

## EXHIBIT 13A: Galaxy 17 C-Band Link Budgets

UPLINK BEAM INFORMATION					
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	6175	6175	6175	6175	6175
Uplink Beam Polarization	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Uplink Relative Contour Level (dB)	-5	-5	-5	-5	-5
Uplink Contour G/T (dB/K)	0.2	0.2	0.2	0.2	0.2
Uplink SFD (dBW/m <sup>2</sup> )	-86.2	-86.2	-86.2	-86.2	-86.2
DOWNLINK BEAM INFORMATION					
Downlink Beam Name	Conus	Conus	Conus	Conus	Conus
Downlink Frequency (MHz)	3950	3950	3950	3950	3950
Downlink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical
Downlink Relative Contour Level (dB)	-3	-3	-3	-3	-3
Downlink Contour EIRP (dBW)	40.3	40.3	40.3	40.3	40.3
ADJACENT SATELLITE 1					
Satellite 1 Orbital Location	89 WL	89 WL	89 WL	89 WL	89 WL
Uplink Power Density (dBW/Hz)	-44	-44	-44	-44	-44
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-31.5	-31.5	-31.5	-31.5	-31.5
Downlink Polarization Advantage (dB)	0	0	0	0	0
ADJACENT SATELLITE 2					
Satellite 2 Orbital Location	93 WL	93 WL	93 WL	93 WL	93 WL
Uplink Power Density (dBW/Hz)	-44	-44	-44	-44	-44
Uplink Polarization Advantage (dB)	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32.5	-32.5	-32.5	-32.5	-32.5
Downlink Polarization Advantage (dB)	0	0	0	0	0
CARRIER INFORMATION					
Carrier ID	36M0F3F	30M1G7W	4M15G7W	1M21G7W	75K4G7W
Information Rate (kbps)	n/a	36863	6000	1544	64
Carrier Modulation	TV/FM	QPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	4	n/a	n/a	n/a	n/a
Code Rate	n/a	3/4-RS	3/4-RS	3/4-RS	1/2-RS
Occupied Bandwidth (kHz)	36000	30133	4154.0	1212.8	75.4
Allocated Bandwidth (kHz)	36000	36000	6875	1550	100
Minimum C/N (dB)	10	6.1	6.7	5.7	3.0
UPLINK EARTH STATION					
Earth Station Diameter (meters)	8.1	8.1	8.1	8.1	8.1
Earth Station Gain (dBi)	52.8	52.8	52.8	52.8	52.8
Earth Station Elevation Angle	20	20	20	20	20
DOWNLINK EARTH STATION					
Earth Station Diameter (meters)	4.5	3.0	3.5	3.5	3.0
Earth Station Gain (dBi)	43.9	39.7	41.1	41.1	39.7
Earth Station G/T (dB/K)	23.6	19.2	21	21	19.2
Earth Station Elevation Angle	20	20	20	20	20
UPLINK PERFORMANCE					
Uplink Earth Station EIRP (dBW)	76.7	76.7	64.1	57.6	45.9
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2	-200.2
Satellite G/T (dB/K)	0.2	0.2	0.2	0.2	0.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-66.2	-60.8	-48.8
Uplink C/N (dB)	29.7	30.5	26.5	25.3	25.8
DOWNLINK PERFORMANCE					
Downlink EIRP per Carrier (dBW)	40.3	40.3	29.2	22.7	11.0
Antenna Pointing Error (dB)	-0.5	-0.5	-0.5	-0.5	-0.5
Downlink Path Loss, Clear Sky (dB)	-196.3	-196.3	-196.3	-196.3	-196.3
Earth Station G/T (dB/K)	23.6	19.2	21	21.0	19.2
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-75.6	-74.8	-66.2	-60.8	-48.8
Downlink C/N (dB)	20.1	16.5	15.7	14.6	13.2
COMPOSITE LINK PERFORMANCE					
C/N Uplink (dB)	29.7	30.5	26.5	25.3	25.8
C/N Downlink (dB)	20.1	16.5	15.7	14.6	13.2
C/I Intermodulation (dB)	n/a	n/a	18.9	17.8	18.2
C/I Uplink Co-Channel (dB)*	25.0	25.0	24.5	24.5	24.8
C/I Downlink Co-Channel (dB)*	25.0	25.0	24.5	24.5	24.8
C/I Uplink Adjacent Satellite 1 (dB)	22.1	22.9	18.9	17.7	18.2
C/I Downlink Adjacent Satellite 1 (dB)	19.8	16.9	15.6	14.4	13.7
C/I Uplink Adjacent Satellite 2 (dB)	22.1	22.9	18.9	17.7	18.2
C/I Downlink Adjacent Satellite 2 (dB)	18.3	9.2	11.8	10.7	6.0
C/(N+I) Composite (dB)	12.6	7.4	7.7	6.7	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	11.6	6.4	6.7	5.7	3.0
Minimum Required C/N (dB)	-10.0	-6.1	-6.7	-5.7	-3.0
Excess Link Margin (dB)	1.6	0.3	0.0	0.0	0.0
Number of Carriers	1	1	5.2	23.2	360
Carrier Density Levels					
Uplink Power Density (dBW/Hz)	-42.1	-50.9	-54.9	-56.1	-55.6
Downlink EIRP Density At Beam Peak	-22.7	-31.5	-34.0	-35.2	-34.7

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

## EXHIBIT 13B: Galaxy 17 Ku-BAND LINK BUDGETS

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
Uplink SFD (dBW/m <sup>2</sup> )	-83.1	-83.1	-83.1	-83.1	-83.1	-83.1
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	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	47.3	47.3	47.3	47.3	47.3	47.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	89 WL	89 WL	89 WL	89 WL	89 WL	89 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-23	-23	-23	-23	-23	-23
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	93 WL	93 WL	93 WL	93 WL	93 WL	93 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-24.9	-24.9	-24.9	-24.9	-24.9	-24.9
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	36M0E3F	36M0E3F	36M0E3F	30M1G7W	30M1G7W	30M1G7W
Carrier Modulation	TV/FM	TV/FM	TV/FM	OPSK	OPSK	OPSK
Peak to Peak Bandwidth of EDS (MHz)	4	4	4	n/a	n/a	n/a
Information Rate (kbps)	n/a	n/a	n/a	36863	36863	36863
Code Rate	n/a	n/a	n/a	3/4 - RS	3/4 - RS	3/4 - RS
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
UPLINK EARTH STATION						
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	1.2	1.2	1.2
Earth Station Gain (dBi)	47.5	47.5	47.5	41.3	41.3	41.3
Earth Station G/T (dB/K)	25	25	22.4	18.8	18.8	16.6
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)	79.8	79.8	79.8	79.8	79.8	79.8
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-5.0	0.0	0.0	-5.4	0.0
Satellite G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
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
Uplink C/N (dB)	26.5	21.5	26.5	27.2	21.9	27.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	47.3	45.6	47.3	47.3	45.3	47.3
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	-2.4
Earth Station G/T (dB/K)	25.0	25.0	22.4	18.8	18.8	16.6
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)	18.9	17.2	12.9	13.4	11.4	8.9
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	26.5	21.5	26.5	27.2	21.9	27.2
C/N Downlink (dB)	18.9	17.2	12.9	13.4	11.4	8.9
C/I Intermodulation (dB)	n/a	n/a	n/a	n/a	n/a	n/a
C/I Uplink Co-Channel (dB)*	25.0	20.0	25.0	25.0	19.6	25.0
C/I Downlink Co-Channel (dB)*	25.0	23.3	25.0	25.0	23.0	25.0
C/I Uplink Adjacent Satellite 1 (dB)	25.2	20.3	25.2	26.0	20.6	26.0
C/I Downlink Adjacent Satellite 1 (dB)	21.5	19.8	21.5	16.8	14.7	16.8
C/I Uplink Adjacent Satellite 2 (dB)	25.2	20.3	25.2	26.0	20.6	26.0
C/I Downlink Adjacent Satellite 2 (dB)	21.8	20.2	21.8	15.2	13.2	15.2
C/(N+I) Composite (dB)	13.9	11.0	11.0	9.6	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)	12.9	10.0	10.0	8.6	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)	2.9	0.0	0.0	2.5	0.0	0.0
Number of Carriers	1	1	1	1	1	1
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-43.1	-43.1	-43.1	-51.9	-51.9	-51.9
Downlink EIRP Density At Beam Peak	-14.7	-16.4	-14.7	-23.5	-23.5	-23.5

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

## EXHIBIT 13B: Galaxy 17 Ku-BAND LINK BUDGETS (cont)

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
Uplink SFD (dBW/m <sup>2</sup> )	-83.1	-83.1	-83.1	-83.1	-83.1	-83.1
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	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	47.3	47.3	47.3	47.3	47.3	47.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	89 WL	89 WL	89 WL	89 WL	89 WL	89 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-23	-23	-23	-23	-23	-23
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	93 WL	93 WL	93 WL	93 WL	93 WL	93 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-24.9	-24.9	-24.9	-24.9	-24.9	-24.9
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	4M15G7W	4M15G7W	4M15G7W	1M21G7W	1M21G7W	1M21G7W
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
Information Rate (kbps)	6000	6000	6000	1544	1544	1544
Code Rate	3/4 - RS	3/4 - RS	3/4 - RS	3/4 - RS	3/4 - RS	3/4 - RS
Occupied Bandwidth (kHz)	4154	4154	4154	1212.8	1212.8	1212.8
Allocated Bandwidth (kHz)	6875	6875	6875	1550	1550	1550
Minimum C/N, Clear Sky (dB)	6.7	6.3	6.3	5.7	5.5	5.5
Minimum C/N, Rain (dB)	6.7	6.3	6.3	5.7	5.5	5.5
UPLINK EARTH STATION						
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)	1.8	1.8	1.8	1.8	1.8	1.8
Earth Station Gain (dBi)	44.8	44.8	44.8	44.8	44.8	44.8
Earth Station G/T (dB/K)	22.3	22.3	19.8	22.3	22.3	19.7
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)	66.8	66.8	66.8	60.6	60.6	60.6
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.8	0.0	0.0	-2.8	0.0
Satellite G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-66.2	-66.2	-66.2	-60.8	-60.8	-60.8
Uplink C/N (dB)	22.8	20.0	22.8	22.0	19.2	22.0
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	36.8	34.1	36.8	30.6	27.9	30.6
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	-3.1	0.0	0.0	-3.2
Earth Station G/T (dB/K)	22.3	22.3	19.8	22.3	22.3	19.7
Boltzman Constant (dBW/K-Hz)	228.6	228.6	228.6	228.6	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-66.2	-66.2	-66.2	-60.8	-60.8	-60.8
Downlink C/N (dB)	15.0	12.4	9.4	14.2	11.5	8.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	22.8	20.0	22.8	22.0	19.2	22.0
C/N Downlink (dB)	15.0	12.4	9.4	14.2	11.5	8.5
C/I Intermodulation (dB)	19.2	17.4	19.2	18.3	15.8	18.3
C/I Uplink Co-Channel (dB)*	25.2	22.4	25.2	25.5	22.7	25.5
C/I Downlink Co-Channel (dB)*	25.2	22.5	25.2	25.5	22.8	25.5
C/I Uplink Adjacent Satellite 1 (dB)	21.6	18.8	21.6	20.8	18.0	20.8
C/I Downlink Adjacent Satellite 1 (dB)	17.9	15.3	17.9	17.1	14.4	17.1
C/I Uplink Adjacent Satellite 2 (dB)	21.6	18.8	21.6	20.8	18.0	20.8
C/I Downlink Adjacent Satellite 2 (dB)	17.7	15.1	17.7	16.9	14.2	16.9
C/(N+I) Composite (dB)	9.9	7.3	7.3	9.1	6.4	6.4
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	8.9	6.3	6.3	8.1	5.4	5.4
Minimum Required C/N (dB)	-6.7	-6.3	-6.3	-5.7	-5.5	-5.5
Excess Link Margin (dB)	2.2	0.0	0.0	2.5	0.0	0.0
Number of Carriers	5	5	5	20.9	20.9	20.9
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-56.3	-56.3	-56.3	-57.1	-57.1	-57.1
Downlink EIRP Density At Beam Peak	-25.4	-25.4	-25.4	-26.2	-26.2	-26.2

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

## EXHIBIT 13B: Galaxy 17 Ku-BAND LINK BUDGETS (cont)

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus	Conus	Conus	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250	14250	14250	14250
Uplink Beam Polarization	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6	-6	-6	-6
Uplink Contour G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
Uplink SFD (dBW/m <sup>2</sup> )	-83.1	-83.1	-83.1	-83.1	-83.1	-83.1
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	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	47.3	47.3	47.3	47.3	47.3	47.3
Rain Rate (mm/hr)	42.0	42.0	42.0	42.0	42.0	42.0
ADIACENT SATELLITE 1						
Satellite 1 Orbital Location	89 WL	89 WL	89 WL	89 WL	89 WL	89 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-23	-23	-23	-23	-23	-23
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
ADIACENT SATELLITE 2						
Satellite 2 Orbital Location	93 WL	93 WL	93 WL	93 WL	93 WL	93 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-24.9	-24.9	-24.9	-24.9	-24.9	-24.9
Downlink Polarization Advantage (dB)	0	0	0	0	0	0
CARRIER INFORMATION						
Carrier ID	1M23G7W	1M23G7W	1M23G7W	75K4G7W	75K4G7W	75K4G7W
Carrier Modulation	BPSK	BPSK	BPSK	QPSK	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a	n/a	n/a	n/a
Information Rate (kbps)	512	512	512	64	64	64
Code Rate	1/2	1/2	1/2	1/2 - RS	1/2 - RS	1/2 - RS
Occupied Bandwidth (kHz)	1229	1229	1229	75.4	75.4	75.4
Allocated Bandwidth (kHz)	1450	1450	1450	100	100	100
Minimum C/N, Clear Sky (dB)	3.4	2.7	2.7	3.0	2.8	2.8
Minimum C/N, Rain (dB)	3.4	2.7	2.7	3.0	2.8	2.8
UPLINK EARTH STATION						
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)	1.2	1.2	1.2	1.2	1.2	1.2
Earth Station Gain (dBi)	41.3	41.3	41.3	41.3	41.3	41.3
Earth Station G/T (dB/K)	18.8	18.8	16.3	18.8	18.8	16.3
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)	60.7	60.7	60.7	48.7	48.7	48.7
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.9	0.0	0.0	-2.9	0.0
Satellite G/T (dB/K)	1.1	1.1	1.1	1.1	1.1	1.1
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	-48.8	-48.8	-48.8
Uplink C/N (dB)	22.0	19.1	22.0	22.2	19.3	22.2
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	30.7	27.9	30.7	18.7	15.8	18.7
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	-2.9	0.0	0.0	-3.0
Earth Station G/T (dB/K)	18.8	18.8	16.3	18.8	18.8	16.3
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	-48.8	-48.8	-48.8
Downlink C/N (dB)	10.7	7.9	5.4	10.9	8.0	5.5
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	22.0	19.1	22.0	22.2	19.3	22.2
C/N Downlink (dB)	10.7	7.9	5.4	10.9	8.0	5.5
C/I Intermodulation (dB)	18.4	15.7	18.4	18.5	15.6	18.5
C/I Uplink Co-Channel (dB)*	25.8	23.0	25.8	25.5	22.6	25.5
C/I Downlink Co-Channel (dB)*	25.8	23.0	25.8	25.5	22.6	25.5
C/I Uplink Adjacent Satellite 1 (dB)	20.8	17.9	20.8	20.9	18.1	20.9
C/I Downlink Adjacent Satellite 1 (dB)	14.1	11.2	14.1	14.2	11.3	14.2
C/I Uplink Adjacent Satellite 2 (dB)	20.8	17.9	20.8	20.9	18.1	20.9
C/I Downlink Adjacent Satellite 2 (dB)	12.5	9.7	12.5	12.7	9.8	12.7
C/(N+I) Composite (dB)	6.5	3.7	3.7	6.7	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)	5.5	2.7	2.7	5.7	2.8	2.8
Minimum Required C/N (dB)	-3.4	-2.7	-2.7	-3.0	-2.8	-2.8
Excess Link Margin (dB)	2.1	0.0	0.0	2.7	0.0	0.0
Number of Carriers	20.4	20.4	20.4	322.8	322.8	322.8
Carrier Density Levels						
Uplink Power Density (dBW/Hz)	-57.1	-57.1	-57.1	-57.0	-57.0	-57.0
Downlink EIRP Density At Beam Peak	-26.2	-26.2	-26.2	-26.1	-26.1	-26.1

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

## EXHIBIT 13B: Galaxy 17 Ku-BAND LINK BUDGETS (cont)

UPLINK BEAM INFORMATION			
Uplink Beam Name	Conus	Conus	Conus
Uplink Frequency (MHz)	14250	14250	14250
Uplink Beam Polarization	Vertical	Vertical	Vertical
Uplink Relative Contour Level (dB)	-6	-6	-6
Uplink Contour G/T (dB/K)	1.1	1.1	1.1
Uplink SFD (dBW/m <sup>2</sup> )	-83.1	-83.1	-83.1
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	Horizontal	Horizontal	Horizontal
Downlink Relative Contour Level (dB)	-4	-4	-4
Downlink Contour EIRP (dBW)	47.3	47.3	47.3
Rain Rate (mm/hr)	42.0	42.0	42.0
ADJACENT SATELLITE 1			
Satellite 1 Orbital Location	89 WL	89 WL	89 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-23	-23	-23
Downlink Polarization Advantage (dB)	0	0	0
ADJACENT SATELLITE 2			
Satellite 2 Orbital Location	93 WL	93 WL	93 WL
Uplink Power Density (dBW/Hz)	-45	-45	-45
Uplink Polarization Advantage (dB)	0	0	0
Downlink EIRP Density (dBW/Hz)	-24.9	-24.9	-24.9
Downlink Polarization Advantage (dB)	0	0	0
CARRIER INFORMATION			
Carrier ID	307KG7W	307KG7W	307KG7W
Carrier Modulation	BPSK	BPSK	BPSK
Peak to Peak Bandwidth of EDS (MHz)	n/a	n/a	n/a
Information Rate (kbps)	128	128	128
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	2.7	2.7
Minimum C/N, Rain (dB)	3.4	2.7	2.7
UPLINK EARTH STATION			
Earth Station Diameter (meters)	1.2	1.2	1.2
Earth Station Gain (dBi)	42.9	42.9	42.9
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 (dB/K)	33.1	33.1	29.5
Earth Station Elevation Angle	20	20	20
LINK FADE TYPE			
	Clear Sky	Uplink Fade	Downlink Fade
UPLINK PERFORMANCE			
Uplink Earth Station EIRP (dBW)	47.5	47.5	47.5
Uplink Path Loss, Clear Sky (dB)	-207.5	-207.5	-207.5
Uplink Rain Attenuation (dB)	0.0	-2.2	0.0
Satellite G/T (dB/K)	1.1	1.1	1.1
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)	14.9	12.7	14.9
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	-7.0
Earth Station G/T (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	7.3
COMPOSITE LINK PERFORMANCE			
C/N Uplink (dB)	14.9	12.7	14.9
C/N Downlink (dB)	17.9	15.7	7.3
C/I Intermodulation (dB)	11.2	9.0	11.2
C/I Uplink Co-Channel (dB)*	18.2	16.1	18.2
C/I Downlink Co-Channel (dB)*	18.2	16.1	18.2
C/I Uplink Adjacent Satellite 1 (dB)	13.6	11.5	13.6
C/I Downlink Adjacent Satellite 1 (dB)	19.9	17.8	19.9
C/I Uplink Adjacent Satellite 2 (dB)	13.6	11.5	13.6
C/I Downlink Adjacent Satellite 2 (dB)	21.2	19.1	21.2
C/(N+I) Composite (dB)	5.9	3.7	3.7
Required System Margin (dB)	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	4.9	2.7	2.7
Minimum Required C/N (dB)	-3.4	-2.7	-2.7
Excess Link Margin (dB)	1.5	0.0	0.0
Number of Carriers	90	90	90
Carrier Density Levels			
Uplink Power Density (dBW/Hz)	-50.3	-50.3	-50.3
Downlink EIRP Density At Beam Peak	-33.4	-33.4	-33.4

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