

EXHIBIT 4: GALAXY 12 LINK BUDGETS

UPLINK BEAM INFORMATION				
Uplink Beam Name	CONUS	CONUS	CONUS	CONUS
Uplink Frequency (MHz)	5925 - 6425	5925 - 6425	5925 - 6425	5925 - 6425
Uplink Beam Polarization	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal
Uplink Relative Contour Level (dB)	-4	-4	-4	-4
Uplink Contour G/T (dB/K)	-0.5	-0.5	-0.5	-0.5
Uplink SFD (dBW/m ²)	-89.5	-89.5	-93.5	-93.5
DOWNLINK BEAM INFORMATION				
Downlink Beam Name	CONUS	CONUS	CONUS	CONUS
Downlink Frequency (MHz)	3700 - 4200	3700 - 4200	3700 - 4200	3700 - 4200
Downlink Beam Polarization	Horizontal / Vertical	Horizontal / Vertical	Horizontal / Vertical	Horizontal / Vertical
Downlink Relative Contour Level (dB)	-4	-4	-4	-4
Downlink Contour EIRP (dBW)	39.4	40.2	40.2	40.2
ADJACENT SATELLITE 1				
Satellite 1 Orbital Location	125 WL	125 WL	125 WL	125 WL
Uplink Power Density (dBW/Hz)	-47.5	-47.5	-47.5	-47.5
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-31.4	-31.4	-31.4	-31.4
Downlink Polarization Advantage (dB)	0	0	0	0
ADJACENT SATELLITE 2				
Satellite 2 Orbital Location	121 WL	121 WL	121 WL	121 WL
Uplink Power Density (dBW/Hz)	-44.2	-44.2	-44.2	-44.2
Uplink Polarization Advantage (dB)	0	0	0	0
Downlink EIRP Density (dBW/Hz)	-32.5	-32.5	-32.5	-32.5
Downlink Polarization Advantage (dB)	0	0	0	0
CARRIER INFORMATION				
Carrier ID	36M0F3F	30M1G7W	6M77G7W	75K4G7W
Information Rate (kbps)	n/a	32767	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	1/2xRS	1/2xRS	1/2xRS
Occupied Bandwidth (kHz)	36000	30133	6771.1	75.4
Allocated Bandwidth (kHz)	36000	36000	10300	100
Minimum C/N, Rain (dB)	10	5.1	3.9	3.0
UPLINK EARTH STATION				
Earth Station Diameter (meters)	6.1	6.1	6.1	6.1
Earth Station Gain (dBi)	49.4	49.4	49.4	49.4
Earth Station Elevation Angle	20	20	20	20
DOWNLINK EARTH STATION				
Earth Station Diameter (meters)	4.5	3.0	3.0	3.0
Earth Station Gain (dBi)	43.9	39.7	39.7	39.7
Earth Station G/T, Clear Sky (dB/K)	23.6	19.2	19.2	19.2
Earth Station Elevation Angle	20	20	20	20
UPLINK PERFORMANCE				
Uplink Earth Station EIRP (dBW)	73.4	73.4	60.7	40.3
Uplink Path Loss, Clear Sky (dB)	-200.2	-200.2	-200.2	-200.2
Satellite G/T (dB/K)	-0.5	-0.5	-0.5	-0.5
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)	25.7	26.5	20.3	19.4
DOWNLINK PERFORMANCE				
Downlink EIRP per Carrier (dBW)	39.4	40.2	33.0	12.6
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)	23.6	19.2	19.2	19.2
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)	19.2	16.4	15.7	14.8
COMPOSITE LINK PERFORMANCE				
C/N Uplink (dB)	25.7	26.5	20.3	19.4
C/N Downlink (dB)	19.2	16.4	15.7	14.8
C/I Intermodulation (dB)	n/a	n/a	20.8	19.9
C/I Uplink Co-Channel (dB)*	24.0	24.0	25.8	25.5
C/I Downlink Co-Channel (dB)*	24.0	24.0	25.8	25.5
C/I Uplink Adjacent Satellite 1 (dB)	23.9	24.7	18.5	17.6
C/I Downlink Adjacent Satellite 1 (dB)	19.3	17.2	16.5	15.7
C/I Uplink Adjacent Satellite 2 (dB)	19.5	20.2	14.0	13.2
C/I Downlink Adjacent Satellite 2 (dB)	16.7	7.7	7.0	6.1
C/(N+I) Composite (dB)	11.5	6.3	4.9	4.0
Required System Margin (dB)	-1.0	-1.0	-1.0	-1.0
Net C/(N+I) Composite (dB)	10.5	5.3	3.9	3.0
Minimum Required C/N (dB)	-10.0	-5.1	-3.9	-3.0
Excess Link Margin (dB)	0.5	0.2	0.0	0.0
Carrier Density Levels				
Number of Carriers	1.0	1.0	2.3	256.0
Uplink Power Density (dBW/Hz)	-42.0	-50.8	-57.0	-57.9
Downlink EIRP Density At Beam Peak (dBW/Hz)	-22.6	-30.6	-31.3	-32.2

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