EXHIBIT 13: LINK BUDGETS
[Ku-to-Ku Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION						
Uplink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Uplink Frequency (MHz)	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 - 14500
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)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Uplink SFD (dBW/m^2)	-81	-81	-81	-72	-72	-72
Rain Rate (mm/hr)	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Downlink Frequency (MHz)	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	44.7	44.7	44.7	44.7	44.7	44.7
Rain Rate (mm/hr)	42	42	42	42	42	42
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
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	36M0G7W	36M0G7W	36M0G7W
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
Required C/N (dB)	10	10	10	6.1	6.1	6.1
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.1	7.1	7.1	7.1	7.1	7.1
Earth Station Gain (dBi)	58.1	58.1	58.1	58.1	58.1	58.1
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)	47.0	47.0	47.0	47.0	47.0	47.0
Earth Station G/T (dB/K)	24.5	24.5	22.7	24.5	24.5	21.9
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 PERFORMANCE						
Uplink Earth Station EIRP (dBW)	81.9	81.9	81.9	81.9	81.9	81.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenutation (dB)	0.0	-6.2	0.0	0.0	-4.0	0.0
Satellite G/T (dB/K)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-75.6	-74.8	-74.8	-74.8
Uplink C/N (dB)	26.0	19.8	26.0	26.7	22.8	26.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	44.7	43.6	44.7	41.5	37.6	41.5
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.5	-205.5	-205.5	-205.5	-205.5	-205.5
Downlink Rain Attenuation (dB)	0.0	0.0	-1.8	0.0	0.0	-3.2
Earth Station G/T (dB/K)	24.5	24.5	22.7	24.5	24.5	21.9
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)	16.3	15.1	12.7	13.9	10.0	8.1
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.0	19.8	26.0	26.7	22.8	26.7
C/N Downlink (dB)	16.3	15.1	12.7	13.9	10.0	8.1
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	20.8	27.0	27.0	23.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	25.9	27.0	27.0	23.1	27.0
C/I Uplink Adjacent Satellite 1 (dB)	32.3	26.2	32.3	33.1	29.1	33.1
C/I Downlink Adjacent Satellite 1 (dB)	19.8	18.7	19.8	17.4	13.5	17.4
C/I Uplink Adjacent Satellite 2 (dB)	32.3	26.2	32.3	33.1	29.1	33.1
C/I Downlink Adjacent Satellite 2 (dB)	21.5	20.4	21.5	19.1	15.2	19.1
C/(N+I) Composite (dB)	13.1	11.0	11.0	11.0	7.1	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.1	10.0	10.0	10.0	6.1	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-10.0	-6.1	-6.1	-6.1
Excess Link Margin (dB)	2.1	0.0	0.0	3.9	0.0	0.0
Number of Carriers	1	1	1	1	1	1
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-42.2	-42.2	-42.2	-51.0	-51.0	-51.0
Downlink EIRP Density At Beam Peak	-15.3	-16.4	-15.3	-27.3	-31.2	-27.3

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

EXHIBIT 13: LINK BUDGETS (continued)
[Ku-to-Ku Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION						
Uplink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Uplink Frequency (MHz)	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 - 14500
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)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Uplink SFD (dBW/m^2)	-88	-88	-88	-88	-88	-88
Rain Rate (mm/hr)	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Downlink Frequency (MHz)	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	44.7	44.7	44.7	44.7	44.7	44.7
Rain Rate (mm/hr)	42	42	42	42	42	42
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	3	3	3	5	5	5
Emission Designation	10M3G7W	10M3G7W	10M3G7W	100KG7W	100KG7W	100KG7W
Information Rate (kbps)	6000	6000	6000	64	64	64
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)	6771.1	6771.1	6771.1	75.4	75.4	75.4
Allocated Bandwidth (kHz)	10300	10300	10300	100	100	100
Required C/N (dB)	3.9	3.6	3.6	3.0	2.8	2.8
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.1	7.1	7.1	7.1	7.1	7.1
Earth Station Gain (dBi)	58.1	58.1	58.1	58.1	58.1	58.1
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	1.8	1.8	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	44.3	44.3	44.3	44.3	44.3	44.3
Earth Station G/T (dB/K)	21.8	21.8	19.4	21.8	21.8	19.3
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 PERFORMANCE						
Uplink Earth Station EIRP (dBW)	61.6	61.6	61.6	41.4	41.4	41.4
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.7	0.0	0.0	-2.7	0.0
Satellite G/T (dB/K)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
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	-48.8	-48.8	-48.8
Uplink C/N (dB)	12.9	10.2	12.9	12.3	9.6	12.3
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	36.0	33.6	36.0	15.9	13.3	15.9
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.5	-205.5	-205.5	-205.5	-205.5	-205.5
Downlink Rain Attenuation (dB)	0.0	0.0	-3.0	0.0	0.0	-3.2
Earth Station G/T (dB/K)	21.8	21.8	19.4	21.8	21.8	19.3
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	-48.8	-48.8	-48.8
Downlink C/N (dB)	12.2	9.8	6.8	11.6	8.9	5.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	12.9	10.2	12.9	12.3	9.6	12.3
C/N Downlink (dB)	12.2	9.8	6.8	11.6	8.9	5.9
C/I Intermodulation (dB)	18.7	17.7	18.7	18.1	15.5	18.1
C/I Uplink Co-Channel (dB)*	27.3	24.6	27.3	27.3	24.7	27.3
C/I Downlink Co-Channel (dB)*	27.3	24.9	27.3	27.3	24.7	27.3
C/I Uplink Adjacent Satellite 1 (dB)	19.3	16.6	19.3	18.6	16.0	18.6
C/I Downlink Adjacent Satellite 1 (dB)	15.4	13.0	15.4	14.8	12.2	14.8
C/I Uplink Adjacent Satellite 2 (dB)	19.3	16.6	19.3	18.6	16.0	18.6
C/I Downlink Adjacent Satellite 2 (dB)	17.6	15.2	17.6	17.0	14.4	17.0
C/(N+I) Composite (dB)	7.0	4.6	4.6	6.4	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	5.4	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	2.4	0.0	0.0
Number of Carriers	3.3	3.3	3.3	337.7	337.7	337.7
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-64.8	-64.8	-64.8	-65.5	-65.5	-65.5
Downlink EIRP Density At Beam Peak	-26.3	-28.7	-26.3	-26.9	-29.5	-26.9

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

EXHIBIT 13: LINK BUDGETS (continued)
[Ku-to-Ku Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION						
Uplink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Uplink Frequency (MHz)	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 – 14500	14000 - 14500
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)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Uplink SFD (dBW/m^2)	-88	-88	-88	-88	-88	-88
Rain Rate (mm/hr)	42	42	42	42	42	42
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Africa	Africa	Africa	Africa	Africa	Africa
Downlink Frequency (MHz)	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	44.7	44.7	44.7	44.7	44.7	44.7
Rain Rate (mm/hr)	42	42	42	42	42	42
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	6	6	6	7	7	7
Emission Designation	1M45G7W	1M45G7W	1M45G7W	400KG7W	400KG7W	400KG7W
Information Rate (kbps)	512	512	512	128	128	128
Carrier Modulation	BPSK	BPSK	BPSK	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Code Rate	1/2	1/2	1/2	1/2	1/2	1/2
Occupied Bandwidth (kHz)	1229	1229	1229	307	307	307
Allocated Bandwidth (kHz)	1450	1450	1450	400	400	400
Required C/N (dB)	3.4	2.7	2.7	3.4	2.7	2.7
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.1	7.1	7.1	1.8	1.8	1.8
Earth Station Gain (dBi)	58.1	58.1	58.1	46.4	46.4	46.4
Earth Station Elevation Angle	20	20	20	20	20	20
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	1.8	1.8	1.8	7.0	7.0	7.0
Earth Station Gain (dBi)	44.3	44.3	44.3	56.6	56.6	56.6
Earth Station G/T,(dB/K)	21.8	21.8	19.3	34.1	34.1	30.3
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 PERFORMANCE						
Uplink Earth Station EIRP (dBW)	53.4	53.4	53.4	43.9	43.9	43.9
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.6	0.0	0.0	-2.2	0.0
Satellite G/T (dB/K)	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-60.9	-60.9	-60.9	-54.9	-54.9	-54.9
Uplink C/N (dB)	12.1	9.5	12.1	8.7	6.5	8.7
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	27.9	25.3	27.9	18.4	16.2	18.4
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.5	-205.5	-205.5	-205.5	-205.5	-205.5
Downlink Rain Attenuation (dB)	0.0	0.0	-3.1	0.0	0.0	-9.1
Earth Station G/T, (dB/K)	21.8	21.8	19.3	34.1	34.1	30.3
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-60.9	-60.9	-60.9	-54.9	-54.9	-54.9
Downlink C/N (dB)	11.4	8.8	5.8	20.3	18.1	7.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	12.1	9.5	12.1	8.7	6.5	8.7
C/N Downlink (dB)	11.4	8.8	5.8	20.3	18.1	7.5
C/I Intermodulation (dB)	18.0	15.6	18.0	14.6	12.4	14.6
C/I Uplink Co-Channel (dB)*	27.7	25.0	27.7	23.8	21.6	23.8
C/I Downlink Co-Channel (dB)*	27.7	25.1	27.7	23.8	21.6	23.8
C/I Uplink Adjacent Satellite 1 (dB)	18.5	15.9	18.5	15.1	12.9	15.1
C/I Downlink Adjacent Satellite 1 (dB)	14.7	12.1	14.7	24.3	22.1	24.3
C/I Uplink Adjacent Satellite 2 (dB)	18.5	15.9	18.5	15.1	12.9	15.1
C/I Downlink Adjacent Satellite 2 (dB)	16.9	14.3	16.9	24.8	22.6	24.8
C/(N+I) Composite (dB)	6.3	3.7	2.7	5.9	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	2.7	2.7	4.9	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.9	0.0	0.0	1.5	0.0	0.0
Number of Carriers	21.3	21.3	21.3	90	90	90
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-65.6	-65.6	-65.6	-57.3	-57.3	-57.3
Downlink EIRP Density At Beam Peak	-27.0	-29.6	-27.0	-30.4	-32.7	-30.4

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

EXHIBIT 13: LINK BUDGETS
[C-to-Ku Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Uplink Frequency (MHz)	5850 - 6650	5850 - 6650	5850 - 6650	5850 - 6650
Uplink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Uplink Relative Contour Level (dB)	-10	-10	-10	-10
Uplink Contour G/T (dB/K)	-9.1	-9.1	-9.1	-9.1
Uplink SFD (dBW/m^2)	-66	-66	-66	-66
Rain Rate (mm/hr)	n/a	n/a	n/a	n/a
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa	Africa	Africa	Africa
Downlink Frequency (MHz)	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	44.7	44.7	44.7	44.7
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	1	1	2	2
Emission Designation	36M0F3F	36M0F3F	36M0G7W	36M0G7W
Information Rate (kbps)	n/a	n/a	36863	36863
Carrier Modulation	TV/FM	TV/FM	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	n/a	n/a
Code Rate	n/a	n/a	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	30133	30133
Allocated Bandwidth (kHz)	36000	36000	36000	36000
Required C/N (dB)	10	10	6.1	6.1
UPLINK EARTH STATION				
Earth Station Diameter (meters)	15.2	15.2	15.2	15.2
Earth Station Gain (dBi)	58.4	58.4	58.4	58.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	3.0	3.0
Earth Station Gain (dBi)	55.0	55.0	48.7	48.7
Earth Station G/T (dB/K)	32.6	30.8	26.2	24.5
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Downlink Fade	Clear Sky	Downlink Fade
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	83.9	83.9	83.9	83.9
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation (dB)	0.0	0.0	0.0	0.0
Satellite G/T (dB/K)	-9.1	-9.1	-9.1	-9.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-74.8	-74.8
Uplink C/N (dB)	27.6	27.6	28.4	28.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	37.6	37.6	37.6	37.6
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.5	-205.5	-205.5	-205.5
Downlink Rain Attenuation (dB)	0.0	-1.7	0.0	-1.6
Earth Station G/T (dB/K)	32.6	30.8	26.2	24.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-74.8	-74.8
Downlink C/N (dB)	17.3	13.7	11.6	8.4
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	27.6	27.6	28.4	28.4
C/N Downlink (dB)	17.3	13.7	11.6	8.4
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	27.0	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	19.0	19.0	19.8	19.8
C/I Downlink Adjacent Satellite 1 (dB)	48.2	48.2	42.4	42.4
C/I Uplink Adjacent Satellite 2 (dB)	19.0	48.2	19.8	19.8
C/I Downlink Adjacent Satellite 2 (dB)	21.9	21.9	16.6	16.6
C/(N+I) Composite (dB)	12.5	11.0	9.3	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.5	10.0	8.3	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-6.1	-6.1
Excess Link Margin (dB)	1.5	0.0	2.2	0.0
Number of Carriers	1	1	1	1
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-40.5	-40.5	-49.3	-49.3
Downlink EIRP Density At Beam Peak	-22.4	-22.4	-31.2	-31.2

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

EXHIBIT 13: LINK BUDGETS (continued)
[C-to-Ku Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Uplink Frequency (MHz)	5850 - 6650	5850 - 6650	5850 - 6650	5850 - 6650
Uplink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Uplink Relative Contour Level (dB)	-10	-10	-10	-10
Uplink Contour G/T (dB/K)	-9.1	-9.1	-9.1	-9.1
Uplink SFD (dBW/m^2)	-77	-77	-77	-77
Rain Rate (mm/hr)	n/a	n/a	n/a	n/a
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa	Africa	Africa	Africa
Downlink Frequency (MHz)	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700	10950 – 11200 11450 – 11700
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	44.7	44.7	44.7	44.7
Rain Rate (mm/hr)	42	42	42	42
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-26	-26	-26	-26
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	3	3	5	5
Emission Designation	10M3G7W	10M3G7W	100KG7W	100KG7W
Information Rate (kbps)	6000	6000	64	64
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771.1	6771.1	75.4	75.4
Allocated Bandwidth (kHz)	10300	10300	100	100
Required C/N (dB)	3.9	3.6	3.0	2.8
UPLINK EARTH STATION				
Earth Station Diameter (meters)	7.0	7.0	7.0	7.0
Earth Station Gain (dBi)	51.0	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	40.8	40.8	40.8	40.8
Earth Station G/T (dB/K)	18.3	16.9	18.3	16.9
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Downlink Fade	Clear Sky	Downlink Fade
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	72.8	72.8	52.5	52.5
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Uplink Rain Attenuation (dB)	0.0	0.0	0.0	0.0
Satellite G/T (dB/K)	-9.1	-9.1	-9.1	-9.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-48.8	-48.8
Uplink C/N (dB)	23.8	23.8	23.0	23.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	36.3	36.3	16.0	16.0
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-205.5	-205.5	-205.5	-205.5
Downlink Rain Attenuation (dB)	0.0	-1.2	0.0	-1.2
Earth Station G/T (dB/K)	18.3	16.9	18.3	16.9
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-48.8	-48.8
Downlink C/N (dB)	8.9	6.3	8.2	5.5
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	23.8	23.8	23.0	23.0
C/N Downlink (dB)	8.9	6.3	8.2	5.5
C/I Intermodulation (dB)	19.0	19.0	18.2	18.2
C/I Uplink Co-Channel (dB)*	27.6	27.6	27.4	27.4
C/I Downlink Co-Channel (dB)*	27.6	27.6	27.4	27.4
C/I Uplink Adjacent Satellite 1 (dB)	15.2	15.2	14.4	14.4
C/I Downlink Adjacent Satellite 1 (dB)	36.8	36.8	36.0	36.0
C/I Uplink Adjacent Satellite 2 (dB)	15.2	15.2	14.4	14.4
C/I Downlink Adjacent Satellite 2 (dB)	14.8	14.8	14.1	14.1
C/(N+I) Composite (dB)	6.2	4.6	5.4	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.2	3.6	4.4	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.0	-2.8
Excess Link Margin (dB)	1.3	0.0	1.4	0.0
Number of Carriers	3.1	3.1	330.2	330.2
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-46.5	-46.5	-47.3	-47.3
Downlink EIRP Density At Beam Peak	-26.0	-26.0	-26.8	-26.8

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

EXHIBIT 13: LINK BUDGETS
[Ku-to-C Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa	Africa	Africa	Africa
Uplink Frequency (MHz)	14000 – 14250	14000 – 14250	14000 – 14250	14000 – 14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-1.5	-1.5	-1.5	-1.5
Uplink SFD (dBW/m^2)	-81	-81	-81	-81
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Downlink Frequency (MHz)	3625 - 4200	3625 - 4200	3625 - 42004200	3625 - 4200
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	36.9	36.9	36.9	36.9
Rain Rate (mm/hr)	n/a	n/a	n/a	n/a
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	1	1	2	2
Emission Designation	36M0F3F	36M0F3F	36M0G7W	36M0G7W
Information Rate (kbps)	n/a	n/a	36863	36863
Carrier Modulation	TV/FM	TV/FM	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	n/a	n/a
Code Rate	n/a	n/a	3/4xRS	3/4xRS
Occupied Bandwidth (kHz)	36000	36000	30133	30133
Allocated Bandwidth (kHz)	36000	36000	36000	36000
Required C/N (dB)	10	10	6.1	6.1
UPLINK EARTH STATION				
Earth Station Diameter (meters)	7.0	7.0	7.0	7.0
Earth Station Gain (dBi)	58.0	58.0	58.0	58.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	4.5	3.5	3.5
Earth Station Gain (dBi)	43.4	43.4	40.6	40.6
Earth Station G/T (dB/K)	23.2	23.2	20.5	20.5
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Uplink Fade	Clear Sky	Uplink Fade
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	81.9	81.9	81.9	81.9
Uplink Path Loss, Clear Sky (dB)	-207.3	-207.3	-207.3	-207.3
Uplink Rain Attenuation (dB)	0.0	-3.5	0.0	-4.9
Satellite G/T (dB/K)	-1.5	-1.5	-1.5	-1.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-74.8	-74.8
Uplink C/N (dB)	26.1	22.6	26.9	22.0
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	36.9	34.6	36.9	33.4
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-195.9	-195.9	-195.9	-195.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	23.2	23.2	20.5	20.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-75.6	-74.8	-74.8
Downlink C/N (dB)	16.7	14.4	14.9	11.3
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	26.1	22.6	26.9	22.0
C/N Downlink (dB)	16.7	14.4	14.9	11.3
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	27.0	23.5	27.0	22.1
C/I Downlink Co-Channel (dB)*	27.0	24.7	27.0	23.5
C/I Uplink Adjacent Satellite 1 (dB)	32.3	28.9	33.1	28.2
C/I Downlink Adjacent Satellite 1 (dB)	19.8	17.5	14.5	10.9
C/I Uplink Adjacent Satellite 2 (dB)	32.3	28.9	33.1	28.2
C/I Downlink Adjacent Satellite 2 (dB)	22.4	20.1	20.7	17.2
C/(N+I) Composite (dB)	13.5	11.0	10.7	7.1
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	12.5	10.0	9.7	6.1
Minimum Required C/N (dB)	-10.0	-10.0	-6.1	-6.1
Excess Link Margin (dB)	2.5	0.0	3.6	0.0
Number of Carriers	1	1	1	1
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-42.1	-42.1	-50.9	-50.9
Downlink EIRP Density At Beam Peak	-23.1	-25.4	-31.9	-35.4

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

EXHIBIT 13: LINK BUDGETS (continued)
[Ku-to-C Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa	Africa	Africa	Africa
Uplink Frequency (MHz)	14000 – 14250	14000 – 14250	14000 – 14250	14000 – 14250
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-1.5	-1.5	-1.5	-1.5
Uplink SFD (dBW/m^2)	-89	-89	-89	-89
Rain Rate (mm/hr)	42	42	42	42
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Downlink Frequency (MHz)	3625 - 4200	3625 - 4200	3625 - 4200	3625 - 4200
Downlink Beam Polarization	RHCP	RHCP	RHCP	RHCP
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	36.9	36.9	36.9	36.9
Rain Rate (mm/hr)	n/a	n/a	n/a	n/a
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-50	-50	-50	-50
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	3	3	5	5
Emission Designation	10M3G7W	10M3G7W	100KG7W	100KG7W
Information Rate (kbps)	6000	6000	64	64
Carrier Modulation	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a
Code Rate	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	6771.1	6771.1	75.4	75.4
Allocated Bandwidth (kHz)	10300	10300	100	100
Required C/N (dB)	3.9	3.6	3.0	2.8
UPLINK EARTH STATION				
Earth Station Diameter (meters)	7.0	7.0	7.0	7.0
Earth Station Gain (dBi)	58.0	58.0	58.0	58.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	3.0	3.0	3.0	3.0
Earth Station Gain (dBi)	39.2	39.2	39.2	39.2
Earth Station G/T (dB/K)	18.7	18.7	18.7	18.7
Earth Station Elevation Angle	20	20	20	20
LINK FADE TYPE	Clear Sky	Uplink Fade	Clear Sky	Uplink Fade
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	66.4	66.4	46.4	46.4
Uplink Path Loss, Clear Sky (dB)	-207.3	-207.3	-207.3	-207.3
Uplink Rain Attenutation (dB)	0.0	-2.1	0.0	-2.1
Satellite G/T (dB/K)	-1.5	-1.5	-1.5	-1.5
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-48.8	-48.8
Uplink C/N (dB)	17.8	15.7	17.3	15.3
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	29.7	27.9	9.7	7.6
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-195.9	-195.9	-195.9	-195.9
Downlink Rain Attenuation (dB)	0.0	0.0	0.0	0.0
Earth Station G/T (dB/K)	18.7	18.7	18.7	18.7
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-68.3	-68.3	-48.8	-48.8
Downlink C/N (dB)	12.3	10.6	11.9	9.8
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	17.8	15.7	17.3	15.3
C/N Downlink (dB)	12.3	10.6	11.9	9.8
C/I Intermodulation (dB)	20.3	20.0	19.8	17.7
C/I Uplink Co-Channel (dB)*	28.7	26.6	28.8	26.7
C/I Downlink Co-Channel (dB)*	28.7	26.9	28.8	26.7
C/I Uplink Adjacent Satellite 1 (dB)	24.1	22.0	23.6	21.5
C/I Downlink Adjacent Satellite 1 (dB)	9.1	7.3	8.6	6.5
C/I Uplink Adjacent Satellite 2 (dB)	24.1	22.0	23.6	21.5
C/I Downlink Adjacent Satellite 2 (dB)	18.8	17.0	18.4	16.3
C/(N+I) Composite (dB)	6.4	4.6	5.9	3.8
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.4	3.6	4.9	2.8
Minimum Required C/N (dB)	-3.9	-3.6	-3.0	-2.8
Excess Link Margin (dB)	1.5	0.0	1.9	0.0
Number of Carriers	2.4	2.4	235.9	235.9
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-59.9	-59.9	-60.4	-60.4
Downlink EIRP Density At Beam Peak	-32.6	-34.4	-33.1	-35.2

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

EXHIBIT 13: LINK BUDGETS (continued)
[C-to-C Band / Channel Bandwidth: 36 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Uplink Frequency (MHz)	5850 - 6650	5850 - 6650	5850 - 6650	5850 - 6650
Uplink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Uplink SFD (dBW/m^2)	-85	-89	-84	-84
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Downlink Frequency (MHz)	3625 – 4200	3625 – 4200	3625 – 4200	3625 – 4200
Downlink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	36.9	36.9	36.9	36.9
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-37.9	-37.9	-37.9	-37.9
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	1	2	3	4
Emission Designation	36M0F3F	30M1G7W	10M3G7W	100KG7W
Information Rate (kbps)	n/a	36863	6000	64
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	n/a	n/a	n/a
Code Rate	n/a	3/4xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth (kHz)	36000	36000	10300	100
Minimum C/N (dB)	10	6.1	3.9	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	8.1	7.0	7.0	7.0
Earth Station Gain (dBi)	52.5	50.7	50.7	50.7
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	3.5	3.0	3.0
Earth Station Gain (dBi)	46.0	40.6	39.2	39.2
Earth Station G/T, Clear Sky (dB/K)	25.8	20.5	18.7	18.7
Earth Station Elevation Angle	20	20	20	20
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	77.9	73.9	66.7	46.3
Uplink Path Loss, Clear Sky (dB)	-199.9	-199.9	-199.9	-199.9
Satellite G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Uplink C/N (dB)	25.9	22.7	22.0	21.1
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	36.9	36.9	29.4	9.0
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-195.9	-195.9	-195.9	-195.9
Earth Station G/T, Clear Sky (dB/K)	25.8	20.5	18.7	18.7
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-68.3	-48.8
Downlink C/N (dB)	19.3	14.9	12.1	11.2
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25.9	22.7	22.0	21.1
C/N Downlink (dB)	19.3	14.9	12.1	11.2
C/I Intermodulation (dB)	n/a	n/a	19.9	19.0
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.5	28.2
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.5	28.2
C/I Uplink Adjacent Satellite 1 (dB)	17.0	13.8	13.1	12.2
C/I Downlink Adjacent Satellite 1 (dB)	22.7	14.5	8.8	7.9
C/I Uplink Adjacent Satellite 2 (dB)	17.0	13.8	13.1	12.2
C/I Downlink Adjacent Satellite 2 (dB)	24.7	20.7	18.5	17.7
C/(N+I) Composite (dB)	11.8	7.7	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.8	6.7	3.9	3.0
Minimum Required C/N (dB)	-10.0	-6.1	-3.9	-3.0
Excess Link Margin (dB)	0.8	0.6	0.0	0.0
Number of Carriers	1	1	2.5	274.9
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-40.6	-51.6	-52.3	-53.2
Downlink EIRP Density At Beam Peak	-23.1	-31.9	-32.9	-33.8

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

EXHIBIT 13: LINK BUDGETS (continued)
[C-to-C Band / Channel Bandwidth: 72 MHz]

UPLINK BEAM INFORMATION				
Uplink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Uplink Frequency (MHz)	5850 - 6650	5850 - 6650	5850 - 6650	5850 - 6650
Uplink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Uplink Relative Contour Level (dB)	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Uplink SFD (dBW/m^2)	-83	-88	-79	-79
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME	Africa, Europe, ME
Downlink Frequency (MHz)	3625 – 4200	3625 – 4200	3625 – 4200	3625 – 4200
Downlink Beam Polarization	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP	RHCP / LHCP
Downlink Relative Contour Level (dB)	-6	-6	-6	-6
Downlink Contour EIRP (dBW)	36.9	36.9	36.9	36.9
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	30.8 EL	30.8 EL	30.8 EL	30.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-40.9	-40.9	-40.9	-40.9
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	34.8 EL	34.8 EL	34.8 EL	34.8 EL
Uplink Power Density (dBW/Hz)	-38.7	-38.7	-38.7	-38.7
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-40.9	-40.9	-40.9	-40.9
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	1	2	3	4
Emission Designation	36M0F3F	72M0G7W	10M3G7W	100KG7W
Information Rate (kbps)	n/a	73726	6000	64
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	n/a	n/a	n/a
Code Rate	n/a	3/4xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	36000	60266	6771.1	75.4
Allocated Bandwidth (kHz)	36000	72000	10300	100
Minimum C/N (dB)	10	6.1	3.9	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	7.0	7.0	7.0	7.0
Earth Station Gain (dBi)	51.0	51.0	51.0	51.0
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	9.2	4.5	3.0	3.0
Earth Station Gain (dBi)	50.3	43.9	39.7	39.7
Earth Station G/T, Clear Sky (dB/K)	29.4	23.6	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	76.9	74.9	68.5	48.1
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Satellite G/T (dB/K)	-5.1	-5.1	-5.1	-5.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-68.3	-48.8
Uplink C/N (dB)	24.6	20.4	23.5	22.6
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	32.7	36.9	26.2	5.8
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3
Earth Station G/T, Clear Sky (dB/K)	29.4	23.6	19.2	19.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-77.8	-68.3	-48.8
Downlink C/N (dB)	18.3	14.5	8.9	8.0
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	24.6	20.4	23.5	22.6
C/N Downlink (dB)	18.3	14.5	8.9	18.0
C/I Intermodulation (dB)	n/a	n/a	19.7	18.8
C/I Uplink Co-Channel (dB)*	27.0	27.0	28.3	28.0
C/I Downlink Co-Channel (dB)*	27.0	27.0	28.3	28.0
C/I Uplink Adjacent Satellite 1 (dB)	16.0	11.8	14.9	14.0
C/I Downlink Adjacent Satellite 1 (dB)	26.2	21.1	10.0	9.1
C/I Uplink Adjacent Satellite 2 (dB)	16.0	11.8	14.9	14.0
C/I Downlink Adjacent Satellite 2 (dB)	27.4	23.6	18.7	17.8
C/(N+I) Composite (dB)	11.2	7.1	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	-10.2	6.1	3.9	3.0
Minimum Required C/N (dB)	-10.0	-6.1	-3.9	-3.0
Excess Link Margin (dB)	0.2	0.0	0.0	0.0
Number of Carriers	2	1	5.2	573.7
Carrier Density Levels				
Uplink Power Density (dBW/Hz)	-40.1	-53.9	-50.8	-51.7
Downlink EIRP Density At Beam Peak	-27.3	-34.9	-36.1	-37.0

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