

# ECHOSTAR-5 Link Budgets

		Medium Power Mode		
Link Parameters		1	2	3
		13 meter Feeder Link E/S Nominal Feeder Link Site	13 meter Feeder Link E/S Nominal Feeder Link Site	13 meter Feeder Link E/S Nominal Feeder Link Site
		to	to	to
		45 cm Receive-Only	45 cm Receive-Only	45 cm Receive-Only
<b>Modulation Parameters:</b>				
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
<b>Link Geometry:</b>				
Satellite Longitude	(°East)	-148.0	-148.0	-148.0
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)	39,032	39,032	39,032
Tx E/S Elevation to Satellite	(°)	25.4	25.4	25.4
Tx E/S Altitude	(m)	1876.0	1876.0	1876.0
Rx E/S City Location	(name)	Houston	Denver	Los Angeles
Rx E/S Longitude	(°East)	-95.3	-105.0	-118.2
Rx E/S Latitude	(°North)	29.8	39.8	34.0
Rx E/S Range to Satellite	(km)	39,186	38,937	37,838
Rx E/S Elevation to Satellite	(°)	23.8	26.4	39.3
Rx E/S Altitude	(m)	10.0	1631.0	33.0
<b>Link (per carrier):</b>				
Carrier Frequency	(MHz)	17,550	17,550	17,550
HPA Power Level (to give required PFD at satellite)	(W)	134.0	134.0	134.0
HPA Power in dBW	(dBW)	21.3	21.3	21.3
Post-HPA Losses	(dB)	2.0	2.0	2.0
Tx E/S Power to Antenna in dBW	(dBW)	19.3	19.3	19.3
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)	85.0	85.0	85.0
E/S Pointing Loss	(dB)	0.1	0.1	0.1
Atmospheric Loss	(dB)	0.45	0.45	0.45
Availability up	(%)	99.9	99.9	99.9
Rain attenuation (ITU-R Rec. P.618-8)	(dB)	3.9	3.9	3.9
Free Space Loss	(dB)	209.2	209.2	209.2