

EchoStar 17/24 GHz Link Budget

Link Parameters		Clear Sky (New York)	Faded D/L (New York)	Clear Sky (Miami)	Faded D/L (Miami)
Link Geometry:					
Tx E/S Range to Satellite (Cheyenne)	(km)	38,983	38,983	38,983	38,983
Rx E/S Range to Satellite	(km)	37,670	37,670	36,853	36,853
Uplink:					
Carrier Frequency	(MHz)	25,000	25,000	25,000	25,000
Tx E/S Antenna Diameter	(m)	12.0	12.0	12.0	12.0
Max. Tx E/S Power to Antenna	(W)	4.7	4.7	4.7	4.7
Max. Tx E/S Power Density to Antenna	(dBW/MHz)	-6.5	-6.5	-6.5	-6.5
Tx E/S Antenna Gain	(dB)	68.2	68.2	68.2	68.2
Tx E/S EIRP per Carrier	(dBW)	74.9	74.9	74.9	74.9
Atmospheric and Other Losses	(dB)	0.5	0.5	0.5	0.5
Free Space Loss	(dB)	212.2	212.2	212.2	212.2
Satellite:					
G/T towards Tx E/S	(dB/K)	10.3	10.3	10.3	10.3
EIRP per Carrier towards Rx E/S	(dBW)	56.5	56.5	58.3	58.3
Downlink:					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.2	5.6	0.2	9.0
Free Space Loss	(dB)	208.8	208.8	208.6	208.6
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1	36.1	36.1
Pointing Error	(dB)	0.5	0.5	0.5	0.5
Rx E/S G/T	(dB/K)	13.1	10.1	13.1	9.7
System (LNA+Sky) Noise Temperature	(K)	200	397	200	440
Total Link:					
Bandwidth	(dB-Hz)	73.20	73.20	73.20	73.20
C/N - Thermal Uplink	(dB)	27.8	27.8	27.8	27.8
C/N - Thermal Downlink	(dB)	15.5	7.1	17.5	5.2
C/I - Aggregate uplink ASI	(dB)	37.6	37.6	37.6	37.6
C/I - Aggregate downlink ASI	(dB)	20.6	20.6	19.6	19.6
C/I - Other Link Degradations	(dB)	20.0	20.0	20.0	20.0
C/(N+I) - Total, Actual	(dB)	13.1	6.7	13.9	4.9
C/(N+I) - Total, Required	(dB)	4.8	4.8	4.8	4.8
Excess Margin	(dB)	8.3	1.9	9.1	0.1
Availability	(%)	N/A	99.90	N/A	99.85
Aggregate Interference Assessment:					
(C/N) - no ASI	(dB)	14.0	6.8	15.3	5.1
Degradation due to aggregate ASI	(dB)	0.9	0.2	1.4	0.2