

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE 1 INFORMATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATELLITE 2 INFORMATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	30M1G7W	30M1G7W	30M1G7W
Information Rate (kbps)	n/a	n/a	n/a	36863	36863	36863
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	30133	30133	30133
Allocated Bandwidth (kHz)	36000	36000	36000	36000	36000	36000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	3	3	3
Earth Station Gain (dBi)	55.5	55.5	55.5	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.7	26.7	26.7	24.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET TYPE						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK LINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	77.3	77.3	77.3	79.1	79.1	79.1
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-5.5	0.0	0.0	-7.3	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Uplink C/N (dB)	25.7	20.1	25.7	28.2	20.9	28.2
DOWNLINK LINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	39.1	38.9	39.1	40.8	40.8	40.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-2.7	0.0	0.0	-3.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.7	26.7	26.7	24.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Downlink C/N (dB)	18.8	18.6	13.8	14.8	12.9	9.0
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.7	20.1	25.7	28.2	20.9	28.2
C/N Downlink (dB)	18.8	18.6	13.8	14.8	12.9	9.0
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	21.5	27.0	27.0	19.7	27.0
C/I Downlink Co-Channel (dB)*	27.0	26.8	27.0	27.0	25.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	35.7	30.2	35.7	38.3	31.0	38.3
C/I Downlink Adjacent Satellite 1 (dB)	19.4	19.2	19.4	15.3	13.4	15.3
C/I Uplink Adjacent Satellite 2 (dB)	22.7	17.2	22.7	25.3	18.0	25.3
C/I Downlink Adjacent Satellite 2 (dB)	18.6	18.4	18.6	15.1	13.2	15.1
C/(N+I) Composite (dB)	13.0	11.0	11.0	9.9	7.4	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.0	10.0	10.0	8.9	6.4	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	2.0	0.0	0.0	2.8	0.2	0.0
Number of Carriers	1	1	1	1	1	1
CARRIER DENSITY LIMITS						
Uplink Power Density (dBW/Hz)	-45.6	-45.6	-45.6	-52.6	-52.6	-52.6
Downlink EIRP Density At Beam Peak	-23.0	-23.1	-23.0	-30.0	-31.9	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name						
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m²)	-80.8	-80.8	-80.8	-80.8	-80.8	-80.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name						
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.8	25.0	25.0	22.2
Earth Station Elevation Angle	20	20	20	20	20	20
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	64.6	64.6	64.6	59.1	59.1	59.1
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	20.2	17.7	20.2	20.4	17.9	20.4
Downlink EIRP per Carrier (dBW)	34.0	31.5	34.0	28.5	26.0	28.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.2	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.8	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.5	12.1	7.4	13.0	10.5	6.3
C/N Uplink (dB)	20.2	17.7	20.2	20.4	17.9	20.4
C/N Downlink (dB)	14.5	12.1	7.4	13.0	10.5	6.3
C/I Intermodulation (dB)	12.5	10.4	12.5	12.8	10.3	12.8
C/I Uplink Co-Channel (dB)*	20.9	18.4	20.9	21.9	19.4	21.9
C/I Downlink Co-Channel (dB)*	20.9	18.5	20.9	21.9	19.4	21.9
C/I Uplink Adjacent Satellite 1 (dB)	30.3	27.8	30.3	30.5	28.0	30.5
C/I Downlink Adjacent Satellite 1 (dB)	14.9	12.5	14.9	13.3	10.8	13.3
C/I Uplink Adjacent Satellite 2 (dB)	17.3	14.8	17.3	17.5	15.0	17.5
C/I Downlink Adjacent Satellite 2 (dB)	14.8	12.3	14.8	13.5	10.9	13.5
C/(N+I) Composite (dB)	6.9	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.9	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	3	3	3	15	15	15
Uplink Power Density (dBW/Hz)	-60.6	-60.6	-60.6	-60.4	-60.4	-60.4
Downlink EIRP Density At Beam Peak	-30.3	-32.8	-30.3	-30.1	-32.6	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK PERFORMANCE	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name						
Uplink Frequency (MHz)	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Polarization	-6	-6	-6	-6	-6	-6
Uplink Relative Contour Level (dB)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour G/T (dB/K)	-80.8	-80.8	-80.8	-80.8	-80.8	-80.8
Uplink SFD (dBW/m ²)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
DOWNLINK PERFORMANCE						
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Beam Polarization	-4	-4	-4	-4	-4	-4
Downlink Relative Contour Level (dB)	49	49	49	49	49	49
Downlink Contour EIRP (dBW)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
SATellite 1 ORBITAL LOCATION	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATellite 2 ORBITAL LOCATION	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER DESIGNATION	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	IM23G7W	IM23G7W	IM23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
EARTH STATION	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Diameter (meters)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Gain (dBi)	20	20	20	20	20	20
EARTH STATION PERFORMANCE	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Diameter (meters)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station Gain (dBi)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station G/T, Clear Sky (dB/K)	20	20	20	20	20	20
Earth Station Elevation Angle						
LINK BUDGET	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE	45.3	45.3	45.3	57.3	57.3	57.3
Uplink Earth Station EIRP (dBW)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Path Loss, Clear Sky (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Uplink Rain Attenuation (dB)	2.8	2.8	2.8	2.8	2.8	2.8
Satellite G/T (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Carrier Noise Bandwidth (dB-Hz)	20.5	17.9	20.5	20.3	17.8	20.3
Uplink C/N (dB)						
DOWNLINK PERFORMANCE	14.7	12.2	14.7	26.7	24.2	26.7
Downlink EIRP per Carrier (dBW)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Antenna Pointing Error (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Path Loss, Clear Sky (dB)	0.0	0.0	-3.9	0.0	-3.9	0.0
Downlink Rain Attenuation (dB)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station G/T, Clear Sky (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Carrier Noise Bandwidth (dB-Hz)	13.1	10.5	6.3	12.9	10.4	6.2
Downlink C/N (dB)						
COMPOSITE LINK PERFORMANCE	20.5	17.9	20.5	20.3	17.8	20.3
C/N Uplink (dB)	13.1	10.5	6.3	12.9	10.4	6.2
C/N Downlink (dB)	12.8	10.3	12.8	12.7	10.2	12.7
C/I Intermodulation (dB)	21.8	19.2	21.8	22.2	19.6	22.2
C/I Uplink Co-Channel (dB)*	21.8	19.2	21.8	22.2	19.6	22.2
C/I Downlink Co-Channel (dB)*	30.5	28.0	30.5	30.4	27.9	30.4
C/I Uplink Adjacent Satellite 1 (dB)	13.3	10.8	13.3	13.2	10.7	13.2
C/I Downlink Adjacent Satellite 1 (dB)	17.5	15.0	17.5	17.4	14.9	17.4
C/I Uplink Adjacent Satellite 2 (dB)	13.5	11.0	13.5	13.4	10.8	13.4
C/I Downlink Adjacent Satellite 2 (dB)						
COMPOSITE LINK PERFORMANCE	6.3	3.8	3.8	6.2	3.7	3.7
C/(N+I) Composite (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Required System Margin (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Net C/(N+I) Composite (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Minimum Required C/N (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Excess Link Margin (dB)	360	360	360	24	24	24
Number of Carriers						
UPLINK PERFORMANCE	-60.4	-60.4	-60.4	-60.5	-60.5	-60.5
Uplink Power Density (dBW/Hz)	-30.1	-32.6	-30.1	-30.2	-32.7	-30.2
Downlink EIRP Density At Beam Peak						

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM INFORMATION			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-80.8	-80.8	-80.8
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 ORBITAL LOCATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK BUDGET			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	48.0	48.0	48.0
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	17.0	14.8	17.0
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.4	15.1	17.4
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.0
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.8	15.5	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	17.0	14.8	17.0
C/N Downlink (dB)	17.8	15.5	7.2
C/I Intermodulation (dB)	9.4	7.1	9.4
C/I Uplink Co-Channel (dB)*	18.4	16.2	18.4
C/I Downlink Co-Channel (dB)*	18.4	16.2	18.4
C/I Uplink Adjacent Satellite 1 (dB)	27.1	24.8	27.1
C/I Downlink Adjacent Satellite 1 (dB)	18.4	16.1	18.4
C/I Uplink Adjacent Satellite 2 (dB)	14.1	11.8	14.1
C/I Downlink Adjacent Satellite 2 (dB)	17.6	15.4	17.6
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	90	90	90
CARRIER DENSITY BUDGET			
Uplink Power Density (dBW/Hz)	-55.9	-55.9	-55.9
Downlink EIRP Density At Beam Peak	-33.5	-35.8	-33.5

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	60M3G7W	60M3G7W	60M3G7W
Information Rate (kbps)	n/a	n/a	n/a	73726	73726	73726
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	60266	60266	60266
Allocated Bandwidth (kHz)	36000	36000	36000	72000	72000	72000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	7.0	7.0	7.0	3	3	3
Earth Station Gain (dBi)	57.0	57.0	57.0	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.7	26.7	26.7	24.1
Earth Station Elevation Angle	20	20	20	20	20	20
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	75.0	75.0	75.0	79.9	79.9	79.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.7	0.0	0.0	-4.0	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Uplink C/N (dB)	23.4	20.6	23.4	26.0	22.1	26.0
Downlink EIRP per Carrier (dBW)	39.1	36.7	39.1	43.8	41.3	43.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-3.9	0.0	0.0	-3.2
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.7	26.7	26.7	24.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Downlink C/N (dB)	20.3	17.9	13.6	14.9	12.3	9.1
C/N Uplink (dB)	23.4	20.6	23.4	26.0	22.1	26.0
C/N Downlink (dB)	20.3	17.9	13.6	14.9	12.3	9.1
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	24.3	27.0	27.0	23.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	24.6	27.0	27.0	24.5	27.0
C/I Uplink Adjacent Satellite 1 (dB)	33.4	30.7	33.4	36.1	32.1	36.1
C/I Downlink Adjacent Satellite 1 (dB)	21.0	18.6	21.0	15.3	12.8	15.3
C/I Uplink Adjacent Satellite 2 (dB)	20.4	17.7	20.4	23.1	19.1	23.1
C/I Downlink Adjacent Satellite 2 (dB)	20.4	18.0	20.4	15.4	12.9	15.4
C/(N+I) Composite (dB)	13.5	11.0	11.0	9.9	7.2	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.5	10.0	10.0	8.9	6.2	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	2.5	0.0	0.0	2.8	0.1	0.0
Number of Carriers	2	2	2	1	1	1
Uplink Power Density (dBW/Hz)	-47.9	-47.9	-47.9	-54.8	-54.8	-54.8
Downlink EIRP Density At Beam Peak	-23.0	-25.3	-23.0	-30.0	-32.5	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

Uplink Beam Information	Conus 14250		Conus 14250		Conus 14250	
	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Name	Conus 14250		Conus 14250		Conus 14250	
Uplink Frequency (MHz)	14250		14250		14250	
Uplink Beam Polarization	Horizontal/Vertical		Horizontal/Vertical		Horizontal/Vertical	
Uplink Relative Contour Level (dB)	-6		-6		-6	
Uplink Contour G/T (dB/K)	2.8		2.8		2.8	
Uplink SFD (dBW/m ²)	-79.8		-79.8		-79.8	
Rain Rate (mm/hr)	42.0		42.0		42.0	
Downlink Beam Information	Conus 11950		Conus 11950		Conus 11950	
	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Beam Name	Conus 11950		Conus 11950		Conus 11950	
Downlink Frequency (MHz)	11950		11950		11950	
Downlink Beam Polarization	Vertical/Horizontal		Vertical/Horizontal		Vertical/Horizontal	
Downlink Relative Contour Level (dB)	-4		-4		-4	
Downlink Contour EIRP (dBW)	51.4		51.4		51.4	
Rain Rate (mm/hr)	42.0		42.0		42.0	
Satellite 1 Orbital Location	72 WL		72 WL		72 WL	
Uplink Power Density (dBW/Hz)	-58.0		-58.0		-58.0	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-22.2		-22.2		-22.2	
Downlink Polarization Advantage (dB)	0		0		0	
Satellite 2 Orbital Location	76 WL		76 WL		76 WL	
Uplink Power Density (dBW/Hz)	-45.0		-45.0		-45.0	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-20.8		-20.8		-20.8	
Downlink Polarization Advantage (dB)	0		0		0	
Carrier Information	3		3		4	
Carrier ID	3		3		4	
Emission Designation	6M77G7W		6M77G7W		1M82G7W	
Information Rate (kbps)	6000		6000		1544	
Carrier Modulation	QPSK		QPSK		QPSK	
Peak to Peak Bandwidth of EDS (MHz)	n/a		n/a		n/a	
Code Rate	1/2xRS		1/2xRS		1/2xRS	
Occupied Bandwidth (kHz)	6771		6771		1819.2	
Allocated Bandwidth (kHz)	10300		10300		2325	
Minimum C/N, Clear Sky (dB)	3.9		3.9		3.0	
Minimum C/N, Rain (dB)	3.6		3.6		2.8	
Earth Station Information	6.1		6.1		6.1	
Earth Station Diameter (meters)	6.1		6.1		6.1	
Earth Station Gain (dBi)	56.9		56.9		56.9	
Earth Station Elevation Angle	20		20		20	
Downlink Earth Station Information	3.0		3.0		2.4	
Earth Station Diameter (meters)	3.0		3.0		2.4	
Earth Station Gain (dBi)	49.2		49.2		47.5	
Earth Station G/T, Clear Sky (dB/K)	26.7		23.7		25.0	
Earth Station Elevation Angle	20		20		20	
Fades	Clear Sky		Uplink Fade		Downlink Fade	
Uplink Earth Station EIRP (dBW)	63.2		63.2		57.7	
Uplink Path Loss, Clear Sky (dB)	-207.5		-207.5		-207.5	
Uplink Rain Attenuation (dB)	0.0		-2.5		0.0	
Satellite G/T (dB/K)	2.8		2.8		2.8	
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6	
Carrier Noise Bandwidth (dB-Hz)	-68.3		-68.3		-62.6	
Uplink C/N (dB)	18.8		16.3		19.0	
Downlink Earth Station Information	34.0		31.6		34.0	
Downlink EIRP per Carrier (dBW)	34.0		31.6		34.0	
Antenna Pointing Error (dB)	-0.5		-0.5		-0.5	
Downlink Path Loss, Clear Sky (dB)	-205.9		-205.9		-205.9	
Downlink Rain Attenuation (dB)	0.0		0.0		-3.9	
Earth Station G/T, Clear Sky (dB/K)	26.7		23.7		25.0	
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6	
Carrier Noise Bandwidth (dB-Hz)	-68.3		-68.3		-62.6	
Downlink C/N (dB)	14.5		12.1		13.0	
C/N and Intermodulation	18.8		16.3		18.8	
C/N Uplink (dB)	18.8		16.3		18.8	
C/N Downlink (dB)	14.5		12.1		13.0	
C/I Intermodulation (dB)	13.2		10.9		13.4	
C/I Uplink Co-Channel (dB)*	21.5		19.1		22.5	
C/I Downlink Co-Channel (dB)*	21.5		19.1		22.5	
C/I Uplink Adjacent Satellite 1 (dB)	28.9		26.4		29.1	
C/I Downlink Adjacent Satellite 1 (dB)	15.0		12.5		13.3	
C/I Uplink Adjacent Satellite 2 (dB)	15.9		13.4		16.1	
C/I Downlink Adjacent Satellite 2 (dB)	15.1		12.7		13.8	
System Margins	7.0		4.6		6.3	
C/(N+I) Composite (dB)	7.0		4.6		6.3	
Required System Margin (dB)	-1.0		-1.0		-1.0	
Net C/(N+I) Composite (dB)	6.0		3.6		5.3	
Minimum Required C/N (dB)	-3.9		-3.6		-3.0	
Excess Link Margin (dB)	2.1		0.0		2.3	
Number of Carriers	7		7		31	
Channel Density Levels	-62.0		-62.0		-61.8	
Uplink Power Density (dBW/Hz)	-62.0		-62.0		-61.8	
Downlink EIRP Density At Beam Peak	-30.3		-32.7		-30.1	

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name						
Uplink Frequency (MHz)	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Polarization	-6	-6	-6	-6	-6	-6
Uplink Relative Contour Level (dB)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour G/T (dB/K)	-79.8	-79.8	-79.8	-79.8	-79.8	-79.8
Uplink SFD (dBW/m²)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name						
Downlink Frequency (MHz)	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Beam Polarization	-4	-4	-4	-4	-4	-4
Downlink Relative Contour Level (dB)	51.4	51.4	51.4	51.4	51.4	51.4
Downlink Contour EIRP (dBW)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.2	25.0	25.0	22.2
Earth Station Elevation Angle	20	20	20	20	20	20
Clear Sky	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	43.9	43.9	43.9	55.9	55.9	55.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	19.0	16.5	19.0	18.9	16.4	18.9
Downlink EIRP per Carrier (dBW)	14.7	12.2	14.7	26.7	24.2	26.7
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.2	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.1	10.5	6.3	12.9	10.4	6.2
C/N Uplink (dB)	19.0	16.5	19.0	18.9	16.4	18.9
C/N Downlink (dB)	13.1	10.5	6.3	12.9	10.4	6.2
C/I Intermodulation (dB)	13.4	10.9	13.4	13.3	10.8	13.3
C/I Uplink Co-Channel (dB)*	22.4	19.8	22.4	22.8	20.2	22.8
C/I Downlink Co-Channel (dB)*	22.4	19.8	22.4	22.8	20.2	22.8
C/I Uplink Adjacent Satellite 1 (dB)	29.1	26.6	29.1	29.0	26.5	29.0
C/I Downlink Adjacent Satellite 1 (dB)	13.3	10.8	13.3	13.2	10.7	13.2
C/I Uplink Adjacent Satellite 2 (dB)	16.1	13.6	16.1	16.0	13.5	16.0
C/I Downlink Adjacent Satellite 2 (dB)	13.8	11.3	13.8	13.7	11.1	13.7
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	720	720	720	49	49	49
Uplink Power Density (dBW/Hz)	-61.8	-61.8	-61.8	-61.9	-61.9	-61.9
Downlink EIRP Density At Beam Peak	-30.1	-32.6	-30.1	-30.2	-32.7	-30.2

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

UPLINK BEAM PERFORMANCE			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-79.8	-79.8	-79.8
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM PERFORMANCE			
Downlink Beam Name	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 PERFORMANCE			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 PERFORMANCE			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0
TRANSMITTER			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
RECEIVER (EARTH STATION)			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
RECEIVER (SATELLITE)			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK BUDGET TOTAL			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	46.6	46.6	46.6
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	15.7	13.4	15.7
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.4	15.2	17.4
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.8	15.6	7.2
COCHANNEL AND INTERMODULATION PERFORMANCE			
C/N Uplink (dB)	15.7	13.4	15.7
C/N Downlink (dB)	17.8	15.6	7.2
C/I Intermodulation (dB)	10.0	7.8	10.0
C/I Uplink Co-Channel (dB)*	19.1	16.8	19.1
C/I Downlink Co-Channel (dB)*	19.1	16.8	19.1
C/I Uplink Adjacent Satellite 1 (dB)	25.8	23.5	25.8
C/I Downlink Adjacent Satellite 1 (dB)	18.5	16.2	18.5
C/I Uplink Adjacent Satellite 2 (dB)	12.8	10.5	12.8
C/I Downlink Adjacent Satellite 2 (dB)	18.0	15.7	18.0
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	180	180	180
Carrier Density Levels			
Uplink Power Density (dBW/Hz)	-57.2	-57.2	-57.2
Downlink EIRP Density At Beam Peak	-33.4	-35.7	-33.4

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM INFORMATION	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Beam Name	14250	14250	14250	14250	14250	14250
Uplink Frequency (MHz)	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Polarization	-6	-6	-6	-6	-6	-6
Uplink Relative Contour Level (dB)	3	3	3	3	3	3
Uplink Contour G/T (dB/K)	-72	-72	-72	-72	-72	-72
Uplink SFD (dBW/m ²)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
DOWNLINK BEAM INFORMATION	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Beam Name	11950	11950	11950	11950	11950	11950
Downlink Frequency (MHz)	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Beam Polarization	-4	-4	-4	-4	-4	-4
Downlink Relative Contour Level (dB)	50	50	50	50	50	50
Downlink Contour EIRP (dBW)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
SATELLITE 1 INFORMATION	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Satellite 1 Orbital Location	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Power Density (dBW/Hz)	0	0	0	0	0	0
Uplink Polarization Advantage (dB)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)						
SATELLITE 2 INFORMATION	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Satellite 2 Orbital Location	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Power Density (dBW/Hz)	0	0	0	0	0	0
Uplink Polarization Advantage (dB)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)						
CARRIER INFORMATION	1	1	1	2	2	2
Carrier ID	36M0F3F	36M0F3F	36M0F3F	30M1G7W	30M1G7W	30M1G7W
Emission Designation	n/a	n/a	n/a	36863	36863	36863
Information Rate (kbps)	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Carrier Modulation	4	4	4	n/a	n/a	n/a
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Code Rate	36000	36000	36000	30133	30133	30133
Occupied Bandwidth (kHz)	36000	36000	36000	36000	36000	36000
Allocated Bandwidth (kHz)	10	10	10	6.1	6.1	6.1
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)						
EARTH STATION INFORMATION	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Diameter (meters)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Gain (dBi)	20	20	20	20	20	20
Earth Station Elevation Angle						
DOWNLINK EARTH STATION INFORMATION	6.1	6.1	6.1	3	3	3
Earth Station Diameter (meters)	55.5	55.5	55.5	49.2	49.2	49.2
Earth Station Gain (dBi)	33.1	33.1	30.8	26.7	26.7	24.1
Earth Station G/T, Clear Sky (dB/K)	20	20	20	20	20	20
Earth Station Elevation Angle						
INTERFERENCE TYPE	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE	76.1	76.1	76.1	77.8	77.8	77.8
Uplink Earth Station EIRP (dBW)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Path Loss, Clear Sky (dB)	0.0	-5.5	0.0	0.0	-9.4	0.0
Uplink Rain Attenuation (dB)	3.0	3.0	3.0	3.0	3.0	3.0
Satellite G/T (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Carrier Noise Bandwidth (dB-Hz)	24.7	21.1	24.7	27.1	17.7	27.1
Uplink C/N (dB)						
DOWNLINK PERFORMANCE	39.1	38.3	39.1	40.8	39.9	40.8
Downlink EIRP per Carrier (dBW)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Antenna Pointing Error (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Path Loss, Clear Sky (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink Rain Attenuation (dB)	33.1	33.1	30.8	26.7	26.7	24.1
Earth Station G/T, Clear Sky (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Carrier Noise Bandwidth (dB-Hz)	18.8	17.9	14.1	14.8	13.9	9.1
Downlink C/N (dB)						
COMPOSITE LINK PERFORMANCE	24.7	21.1	24.7	27.1	17.7	27.1
C/N Uplink (dB)	18.8	17.9	14.1	14.8	13.9	9.1
C/N Downlink (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Intermodulation (dB)	26.2	22.6	26.2	27.0	17.6	27.0
C/I Uplink Co-Channel (dB)*	26.2	25.4	26.2	27.0	26.1	27.0
C/I Downlink Co-Channel (dB)*	34.5	31.0	34.5	37.0	27.6	37.0
C/I Uplink Adjacent Satellite 1 (dB)	19.4	18.6	19.4	15.3	14.4	15.3
C/I Downlink Adjacent Satellite 1 (dB)	21.5	18.0	21.5	24.0	14.6	24.0
C/I Uplink Adjacent Satellite 2 (dB)	18.6	17.8	18.6	15.1	14.2	15.1
C/I Downlink Adjacent Satellite 2 (dB)						
C/(N+I) Composite (dB)	12.7	11.0	11.0	9.9	7.2	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.7	10.0	10.0	8.9	6.2	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	1.7	0.0	0.0	2.8	0.1	0.0
Number of Carriers	1	1	1	1	1	1
DOWNLINK BEAM INFORMATION	Uplink Power Density (dBW/Hz)	Downlink EIRP Density At Beam Peak				
	-46.8	-46.8	-46.8	-53.9	-53.9	-53.9
	-23.0	-23.7	-23.0	-30.0	-30.9	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
UPLINK BEAM INFORMATION						
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-77	-77	-77	-77	-77	-77
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE INFORMATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET IMPACT						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	67.5	67.5	67.5	62.0	62.0	62.0
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	23.3	20.8	23.3	23.5	21.0	23.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	34.1	31.6	34.1	28.6	26.1	28.6
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.3	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.6	12.2	7.4	13.1	10.6	6.3
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	23.3	20.8	23.3	23.5	21.0	23.5
C/N Downlink (dB)	14.6	12.2	7.4	13.1	10.6	6.3
C/I Intermodulation (dB)	11.6	9.4	11.6	11.8	9.4	11.8
C/I Uplink Co-Channel (dB)*	20.0	17.5	20.0	21.0	18.4	21.0
C/I Downlink Co-Channel (dB)*	20.0	17.6	17.6	21.0	18.5	21.0
C/I Uplink Adjacent Satellite 1 (dB)	33.2	30.7	33.2	33.4	30.8	33.4
C/I Downlink Adjacent Satellite 1 (dB)	15.0	12.6	15.0	13.4	10.9	13.4
C/I Uplink Adjacent Satellite 2 (dB)	20.2	17.7	20.2	20.4	17.8	20.4
C/I Downlink Adjacent Satellite 2 (dB)	14.9	12.4	14.9	13.5	11.0	13.5
C/(N+I) Composite (dB)	6.9	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.9	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	3	3	3	15	15	15
Channel Density Levels						
Uplink Power Density (dBW/Hz)	-57.8	-57.8	-57.8	-57.5	-57.5	-57.5
Downlink EIRP Density At Beam Peak	-30.2	-32.7	-30.2	-30.0	-32.5	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
UPLINK BEAM INFORMATION						
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-77	-77	-77	-77	-77	-77
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE 1 ORBITAL LOCATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATELLITE 2 ORBITAL LOCATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	48.2	48.2	48.2	60.2	60.2	60.2
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	23.5	21.0	23.5	23.4	20.9	23.4
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	14.8	12.3	14.8	26.8	24.2	26.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.0	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.1	10.6	6.3	13.0	10.5	6.2
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	23.5	21.0	23.5	23.4	20.9	23.4
C/N Downlink (dB)	13.1	10.6	6.3	13.0	10.5	6.2
C/I Intermodulation (dB)	11.9	9.3	11.9	11.7	9.3	11.7
C/I Uplink Co-Channel (dB)*	20.8	18.3	20.8	21.2	18.7	21.2
C/I Downlink Co-Channel (dB)*	20.8	18.3	20.8	21.2	18.7	21.2
C/I Uplink Adjacent Satellite 1 (dB)	33.4	30.9	33.4	33.3	30.7	33.3
C/I Downlink Adjacent Satellite 1 (dB)	13.4	10.9	13.4	13.3	10.7	13.3
C/I Uplink Adjacent Satellite 2 (dB)	20.4	17.9	20.4	20.3	17.7	20.3
C/I Downlink Adjacent Satellite 2 (dB)	13.6	11.0	13.6	13.4	10.9	13.4
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	360	360	360	24	24	24
CARRIER DENSITY						
Uplink Power Density (dBW/Hz)	-57.5	-57.5	-57.5	-57.6	-57.6	-57.6
Downlink EIRP Density At Beam Peak	-30.0	-32.5	-30.0	-30.1	-32.7	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM PERFORMANCE			
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3
Uplink SFD (dBW/m ²)	-77	-77	-77
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM PERFORMANCE			
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 ORBITAL LOCATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION INFORMATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK BUDGET			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK LINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	50.9	50.9	50.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	20.2	17.9	20.2
DOWNLINK LINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.5	15.3	17.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.9	15.6	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	20.2	17.9	20.2
C/N Downlink (dB)	17.9	15.6	7.2
C/I Intermodulation (dB)	8.5	6.2	8.5
C/I Uplink Co-Channel (dB)*	17.6	15.3	17.6
C/I Downlink Co-Channel (dB)*	17.6	15.3	17.6
C/I Uplink Adjacent Satellite 1 (dB)	30.1	27.8	30.1
C/I Downlink Adjacent Satellite 1 (dB)	18.5	16.3	18.5
C/I Uplink Adjacent Satellite 2 (dB)	17.1	14.8	17.1
C/I Downlink Adjacent Satellite 2 (dB)	17.8	15.5	17.8
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	90	90	90
C/N+I DENSITY LEVELS			
Uplink Power Density (dBW/Hz)	-53.0	-53.0	-53.0
Downlink EIRP Density At Beam Peak	-33.4	-35.6	-33.4

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels

	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-72	-72	-72	-72	-72	-72
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	60M3G7W	60M3G7W	60M3G7W
Information Rate (kbps)	n/a	n/a	n/a	73726	73726	73726
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	60266	60266	60266
Allocated Bandwidth (kHz)	36000	36000	36000	72000	72000	72000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	7.0	7.0	7.0	3	3	3
Earth Station Gain (dBi)	57.0	57.0	57.0	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.9	26.7	26.7	24.2
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET SUMMARY	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK LINK BUDGET SUMMARY						
Uplink Earth Station EIRP (dBW)	73.4	73.4	73.4	78.1	78.1	78.1
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.4	0.0	0.0	-7.0	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Uplink C/N (dB)	22.0	19.5	22.0	24.4	17.4	24.4
Downlink EIRP per Carrier (dBW)	39.1	37.6	39.1	43.8	42.6	43.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	-3.4	-3.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.3	26.7	26.7	24.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Downlink C/N (dB)	20.3	18.8	14.2	14.8	13.6	9.2
C/N Uplink (dB)	22.0	19.5	22.0	24.4	17.4	24.4
C/N Downlink (dB)	20.3	18.8	14.2	14.8	13.6	9.2
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	26.5	24.1	26.5	27.0	20.0	27.0
C/I Downlink Co-Channel (dB)*	26.5	25.0	26.5	27.0	25.8	27.8
C/I Uplink Adjacent Satellite 1 (dB)	31.8	29.4	31.8	34.3	27.3	34.3
C/I Downlink Adjacent Satellite 1 (dB)	21.0	19.5	21.0	15.2	14.1	15.2
C/I Uplink Adjacent Satellite 2 (dB)	18.8	16.4	18.8	21.3	14.3	21.3
C/I Downlink Adjacent Satellite 2 (dB)	20.4	18.9	20.4	15.4	14.2	15.4
C/(N+I) Composite (dB)	12.9	11.0	11.0	9.7	7.2	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.9	10.0	10.0	8.7	6.2	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	1.9	0.0	0.0	2.6	0.1	0.0
Number of Carriers	2	2	2	1	1	1
Uplink Power Density (dBW/Hz)	-49.5	-49.5	-49.5	-56.6	-56.6	-56.6
Downlink EIRP Density At Beam Peak	-23.0	-24.4	-23.0	-30.0	-31.2	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-76	-76	-76	-76	-76	-76
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER LINK INFORMATION						
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	65.8	65.8	65.8	60.2	60.2	60.2
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	21.6	19.1	21.6	21.8	19.2	21.8
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	34.1	31.6	34.1	28.5	26.0	28.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.3	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.6	12.2	7.4	13.1	10.6	6.3
COMPOSITE LINK ERROR RATES AND LEVELS						
C/N Uplink (dB)	21.6	19.1	21.6	21.8	19.2	21.8
C/N Downlink (dB)	14.6	12.2	7.4	13.1	10.6	6.3
C/I Intermodulation (dB)	11.9	9.6	11.9	12.1	9.6	12.1
C/I Uplink Co-Channel (dB)*	20.3	17.9	20.3	21.3	18.7	21.3
C/I Downlink Co-Channel (dB)*	20.3	17.9	20.3	21.3	18.7	21.3
C/I Uplink Adjacent Satellite 1 (dB)	31.5	29.0	31.5	31.7	29.1	31.7
C/I Downlink Adjacent Satellite 1 (dB)	15.0	12.6	15.0	13.3	10.8	13.3
C/I Uplink Adjacent Satellite 2 (dB)	18.5	16.0	18.5	18.7	16.1	18.7
C/I Downlink Adjacent Satellite 2 (dB)	15.2	12.7	15.2	13.8	11.3	13.8
C/(N+I) Composite (dB)	7.0	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	6.0	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	7	7	7	31	31	31
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-59.4	-59.4	-59.4	-59.3	-59.3	-59.3
Downlink EIRP Density At Beam Peak	-30.2	-32.7	-30.2	-30.1	-32.6	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m²)	-76	-76	-76	-76	-76	-76
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station Elevation Angle	20	20	20	20	20	20
Uplink Interference	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	46.4	46.4	46.4	58.4	58.4	58.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	21.8	19.3	21.8	21.7	19.1	21.7
Downlink EIRP per Carrier (dBW)	14.7	12.2	14.7	26.7	24.2	26.7
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-3.9	0.0	-3.9	0.0
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.1	10.6	6.3	13.0	10.5	6.2
C/N Uplink (dB)	21.8	19.3	21.8	21.7	19.1	21.7
C/N Downlink (dB)	13.1	10.6	6.3	13.0	10.5	6.2
C/I Intermodulation (dB)	12.1	9.6	12.1	12.0	9.5	12.0
C/I Uplink Co-Channel (dB)*	21.1	18.6	21.1	21.5	19.0	21.5
C/I Downlink Co-Channel (dB)*	21.1	18.6	21.1	21.5	19.0	21.5
C/I Uplink Adjacent Satellite 1 (dB)	31.7	29.1	31.7	31.5	29.0	31.5
C/I Downlink Adjacent Satellite 1 (dB)	13.4	10.8	13.4	13.2	10.7	13.2
C/I Uplink Adjacent Satellite 2 (dB)	18.7	16.1	18.7	18.5	16.0	18.5
C/I Downlink Adjacent Satellite 2 (dB)	13.8	11.3	13.8	13.7	11.2	13.7
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	720	720	720	49	49	49
Uplink Power Density (dBW/Hz)	-59.2	-59.2	-59.2	-59.4	-59.4	-59.4
Downlink EIRP Density At Beam Peak	-30.0	-32.6	-30.0	-30.2	-32.7	-30.2

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	East Coast U.S.	East Coast U.S.	East Coast U.S.
UPLINK BEAM INFORMATION			
Uplink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3
Uplink SFD (dBW/m ²)	-76	-76	-76
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 INFORMATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 INFORMATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION INFORMATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK FADING			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	49.2	49.2	49.2
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	18.5	16.2	18.5
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.5	15.3	17.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.9	15.7	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	18.5	16.2	18.5
C/N Downlink (dB)	17.9	15.7	7.2
C/I Intermodulation (dB)	8.8	6.6	8.8
C/I Uplink Co-Channel (dB)*	17.9	15.6	17.9
C/I Downlink Co-Channel (dB)*	17.9	15.6	17.9
C/I Uplink Adjacent Satellite 1 (dB)	28.4	26.1	28.4
C/I Downlink Adjacent Satellite 1 (dB)	18.6	16.3	18.6
C/I Uplink Adjacent Satellite 2 (dB)	15.4	13.1	15.4
C/I Downlink Adjacent Satellite 2 (dB)	18.1	15.8	18.1
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	180	180	180
Channel Density Budget			
Uplink Power Density (dBW/Hz)	-54.6	-54.6	-54.6
Downlink EIRP Density At Beam Peak	-33.3	-35.6	-33.2

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name						
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m²)	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	30M1G7W	30M1G7W	30M1G7W
Information Rate (kbps)	n/a	n/a	n/a	36863	36863	36863
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	30133	30133	30133
Allocated Bandwidth (kHz)	36000	36000	36000	36000	36000	36000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	6.1	6.1	6.1	3	3	3
Earth Station Gain (dBi)	55.5	55.5	55.5	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.8	26.7	26.7	24.1
Earth Station Elevation Angle	20	20	20	20	20	20
Clear Sky	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	76.3	76.3	76.3	78.0	78.0	78.0
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-3.6	0.0	0.0	-9.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Uplink C/N (dB)	24.7	21.0	24.7	27.1	17.6	27.1
Downlink EIRP per Carrier (dBW)	39.1	38.2	39.1	40.8	39.9	40.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-2.5	0.0	0.0	-3.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.7	26.7	26.7	24.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Downlink C/N (dB)	18.8	17.9	14.1	14.8	13.9	9.1
C/N Uplink (dB)	24.7	21.0	24.7	27.1	17.6	27.1
C/N Downlink (dB)	18.8	17.9	14.1	14.8	13.9	9.1
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	26.2	22.6	26.2	27.0	17.5	27.0
C/I Downlink Co-Channel (dB)*	26.2	25.3	26.2	27.0	26.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	34.7	31.1	34.7	37.2	27.7	37.2
C/I Downlink Adjacent Satellite 1 (dB)	19.4	18.6	19.4	15.3	14.4	15.3
C/I Uplink Adjacent Satellite 2 (dB)	21.7	18.1	21.7	24.2	14.7	24.2
C/I Downlink Adjacent Satellite 2 (dB)	18.6	17.8	18.6	15.1	14.2	15.1
C/(N+I) Composite (dB)	12.7	11.0	11.0	9.9	7.3	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.7	10.0	10.0	8.9	6.3	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	1.7	0.0	0.0	2.8	0.2	0.0
Number of Carriers	1	1	1	1	1	1
Uplink Power Density (dBW/Hz)	-46.6	-46.6	-46.6	-53.7	-53.7	-53.7
Downlink EIRP Density At Beam Peak	-23.0	-23.8	-23.0	-30.0	-30.9	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

Uplink Beam Name	Conus 14250 Horizontal	Conus 14250 Horizontal	Conus 14250 Horizontal	Conus 14250 Horizontal	Conus 14250 Horizontal	Conus 14250 Horizontal
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE 1 ORBITAL LOCATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATELLITE 2 ORBITAL LOCATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
GROUND STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
GROUND STATION INFORMATION						
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK LOSS AND FADE						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	67.6	67.6	67.6	62.2	62.2	62.2
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	23.3	20.8	23.3	23.5	21.0	23.5
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	34.0	31.6	34.0	28.6	26.0	28.6
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.2	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.6	12.1	7.4	13.1	10.6	6.3
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	23.3	20.8	23.3	23.5	21.0	23.5
C/N Downlink (dB)	14.6	12.1	7.4	13.1	10.6	6.3
C/I Intermodulation (dB)	11.6	9.4	11.6	11.8	9.4	11.8
C/I Uplink Co-Channel (dB)*	20.0	17.5	20.0	21.0	18.4	21.0
C/I Downlink Co-Channel (dB)*	20.0	17.6	20.0	21.0	18.4	21.0
C/I Uplink Adjacent Satellite 1 (dB)	33.3	30.9	33.3	33.6	31.0	33.6
C/I Downlink Adjacent Satellite 1 (dB)	15.0	12.6	15.0	13.4	10.8	13.4
C/I Uplink Adjacent Satellite 2 (dB)	20.3	17.9	20.3	20.6	18.0	20.6
C/I Downlink Adjacent Satellite 2 (dB)	14.9	12.4	14.9	13.5	11.0	13.5
C/(N+I) Composite (dB)	6.9	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.9	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	3	3	3	15	15	15
CARRIER LEVELS						
Uplink Power Density (dBW/Hz)	-57.6	-57.6	-57.6	-57.3	-57.3	-57.3
Downlink EIRP Density At Beam Peak	-30.3	-32.7	-30.3	-30.0	-32.6	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

Uplink Beam Name	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station Elevation Angle	20	20	20	20	20	20
Clear Sky	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	48.4	48.4	48.4	60.4	60.4	60.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	23.5	21.0	23.5	23.4	20.9	23.4
Downlink EIRP per Carrier (dBW)	14.8	12.2	14.8	26.8	24.2	26.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.1	10.6	6.3	13.0	10.5	6.2
C/N Uplink (dB)	23.5	21.0	23.5	23.4	20.9	23.4
C/N Downlink (dB)	13.1	10.6	6.3	13.0	10.5	6.2
C/I Intermodulation (dB)	11.9	9.3	11.9	11.7	9.2	11.7
C/I Uplink Co-Channel (dB)*	20.8	18.3	20.8	21.2	18.7	21.2
C/I Downlink Co-Channel (dB)*	20.8	18.3	20.8	21.2	18.7	21.2
C/I Uplink Adjacent Satellite 1 (dB)	33.6	31.1	33.6	33.5	30.9	33.5
C/I Downlink Adjacent Satellite 1 (dB)	13.4	10.9	13.4	13.3	10.7	13.3
C/I Uplink Adjacent Satellite 2 (dB)	20.6	18.1	20.6	20.5	17.9	20.5
C/I Downlink Adjacent Satellite 2 (dB)	13.6	11.0	13.6	13.4	10.9	13.4
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	360	360	360	24	24	24
Uplink Power Density (dBW/Hz)	-57.3	-57.3	-57.3	-57.4	-57.4	-57.4
Downlink EIRP Density At Beam Peak	-30.0	-32.6	-30.0	-30.1	-32.7	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM PERFORMANCE INFORMATION			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM PERFORMANCE INFORMATION			
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	50	50	50
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 ORBITAL LOCATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK BUDGET TABLE			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	51.1	51.1	51.1
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	20.2	17.9	20.2
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.5	15.2	17.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.9	15.6	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	20.2	17.9	20.2
C/N Downlink (dB)	17.9	15.6	7.2
C/I Intermodulation (dB)	8.5	6.2	8.5
C/I Uplink Co-Channel (dB)*	17.5	15.3	17.5
C/I Downlink Co-Channel (dB)*	17.5	15.3	17.5
C/I Uplink Adjacent Satellite 1 (dB)	30.2	28.0	30.2
C/I Downlink Adjacent Satellite 1 (dB)	18.5	16.3	18.5
C/I Uplink Adjacent Satellite 2 (dB)	17.2	15.0	17.2
C/I Downlink Adjacent Satellite 2 (dB)	17.7	15.5	17.7
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	90	90	90
CARRIER DENSITY BUDGETS			
Uplink Power Density (dBW/Hz)	-52.8	-52.8	-52.8
Downlink EIRP Density At Beam Peak	-33.4	-35.7	-33.4

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name						
Uplink Frequency (MHz)	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Polarization	-6	-6	-6	-6	-6	-6
Uplink Relative Contour Level (dB)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink Contour G/T (dB/K)	-71.8	-71.8	-71.8	-71.8	-71.8	-71.8
Uplink SFD (dBW/m ²)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	60M3G7W	60M3G7W	60M3G7W
Information Rate (kbps)	n/a	n/a	n/a	73726	73726	73726
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	60266	60266	60266
Allocated Bandwidth (kHz)	36000	36000	36000	72000	72000	72000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	7.0	7.0	7.0	3	3	3
Earth Station Gain (dBi)	57.0	57.0	57.0	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.9	26.7	26.7	24.2
Earth Station Elevation Angle	20	20	20	20	20	20
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	73.6	73.6	73.6	78.3	78.3	78.3
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-7.1	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Uplink C/N (dB)	22.0	19.5	22.0	24.4	17.3	24.4
Downlink EIRP per Carrier (dBW)	39.1	37.6	39.1	43.8	42.6	43.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-3.4	0.0	0.0	-3.1
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.9	26.7	26.7	24.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Downlink C/N (dB)	20.3	18.7	14.2	14.8	13.6	9.2
C/N Uplink (dB)	22.0	19.5	22.0	24.4	17.3	24.4
C/N Downlink (dB)	20.3	18.7	14.2	14.8	13.6	9.2
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	26.5	24.0	26.5	27.0	19.9	27.0
C/I Downlink Co-Channel (dB)*	26.5	25.0	26.5	27.0	25.8	27.0
C/I Uplink Adjacent Satellite 1 (dB)	32.0	29.6	32.0	34.5	27.4	34.5
C/I Downlink Adjacent Satellite 1 (dB)	21.0	19.4	21.0	15.2	14.1	15.2
C/I Uplink Adjacent Satellite 2 (dB)	19.0	16.6	19.0	21.5	14.4	21.5
C/I Downlink Adjacent Satellite 2 (dB)	20.4	18.8	20.4	15.4	14.2	15.4
C/(N+I) Composite (dB)	13.0	11.0	11.0	9.7	7.2	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.0	10.0	10.0	8.7	6.2	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	2.0	0.0	0.0	2.6	0.1	0.0
Number of Carriers	2	2	2	1	1	1
Uplink Power Density (dBW/Hz)	-49.3	-49.3	-49.3	-56.4	-56.4	-56.4
Downlink EIRP Density At Beam Peak	-23.0	-24.4	-23.0	-30.0	-31.2	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250	Conus 14250
Uplink Beam Name	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m²)	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
Uplink Fade	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	65.1	65.1	65.1	59.5	59.5	59.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	20.7	18.2	20.7	20.8	18.3	20.8
Downlink EIRP per Carrier (dBW)	34.2	31.7	34.2	28.6	26.1	28.6
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.4	0.0	0.0	-4.0
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.7	12.3	7.4	13.2	10.6	6.4
C/N Uplink (dB)	20.7	18.2	20.7	20.8	18.3	20.8
C/N Downlink (dB)	14.7	12.3	7.4	13.2	10.6	6.4
C/I Intermodulation (dB)	12.0	9.7	12.0	12.2	9.7	12.2
C/I Uplink Co-Channel (dB)*	20.4	18.0	20.4	21.3	18.8	21.3
C/I Downlink Co-Channel (dB)*	20.4	18.0	20.4	21.3	18.8	21.3
C/I Uplink Adjacent Satellite 1 (dB)	30.8	28.3	30.8	30.9	28.4	30.9
C/I Downlink Adjacent Satellite 1 (dB)	15.1	12.7	15.1	13.4	10.9	13.4
C/I Uplink Adjacent Satellite 2 (dB)	17.8	15.3	17.8	17.9	15.4	17.9
C/I Downlink Adjacent Satellite 2 (dB)	15.3	12.8	15.3	13.9	11.4	13.9
C/(N+I) Composite (dB)	7.0	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	6.0	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	7	7	7	31	31	31
Uplink Power Density (dBW/Hz)	-60.1	-60.1	-60.1	-60.0	-60.0	-60.0
Downlink EIRP Density At Beam Peak	-30.1	-32.6	-30.1	-30.0	-32.5	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-76.8	-76.8	-76.8	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
UPLINK SATELLITE INFORMATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
DOWNLINK SATELLITE INFORMATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION INFORMATION						
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK FADE TYPE						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK LINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	45.7	45.7	45.7	57.7	57.7	57.7
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	20.9	18.4	20.9	20.7	18.2	20.7
DOWNLINK LINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	14.8	12.3	14.8	26.8	24.3	26.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.2	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.2	10.7	6.4	13.1	10.5	6.3
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	20.9	18.4	20.9	20.7	18.2	20.7
C/N Downlink (dB)	13.2	10.7	6.4	13.1	10.5	6.3
C/I Intermodulation (dB)	12.2	9.7	12.2	12.1	9.6	12.1
C/I Uplink Co-Channel (dB)*	21.2	18.7	21.2	21.6	19.1	21.6
C/I Downlink Co-Channel (dB)*	21.2	18.7	21.2	21.6	19.1	21.6
C/I Uplink Adjacent Satellite 1 (dB)	30.9	28.4	30.9	30.8	28.3	30.8
C/I Downlink Adjacent Satellite 1 (dB)	13.4	10.9	13.4	13.3	10.8	13.3
C/I Uplink Adjacent Satellite 2 (dB)	17.9	15.4	17.9	17.8	15.3	17.8
C/I Downlink Adjacent Satellite 2 (dB)	13.9	11.4	13.9	13.8	11.3	13.8
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	720	720	720	49	49	49
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-60.0	-60.0	-60.0	-60.1	-60.1	-60.1
Downlink EIRP Density At Beam Peak	-30.0	-32.5	-30.0	-30.1	-32.6	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	Conus	Conus	Conus
UPLINK BEAM INFORMATION			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	2.8	2.8	2.8
Uplink SFD (dBW/m ²)	-76.8	-76.8	-76.8
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	East Coast U.S.	East Coast U.S.	East Coast U.S.
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	52.7	52.7	52.7
Rain Rate (mm/hr)	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATellite 2 ORBITAL LOCATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
UPLINK EARTH STATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK LOSS TYPES	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	48.6	48.6	48.6
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	2.8	2.8	2.8
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	17.7	15.4	17.7
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.7	15.4	17.7
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.3
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	18.1	15.8	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	17.7	15.4	17.7
C/N Downlink (dB)	18.1	15.8	7.2
C/I Intermodulation (dB)	9.0	6.7	9.0
C/I Uplink Co-Channel (dB)*	18.1	15.8	18.1
C/I Downlink Co-Channel (dB)*	18.1	15.8	18.1
C/I Uplink Adjacent Satellite 1 (dB)	27.7	25.5	27.7
C/I Downlink Adjacent Satellite 1 (dB)	18.7	16.5	18.7
C/I Uplink Adjacent Satellite 2 (dB)	14.7	12.5	14.7
C/I Downlink Adjacent Satellite 2 (dB)	18.2	16.0	18.2
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	180	180	180
Carrier Density Levels			
Uplink Power Density (dBW/Hz)	-55.3	-55.3	-55.3
Downlink EIRP Density At Beam Peak	-33.2	-35.5	-33.2

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM INFORMATION	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
Uplink Beam Name	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-72	-72	-72	-72	-72	-72
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATellite 2 ORBITAL LOCATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	30M1G7W	30M1G7W	30M1G7W
Information Rate (kbps)	n/a	n/a	n/a	36863	36863	36863
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	36000	36000	36000
Allocated Bandwidth (kHz)	36000	36000	36000	36000	36000	36000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	3	3	3
Earth Station Gain (dBi)	55.5	55.5	55.5	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.7	26.7	26.7	24.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET						
Clear Sky	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK LINK BUDGET						
Uplink Earth Station EIRP (dBW)	77.1	77.1	77.1	78.9	78.9	77.8
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-5.4	0.0	0.0	-7.2	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Uplink C/N (dB)	25.7	20.2	25.7	28.2	21.0	28.2
DOWNLINK LINK BUDGET						
Downlink EIRP per Carrier (dBW)	39.1	38.9	39.1	40.8	38.9	40.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-2.6	0.0	0.0	-3.2
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.8	26.7	26.7	24.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Downlink C/N (dB)	18.8	18.6	13.8	14.8	12.9	9.1
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.7	20.2	25.7	28.2	21.0	28.2
C/N Downlink (dB)	18.8	18.6	13.8	14.8	12.9	9.1
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	21.6	27.0	27.0	19.8	27.0
C/I Downlink Co-Channel (dB)*	27.0	26.8	27.0	27.0	25.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	35.5	30.1	35.5	38.1	30.9	38.1
C/I Downlink Adjacent Satellite 1 (dB)	19.4	19.2	19.4	15.3	13.4	15.3
C/I Uplink Adjacent Satellite 2 (dB)	22.5	17.1	22.5	25.1	17.9	25.1
C/I Downlink Adjacent Satellite 2 (dB)	18.6	18.4	18.6	15.1	13.2	15.1
C/(N+I) Composite (dB)	12.9	11.0	11.0	9.9	7.4	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.9	10.0	10.0	8.9	6.4	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	1.9	0.0	0.0	2.8	0.3	0.0
Number of Carriers	1	1	1	1	1	1
OTHER TECHNICAL VALUES						
Uplink Power Density (dBW/Hz)	-45.8	-45.8	-45.8	-52.8	-52.8	-52.8
Downlink EIRP Density At Beam Peak	-23.0	-23.1	-23.0	-30.0	-31.9	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

UPLINK BEAM INFORMATION	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
Uplink Beam Name	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	-6	-6	-6	-6	-6	-6
Uplink Beam Polarization	3	3	3	3	3	3
Uplink Relative Contour Level (dB)	-81	-81	-81	-81	-81	-81
Uplink Contour G/T (dB/K)	42.0	42.0	42.0	42.0	42.0	42.0
Uplink SFD (dBW/m ²)						
Rain Rate (mm/hr)						
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE 1 ORBITAL LOCATION						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATELLITE 2 ORBITAL LOCATION						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.8	25.0	25.0	22.2
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET TYPE	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK ERROR MARGINS						
Uplink Earth Station EIRP (dBW)	64.4	64.4	64.4	58.9	58.9	58.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	20.2	17.7	20.2	20.4	17.9	20.4
DOWNLINK ERROR MARGINS						
Downlink EIRP per Carrier (dBW)	34.0	31.6	34.0	28.5	26.0	28.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.2	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.8	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.5	12.1	7.4	13.1	10.5	6.3
C/I POSITIVE LINK ERROR MARGINS						
C/N Uplink (dB)	20.2	17.7	20.2	20.4	17.9	20.4
C/N Downlink (dB)	14.5	12.1	7.4	13.1	10.5	6.3
C/I Intermodulation (dB)	12.5	10.4	12.5	12.8	10.3	12.8
C/I Uplink Co-Channel (dB)*	20.9	18.4	20.9	21.9	19.4	21.9
C/I Downlink Co-Channel (dB)*	20.9	18.5	20.9	21.9	19.4	21.9
C/I Uplink Adjacent Satellite 1 (dB)	30.1	27.6	30.1	30.3	27.8	30.3
C/I Downlink Adjacent Satellite 1 (dB)	14.9	12.5	14.9	13.3	10.8	13.3
C/I Uplink Adjacent Satellite 2 (dB)	17.1	14.6	17.1	17.3	14.8	17.3
C/I Downlink Adjacent Satellite 2 (dB)	14.8	12.4	14.8	13.5	11.0	13.5
C/(N+I) Composite (dB)	6.9	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.9	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	3	3	3	15	15	15
Carrier Power Levels						
Uplink Power Density (dBW/Hz)	-60.8	-60.8	-60.8	-60.6	-60.6	-60.6
Downlink EIRP Density At Beam Peak	-30.3	-32.7	-30.3	-30.1	-32.6	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Beam Name						
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m²)	-81	-81	-81	-81	-81	-81
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Gain (dBi)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station Elevation Angle	20	20		20	20	20
LINK BUDGET LEVEL	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	45.1	45.1	45.1	57.1	57.1	57.1
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Uplink C/N (dB)	20.5	18.0	20.5	20.3	17.8	20.3
Downlink EIRP per Carrier (dBW)	14.7	12.2	14.7	26.7	24.2	26.7
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-3.9	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	25.0	25.0	22.1	25.0	25.0	22.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Downlink C/N (dB)	13.1	10.6	6.3	13.0	10.4	6.2
C/N Uplink (dB)	20.5	18.0	20.5	20.3	17.8	20.3
C/N Downlink (dB)	13.1	10.6	6.3	13.0	10.4	6.2
C/I Intermodulation (dB)	12.8	10.3	12.8	12.7	10.2	12.7
C/I Uplink Co-Channel (dB)*	21.8	19.3	21.8	22.2	19.6	22.2
C/I Downlink Co-Channel (dB)*	21.8	19.3	21.8	22.2	19.6	22.2
C/I Uplink Adjacent Satellite 1 (dB)	30.4	27.8	30.4	30.2	27.7	30.2
C/I Downlink Adjacent Satellite 1 (dB)	13.4	10.8	13.4	13.2	10.7	13.2
C/I Uplink Adjacent Satellite 2 (dB)	17.4	14.8	17.4	17.2	14.7	17.2
C/I Downlink Adjacent Satellite 2 (dB)	13.5	11.0	13.5	13.4	10.9	13.4
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	360	360	360	24	24	24
Uplink Power Density (dBW/Hz)	-60.6	-60.6	-60.6	-60.7	-60.7	-60.7
Downlink EIRP Density At Beam Peak	-30.0	-32.6	-30.0	-30.2	-32.7	-30.2

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 36 MHz Channels (continued)

	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
UPLINK BEAM INFORMATION			
Uplink Beam Name	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3
Uplink SFD (dBW/m ²)	-81	-81	-81
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	49	49	49
Rain Rate (mm/hr)	42.0	42.0	42.0
SATELLITE 1 ORBITAL LOCATION			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
SATELLITE 2 ORBITAL LOCATION			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-20.8	-20.8	-20.8
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
EARTH STATION INFORMATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK FADE MODEL			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	47.8	47.8	47.8
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	17.1	14.8	17.1
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.4	15.1	17.4
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.8	15.5	7.2
CARRIER INTERFERENCE PERFORMANCE			
C/N Uplink (dB)	17.1	14.8	17.1
C/N Downlink (dB)	17.8	15.5	7.2
C/I Intermodulation (dB)	9.4	7.1	9.4
C/I Uplink Co-Channel (dB)*	18.5	16.2	18.5
C/I Downlink Co-Channel (dB)*	18.5	16.2	18.5
C/I Uplink Adjacent Satellite 1 (dB)	26.9	24.7	26.9
C/I Downlink Adjacent Satellite 1 (dB)	18.4	16.2	18.4
C/I Uplink Adjacent Satellite 2 (dB)	13.9	11.7	13.9
C/I Downlink Adjacent Satellite 2 (dB)	17.7	15.4	17.7
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	90	90	90
CARRIER DENSITY PERFORMANCE			
Uplink Power Density (dBW/Hz)	-56.1	-56.1	-56.1
Downlink EIRP Density At Beam Peak	-33.5	-35.8	-33.5

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels

	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
Uplink Beam Name	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m²)	-72	-72	-72	-72	-72	-72
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
Carrier ID	1	1	1	2	2	2
Emission Designation	36M0F3F	36M0F3F	36M0F3F	60M3G7W	60M3G7W	60M3G7W
Information Rate (kbps)	n/a	n/a	n/a	73726	73726	73726
Carrier Modulation	TV/FM	TV/FM	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Code Rate	n/a	n/a	n/a	3/4xRS	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	36000	60266	60266	60266
Allocated Bandwidth (kHz)	36000	36000	36000	72000	72000	72000
Minimum C/N, Clear Sky (dB)	10	10	10	6.1	6.1	6.1
Minimum C/N, Rain (dB)	10	10	10	6.1	6.1	6.1
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
Earth Station Diameter (meters)	7.0	7.0	7.0	3	3	3
Earth Station Gain (dBi)	57.0	57.0	57.0	49.2	49.2	49.2
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.7	26.7	26.7	24.1
Earth Station Elevation Angle	20	20	20	20	20	20
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
Uplink Earth Station EIRP (dBW)	74.8	74.8	74.8	79.7	79.7	79.7
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.7	0.0	0.0	-3.9	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Carrier Noise Bandwidth (dB-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Uplink C/N (dB)	23.4	20.7	23.4	26.0	22.1	26.0
Downlink EIRP per Carrier (dBW)	39.1	36.8	39.1	43.8	41.3	43.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-3.8	0.0	-3.2	0.0
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	30.3	26.7	26.7	23.7
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-77.8	-77.8	-77.8
Downlink C/N (dB)	20.3	17.9	13.6	14.9	12.3	9.1
C/N Uplink (dB)	23.4	20.7	23.4	26.0	22.1	26.0
C/N Downlink (dB)	20.3	17.9	13.6	14.9	12.3	9.1
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	24.3	27.0	27.0	23.1	27.0
C/I Downlink Co-Channel (dB)*	27.0	24.7	27.0	27.0	24.5	27.0
C/I Uplink Adjacent Satellite 1 (dB)	33.2	30.6	33.2	35.9	32.0	35.9
C/I Downlink Adjacent Satellite 1 (dB)	21.0	18.6	21.0	15.3	12.8	15.3
C/I Uplink Adjacent Satellite 2 (dB)	20.2	17.6	20.2	22.9	19.0	22.9
C/I Downlink Adjacent Satellite 2 (dB)	20.4	18.1	20.4	15.4	12.9	15.4
C/(N+I) Composite (dB)	13.5	11.0	11.0	9.9	7.2	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.5	10.0	10.0	8.9	6.2	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	2.5	0.0	0.0	2.8	0.1	0.0
Number of Carriers	2	2	2	1	1	1
Uplink Power Density (dBW/Hz)	-48.1	-48.1	-48.1	-55.0	-55.0	-55.0
Downlink EIRP Density At Beam Peak	-23.0	-25.2	-23.0	-30.0	-32.5	-30.0

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

UPLINK BEAM INFORMATION	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Beam Name	14250	14250	14250	14250	14250	14250
Uplink Frequency (MHz)	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Beam Polarization	-6	-6	-6	-6	-6	-6
Uplink Relative Contour Level (dB)	3	3	3	3	3	3
Uplink Contour G/T (dB/K)	-80	-80	-80	-80	-80	-80
Uplink SFD (dBW/m ²)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATELLITE 1						
Satellite 1 Orbital Location	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATELLITE 2						
Satellite 2 Orbital Location	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	3	3	3	4	4	4
Emission Designation	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Carrier Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771	6771	6771	1819.2	1819.2	1819.2
Allocated Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Minimum C/N, Clear Sky (dB)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Rain (dB)	3.6	3.6	3.6	2.8	2.8	2.8
EARTH STATION INFORMATION						
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION INFORMATION						
Earth Station Diameter (meters)	3.0	3.0	3.0	2.4	2.4	2.4
Earth Station Gain (dBi)	49.2	49.2	49.2	47.5	47.5	47.5
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Earth Station Elevation Angle	20	20	20	20	20	20
LINK BUDGET (dB)						
	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	63.0	63.0	63.0	57.5	57.5	57.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Uplink C/N (dB)	18.8	16.4	18.8	19.0	16.5	19.0
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	34.0	31.6	34.0	28.5	26.0	28.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-4.3	0.0	0.0	-3.9
Earth Station G/T, Clear Sky (dB/K)	26.7	26.7	23.7	25.0	25.0	22.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Downlink C/N (dB)	14.6	12.1	7.4	13.1	10.5	6.3
C/I PERFORMANCE						
C/N Uplink (dB)	18.8	16.4	18.8	19.0	16.5	19.0
C/N Downlink (dB)	14.6	12.1	7.4	13.1	10.5	6.3
C/I Intermodulation (dB)	13.2	10.9	13.2	13.4	10.9	13.4
C/I Uplink Co-Channel (dB)*	21.6	19.1	21.6	22.5	20.0	22.5
C/I Downlink Co-Channel (dB)*	21.6	19.1	21.6	22.5	20.0	22.54
C/I Uplink Adjacent Satellite 1 (dB)	28.7	26.3	28.7	28.9	26.4	28.9
C/I Downlink Adjacent Satellite 1 (dB)	15.0	12.5	15.0	13.3	10.8	13.3
C/I Uplink Adjacent Satellite 2 (dB)	15.7	13.3	15.7	15.9	13.4	15.9
C/I Downlink Adjacent Satellite 2 (dB)	15.1	12.7	15.1	13.8	11.3	13.8
C/(N+I) Composite (dB)	7.0	4.6	4.6	6.3	3.8	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	6.0	3.6	3.6	5.3	2.8	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.6	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.3	0.0	0.0
Number of Carriers	7	7	7	31	31	31
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-62.2	-62.2	-62.2	-62.0	-62.0	-62.0
Downlink EIRP Density At Beam Peak	-30.3	-32.7	-30.3	-30.1	-32.6	-30.1

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
UPLINK BEAM NAME	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.	East Coast U.S.
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3	3	3	3
Uplink SFD (dBW/m ²)	-80	-80	-80	-80	-80	-80
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
DOWNLINK BEAM NAME	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
SATellite 1 ORBITAL LOCATION	72 WL	72 WL	72 WL	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
SATellite 2 ORBITAL LOCATION	76 WL	76 WL	76 WL	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER	5	5	5	6	6	6
Emission Designation	75K4G7W	75K4G7W	75K4G7W	1M23G7W	1M23G7W	1M23G7W
Information Rate (kbps)	64	64	64	512	512	512
Carrier Modulation	QPSK	QPSK	QPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2	1/2	1/2
Occupied Bandwidth (kHz)	75.4	75.4	75.4	1229	1229	1229
Allocated Bandwidth (kHz)	100	100	100	1450	1450	1450
Minimum C/N, Clear Sky (dB)	3.0	3.0	3.0	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.8	2.8	2.8	2.7	2.7	2.7
GROUND STATION	6.1	6.1	6.1	6.1	6.1	6.1
Earth Station Diameter (meters)	56.9	56.9	56.9	56.9	56.9	56.9
Earth Station Gain (dBi)	20	20	20	20	20	20
DOWNLINK GROUND STATION	2.4	2.4	2.4	2.4	2.4	2.4
Earth Station Diameter (meters)	47.5	47.5	47.5	47.5	47.5	47.5
Earth Station Gain (dBi)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station G/T, Clear Sky (dB/K)	20	20	20	20	20	20
Earth Station Elevation Angle						
LINK FADING	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE	43.7	43.7	43.7	55.7	55.7	55.7
Uplink Earth Station EIRP (dBW)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Path Loss, Clear Sky (dB)	0.0	-2.5	0.0	0.0	-2.5	0.0
Uplink Rain Attenuation (dB)	3.0	3.0	3.0	3.0	3.0	3.0
Satellite G/T (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Carrier Noise Bandwidth (dB-Hz)	19.1	16.5	19.1	18.9	16.4	18.9
DOWNLINK PERFORMANCE	14.7	12.2	14.7	26.7	24.2	26.7
Downlink EIRP per Carrier (dBW)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Antenna Pointing Error (dB)	-205.9	-205.9	-205.9	-205.9	-205.9	-205.9
Downlink Path Loss, Clear Sky (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Downlink Rain Attenuation (dB)	25.0	25.0	22.1	25.0	25.0	22.2
Earth Station G/T, Clear Sky (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-48.8	-48.8	-48.8	-60.9	-60.9	-60.9
Carrier Noise Bandwidth (dB-Hz)	13.1	10.5	6.3	13.0	10.4	6.2
Downlink C/N (dB)						
COMPOSITE LINK PERFORMANCE	19.1	16.5	19.1	18.9	16.4	18.9
C/N Uplink (dB)	13.1	10.5	6.3	13.0	10.4	6.2
C/N Downlink (dB)	13.4	10.9	13.4	13.3	10.8	13.3
C/I Intermodulation (dB)	22.4	19.9	22.4	22.8	20.2	22.8
C/I Uplink Co-Channel (dB)*	22.4	19.9	22.4	22.8	20.3	22.8
C/I Downlink Co-Channel (dB)*	28.9	26.4	28.9	28.8	26.3	28.8
C/I Uplink Adjacent Satellite 1 (dB)	13.3	10.8	13.3	13.2	10.7	13.2
C/I Downlink Adjacent Satellite 1 (dB)	15.9	13.4	15.9	15.8	13.3	15.8
C/I Uplink Adjacent Satellite 2 (dB)	13.8	11.3	13.8	13.7	11.2	13.7
C/I Downlink Adjacent Satellite 2 (dB)						
C/(N+I) Composite (dB)	6.3	3.8	3.8	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.3	2.8	2.8	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.0	-2.8	-2.8	-3.4	-2.7	-2.7
Excess Link Margin (dB)	2.3	0.0	0.0	1.8	0.0	0.0
Number of Carriers	720	720	720	49	49	49
CHANNEL POWER DENSITIES	-62.0	-62.0	-62.0	-62.1	-62.1	-62.1
Uplink Power Density (dBW/Hz)	-30.1	-32.6	-30.1	-30.2	-32.7	-30.2
Downlink EIRP Density At Beam Peak						

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.

EXHIBIT 12: HORIZONS 2 Ku-BAND LINK BUDGETS – 72 MHz Channels (continued)

	East Coast U.S. 14250	East Coast U.S. 14250	East Coast U.S. 14250
UPLINK BEAM INFORMATION			
Uplink Beam Name	Horizontal	Horizontal	Horizontal
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	3	3	3
Uplink SFD (dBW/m ²)	-80	-80	-80
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	Conus	Conus	Conus
Downlink Frequency (MHz)	11950	11950	11950
Downlink Beam Polarization	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	51.4	51.4	51.4
Rain Rate (mm/hr)	42.0	42.0	42.0
ADDITIONAL SATELLITE 1			
Satellite 1 Orbital Location	72 WL	72 WL	72 WL
Uplink Power Density (dBW/Hz)	-58.0	-58.0	-58.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-22.2	-22.2	-22.2
Downlink Polarization Advantage (dB)	0	0	0
ADDITIONAL SATELLITE 2			
Satellite 2 Orbital Location	76 WL	76 WL	76 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.1	-21.1	-21.1
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	7	7	7
Emission Designation	307KG7W	307KG7W	307KG7W
Information Rate (kbps)	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2
Occupied Bandwidth (kHz)	307	307	307
Allocated Bandwidth (kHz)	400	400	400
Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Minimum C/N, Rain (dB)	2.7	2.7	2.7
UPLINK EARTH STATION			
Earth Station Diameter (meters)	2.4	2.4	2.4
Earth Station Gain (dBi)	49.0	49.0	49.0
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION			
Earth Station Diameter (meters)	6.1	6.1	6.1
Earth Station Gain (dBi)	55.5	55.5	55.5
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK LOSS			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	46.5	46.5	46.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.3	0.0
Satellite G/T (dB/K)	3.0	3.0	3.0
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Uplink C/N (dB)	15.7	13.5	15.7
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	17.5	15.2	17.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.9	-205.9	-205.9
Downlink Rain Attenuation (dB)	0.0	0.0	-7.1
Earth Station G/T, Clear Sky (dB/K)	33.1	33.1	29.4
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-54.9	-54.9	-54.9
Downlink C/N (dB)	17.9	15.6	7.2
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	15.7	13.5	15.7
C/N Downlink (dB)	17.9	15.6	7.2
C/I Intermodulation (dB)	10.1	7.8	10.1
C/I Uplink Co-Channel (dB)*	19.1	16.9	19.1
C/I Downlink Co-Channel (dB)*	19.1	16.9	19.1
C/I Uplink Adjacent Satellite 1 (dB)	25.6	23.3	25.6
C/I Downlink Adjacent Satellite 1 (dB)	18.5	16.2	18.5
C/I Uplink Adjacent Satellite 2 (dB)	12.6	10.3	12.6
C/I Downlink Adjacent Satellite 2 (dB)	18.0	15.8	18.0
C/(N+I) Composite (dB)	6.0	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.0	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.6	0.0	0.0
Number of Carriers	180	180	180
CARRIER DENSITY LEVEL			
Uplink Power Density (dBW/Hz)	-57.4	-57.4	-57.4
Downlink EIRP Density At Beam Peak	-33.4	-35.7	-33.4

* Note: The C/I level is adjusted depending on the signal level and transponder mode of operation.