

EchoStar-15 Link Budgets

(QPSK Normal Mode)

Link Parameters		Rio de Janeiro	Brasilia	Sao Paulo
Link Geometry:				
Tx E/S Range to Satellite	(km)	36,520	36,520	36,520
Rx E/S Range to Satellite	(km)	36,372	36,077	36,404
Uplink (per carrier):				
Carrier Frequency	(MHz)	17,500	17,500	17,500
Tx E/S Antenna Diameter	(m)	13.2	13.2	13.2
Tx E/S Power to Antenna	(dBW)	11.2	11.2	11.2
Tx E/S Antenna Gain	(dB)	65.8	65.8	65.8
Tx E/S EIRP per Carrier	(dBW)	77.0	77.0	77.0
Atmospheric and Other Losses	(dB)	0.5	0.5	0.5
Free Space Loss	(dB)	208.6	208.6	208.6
Satellite:				
G/T towards Tx E/S	(dB/K)	9.9	9.9	9.9
Peak EIRP	(dBW)	56.5	56.5	56.5
EIRP towards Rx E/S	(dBW)	53.2	55.3	52.5
Downlink (per carrier):				
Carrier Frequency	(MHz)	12,500	12,500	12,500
Atmospheric Losses	(dB)	0.1	0.1	0.1
Free Space Loss	(dB)	205.6	205.5	205.6
Rain Attenuation	(dB)	7.4	9.5	7.1
Rx E/S Antenna Diameter	(m)	0.60	0.60	0.60
Antenna Mis-pointing Error	(dB)	0.40	0.40	0.40
Rx E/S Antenna Gain	(dB)	36.5	36.5	36.5
Rx E/S G/T	(dB/K)	15.7	15.7	15.7
Noise Temperature - Clear Sky	(K)	120	120	120
Noise Temperature - Rain	(K)	346	364	341
Total Link:				
Noise Bandwidth	(dB-Hz)	73.2	73.2	73.2
(C/N) - Thermal Uplink	(dB)	33.2	33.2	33.2
(C/N) - Thermal Downlink - Clear Sky	(dB)	18.2	20.4	17.5
(C/N) - Thermal Downlink - Rain Down	(dB)	6.1	6.0	5.9
(C/I) - Adjacent Satellite Interference	(dB)	30.0	32.2	29.3
(C/N+I) - Clear Sky	(dB)	17.5	19.5	16.9
(C/N+I) - Rain Down	(dB)	6.1	6.0	5.8
(C/N+I) - Total Required	(dB)	5.8	5.8	5.8
Downlink Margin - Clear Sky	(dB)	11.7	13.7	11.1
Downlink Margin - Rain Down	(dB)	0.3	0.2	0.0
Downlink Availability	(%)	99.98	99.98	99.98