

EchoStar-15 Link Budgets

(QPSK Normal Mode)

Link Parameters		Rio de Janeiro	Manaus	Recife
Link Geometry:				
Tx E/S Range to Satellite	(km)	40,504	40,504	40,504
Rx E/S Range to Satellite	(km)	36,372	36,048	35,977
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)	209.5	209.5	209.5
Satellite:				
G/T towards Tx E/S	(dB/K)	9.7	9.7	9.7
Peak EIRP	(dBW)	56.5	56.5	56.5
EIRP towards Rx E/S	(dBW)	54.7	53.0	53.5
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	205.5
Rain Attenuation	(dB)	7.4	7.5	7.5
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	346	347
Total Link:				
Noise Bandwidth	(dB-Hz)	73.2	73.2	73.2
(C/N) - Thermal Uplink	(dB)	32.1	32.1	32.1
(C/N) - Thermal Downlink - Clear Sky	(dB)	19.7	18.1	18.6
(C/N) - Thermal Downlink - Rain Down	(dB)	7.6	6.0	6.5
(C/I) - Adjacent Satellite Interference	(dB)	31.5	29.9	30.4
(C/N+I) - Clear Sky	(dB)	18.8	17.4	17.9
(C/N+I) - Rain Down	(dB)	7.6	5.9	6.4
(C/N+I) - Total Required	(dB)	5.8	5.8	5.8
Downlink Margin - Clear Sky	(dB)	13.0	11.6	12.1
Downlink Margin - Rain Down	(dB)	1.8	0.1	0.6
Downlink Availability	(%)	99.98	99.89	99.95