

ECHOSTAR-8 Link Budgets

Link Parameters		High Power Mode		
		1	2	3
		13 meter Feeder Link E/S	13 meter Feeder Link E/S	13 meter Feeder Link E/S
		Nominal Feeder Link Site	Nominal Feeder Link Site	Nominal Feeder Link Site
		to	to	to
		45 cm Receive-Only	45 cm Receive-Only	45 cm Receive-Only
Modulation Parameters:				
Information Bit Rate per Carrier	(kbps)	27,647	27,647	27,647
FEC Rate		3/4	3/4	3/4
Reed-Solomon Ratio (188/204, None)		188/204	188/204	188/204
Overall Coding Overhead	(%)	44.7%	44.7%	44.7%
Modulation Type (BPSK/QPSK/8PSK/16QAM)		QPSK	QPSK	QPSK
Filter Roll-off Factor ("alpha")	(%)	20	20	20
Link Geometry:				
Satellite Longitude	(°East)	-77.0	-77.0	-77.0
Tx E/S City Location	(name)	Cheyenne	Cheyenne	Cheyenne
Tx E/S Longitude	(°East)	-104.7	-104.7	-104.7
Tx E/S Latitude	(°North)	41.1	41.1	41.1
Tx E/S Range to Satellite	(Km)	38,209	38,209	38,209
Tx E/S Elevation to Satellite	(°)	34.7	34.7	34.7
Tx E/S Altitude	(m)	1876.0	1876.0	1876.0
Rx E/S City Location	(name)	Miami	New York	Los Angeles
Rx E/S Longitude	(°East)	-80.3	-74.0	-118.2
Rx E/S Latitude	(°North)	25.9	40.8	34.0
Rx E/S Range to Satellite	(km)	36,542	37,571	38,507
Rx E/S Elevation to Satellite	(°)	59.5	42.8	31.2
Rx E/S Altitude	(m)	1.0	15.0	33.0
Link (per carrier):				
Carrier Frequency	(MHz)	17,550	17,550	17,550
HPA Power Level (to give required PFD at satellite)	(W)	26.8	26.9	26.9
HPA Power in dBW	(dBW)	14.3	14.3	14.3
Post-HPA Losses	(dB)	2.0	2.0	2.0
Tx E/S Power to Antenna in dBW	(dBW)	12.3	12.3	12.3
Tx E/S Antenna Diameter	(m)	13.0	13.0	13.0
Antenna Efficiency	(%)	65	65	65
Tx E/S Antenna Gain	(dB)	65.7	65.7	65.7
Tx E/S EIRP	(dBW)	78.0	78.0	78.0
E/S Pointing Loss	(dB)	0.1	0.1	0.1
Atmospheric Loss	(dB)	0.34	0.34	0.34
Availability up	(%)	99.9	99.9	99.9
Rain attenuation (ITU-R Rec. P.618-8)	(dB)	2.7	2.7	2.7
Free Space Loss	(dB)	209.0	209.0	209.0