

TABLE 8: Link Budgets for 7 Typical Links - Digital carriers

Parameter	Digital TV MCPC 40 Mbps QPSK ¾ RS	Digital TV MCPC 32 Mbps QPSK ¾ RS	Digital TV MCPC 60 Mbps QPSK ¾ RS	Digital TV SCPC QPSK ¾ RS
Carrier designation	36M0G7W	27M0G7W	54M0G7W	5M00G1W
Data Rate (dB-Hz)	76.00	75.00	77.80	67.60
Throughput rate (Mbps)	39.81	31.62	60.26	5.75
Symbol rate (Msps)	28.80	22.88	43.59	4.16
Uplinks:				
Transmit Power (dBW)	20.00	20.00	8.90	8.90
Transmit Loss (dB)	-2.50	-2.50	-2.50	-2.50
Antenna diameter	6.10	6.10	6.10	3.70
Antenna Gain (dBi)	57.31	57.31	57.31	52.97
Ground Station EIRP (dBW)	74.81	74.81	74.80	59.37
Uplink Rain Loss (dB)	-2.00	-2.00	-2.00	-2.00
Free Space Loss (dB)	-207.00	-207.00	-207.00	-207.00
Satellite G/T (dB/K)	3.00	3.00	3.00	3.00
Boltzmann's Constant (dBW/K-Hz)	-228.60	-228.60	-228.60	-228.60
Eb/NO (dB)	21.41	22.41	19.60	14.37
Eb/IO (dB)	18.00	18.00	16.00	16.00
Total Eb/(NO + IO) (dB)	16.37	16.66	14.43	12.10
Downlinks:				
Satellite Carrier EIRP (dBW)	47.00	46.00	47.00	34.30
Interference bandwidth (MHz)	36.00	27.00	54.00	5.00
Satellite EIRP density (dBW/4KHz)	7.46	7.71	5.70	3.33
Downlink Rain Loss (dB)	-3.00	-3.00	-3.00	-3.00
Free Space Loss (dB)	-205.40	-205.40	-205.40	-205.40
Ground station antenna dia, m	1.20	1.20	1.20	2.40
Ground Station G/T (dB/K)	20.91	20.91	20.91	26.93
Eb/NO (dB)	12.11	12.11	10.31	13.83
C/IM			18.00	18.00
Eb/Imo (dB)			16.60	16.60
C/I	15.00	15.00	15.00	15.00
Eb/IO (ASI) (dB)	13.59	13.59	13.59	13.59
Eb/IO (dB)	13.59	13.59	13.59	13.59
Eb/(NO + IO) (dB)	9.78	9.78	7.99	9.71
Total Up/Down Eb/(NO+Io)(dB)	8.92	8.97	7.10	7.73
Required Eb/NO	5.40	5.40	5.40	5.40
Margin	3.52	3.57	1.70	2.33

56 Kbps QPSK ¾ RS 100KG1W	1.544 Mbps QPSK ¾ RS 1M60G1W	Digital TV MCPC 50 Mbps 8PSK ¾ RS 36M0G7W
47.50	61.89	77.00
0.06	1.54	50.12
0.04	1.12	27.19
-2.00	8.00	20.00
-2.50	-2.50	-2.50
1.80	1.80	6.10
46.71	46.71	57.31
42.21	52.21	74.81
-2.00	-2.00	-2.00
-207.00	-207.00	-207.00
3.00	3.00	3.00
-228.60	-228.60	-228.60
17.31	12.93	20.41
16.00	16.00	18.00
13.60	11.19	16.03
18.50	28.50	47.00
0.10	1.60	36.00
4.52	2.48	7.46
-3.00	-3.00	-3.00
-205.40	-205.40	-205.40
1.20	2.40	2.40
20.91	26.93	26.93
12.11	13.74	17.13
18.00	18.00	
16.60	16.60	
15.00	15.00	15.00
13.59	13.59	12.34
13.59	13.59	12.34
8.96	9.67	11.10
7.67	7.35	9.89
5.40	5.40	7.20
2.27	1.95	2.69