

EXHIBIT 4A: Galaxy 4R C-Band Link Budgets

UPLINK BEAM INFORMATION						
Uplink Beam Name	Conus		Conus		Conus	
Uplink Frequency (MHz)	6175		6175		6175	
Uplink Beam Polarization	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal	Vertical/Horizontal
Uplink Relative Contour Level (dB)	-4		-4		-4	
Uplink Contour G/T (dB/K)	-4.0		-4.0		-4.0	
Uplink SFD (dBW/m ²)	-88.0		-88.0		-84.0	
Uplink Input Backoff (dB)	0		5		5	
DOWNLINK BEAM INFORMATION						
Downlink Beam Name	Conus		Conus		Conus	
Downlink Frequency (MHz)	3950		3950		3950	
Downlink Beam Polarization	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical	Horizontal/Vertical
Downlink Relative Contour Level (dB)	-4		-4		-4	
Downlink Contour EIRP (dBW)	38.1		38.1		38.1	
Downlink Output Backoff (dB)	0		3.5		3.5	
ADJACENT SATELLITE 1						
Satellite 1 Orbital Location	74.85 WL		74.85 WL		74.85 WL	
Uplink Power Density (dBW/Hz)	-38.7		-38.7		-38.7	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-32.0		-32.0		-32.0	
Downlink Polarization Advantage (dB)	0		0		0	
ADJACENT SATELLITE 2						
Satellite 2 Orbital Location	78.85 WL		78.85 WL		78.85 WL	
Uplink Power Density (dBW/Hz)	-38.7		-38.7		-38.7	
Uplink Polarization Advantage (dB)	0		0		0	
Downlink EIRP Density (dBW/Hz)	-32.0		-32.0		-32.0	
Downlink Polarization Advantage (dB)	0		0		0	
CARRIER INFORMATION						
Carrier ID	1		2		3	
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		3/4 - RS		3/4 - RS	
Occupied Bandwidth (kHz)	36000		30133		4154	
Allocated Bandwidth (kHz)	36000		36000		6875	
Minimum C/N _{min} (dB)	10.0		6.1		6.7	
5.7					5.7	
3.0					3.0	
UPLINK EARTH STATION						
Earth Station Diameter (meters)	7.0		7.0		7.0	
Earth Station Gain (dBi)	51.0		51.0		51.0	
Earth Station Elevation Angle	20		20		20	
DOWNLINK EARTH STATION						
Earth Station Diameter (meters)	8.1		3.5		3.5	
Earth Station Gain (dBi)	49.3		41.1		41.1	
Earth Station G/T (dB/K)	28.4		21.0		21.0	
Earth Station Elevation Angle	20		20		20	
UPLINK PERFORMANCE						
Uplink Earth Station EIRP (dBW)	74.9		74.9		68.4	
Uplink Path Loss, Clear Sky (dB)	-200.2		-200.2		-200.2	
Satellite G/T (dB/K)	-4.0		-4.0		-4.0	
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)	23.7		24.5		26.6	
25.5					25.5	
22.8					22.8	
DOWNLINK PERFORMANCE						
Downlink EIRP per Carrier (dBW)	38.1		38.1		29.1	
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 (dB/K)	28.4		21.0		21.0	
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)	22.7		16.1		15.7	
14.5					14.5	
11.9					11.9	
COMPOSITE LINK PERFORMANCE						
C/N Uplink (dB)	23.7		24.5		26.6	
C/N Downlink (dB)	22.7		16.1		15.7	
C/I Intermodulation (dB)	n/a		n/a		21.1	
C/I Uplink Co-Channel (dB)*	24.0		24.0		25.7	
C/I Downlink Co-Channel (dB)*	24.0		24.0		25.7	
C/I Uplink Adjacent Satellite 1 (dB)	16.0		16.8		18.9	
C/I Downlink Adjacent Satellite 1 (dB)	23.0		16.4		16.0	
C/I Uplink Adjacent Satellite 2 (dB)	16.0		16.8		18.9	
C/I Downlink Adjacent Satellite 2 (dB)	21.6		11.6		11.2	
10.1					10.1	
7.5					7.5	
C/(N+I) Composite (dB)	11.0		7.7		7.7	
Required System Margin (dB)	-1.0		-1.0		-1.0	
Net C/(N+I) Composite (dB)	10.0		6.7		6.7	
Minimum Required C/N (dB)	-10.0		-6.1		-6.7	
Excess Link Margin (dB)	0.0		0.6		0.0	
Number of Carriers	1.0		1.0		3.6	
15.8					15.8	
360.0					360.0	
CARRIER DENSITY LEVELS						
Uplink Power Density (dBW/Hz)	-42.1		-50.9		-48.8	
Downlink EIRP Density At Beam Peak	-23.9		-32.7		-33.1	
-34.2					-34.2	
-36.9					-36.9	

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