

# EchoStar 17/24 GHz Link Budget

Link Parameters		Clear Sky (Los Angeles)	Faded D/L (Los Angeles)	Clear Sky (Mexico City)	Faded D/L (Mexico City)
<b>Link Geometry:</b>					
Tx E/S Range to Satellite (Cheyenne)	(km)	38,110	38,110	38,110	38,110
Rx E/S Range to Satellite	(km)	38,362	38,362	36,627	36,627
<b>Uplink:</b>					
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)	5.0	5.0	5.0	5.0
Max. Tx E/S Power Density to Antenna	(dBW/MHz)	-6.8	-6.8	-6.8	-6.8
Tx E/S Antenna Gain	(dB)	68.2	68.2	68.2	68.2
Tx E/S EIRP per Carrier	(dBW)	75.2	75.2	75.2	75.2
Atmospheric and Other Losses	(dB)	0.7	0.7	0.7	0.7
Free Space Loss	(dB)	212.0	212.0	212.0	212.0
<b>Satellite:</b>					
G/T towards Tx E/S	(dB/K)	17.3	17.3	17.3	17.3
EIRP per Carrier towards Rx E/S	(dBW)	52.5	52.5	52.3	52.3
<b>Downlink:</b>					
Carrier Frequency	(MHz)	17,500	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.3	2.7	0.2	2.4
Free Space Loss	(dB)	209.0	209.0	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	11.1	13.1	11.2
System (LNA+Sky) Noise Temperature	(K)	200	319	200	311
<b>Total Link:</b>					
Bandwidth	(dB-Hz)	73.8	73.8	73.8	73.8
C/N - Thermal Uplink	(dB)	34.5	34.5	34.5	34.5
C/N - Thermal Downlink	(dB)	10.6	6.2	10.9	6.8
C/I - Aggregate uplink ASI	(dB)	37.3	37.3	37.3	37.3
C/I - Aggregate downlink ASI	(dB)	18.9	18.9	13.1	13.1
C/I - Other Link Degradations	(dB)	22.0	22.0	22.0	22.0
C/(N+I) - Total, Actual	(dB)	9.7	5.9	8.6	5.8
C/(N+I) - Total, Required	(dB)	5.8	5.8	5.8	5.8
Excess Margin	(dB)	3.9	0.1	2.8	0.0
Availability	(%)	N/A	99.89	N/A	99.85
<b>Aggregate Interference Assessment:</b>					
(C/N) - no ASI	(dB)	10.3	6.1	10.6	6.7
Degradation due to aggregate ASI	(dB)	0.6	0.2	1.9	0.9