

# EchoStar 17 GHz RBW DBS Link Budget

Link Parameters		Clear Sky (New York)	Faded D/L (New York)	Faded D/L (Los Angeles)
<b>Link Geometry:</b>				
Tx E/S Range to Satellite (Cheyenne)	(km)	37,871	37,871	37,871
Rx E/S Range to Satellite	(km)	37,669	37,669	37,912
<b>Uplink (per carrier):</b>				
Carrier Frequency	(MHz)	25,000	25,000	25,000
Tx E/S Antenna Diameter	(m)	12.0	12.0	12.0
Tx E/S Power to Antenna	(W)	53.7	53.7	53.7
Tx E/S Antenna Gain	(dB)	68.2	68.2	68.2
Tx E/S EIRP per Carrier	(dBW)	85.5	85.5	85.5
Atmospheric and Other Losses	(dB)	0.5	0.5	0.5
Free Space Loss	(dB)	212.0	212.0	212.0
<b>Satellite:</b>				
G/T towards Tx E/S	(dB/K)	10.3	10.3	10.3
EIRP per Carrier towards Rx E/S	(dBW)	55.2	55.2	52.1
<b>Downlink:</b>				
Carrier Frequency	(MHz)	17,500	17,500	17,500
Atmospheric and Other Losses	(dB)	0.3	3.8	1.8
Free Space Loss	(dB)	208.8	208.8	208.9
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45
Rx E/S Antenna Gain	(dB)	36.1	36.1	36.1
Rx E/S G/T	(dB/K)	13.1	10.6	11.6
System (LNA+Sky) Noise Temp.	(K)	200	357	284
<b>Total Link:</b>				
Carrier Noise Bandwidth	(kHz)	24,000	24,000	24,000
(C/N) - Thermal Uplink	(dB)	38.1	38.1	38.1
(C/N) - Thermal Downlink	(dB)	14.0	8.0	7.7
(C/I) - Other Link Degradations	(dB)	20.0	20.0	20.0
(C/N) - Total Actual	(dB)	13.0	7.7	7.5
(C/N) - Total Required	(dB)	4.8	4.8	4.8
Excess Margin	(dB)	8.2	2.9	2.7
Availability	(%)	N/A	99.80	99.80