

# 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	(km)	38,983	38,983
Rx E/S Range to Satellite	(km)	37,592	37,592
<b>Uplink:</b>			
Carrier Frequency	(MHz)	25,198	25,198
Tx E/S Antenna Diameter	(m)	12.0	12.0
Max. Tx E/S Power to Antenna	(W)	15.0	15.0
Max. Tx E/S Power Density to Antenna	(dBW/MHz)	-7.1	-7.1
Tx E/S Antenna Gain	(dB)	68.2	68.2
Tx E/S EIRP per Carrier	(dBW)	80.0	80.0
Atmospheric and Other Losses	(dB)	0.5	0.5
Free Space Loss	(dB)	212.3	212.3
<b>Satellite:</b>			
G/T towards Tx E/S	(dB/K)	17.2	17.2
EIRP per Carrier towards Rx E/S	(dBW)	62.8	62.8
<b>Downlink:</b>			
Carrier Frequency	(MHz)	17,748	17,748
Atmospheric and Other Losses	(dB)	0.2	5.1
Free Space Loss	(dB)	208.9	208.9
Rx E/S Antenna Diameter	(m)	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.2	36.2
Pointing Error	(dB)	0.5	0.5
Rx E/S G/T	(dB/K)	13.2	10.4
System (LNA+Sky) Noise Temperature	(K)	200	387
<b>Total Link:</b>			
Bandwidth	(dB-Hz)	78.90	78.90
C/N - Thermal Uplink	(dB)	34.1	34.1
C/N - Thermal Downlink	(dB)	16.1	8.3
C/I - Aggregate uplink ASI	(dB)	36.9	36.9
C/I - Aggregate downlink ASI	(dB)	18.2	18.2
C/I - Other Link Degradations	(dB)	22.0	22.0
C/(N+I) - Total, Actual	(dB)	13.3	7.7
C/(N+I) - Total, Required	(dB)	7.5	7.5
Excess Margin	(dB)	5.8	0.2
Availability	(%)	N/A	99.96
<b>Aggregate Interference Assessment:</b>			
(C/N) - no ASI	(dB)	15.0	8.1
Degradation due to aggregate ASI	(dB)	1.7	0.4