

## EXHIBIT 13A: GALAXY 18 C-BAND LINK BUDGETS

UPLINK BEAM INFORMATION							
Uplink Beam Name	CONUS 5925 - 6425		CONUS 5925 - 6425		CONUS 5925 - 6425		
Uplink Frequency (MHz)	Horizontal / Vertical		Horizontal / Vertical		Horizontal / Vertical		
Uplink Beam Polarization	-6		-6		-6		
Uplink Relative Contour Level (dB)	-0.6		-0.6		-0.6		
Uplink Contour G/T (dB/K)	-90.2		-90.2		-89.2		
Uplink SFD (dBW/m <sup>2</sup> )							
DOWNLINK BEAM INFORMATION							
Downlink Beam Name	CONUS 3700 - 4200		CONUS 3700 - 4200		CONUS 3700 - 4200		
Downlink Frequency (MHz)	Vertical / Horizontal		Vertical / Horizontal		Vertical / Horizontal		
Downlink Beam Polarization	-4		-4		-4		
Downlink Relative Contour Level (dB)	42.5		42.5		42.5		
Downlink Contour EIRP (dBW)							
ADJACENT SATELLITE 1							
Satellite 1 Orbital Location	125 WL		125 WL		125 WL		
Uplink Power Density (dBW/Hz)	-47.5		-47.5		-47.5		
Uplink Polarization Advantage (dB)	0		0		0		
Downlink EIRP Density (dBW/Hz)	-30.6		-30.6		-30.6		
Downlink Polarization Advantage (dB)	0		0		0		
ADJACENT SATELLITE 2							
Satellite 2 Orbital Location	121 WL		121 WL		121 WL		
Uplink Power Density (dBW/Hz)	-44		-44		-44		
Uplink Polarization Advantage (dB)	0		0		0		
Downlink EIRP Density (dBW/Hz)	-32.4		-32.4		-32.4		
Downlink Polarization Advantage (dB)	0		0		0		
CARRIER INFORMATION							
Carrier ID	1		2		3		
Emission Designation	36M0F3F		30M1G7W		4M15G7W		
Information Rate (kbps)	n/a		36863		6000		
Carrier Modulation	TV/FM		QPSK		QPSK		
Peak to Peak Bandwidth of EDS (MHz)	4		n/a		n/a		
Code Rate	n/a		3/4xRS		3/4xRS		
Occupied Bandwidth (kHz)	36000		30133		4154		
Allocated Bandwidth (kHz)	36000		36000		6875		
Minimum C/N (dB)	10		6.1		6.7		
UPLINK EARTH STATION							
Earth Station Diameter (meters)	6.1		6.1		6.1		
Earth Station Gain (dBi)	49.4		49.4		49.4		
Earth Station Elevation Angle	20		20		20		
DOWNLINK EARTH STATION							
Earth Station Diameter (meters)	4.5		3.0		3.0		
Earth Station Gain (dBi)	43.9		39.7		39.7		
Earth Station G/T, Clear Sky (dB/K)	23.6		19.2		19.2		
Earth Station Elevation Angle	20		20		20		
UPLINK PERFORMANCE							
Uplink Earth Station EIRP (dBW)	72.7		72.7		63.1		
Uplink Path Loss, Clear Sky (dB)	-200.2		-200.2		-200.2		
Satellite G/T (dB/K)	-0.6		-0.6		-0.6		
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6		
Carrier Noise Bandwidth (dB-Hz)	-75.6		-74.8		-66.2		
Uplink C/N (dB)	24.9		25.7		24.7		
DOWNLINK PERFORMANCE							
Downlink EIRP per Carrier (dBW)	42.5		42.5		33.4		
Antenna Pointing Error (dB)	-0.5		-0.5		-0.5		
Downlink Path Loss, Clear Sky (dB)	-196.3		-196.3		-196.3		
Earth Station G/T, Clear Sky (dB/K)	23.6		19.2		19.2		
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6		
Carrier Noise Bandwidth (dB-Hz)	-75.6		-74.8		-66.2		
Downlink C/N (dB)	22.3		18.7		18.2		
COMPOSITE LINK PERFORMANCE							
C/N Uplink (dB)	24.9		25.7		24.7		
C/N Downlink (dB)	22.3		18.7		18.2		
C/I Intermodulation (dB)	n/a		n/a		21.0		
C/I Uplink Co-Channel (dB)*	20.0		20.0		21.6		
C/I Downlink Co-Channel (dB)*	20.0		20.0		21.6		
C/I Uplink Adjacent Satellite 1 (dB)	20.6		21.4		20.5		
C/I Downlink Adjacent Satellite 1 (dB)	21.1		18.2		17.8		
C/I Uplink Adjacent Satellite 2 (dB)	17.1		17.9		17.0		
C/I Downlink Adjacent Satellite 2 (dB)	20.4		11.3		10.8		
C/(N+I) Composite (dB)	11.3		8.3		7.7		
Required System Margin (dB)	-1.0		-1.0		-1.0		
Net C/(N+I) Composite (dB)	10.3		7.3		6.7		
Minimum Required C/N (dB)	-10.0		-6.1		-6.7		
Excess Link Margin (dB)	0.3		1.1		0.0		
Number of Carriers	1		1		3.6		
Carrier Density Levels							
Uplink Power Density (dBW/Hz)	-42.7		-51.5		-52.4		
Downlink EIRP Density At Beam Peak	-19.5		-28.3		-28.7		

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

## EXHIBIT 13B: GALAXY 18 Ku-BAND LINK BUDGETS

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus		Conus		Conus	
Uplink Frequency (MHz)	14000 - 14500		14000 - 14500		14000 - 14500	
Uplink Beam Polarization	Horizontal/Vertical		Horizontal/Vertical		Horizontal/Vertical	
Uplink Relative Contour Level (dB)	-10		-10		-10	
Uplink Contour G/T (dB/K)	-1.7		-1.7		-1.7	
Uplink SFD (dBW/m <sup>2</sup> )	-66.9		-66.9		-68.9	
Rain Rate (mm/hr)	42.0		42.0		42.0	
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus		Conus		Conus	
Downlink Frequency (MHz)	11700 - 12200		11700 - 12200		11700 - 12200	
Downlink Beam Polarization	Vertical/Horizontal		Vertical/Horizontal		Vertical/Horizontal	
Downlink Relative Contour Level (dB)	-8		-8		-8	
Downlink Contour EIRP (dBW)	45.6		45.6		45.6	
Rain Rate (mm/hr)	42.0		42.0		42.0	
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	125 WL		125 WL		125 WL	
Uplink Power Density (dBW/Hz)	-46.8		-46.8		-46.8	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-23.30		-23.30		-23.30	
Downlink Polarization Advantage (dB)	0		0		0	
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	121 WL		121 WL		121 WL	
Uplink Power Density (dBW/Hz)	-45.0		-45.0		-45.0	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-21.6		-21.6		-21.6	
Downlink Polarization Advantage (dB)	0		0		0	
CARRIER INFORMATION						
Carrier ID	1		1		2	
Emission Designation	36M0F3F		36M0F3F		30M1G7W	
Information Rate (kbps)	n/a		n/a		36863	
Carrier Modulation	TV/FM		TV/FM		QPSK	
Peak to Peak Bandwidth of EDS (MHz)	4		4		n/a	
Code Rate	n/a		n/a		3/4xRS	
Occupied Bandwidth (kHz)	36000		36000		30133	
Allocated Bandwidth (kHz)	36000		36000		36000	
Minimum C/N, Clear Sky (dB)	10		10		6.1	
Minimum C/N, Rain (dB)	10		10		6.1	
UPLINK EARTH STATION						
Earth Station Diameter (meters)	9		9		7	
Earth Station Gain (dBi)	60.2		60.2		58.1	
Earth Station Elevation Angle	20		20		20	
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	13.0		13.0		4.6	
Earth Station Gain (dBi)	62.6		62.6		53.5	
Earth Station G/T (dB/K)	41.9		37.7		31.0	
Earth Station Elevation Angle	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)	81.5		81.5		81.3	
Uplink Path Loss, Clear Sky (dB)	-207.5		-207.5		-207.5	
Uplink Rain Attenuation (dB)	0.0		-3.5		0.0	
Satellite G/T (dB/K)	-1.7		-1.7		-1.7	
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6	
Carrier Noise Bandwidth (dB-Hz)	-75.6		-75.6		-74.8	
Uplink C/N (dB)	25.4		21.9		25.9	
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	35.0		34.5		36.8	
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		-4.9	
Earth Station G/T, Clear Sky (dB/K)	41.9		37.7		31.0	
Boltzman Constant (dBW/K-Hz)	228.6		228.6		228.6	
Carrier Noise Bandwidth (dB-Hz)	-75.6		-75.6		-74.8	
Downlink C/N (dB)	23.5		23.0		14.5	
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	25.4		21.9		25.4	
C/N Downlink (dB)	23.5		23.0		14.5	
C/I Intermodulation (dB)	n/a		n/a		n/a	
C/I Uplink Co-Channel (dB)*	19.5		16.0		19.5	
C/I Downlink Co-Channel (dB)*	19.5		19.0		19.5	
C/I Uplink Adjacent Satellite 1 (dB)	24.7		21.3		24.7	
C/I Downlink Adjacent Satellite 1 (dB)	23.8		23.2		23.8	
C/I Uplink Adjacent Satellite 2 (dB)	22.9		19.5		22.9	
C/I Downlink Adjacent Satellite 2 (dB)	22.4		21.8		22.4	
C/(N+I) Composite (dB)	13.2		11.0		11.0	
Required System Margin (dB)	-1.0		-1.0		-1.0	
Net C/(N+I) Composite (dB)	12.2		10.0		10.0	
Minimum Required C/N (dB)	-10.0		-10.0		-10.0	
Excess Link Margin (dB)	2.2		0.0		2.6	
Number of Carriers	1.0		1.0		1.0	
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-44.7		-44.7		-51.6	
Downlink EIRP Density At Beam Peak	-23.0		-23.0		-30.0	

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

## EXHIBIT 13B: GALAXY 18 Ku-BAND LINK BUDGETS (continued)

UPLINK BEAM INFORMATION	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Beam Name	14000 - 14500	14000 - 14500	14000 - 14500	14000 - 14500	14000 - 14500	14000 - 14500
Uplink Frequency (MHz)	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Polarization	-10	-10	-10	-10	-10	-10
Uplink Relative Contour Level (dB)	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
Uplink Contour G/T (dB/K)	-68.9	-68.9	-68.9	-68.9	-68.9	-68.9
Uplink SFD (dBW/m <sup>2</sup> )	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
DOWNLINK BEAM INFORMATION	Conus	Conus	Conus	Conus	Conus	Conus
Downlink Beam Name	11700 - 12200	11700 - 12200	11700 - 12200	11700 - 12200	11700 - 12200	11700 - 12200
Downlink Frequency (MHz)	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Beam Polarization	-8	-8	-8	-8	-8	-8
Downlink Relative Contour Level (dB)	45.6	45.6	45.6	45.6	45.6	45.6
Downlink Contour EIRP (dBW)	42.0	42.0	42.0	42.0	42.0	42.0
Rain Rate (mm/hr)						
ADJACENT SATELLITE 1	125 WL	125 WL	125 WL	125 WL	125 WL	125 WL
Satellite 1 Orbital Location	-46.8	-46.8	-46.8	-46.8	-46.8	-46.8
Uplink Power Density (dBW/Hz)	0	0	0	0	0	0
Uplink Polarization Advantage (dB)	-23.30	-23.30	-23.30	-23.30	-23.30	-23.30
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)						
ADJACENT SATELLITE 2	121 WL	121 WL	121 WL	121 WL	121 WL	121 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)	-21.6	-21.6	-21.6	-21.6	-21.6	-21.6
Downlink EIRP Density (dBW/Hz)	0	0	0	0	0	0
Downlink Polarization Advantage (dB)						
CARRIER INFORMATION	3	3	3	4	4	4
Carrier ID	6M77G7W	6M77G7W	6M77G7W	1M82G7W	1M82G7W	1M82G7W
Emission Designation	6000	6000	6000	1544	1544	1544
Information Rate (kbps)	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK
Carrier Modulation	n/a	n/a	n/a	n/a	n/a	n/a
Peak to Peak Bandwidth of EDS (MHz)	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS	1/2xRS
Code Rate	6771.1	6771.1	6771.1	1819.2	1819.2	1819.2
Occupied Bandwidth (kHz)	10300	10300	10300	2325	2325	2325
Allocated Bandwidth (kHz)	3.9	3.9	3.9	3.0	3.0	3.0
Minimum C/N, Clear Sky (dB)	3.6	3.6	3.6	2.8	2.8	2.8
Minimum C/N, Rain (dB)						
UPLINK EARTH STATION	7	7	7	7	7	7
Earth Station Diameter (meters)	58.1	58.1	58.1	58.1	58.1	58.1
Earth Station Gain (dBi)	20	20	20	20	20	20
Earth Station Elevation Angle						
DOWNLINK EARTH STATION	6.1	6.1	6.1	4.6	4.6	4.6
Earth Station Diameter (meters)	55.5	55.5	55.5	53.5	53.5	53.5
Earth Station Gain (dBi)	33.1	33.1	29.7	31.0	31.0	27.8
Earth Station G/T (dB/K)	20	20	20	20	20	20
Earth Station Elevation Angle						
LINK FADE TYPE	Clear Sky	Uplink Fade	Downlink Fade	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE	76.2	76.2	76.2	70.2	70.2	70.2
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	-2.6	0.0
Uplink Rain Attenuation (dB)	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
Satellite G/T (dB/K)	228.6	228.6	228.6	228.6	228.6	228.6
Boltzman Constant (dBW/K-Hz)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Carrier Noise Bandwidth (dB-Hz)	17.3	14.8	7.7	27.0	24.4	27.0
Uplink C/N (dB)						
DOWNLINK PERFORMANCE	30.3	27.8	30.3	24.3	21.7	24.3
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	-6.1	0.0	0.0	-5.1
Downlink Rain Attenuation (dB)	33.1	33.1	29.7	31.0	31.0	27.8
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)	-68.3	-68.3	-68.3	-62.6	-62.6	-62.6
Carrier Noise Bandwidth (dB-Hz)	17.3	14.8	7.7	14.8	12.2	6.6
Downlink C/N (dB)						
COMPOSITE LINK PERFORMANCE	27.3	24.8	27.3	27.0	24.4	27.0
C/N Uplink (dB)	17.3	14.8	7.7	14.8	12.2	6.6
C/N Downlink (dB)	12.3	10.1	12.3	12.0	9.4	12.0
C/I Intermodulation (dB)	13.7	11.1	13.7	14.1	11.5	14.1
C/I Uplink Co-Channel (dB)*	13.7	11.2	13.7	14.1	11.5	14.1
C/I Downlink Co-Channel (dB)*	26.7	24.2	26.7	26.4	23.8	26.4
C/I Uplink Adjacent Satellite 1 (dB)	19.0	16.5	19.0	16.6	14.0	16.6
C/I Downlink Adjacent Satellite 1 (dB)	24.9	22.4	24.9	24.6	22.0	24.6
C/I Uplink Adjacent Satellite 2 (dB)	17.9	15.4	17.9	15.7	13.1	15.7
C/I Downlink Adjacent Satellite 2 (dB)						
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	3.5	3.5	3.5	15.5	15.5	15.5
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-50.2	-50.2	-50.2	-50.5	-50.5	-50.5
Downlink EIRP Density At Beam Peak	-30.0	-32.5	-30.0	-30.3	-32.9	-30.3

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

## EXHIBIT 13B: GALAXY 18 Ku-BAND LINK BUDGETS (continued)

UPLINK BEAM INFORMATION	Conus 14000 - 14500		Conus 14000 - 14500		Conus 14000 - 14500		Conus 14000 - 14500		Conus 14000 - 14500	
	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Beam Name										
Uplink Frequency (MHz)	14000 - 14500		14000 - 14500		14000 - 14500		14000 - 14500		14000 - 14500	
Uplink Beam Polarization	Horizontal/Vertical		Horizontal/Vertical		Horizontal/Vertical		Horizontal/Vertical		Horizontal/Vertical	
Uplink Relative Contour Level (dB)	-10		-10		-10		-10		-10	
Uplink Contour G/T (dB/K)	-1.7		-1.7		-1.7		-1.7		-1.7	
Uplink SFD (dBW/m <sup>2</sup> )	-68.9		-68.9		-68.9		-75.9		-75.9	
Rain Rate (mm/hr)	42.0		42.0		42.0		42.0		42.0	
DOWNLINK BEAM INFORMATION	Conus 11700 - 12200		Conus 11700 - 12200		Conus 11700 - 12200		Conus 11700 - 12200		Conus 11700 - 12200	
Downlink Beam Name										
Downlink Frequency (MHz)	11700 - 12200		11700 - 12200		11700 - 12200		11700 - 12200		11700 - 12200	
Downlink Beam Polarization	Vertical/Horizontal		Vertical/Horizontal		Vertical/Horizontal		Vertical/Horizontal		Vertical/Horizontal	
Downlink Relative Contour Level (dB)	-8		-8		-8		-8		-8	
Downlink Contour EIRP (dBW)	45.6		45.6		45.6		45.6		45.6	
Rain Rate (mm/hr)	42.0		42.0		42.0		42.0		42.0	
ADJACENT SATELLITE 1	125 WL		125 WL		125 WL		125 WL		125 WL	
Satellite 1 Orbital Location	125 WL		125 WL		125 WL		125 WL		125 WL	
Uplink Power Density (dBW/Hz)	-46.8		-46.8		-46.8		-46.8		-46.8	
Uplink Polarization Advantage (dB)	0		0		0		0		0	
Downlink EIRP Density (dBW/Hz)	-23.30		-23.30		-23.30		-23.30		-23.30	
Downlink Polarization Advantage (dB)	0		0		0		0		0	
ADJACENT SATELLITE 2	121 WL		121 WL		121 WL		121 WL		121 WL	
Satellite 2 Orbital Location	121 WL		121 WL		121 WL		121 WL		121 WL	
Uplink Power Density (dBW/Hz)	-45.0		-45.0		-45.0		-45.0		-45.0	
Uplink Polarization Advantage (dB)	0		0		0		0		0	
Downlink EIRP Density (dBW/Hz)	-21.6		-21.6		-21.6		-21.6		-21.6	
Downlink Polarization Advantage (dB)	0		0		0		0		0	
CARRIER INFORMATION	5		5		5		6		6	
Carrier ID	5		5		5		6		6	
Emission Designation	75K4G7W		75K4G7W		75K4G7W		1M23G7W		1M23G7W	
Information Rate (kbps)	64		64		64		512		512	
Carrier Modulation	QPSK		QPSK		QPSK		BPSK		BPSK	
Peak to Peak Bandwidth of EDS (MHz)	n/a		n/a		n/a		n/a		n/a	
Code Rate	1/2xRS		1/2xRS		1/2xRS		1/2		1/2	
Occupied Bandwidth (kHz)	75.4		75.4		75.4		1229		1229	
Allocated Bandwidth (kHz)	100		100		100		1450		1450	
Minimum C/N, Clear Sky (dB)	3.0		3.0		3.0		3.4		3.4	
Minimum C/N, Rain (dB)	2.8		2.8		2.8		2.7		2.7	
UPLINK EARTH STATION	7		7		7		7		7	
Earth Station Diameter (meters)	7		7		7		7		7	
Earth Station Gain (dBi)	58.1		58.1		58.1		58.1		58.1	
Earth Station Elevation Angle	20		20		20		20		20	
DOWNLINK EARTH STATION	4.6		4.6		4.6		4.6		4.6	
Earth Station Diameter (meters)	4.6		4.6		4.6		4.6		4.6	
Earth Station Gain (dBi)	53.5		53.5		53.5		53.5		53.5	
Earth Station G/T (dB/K)	31.0		31.0		27.8		31.0		27.8	
Earth Station Elevation Angle	20		20		20		20		20	
LINK FADE TYPE	Clear Sky		Uplink Fade		Downlink Fade		Clear Sky		Uplink Fade	
Clear Sky	Clear Sky		Uplink Fade		Downlink Fade		Clear Sky		Uplink Fade	
Uplink Fade	Uplink Fade		Uplink Fade		Downlink Fade		Uplink Fade		Uplink Fade	
Downlink Fade	Downlink Fade		Downlink Fade		Downlink Fade		Downlink Fade		Downlink Fade	
UPLINK PERFORMANCE	56.5		56.5		56.5		61.8		61.8	
Uplink Earth Station EIRP (dBW)	56.5		56.5		56.5		61.8		61.8	
Uplink Path Loss, Clear Sky (dB)	-207.5		-207.5		-207.5		-207.5		-207.5	
Uplink Rain Attenuation (dB)	0.0		-2.6		0.0		0.0		0.0	
Satellite G/T (dB/K)	-1.7		-1.7		-1.7		-1.7		-1.7	
Boltzman Constant (dBW/K-Hz)	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	
Uplink C/N (dB)	27.1		24.5		27.1		20.4		17.8	
DOWNLINK PERFORMANCE	10.6		8.0		10.6		22.9		20.4	
Downlink EIRP per Carrier (dBW)	10.6		8.0		10.6		22.9		20.4	
Antenna Pointing Error (dB)	-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	
Downlink Rain Attenuation (dB)	0.0		0.0		-5.2		0.0		-5.4	
Earth Station G/T, Clear Sky (dB/K)	31.0		31.0		27.8		31.0		27.8	
Boltzman Constant (dBW/K-Hz)	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	
Downlink C/N (dB)	14.9		12.3		6.6		15.2		12.6	
COMPOSITE LINK PERFORMANCE	27.1		24.5		27.1		20.4		17.8	
C/N Uplink (dB)	27.1		24.5		27.1		20.4		17.8	
C/N Downlink (dB)	14.9		12.3		6.6		15.2		12.6	
C/I Intermodulation (dB)	12.0		9.4		12.0		12.3		9.8	
C/I Uplink Co-Channel (dB)*	14.0		11.4		14.0		14.8		12.2	
C/I Downlink Co-Channel (dB)*	14.0		11.4		14.0		14.8		12.2	
C/I Uplink Adjacent Satellite 1 (dB)	26.5		23.9		26.5		19.7		17.2	
C/I Downlink Adjacent Satellite 1 (dB)	16.7		14.1		16.7		16.9		14.4	
C/I Uplink Adjacent Satellite 2 (dB)	24.7		22.1		24.7		17.9		15.4	
C/I Downlink Adjacent Satellite 2 (dB)	15.8		13.2		15.8		16.1		13.5	
C/(N+I) Composite (dB)	6.4		3.8		3.8		6.3		3.7	
Required System Margin (dB)	-1.0		-1.0		-1.0		-1.0		-1.0	
Net C/(N+I) Composite (dB)	5.4		2.8		2.8		5.3		2.7	
Minimum Required C/N (dB)	-3.0		-2.8		-2.8		-3.4		-2.7	
Excess Link Margin (dB)	2.4		0.0		0.0		1.9		0.0	
Number of Carriers	360		360		360		24.8		24.8	
Carrier Density Levels	-50.4		-50.4		-50.4		-57.2		-57.2	
Uplink Power Density (dBW/Hz)	-50.4		-50.4		-50.4		-57.2		-57.2	
Downlink EIRP Density At Beam Peak	-30.2		-32.8		-30.2		-30.0		-32.5	

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

# EXHIBIT 13B: GALAXY 18 Ku-BAND LINK BUDGETS (continued)

UPLINK BEAM INFORMATION			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14000 - 14500	14000 - 14500	14000 - 14500
Uplink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Uplink Relative Contour Level (dB)	-10	-10	-10
Uplink Contour G/T (dB/K)	-1.7	-1.7	-1.7
Uplink SFD (dBW/m <sup>2</sup> )	-75.9	-75.9	-75.9
Rain Rate (mm/hr)	42.0	42.0	42.0
DOWNLINK BEAM INFORMATION			
Downlink Beam Name	Conus	Conus	Conus
Downlink Frequency (MHz)	11700 - 12200	11700 - 12200	11700 - 12200
Downlink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Downlink Relative Contour Level (dB)	-8	-8	-8
Downlink Contour EIRP (dBW)	45.6	45.6	45.6
Rain Rate (mm/hr)	42.0	42.0	42.0
ADJACENT SATELLITE 1			
Satellite 1 Orbital Location	125 WL	125 WL	125 WL
Uplink Power Density (dBW/Hz)	-46.8	-46.8	-46.8
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-23.30	-23.30	-23.30
Downlink Polarization Advantage (dB)	0	0	0
ADJACENT SATELLITE 2			
Satellite 2 Orbital Location	121 WL	121 WL	121 WL
Uplink Power Density (dBW/Hz)	-45.0	-45.0	-45.0
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-21.6	-21.6	-21.6
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	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
Assumed Allocated Bandwidth (kHz)	400	400	400
Assumed Minimum C/N, Clear Sky (dB)	3.4	3.4	3.4
Assumed Minimum C/N, Rain (dB)	2.7	2.7	2.7
UPLINK EARTH STATION			
Earth Station Diameter (meters)	4.6	4.6	4.6
Earth Station Gain (dBi)	54.7	54.7	54.7
Earth Station Elevation Angle	20	20	20
DOWNLINK EARTH STATION			
Earth Station Diameter (meters)	7.0	7.0	7.0
Earth Station Gain (dBi)	57.0	57.0	57.0
Earth Station G/T (dB/K)	34.6	34.6	31.0
Earth Station Elevation Angle	20	20	20
LINK FADE TYPE			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	55.0	55.0	55.0
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)	-1.7	-1.7	-1.7
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)	19.6	17.1	19.6
DOWNLINK PERFORMANCE			
Downlink EIRP per Carrier (dBW)	16.1	13.7	16.1
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	-7.5
Earth Station G/T, Clear Sky (dB/K)	34.6	34.6	31.0
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)	18.0	15.5	6.9
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	19.6	17.1	19.6
C/N Downlink (dB)	18.0	15.5	6.9
C/I Intermodulation (dB)	11.5	9.1	11.5
C/I Uplink Co-Channel (dB)*	13.6	11.1	13.6
C/I Downlink Co-Channel (dB)*	13.6	11.1	13.6
C/I Uplink Adjacent Satellite 1 (dB)	19.0	16.5	19.0
C/I Downlink Adjacent Satellite 1 (dB)	19.8	17.3	19.8
C/I Uplink Adjacent Satellite 2 (dB)	17.2	14.7	17.2
C/I Downlink Adjacent Satellite 2 (dB)	18.6	16.1	18.6
C/(N+I) Composite (dB)	6.2	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	5.2	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.8	0.0	0.0
Number of Carriers	90	90	90
Carrier Density Levels			
Uplink Power Density (dBW/Hz)	-54.5	-54.5	-54.5
Downlink EIRP Density At Beam Peak	-30.7	-33.2	-30.7

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