

Table A.1: DIRECTV 1R Link Budgets

UPLINK BEAM INFORMATION		
Uplink Beam Name	RUSSIA	RUSSIA
Uplink Frequency (GHz)	17.450	17.450
Uplink Beam Polarization	CIRCULAR	CIRCULAR
Uplink Relative Contour Level (dB)	-6.0	-6.0
Uplink Contour G/T (dB/K)	0.8	0.8
Uplink SFD (dBW/m2)	-79.8	-79.8
Rain Rate (mm/hr)	22.0	22.0
DOWNLINK BEAM INFORMATION		
Downlink Beam Name	RUSSIA	RUSSIA
Downlink Frequency (GHz)	12.350	12.350
Downlink Beam Polarization	CIRCULAR	CIRCULAR
Downlink Relative Contour Level (dB)	-6.0	-6.0
Downlink Contour EIRP (dBW)	51.8	51.8
Rain Rate (mm/hr)	22.0	22.0
ADJACENT SATELLITE 1		
Satellite 1 Orbital Location	51.2E	51.2E
Uplink Power Density (dBW/Hz)	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-21.4	-21.4
Downlink Polarization Advantage (dB)	0.0	0.0
ADJACENT SATELLITE 2		
Satellite 1 Orbital Location	60.3E	60.3E
Uplink Power Density (dBW/Hz)	-45.0	-45.0
Uplink Polarization Advantage (dB)	0.0	0.0
Downlink EIRP Density (dBW/Hz)	-26.2	-26.2
Downlink Polarization Advantage (dB)	0.0	0.0
CARRIER INFORMATION		
Carrier ID	24M0G7W	24M0G7W
Carrier Modulation	QPSK	QPSK
Peak to Peak Bandwidth of EDS (MHz)	N/A	N/A
Information Rate(kbps)	16383	16383
Code Rate	1/2x188/204	1/2x188/204
Occupied Bandwidth(kHz)	20089	20089
Allocated Bandwidth(kHz)	24000	24000
Minimum C/N, Clear Sky (dB)	3.36	3.36
Minimum C/N, Rain (dB)	3.36	3.36
UPLINK EARTH STATION		
Earth Station Diameter (meters)	5.0	5.0
Earth Station Gain (dBi)	57.0	57.0
Earth Station Elevation Angle	20	20
DOWNLINK EARTH STATION		
Earth Station Diameter (meters)	.60	.90
Earth Station Gain (dBi)	35.5	39.0
Earth Station G/T (dB/K)	13.0	16.5
Earth Station Elevation Angle	20	20
LINK FADE TYPE	Clear Sky	Clear Sky
UPLINK PERFORMANCE		
Uplink Earth Station EIRP (dBW)	72.2	72.2
Uplink Path Loss, Clear Sky (dB)	-209.2	-209.2
Uplink Rain Attenuation	0.0	0.0
Satellite G/T(dB/K)	0.8	0.8
Boltzman Constant(dBW/K-Hz)	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-73.0	-73.0
Uplink C/N(dB)	19.3	19.3
DOWNLINK PERFORMANCE		
Downlink EIRP per Carrier (dBW)	46.8	46.8
Antenna Pointing Error (dB)	-.5	-.5
Downlink Path Loss, Clear Sky (dB)	-206.2	-206.2
Downlink Rain Attenuation	0.0	0.0
Earth Station G/T (dB/K)	13.0	16.5
Boltzman Constant(dBW / K - Hz)	228.6	228.6
Carrier Noise Bandwidth (dB-Hz)	-73.0	-73.0
Downlink C / N(dB)	8.6	12.1
COMPOSITE LINK PERFORMANCE		
C/N Uplink (dB)	19.3	19.3
C/N Downlink (dB)	8.6	12.1
C/I Intermodulation (dB)	N/A	N/A
C/I Uplink Co-Channel (dB)*	27.0	27.0
C/I Downlink Co-Channel (dB)*	27.0	27.0
C/I Uplink Adjacent Satellite 1 (dB)	29.5	29.5
C/I Downlink Adjacent Satellite 1 (dB)	19.7	19.3
C/I Uplink Adjacent Satellite 2 (dB)	29.3	29.3
C/I Downlink Adjacent Satellite 2 (dB)	21.7	22.2
C/(N+I) Composite (dB)	7.6	10.1
Required System Margin (dB)	-1.0	-1.0
Net C/(N+I) Composite (dB)	6.6	9.1
Minimum Required C/N (dB)	-3.4	-3.4
Excess Link Margin (dB)	3.3	5.8
Number of Carriers	1.0	1.0
CARRIER DENSITY LEVELS		
Uplink Power Density (dBW/Hz)	-57.8	-57.8
Downlink EIRP Density At Beam Peak (dBW/Hz)	-20.2	-20.2