

# EchoStar 17/24 GHz Link Budget

Link Parameters		Clear Sky (Mexico City)	Faded D/L (Mexico City)
<b>Link Geometry:</b>			
Tx E/S Range to Satellite (Cheyenne)	(km)	37,621	37,621
Rx E/S Range to Satellite	(km)	36,340	36,340
<b>Uplink:</b>			
Carrier Frequency	(MHz)	25,000	25,000
Tx E/S Antenna Diameter	(m)	12.0	12.0
Max. Tx E/S Power to Antenna	(W)	4.7	4.7
Max. Tx E/S Power Density to Antenna	(dBW/MHz)	-6.9	-6.9
Tx E/S Antenna Gain	(dB)	68.2	68.2
Tx E/S EIRP per Carrier	(dBW)	74.9	74.9
Atmospheric and Other Losses	(dB)	0.5	0.5
Free Space Loss	(dB)	211.9	211.9
<b>Satellite:</b>			
G/T towards Tx E/S	(dB/K)	10.3	10.3
EIRP per Carrier towards Rx E/S	(dBW)	55.9	55.9
<b>Downlink:</b>			
Carrier Frequency	(MHz)	17,500	17,500
Atmospheric and Other Losses	(dB)	0.1	3.8
Free Space Loss	(dB)	208.5	208.5
Rx E/S Antenna Diameter	(m)	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1
Pointing Error	(dB)	0.5	0.5
Rx E/S G/T	(dB/K)	13.1	10.6
System (LNA+Sky) Noise Temperature	(K)	200	359
<b>Total Link:</b>			
Bandwidth	(dB-Hz)	73.60	73.60
C/N - Thermal Uplink	(dB)	27.8	27.8
C/N - Thermal Downlink	(dB)	14.9	8.6
C/I - Aggregate uplink ASI	(dB)	37.5	37.5
C/I - Aggregate downlink ASI	(dB)	16.9	16.9
C/I - Other Link Degradations	(dB)	20.0	20.0
C/(N+I) - Total, Actual	(dB)	11.9	7.7
C/(N+I) - Total, Required	(dB)	7.5	7.5
Excess Margin	(dB)	4.4	0.2
Availability	(%)	N/A	99.95
<b>Aggregate Interference Assessment:</b>			
(C/N) - no ASI	(dB)	13.6	8.3
Degradation due to aggregate ASI	(dB)	1.7	0.6