exhibit 5-10: C-BAND – Hemi Uplink/C-band Spot Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-84.5	-84.5	-85.5	-85.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	34.5	34.5	34.5	34.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159 0E	159 0E	159 0E	159 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	10.0
Earth Station Gain (dBi)	41.9	41.9	54.1	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	4.5	11.0
Earth Station Gain (dBi)	46.5	46.5	43.9	51.9
Earth Station G/T (dB/K)	26.2	26.2	23.6	31.0
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)	44.3	65.1	77.4	77.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.3	17.5	23.3	22.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	5.4	26.2	34.5	34.5
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)	26.2	26.2	23.6	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.7	15.9	15.1	21.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.3	17.5	23.3	22.5
C/N Downlink (dB)	14.7	15.9	15.1	21.7
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 1 (dB)	12.7	14.0	12.8	20.8
C/I Uplink Adjacent Satellite 2 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 2 (dB)	14.6	15.8	15.3	21.8
C/(N+I) Composite (dB)	4.5	5.8	8.0	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.5	4.8	7.0	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.5	.9	.9	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.3	-45.1	-51.5	-42.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.3	-36.1	-34.3	-25.5

Exhibit 5-11: C-BAND – Zone Uplink/Zone Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.0	10.0
Earth Station Gain (dBi)	41.9	41.9	53.4	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	13.1
Earth Station Gain (dBi)	51.9	50.3	46.5	53.5
Earth Station G/T (dB/K)	31.0	29.4	26.2	33.0
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	31.0	29.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	15.2	14.9	15.0	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	15.2	14.9	15.0	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.3	13.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.3	15.1	14.9	20.6
C/(N+I) Composite (dB)	4.3	5.1	7.8	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	4.1	6.8	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	.2	.7	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-51.5	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 5-12: C-BAND – Zone Uplink/Hemi Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	155 0E	155 0E	155 0E	155 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	159 0E	159 0E	159 0E	159 0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	8.1	10.0
Earth Station Gain (dBi)	41.9	41.9	52.8	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	15.2
Earth Station Gain (dBi)	51.9	50.3	46.5	55.0
Earth Station G/T (dB/K)	31.0	29.4	26.2	34.5
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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)	31.0	29.4	26.2	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.9	14.6	14.7	22.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	14.9	14.6	14.7	22.2
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.0	13.5	12.7	21.1
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.0	14.8	14.6	21.8
C/(N+I) Composite (dB)	4.2	5.0	7.6	11.6
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.0	6.6	10.6
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.2	.1	.5	.6
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-50.9	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 5-13: KU-BAND – Ku-band Spot Uplink/Ku-band Spot Downlink

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Uplink SFD (dBW/m2)	-84.5	-84.5	-84.5	-84.5	-89.5	-80.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	48.3	48.3	48.3	48.3	48.3	48.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	155.0E	155.0E	155.0E	155.0E	155.0E	155.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	159.0E	159.0E	159.0E	159.0E	159.0E	159.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	100KG7W	400KG7W	1M45G7W	10M3G7W	112M0G7W	36M0F3F
Carrier Modulation	QPSK	BPSK	BPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	N/A	N/A	4
Information Rate(kbps)	64	128	512	6000	129020	N/A
Code Rate	1/2x239/256	R1/2	R1/2	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	307.0	1229.0	6771.1	93334	36000
Allocated Bandwidth(kHz)	100	400.0	1450.0	10300	112000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.4	3.4	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	2.7	2.7	3.57	7.3	10.0
UPLINK EARTH STATION						
Earth Station Diameter (meters)	1.8	1.8	1.8	1.8	3.0	2.4
Earth Station Gain (dBi)	46.4	46.4	46.4	46.4	49.7	49.0
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	4.6	3.0	3.7	6.1
Earth Station Gain (dBi)	51.1	51.1	53.5	49.2	51.1	55.5
Earth Station G/T (dB/K)	28.6	28.6	31.0	26.7	28.6	33.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	39.4	45.4	53.5	59.9	73.4	72.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Uplink C/N(dB)	17.4	17.3	19.4	18.3	20.4	23.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	14.3	20.3	21.0	34.8	48.3	43.3
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)	28.6	28.6	31.0	26.7	28.6	33.1
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Downlink C / N(dB)	16.3	16.2	13.3	15.3	19.3	22.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	17.4	17.3	19.4	18.3	20.4	23.6
C/N Downlink (dB)	16.3	16.2	13.3	15.3	19.3	22.9
C/I Intermodulation (dB)	18.0	17.9	33.7	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Uplink Adjacent Satellite 1 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 1 (dB)	14.6	14.5	11.7	13.6	17.7	21.4
C/I Uplink Adjacent Satellite 2 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 2 (dB)	15.6	15.6	12.5	14.8	18.7	22.0
C/(N+I) Composite (dB)	6.8	6.7	6.2	6.8	10.1	13.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.8	5.7	5.2	5.8	9.1	12.3
Minimum Required C/N (dB)	-3.0	-3.4	-3.4	-3.9	-8.3	-10.0
Excess Link Margin (dB)	2.8	2.3	1.8	2.0	.8	2.3
Number of Carriers	1120	280	77	10	1	2
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-55.8	-55.8	-53.8	-54.8	-56.0	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-30.5	-30.5	-35.9	-29.5	-27.4	-18.7

Exhibit 6: Hypothetical 155.0° E.L. Link Budgets

Exhibit 6-1: C-BAND – Global Uplink/Global Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-82.1	-82.1	-86.1	-82.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.2	15.2
Earth Station Gain (dBi)	41.9	41.9	53.5	58.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	9.2	9.2	11.0	13.1
Earth Station Gain (dBi)	50.3	50.3	51.9	53.5
Earth Station G/T (dB/K)	29.4	29.4	31.0	33.0
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)	45.7	65.8	76.8	80.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	14.1	14.7	18.7	22.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-4	19.7	29.8	29.8
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)	29.4	29.4	31.0	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	12.0	12.5	17.3	19.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	14.1	14.7	18.7	22.4
C/N Downlink (dB)	12.0	12.5	17.3	19.0
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 1 (dB)	10.9	11.5	16.3	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 2 (dB)	12.2	12.8	17.4	18.6
C/(N+I) Composite (dB)	4.6	5.2	9.6	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.6	4.2	8.6	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.6	.3	.3	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.0	-44.4	-52.0	-43.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 6-2: C-BAND – Global Uplink/C-band Spot Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-83.1	-83.1	-85.1	-83.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	13.0
Earth Station Gain (dBi)	41.9	41.9	54.1	56.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	4.5	6.1	7.0
Earth Station Gain (dBi)	43.9	43.9	46.5	47.5
Earth Station G/T (dB/K)	23.6	23.6	26.2	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)	45.2	65.3	77.8	79.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	13.6	14.2	19.7	21.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	23.6	23.6	26.2	26.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	13.5	14.1	19.2	19.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.6	14.2	19.7	21.4
C/N Downlink (dB)	13.5	14.1	19.2	19.3
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 1 (dB)	11.2	11.8	17.2	18.1
C/I Uplink Adjacent Satellite 2 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 2 (dB)	13.7	14.3	19.1	19.7
C/(N+I) Composite (dB)	4.9	5.5	10.8	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.9	4.5	9.8	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.9	.6	1.5	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.5	-44.9	-51.6	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 6-3: C-BAND – Global Uplink/Hemi Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-82.1	-82.1	-87.1	-84.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	3.0	8.1	11.0
Earth Station Gain (dBi)	41.9	43.2	52.8	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	11.0
Earth Station Gain (dBi)	46.5	46.5	46.5	51.9
Earth Station G/T (dB/K)	26.2	26.2	26.2	31.0
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)	45.2	66.0	75.8	78.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	13.7	14.9	18.2	20.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	2.9	23.7	31.5	31.5
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)	26.2	26.2	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.1	13.4	14.7	18.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.7	14.9	18.2	20.4
C/N Downlink (dB)	12.1	13.4	14.7	18.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 1 (dB)	10.1	11.4	12.7	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 2 (dB)	12.0	13.3	14.6	18.8
C/(N+I) Composite (dB)	4.3	5.6	7.6	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	4.6	6.6	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	.7	.4	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.4	-45.5	-51.8	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 6-4: C-BAND – C-band Spot Uplink/C-band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-87.1	-87.1	-89.1	-88.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	11.0
Earth Station Gain (dBi)	46.5	46.5	46.5	51.9
Earth Station G/T (dB/K)	26.2	26.2	26.2	31.0
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)	41.2	61.3	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	19.4	20.0	25.5	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	26.2	26.2	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	16.1	16.7	19.2	23.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.4	20.0	25.5	26.2
C/N Downlink (dB)	16.1	16.7	19.2	23.7
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 1 (dB)	14.1	14.7	17.2	22.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.0	16.6	19.1	23.8
C/(N+I) Composite (dB)	4.4	5.0	9.5	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.0	8.5	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.4	.1	.2	.5
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.5	-48.9	-52.5	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 6-5: C-BAND – C-band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-87.1	-87.1	-89.1	-87.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	41000
Allocated Bandwidth(kHz)	100	10300	41000	41000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	8.1
Earth Station Gain (dBi)	41.9	41.9	51.0	52.8
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	15.2	13.1	15.2
Earth Station Gain (dBi)	55.0	55.0	53.5	55.0
Earth Station G/T (dB/K)	34.5	34.5	33.0	34.5
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)	40.7	60.8	73.8	75.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	18.9	19.5	25.5	27.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-.4	19.7	29.8	29.8
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)	34.5	34.5	33.0	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	17.1	17.6	19.3	20.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	18.9	19.5	25.5	27.2
C/N Downlink (dB)	17.1	17.6	19.3	20.5
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 1 (dB)	15.9	16.5	18.0	19.4
C/I Uplink Adjacent Satellite 2 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 2 (dB)	16.6	17.2	18.9	20.1
C/(N+I) Composite (dB)	4.3	4.9	9.7	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	3.9	8.7	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.3	0.0	.4	.2
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50.0	-49.4	-52.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 6-6: C-BAND – C-band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-88.1	-88.1	-89.1	-88.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	7.0	6.1	18.3
Earth Station Gain (dBi)	49.3	47.5	46.5	56.0
Earth Station G/T (dB/K)	28.4	26.6	26.2	35.5
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)	40.7	61.5	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	19.0	20.2	26.0	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	4.4	25.2	33.5	31.5
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	26.6	26.2	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	15.9	15.3	16.7	23.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.0	20.2	26.0	26.2
C/N Downlink (dB)	15.9	15.3	16.7	23.2
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 1 (dB)	14.8	14.1	14.7	22.1
C/I Uplink Adjacent Satellite 2 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.1	15.7	16.6	22.7
C/(N+I) Composite (dB)	4.1	4.9	8.6	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.1	3.9	7.6	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.1	0.0	1.5	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.9	-48.7	-52.0	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-40.3	-39.1	-37.3	-28.5

Exhibit 6-7: C-BAND – Hemi Uplink/Hemi Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	28.4	28.4	26.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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	28.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.3	13.6	14.7	20.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	12.3	13.6	14.7	20.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.2	12.5	12.7	19.5
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.6	13.8	14.6	20.3
C/(N+I) Composite (dB)	4.1	5.4	7.8	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.1	4.4	6.8	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.1	.5	.6	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 6-8: C-BAND – Hemi Uplink/Zone Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m ²)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	29.2	29.2	27.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T (dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	29.2	29.2	27.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	13.4	14.7	15.9	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	13.4	14.7	15.9	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.5	12.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.9	14.1	14.9	20.6
C/(N+I) Composite (dB)	4.4	5.6	8.1	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.6	7.1	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.4	.7	1.0	.5
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 6-9: C-BAND – Hemi Uplink/Global Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m ²)	-84.5	-84.5	-85.5	-83.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	27.8	27.8	27.8	27.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	13.1	13.1	9.2	18.3
Earth Station Gain (dBi)	53.5	53.5	50.3	56.0
Earth Station G/T (dB/K)	33.0	33.0	29.4	35.5
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)	43.8	64.6	77.4	79.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	15.8	17.0	23.3	24.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-1.9	18.9	27.8	27.8
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)	33.0	33.0	29.4	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.1	15.4	14.2	19.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	15.8	17.0	23.3	24.5
C/N Downlink (dB)	14.1	15.4	14.2	19.5
C/I Intermodulation (dB)	19.7	21.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 1 (dB)	12.9	14.2	13.2	18.4
C/I Uplink Adjacent Satellite 2 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 2 (dB)	13.8	15.0	14.4	19.0
C/(N+I) Composite (dB)	4.2	5.4	7.7	11.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.4	6.7	10.3
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.2	.5	.6	.3
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.8	-45.6	-51.5	-42.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44.7	-43.4	-41.0	-32.2

Exhibit 6-10: C-BAND – Hemi Uplink/C-band Spot Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-84.5	-84.5	-85.5	-85.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	34.5	34.5	34.5	34.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	10.0
Earth Station Gain (dBi)	41.9	41.9	54.1	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	4.5	11.0
Earth Station Gain (dBi)	46.5	46.5	43.9	51.9
Earth Station G/T (dB/K)	26.2	26.2	23.6	31.0
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)	44.3	65.1	77.4	77.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.3	17.5	23.3	22.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	5.4	26.2	34.5	34.5
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)	26.2	26.2	23.6	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.7	15.9	15.1	21.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.3	17.5	23.3	22.5
C/N Downlink (dB)	14.7	15.9	15.1	21.7
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 1 (dB)	12.7	14.0	12.8	20.8
C/I Uplink Adjacent Satellite 2 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 2 (dB)	14.6	15.8	15.3	21.8
C/(N+I) Composite (dB)	4.5	5.8	8.0	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.5	4.8	7.0	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.5	.9	.9	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.3	-45.1	-51.5	-42.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.3	-36.1	-34.3	-25.5

Exhibit 6-11: C-BAND – Zone Uplink/Zone Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.0	10.0
Earth Station Gain (dBi)	41.9	41.9	53.4	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	13.1
Earth Station Gain (dBi)	51.9	50.3	46.5	53.5
Earth Station G/T (dB/K)	31.0	29.4	26.2	33.0
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	31.0	29.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	15.2	14.9	15.0	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	15.2	14.9	15.0	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.3	13.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.3	15.1	14.9	20.6
C/(N+I) Composite (dB)	4.3	5.1	7.8	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	4.1	6.8	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	.2	.7	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-51.5	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 6-12: C-BAND – Zone Uplink/Hemi Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	8.1	10.0
Earth Station Gain (dBi)	41.9	41.9	52.8	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	15.2
Earth Station Gain (dBi)	51.9	50.3	46.5	55.0
Earth Station G/T (dB/K)	31.0	29.4	26.2	34.5
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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)	31.0	29.4	26.2	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.9	14.6	14.7	22.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	14.9	14.6	14.7	22.2
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.0	13.5	12.7	21.1
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.0	14.8	14.6	21.8
C/(N+I) Composite (dB)	4.2	5.0	7.6	11.6
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.0	6.6	10.6
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.2	.1	.5	.6
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-50.9	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 6-13: KU-BAND – Ku-band Spot Uplink/Ku-band Spot Downlink

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Uplink SFD (dBW/m2)	-84.5	-84.5	-84.5	-84.5	-89.5	-80.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	48.3	48.3	48.3	48.3	48.3	48.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	153.0E	153.0E	153.0E	153.0E	153.0E	153.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	100KG7W	400KG7W	1M45G7W	10M3G7W	112M0G7W	36M0F3F
Carrier Modulation	QPSK	BPSK	BPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	N/A	N/A	4
Information Rate(kbps)	64	128	512	6000	129020	N/A
Code Rate	1/2x239/256	R1/2	R1/2	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	307.0	1229.0	6771.1	93334	36000
Allocated Bandwidth(kHz)	100	400.0	1450.0	10300	112000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.4	3.4	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	2.7	2.7	3.57	7.3	10.0
UPLINK EARTH STATION						
Earth Station Diameter (meters)	1.8	1.8	1.8	1.8	3.0	2.4
Earth Station Gain (dBi)	46.4	46.4	46.4	46.4	49.7	49.0
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	4.6	3.0	3.7	6.1
Earth Station Gain (dBi)	51.1	51.1	53.5	49.2	51.1	55.5
Earth Station G/T (dB/K)	28.6	28.6	31.0	26.7	28.6	33.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	39.4	45.4	53.5	59.9	73.4	72.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Uplink C/N(dB)	17.4	17.3	19.4	18.3	20.4	23.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	14.3	20.3	21.0	34.8	48.3	43.3
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)	28.6	28.6	31.0	26.7	28.6	33.1
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Downlink C / N(dB)	16.3	16.2	13.3	15.3	19.3	22.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	17.4	17.3	19.4	18.3	20.4	23.6
C/N Downlink (dB)	16.3	16.2	13.3	15.3	19.3	22.9
C/I Intermodulation (dB)	18.0	17.9	33.7	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Uplink Adjacent Satellite 1 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 1 (dB)	14.6	14.5	11.7	13.6	17.7	21.4
C/I Uplink Adjacent Satellite 2 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 2 (dB)	15.6	15.6	12.5	14.8	18.7	22.0
C/(N+I) Composite (dB)	6.8	6.7	6.2	6.8	10.1	13.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.8	5.7	5.2	5.8	9.1	12.3
Minimum Required C/N (dB)	-3.0	-3.4	-3.4	-3.9	-8.3	-10.0
Excess Link Margin (dB)	2.8	2.3	1.8	2.0	.8	2.3
Number of Carriers	1120	280	77	10	1	2
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-55.8	-55.8	-53.8	-54.8	-56.0	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-30.5	-30.5	-35.9	-29.5	-27.4	-18.7

Exhibit 7: Hypothetical 159.0° E.L. Link Budgets

Exhibit 7-1: C-BAND – Global Uplink/Global Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-82.1	-82.1	-86.1	-82.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.2	15.2
Earth Station Gain (dBi)	41.9	41.9	53.5	58.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	9.2	9.2	11.0	13.1
Earth Station Gain (dBi)	50.3	50.3	51.9	53.5
Earth Station G/T (dB/K)	29.4	29.4	31.0	33.0
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)	45.7	65.8	76.8	80.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	14.1	14.7	18.7	22.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-4	19.7	29.8	29.8
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)	29.4	29.4	31.0	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	12.0	12.5	17.3	19.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	14.1	14.7	18.7	22.4
C/N Downlink (dB)	12.0	12.5	17.3	19.0
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 1 (dB)	10.9	11.5	16.3	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.6	14.2	18.2	21.9
C/I Downlink Adjacent Satellite 2 (dB)	12.2	12.8	17.4	18.6
C/(N+I) Composite (dB)	4.6	5.2	9.6	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.6	4.2	8.6	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.6	.3	.3	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.0	-44.4	-52.0	-43.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 7-2: C-BAND – Global Uplink/C-band Spot Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-83.1	-83.1	-85.1	-83.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	13.0
Earth Station Gain (dBi)	41.9	41.9	54.1	56.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	4.5	6.1	7.0
Earth Station Gain (dBi)	43.9	43.9	46.5	47.5
Earth Station G/T (dB/K)	23.6	23.6	26.2	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)	45.2	65.3	77.8	79.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	13.6	14.2	19.7	21.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	23.6	23.6	26.2	26.6
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	13.5	14.1	19.2	19.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.6	14.2	19.7	21.4
C/N Downlink (dB)	13.5	14.1	19.2	19.3
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 1 (dB)	11.2	11.8	17.2	18.1
C/I Uplink Adjacent Satellite 2 (dB)	13.1	13.7	19.2	20.9
C/I Downlink Adjacent Satellite 2 (dB)	13.7	14.3	19.1	19.7
C/(N+I) Composite (dB)	4.9	5.5	10.8	11.9
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.9	4.5	9.8	10.9
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.9	.6	1.5	.9
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.5	-44.9	-51.6	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 7-3: C-BAND – Global Uplink/Hemi Downlink

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)	-11.2	-11.2	-11.2	-11.2
Uplink SFD (dBW/m2)	-82.1	-82.1	-87.1	-84.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	153E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	3.0	8.1	11.0
Earth Station Gain (dBi)	41.9	43.2	52.8	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	11.0
Earth Station Gain (dBi)	46.5	46.5	46.5	51.9
Earth Station G/T (dB/K)	26.2	26.2	26.2	31.0
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)	45.2	66.0	75.8	78.8
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)	-11.2	-11.2	-11.2	-11.2
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	13.7	14.9	18.2	20.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	2.9	23.7	31.5	31.5
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)	26.2	26.2	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.1	13.4	14.7	18.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	13.7	14.9	18.2	20.4
C/N Downlink (dB)	12.1	13.4	14.7	18.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 1 (dB)	10.1	11.4	12.7	17.8
C/I Uplink Adjacent Satellite 2 (dB)	13.2	14.4	17.7	19.9
C/I Downlink Adjacent Satellite 2 (dB)	12.0	13.3	14.6	18.8
C/(N+I) Composite (dB)	4.3	5.6	7.6	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	4.6	6.6	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	.7	.4	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.4	-45.5	-51.8	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 7-4: C-BAND – C-band Spot Uplink/C-band Spot Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m ²)	-87.1	-87.1	-89.1	-88.1
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	36.5	36.5	36.5	36.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	36000
Allocated Bandwidth(kHz)	100	10300	41000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	11.0
Earth Station Gain (dBi)	46.5	46.5	46.5	51.9
Earth Station G/T (dB/K)	26.2	26.2	26.2	31.0
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)	41.2	61.3	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	19.4	20.0	25.5	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	6.9	27.0	36.5	36.5
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)	26.2	26.2	26.2	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	16.1	16.7	19.2	23.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.4	20.0	25.5	26.2
C/N Downlink (dB)	16.1	16.7	19.2	23.7
C/I Intermodulation (dB)	18.4	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 1 (dB)	14.1	14.7	17.2	22.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	9.7	15.2	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.0	16.6	19.1	23.8
C/(N+I) Composite (dB)	4.4	5.0	9.5	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.0	8.5	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.4	.1	.2	.5
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.5	-48.9	-52.5	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.9	-37.3	-34.8	-25.5

Exhibit 7-5: C-BAND – C-band Spot Uplink/Global Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m2)	-87.1	-87.1	-89.1	-87.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	29.8	29.8	29.8	29.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	41M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	47230	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	34166	41000
Allocated Bandwidth(kHz)	100	10300	41000	41000
Minimum C/N, Clear Sky (dB)	2.99	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	3.57	7.3	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	8.1
Earth Station Gain (dBi)	41.9	41.9	51.0	52.8
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	15.2	13.1	15.2
Earth Station Gain (dBi)	55.0	55.0	53.5	55.0
Earth Station G/T (dB/K)	34.5	34.5	33.0	34.5
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)	40.7	60.8	73.8	75.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Uplink C/N(dB)	18.9	19.5	25.5	27.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-4	19.7	29.8	29.8
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)	34.5	34.5	33.0	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-75.3	-75.6
Downlink C / N(dB)	17.1	17.6	19.3	20.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	18.9	19.5	25.5	27.2
C/N Downlink (dB)	17.1	17.6	19.3	20.5
C/I Intermodulation (dB)	19.7	20.3	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 1 (dB)	15.9	16.5	18.0	19.4
C/I Uplink Adjacent Satellite 2 (dB)	8.6	9.2	15.2	16.9
C/I Downlink Adjacent Satellite 2 (dB)	16.6	17.2	18.9	20.1
C/(N+I) Composite (dB)	4.3	4.9	9.7	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	3.9	8.7	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-8.3	-10.0
Excess Link Margin (dB)	.3	0.0	.4	.2
Number of Carriers	410	4	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-50.0	-49.4	-52.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-45.2	-44.6	-41.5	-32.2

Exhibit 7-6: C-BAND – C-band Spot Uplink/Hemi Downlink

UPLINK BEAM INFORMATION				
Uplink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
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)	-1.4	-1.4	-1.4	-1.4
Uplink SFD (dBW/m ²)	-88.1	-88.1	-89.1	-88.1
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-6.0
Downlink Contour EIRP (dBW)	33.5	33.5	33.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	7.0	7.0
Earth Station Gain (dBi)	41.9	41.9	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	7.0	6.1	18.3
Earth Station Gain (dBi)	49.3	47.5	46.5	56.0
Earth Station G/T (dB/K)	28.4	26.6	26.2	35.5
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)	40.7	61.5	73.8	74.8
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)	-1.4	-1.4	-1.4	-1.4
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	19.0	20.2	26.0	26.2
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	4.4	25.2	33.5	31.5
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	26.6	26.2	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	15.9	15.3	16.7	23.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	19.0	20.2	26.0	26.2
C/N Downlink (dB)	15.9	15.3	16.7	23.2
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.6
C/I Uplink Adjacent Satellite 1 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 1 (dB)	14.8	14.1	14.7	22.1
C/I Uplink Adjacent Satellite 2 (dB)	8.7	9.9	15.7	15.9
C/I Downlink Adjacent Satellite 2 (dB)	16.1	15.7	16.6	22.7
C/(N+I) Composite (dB)	4.1	4.9	8.6	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.1	3.9	7.6	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.1	0.0	1.5	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-49.9	-48.7	-52.0	-42.2
Downlink EIRP Density At Beam Peak (dBW/Hz)	-40.3	-39.1	-37.3	-28.5

Exhibit 7-7: C-BAND – Hemi Uplink/Hemi Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.5	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	28.4	28.4	26.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	.9	21.7	31.5	31.5
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	28.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	12.3	13.6	14.7	20.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	12.3	13.6	14.7	20.7
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.2	12.5	12.7	19.5
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.6	13.8	14.6	20.3
C/(N+I) Composite (dB)	4.1	5.4	7.8	11.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.1	4.4	6.8	10.4
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.1	.5	.6	.4
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.6	-37.3	-28.5

Exhibit 7-8: C-BAND – Hemi Uplink/Zone Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m ²)	-82.5	-82.5	-85.5	-84.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	8.1	6.1	13.1
Earth Station Gain (dBi)	49.3	49.3	46.5	53.5
Earth Station G/T (dB/K)	29.2	29.2	27.2	33.0
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)	44.8	65.6	77.4	78.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.8	18.0	23.3	23.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	29.2	29.2	27.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	13.4	14.7	15.9	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.8	18.0	23.3	23.5
C/N Downlink (dB)	13.4	14.7	15.9	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 1 (dB)	11.5	12.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	10.8	12.0	17.3	17.5
C/I Downlink Adjacent Satellite 2 (dB)	12.9	14.1	14.9	20.6
C/(N+I) Composite (dB)	4.4	5.6	8.1	11.5
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.4	4.6	7.1	10.5
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.4	.7	1.0	.5
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-45.8	-44.6	-51.5	-43.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 7-9: C-BAND – Hemi Uplink/Global Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m ²)	-84.5	-84.5	-85.5	-83.5
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	27.8	27.8	27.8	27.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	11.0
Earth Station Gain (dBi)	41.9	41.9	54.1	55.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	13.1	13.1	9.2	18.3
Earth Station Gain (dBi)	53.5	53.5	50.3	56.0
Earth Station G/T (dB/K)	33.0	33.0	29.4	35.5
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)	43.8	64.6	77.4	79.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	15.8	17.0	23.3	24.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	-1.9	18.9	27.8	27.8
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)	33.0	33.0	29.4	35.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.1	15.4	14.2	19.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	15.8	17.0	23.3	24.5
C/N Downlink (dB)	14.1	15.4	14.2	19.5
C/I Intermodulation (dB)	19.7	21.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 1 (dB)	12.9	14.2	13.2	18.4
C/I Uplink Adjacent Satellite 2 (dB)	9.8	11.0	17.3	18.5
C/I Downlink Adjacent Satellite 2 (dB)	13.8	15.0	14.4	19.0
C/(N+I) Composite (dB)	4.2	5.4	7.7	11.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.4	6.7	10.3
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.2	.5	.6	.3
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.8	-45.6	-51.5	-42.0
Downlink EIRP Density At Beam Peak (dBW/Hz)	-44.7	-43.4	-41.0	-32.2

Exhibit 7-10: C-BAND – Hemi Uplink/C-band Spot Downlink

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)	-7.7	-7.7	-7.7	-7.7
Uplink SFD (dBW/m2)	-84.5	-84.5	-85.5	-85.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CSPOT	CSPOT	CSPOT	CSPOT
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	34.5	34.5	34.5	34.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	10.0	10.0
Earth Station Gain (dBi)	41.9	41.9	54.1	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	4.5	11.0
Earth Station Gain (dBi)	46.5	46.5	43.9	51.9
Earth Station G/T (dB/K)	26.2	26.2	23.6	31.0
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)	44.3	65.1	77.4	77.4
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	-7.7	-7.7	-7.7	-7.7
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	16.3	17.5	23.3	22.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	5.4	26.2	34.5	34.5
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)	26.2	26.2	23.6	31.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.7	15.9	15.1	21.7
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	16.3	17.5	23.3	22.5
C/N Downlink (dB)	14.7	15.9	15.1	21.7
C/I Intermodulation (dB)	18.4	19.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 1 (dB)	12.7	14.0	12.8	20.8
C/I Uplink Adjacent Satellite 2 (dB)	10.3	11.5	17.3	16.5
C/I Downlink Adjacent Satellite 2 (dB)	14.6	15.8	15.3	21.8
C/(N+I) Composite (dB)	4.5	5.8	8.0	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.5	4.8	7.0	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.5	.9	.9	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-46.3	-45.1	-51.5	-42.7
Downlink EIRP Density At Beam Peak (dBW/Hz)	-37.3	-36.1	-34.3	-25.5

Exhibit 7-11: C-BAND – Zone Uplink/Zone Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
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)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.8	31.8	31.8	31.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	9.0	10.0
Earth Station Gain (dBi)	41.9	41.9	53.4	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	13.1
Earth Station Gain (dBi)	51.9	50.3	46.5	53.5
Earth Station G/T (dB/K)	31.0	29.4	26.2	33.0
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	1.2	22.0	31.8	31.8
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)	31.0	29.4	26.2	33.0
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	15.2	14.9	15.0	21.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	15.2	14.9	15.0	21.0
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.3	13.8	13.0	19.8
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.3	15.1	14.9	20.6
C/(N+I) Composite (dB)	4.3	5.1	7.8	11.2
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.3	4.1	6.8	10.2
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	.3	.2	.7	.2
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-51.5	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.6	-40.3	-37.0	-28.2

Exhibit 7-12: C-BAND – Zone Uplink/Hemi Downlink

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)	-5	-5	-5	-5
Uplink SFD (dBW/m2)	-84.2	-84.2	-86.2	-85.2
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	HEMI	ZONE	HEMI	HEMI
Downlink Frequency (GHz)	3.95	3.95	3.95	3.95
Downlink Beam Polarization	CIRCULAR	CIRCULAR	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0	-6.0	-6.0
Downlink Contour EIRP (dBW)	31.5	31.8	31.5	31.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32	-32	-32	-32
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	100KG7W	10M3G7W	36M0G7W	36M0F3F
Carrier Modulation	QPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	4
Information Rate(kbps)	64	6000	36863	N/A
Code Rate	1/2x239/256	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	6771.1	30133	36000
Allocated Bandwidth(kHz)	100	10300	36000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.87	6.13	10.0
Minimum C/N, Rain (dB)	2.79	3.57	6.13	10.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	2.4	2.4	8.1	10.0
Earth Station Gain (dBi)	41.9	41.9	52.8	54.1
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	11.0	9.2	6.1	15.2
Earth Station Gain (dBi)	51.9	50.3	46.5	55.0
Earth Station G/T (dB/K)	31.0	29.4	26.2	34.5
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)	43.1	63.9	76.7	77.7
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)	-5	-5	-5	-5
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Uplink C/N(dB)	17.8	19.0	25.3	25.5
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	9	22.0	31.5	31.5
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)	31.0	29.4	26.2	34.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-68.3	-74.8	-75.6
Downlink C / N(dB)	14.9	14.9	14.7	22.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	19.0	25.3	25.5
C/N Downlink (dB)	14.9	14.9	14.7	22.2
C/I Intermodulation (dB)	22.4	23.7	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.7	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 1 (dB)	14.0	13.8	12.7	21.1
C/I Uplink Adjacent Satellite 2 (dB)	9.1	10.3	16.6	16.8
C/I Downlink Adjacent Satellite 2 (dB)	15.0	15.1	14.6	21.8
C/(N+I) Composite (dB)	4.2	5.1	7.6	11.6
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	3.2	4.1	6.6	10.6
Minimum Required C/N (dB)	-3.0	-3.9	-6.1	-10.0
Excess Link Margin (dB)	2	2	.5	.6
Number of Carriers	360	3	1	1
CARRIER DENSITY LEVELS				
Uplink Power Density (dBW/Hz)	-47.5	-46.3	-50.9	-42.4
Downlink EIRP Density At Beam Peak (dBW/Hz)	-41.9	-40.3	-37.3	-28.5

Exhibit 7-13: KU-BAND – Ku-band Spot Uplink/Ku-band Spot Downlink

UPLINK BEAM INFORMATION						
Uplink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Uplink Frequency (GHz)	14.25	14.25	14.25	14.25	14.25	14.25
Uplink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Uplink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Uplink Contour G/T (dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Uplink SFD (dBW/m2)	-84.5	-84.5	-84.5	-84.5	-89.5	-80.5
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT	KUSPOT
Downlink Frequency (GHz)	11.95	11.95	11.95	11.95	11.95	11.95
Downlink Beam Polarization	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR	LINEAR
Downlink Relative Contour Level (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Downlink Contour EIRP (dBW)	48.3	48.3	48.3	48.3	48.3	48.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	157.0E	157.0E	157.0E	157.0E	157.0E	157.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 1 Orbital Location	161.0E	161.0E	161.0E	161.0E	161.0E	161.0E
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20	-20	-20	-20	-20	-20
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	100KG7W	400KG7W	1M45G7W	10M3G7W	112M0G7W	36M0F3F
Carrier Modulation	QPSK	BPSK	BPSK	QPSK	QPSK	TV/FM
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A	N/A	N/A	N/A	4
Information Rate(kbps)	64	128	512	6000	129020	N/A
Code Rate	1/2x239/256	R1/2	R1/2	1/2x188/204	3/4x188/204	N/A
Occupied Bandwidth(kHz)	75.4	307.0	1229.0	6771.1	93334	36000
Allocated Bandwidth(kHz)	100	400.0	1450.0	10300	112000	36000
Minimum C/N, Clear Sky (dB)	2.99	3.4	3.4	3.87	8.3	10.0
Minimum C/N, Rain (dB)	2.79	2.7	2.7	3.57	7.3	10.0
UPLINK EARTH STATION						
Earth Station Diameter (meters)	1.8	1.8	1.8	1.8	3.0	2.4
Earth Station Gain (dBi)	46.4	46.4	46.4	46.4	49.7	49.0
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.7	3.7	4.6	3.0	3.7	6.1
Earth Station Gain (dBi)	51.1	51.1	53.5	49.2	51.1	55.5
Earth Station G/T (dB/K)	28.6	28.6	31.0	26.7	28.6	33.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky	Clear Sky
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	39.4	45.4	53.5	59.9	73.4	72.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation	0.0	0.0	0.0	0.0	0.0	0.0
Satellite G/T(dB/K)	5.6	5.6	5.6	5.6	5.6	5.6
Boltzman Constant(dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Uplink C/N(dB)	17.4	17.3	19.4	18.3	20.4	23.6
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	14.3	20.3	21.0	34.8	48.3	43.3
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)	28.6	28.6	31.0	26.7	28.6	33.1
Boltzman Constant(dBW / K - Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-54.9	-60.9	-68.3	-79.7	-75.6
Downlink C / N(dB)	16.3	16.2	13.3	15.3	19.3	22.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	17.4	17.3	19.4	18.3	20.4	23.6
C/N Downlink (dB)	16.3	16.2	13.3	15.3	19.3	22.9
C/I Intermodulation (dB)	18.0	17.9	33.7	19.0	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.4	27.0	28.9
C/I Uplink Adjacent Satellite 1 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 1 (dB)	14.6	14.5	11.7	13.6	17.7	21.4
C/I Uplink Adjacent Satellite 2 (dB)	13.6	13.6	15.6	14.6	16.7	19.8
C/I Downlink Adjacent Satellite 2 (dB)	15.6	15.6	12.5	14.8	18.7	22.0
C/(N+I) Composite (dB)	6.8	6.7	6.2	6.8	10.1	13.3
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.8	5.7	5.2	5.8	9.1	12.3
Minimum Required C/N (dB)	-3.0	-3.4	-3.4	-3.9	-8.3	-10.0
Excess Link Margin (dB)	2.8	2.3	1.8	2.0	.8	2.3
Number of Carriers	1120	280	77	10	1	2
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-55.8	-55.8	-53.8	-54.8	-56.0	-42.6
Downlink EIRP Density At Beam Peak (dBW/Hz)	-30.5	-30.5	-35.9	-29.5	-27.4	-18.7