

Table 4 Link budgets for 7 typical Ku-band carriers

Parameter	Digital TV MCPC 40 MBPS QPSK $\frac{3}{4}$ RS	Digital TV MCPC 40 MBPS QPSK $\frac{3}{4}$ RS	Digital TV SCPC QPSK $\frac{3}{4}$ RS	Digital TV SCPC QPSK $\frac{3}{4}$ RS	56Kbps QPSK $\frac{3}{4}$ RS
Digital MOD ID	A_Ku	B_Ku	C_Ku	D_Ku	E_Ku
Carrier designation	36M0G7 W	27M0G7 W	6M95G1 W	5M00G1 W	100KG1 W
Throughput rate, Mbps	40	32	8	6	0.0562
Symbol rate, MHz	28.8	22.9	5.7	4.2	0.0407
<b>Uplinks:</b>					
Transmit Power (dBW)	20	20	8.9	8.9	-2
Transmit Loss (dB)	-1	-1	-1	-1	-1
Antenna diameter	6.1	6.1	3.7	3.7	1.8
Antenna Gain (dBi)	57.2	57.2	52.9	52.9	46.6
Ground Station EIRP (dBW)	76.2	76.2	60.8	60.8	43.6
Uplink Rain Loss (dB)	-2	-2	-2	-2	-2
Free Space Loss (dB)	-207.5	-207.5	-207.5	-207.5	-207.5
Satellite G/T (dB/K)	3	3	3	3	3
Data Rate (dB-Hz)	76	75	69	67.6	47.5
Boltzmann's Constant (dBW/K-Hz)	-228.6	-228.6	-228.6	-228.6	-228.6
Eb/No (dB)	22.3	23.3	13.9	15.3	18.2
Eb/Io (dB)	18	18	16	16	16
Total Eb/(No + Io) (dB) For 10 <sup>-7</sup>	16.6	16.9	11.8	12.6	14
<b>Downlinks:</b>					
Satellite Carrier EIRP (dBW)	49.4	49.4	35.7	34.3	18.5
Downlink Rain Loss (dB)	-3	-3	-3	-3	-3
Free Space Loss (dB)	-206.3	-206.3	-206.3	-206.3	-206.3
Ground station antenna dia, m	0.9	0.9	2.4	2.4	1.2
Ground Station G/T (dB/K)	17.1	17.1	25.6	25.6	19.6
Eb/No (dB)	9.8	10.8	11.6	11.6	9.9
C/IM(dB)			18	18	18
Eb/InterMod, dB			16.6	16.6	16.6
C/I(ASI), dB	15	15	15	15	15
Eb/Io(ASI), dB	13.6	13.6	13.6	13.6	13.6
Eb/Io (dB)	13.6	13.6	11.8	11.8	11.8
Eb/(No + Io) (dB)	8.3	9	8.7	8.7	7.7
Eb/(No+Io) total (dB)	7.7	8.3	7	7.2	6.8

Required(dB)	5.4	5.4	5.4	5.4	5.4
Margin(dB)	2.3	2.9	1.6	1.8	1.4

Table 5 Link budgets for TV/FM in Ku-band

Parameter	Typical TV/FM link
Carrier designation	36M0F3F
Uplinks:	
Transmit Power (dBW)	22
Transmit Loss (dB)	-1
Antenna diameter	6.1
Antenna Gain (dBi)	57.2
Ground Station EIRP (dBW)	78.2
Uplink Rain Loss (dB)	-2
Free Space Loss (dB)	-207.5
Satellite G/T (dB/K)	3
Bandwidth (dB-Hz)	75.6
Boltzmann's Constant (dBW/K-Hz)	-228.6
C/N, uplink(dB)	24.7
Downlinks:	
Satellite Carrier EIRP (dBW)	49.4
Downlink Rain Loss (dB)	-3
Free Space Loss (dB)	-206.3
Ground station antenna dia, m	1.2
Ground Station G/T (dB/K)	19.6
C/N, DL (dB)	12.7
C/I ASI (dB)	18
C/Ntot, dB	11.4
Required(dB)	11
Margin(dB)	0.4

1.544 MBPS QPSK 3/4	Digital TV MCPC 50 MBPS 8PSK 2/3 RS
F_Ku	G_Ku
1M60G1 W	36M0G7 W
1.544	50
1.1	27.1
	32.55319
8	20
-1	-1
1.8	6.1
46.6	57.2
53.6	76.2
-2	-2
-207.5	-207.5
3	3
61.9	76
-228.6	-228.6
13.8	21.3
16	18
11.8	16.3
28.5	49.4
-3	-3
-206.3	-206.3
2.4	2.4
25.6	25.6
11.5	17.3
18	
16.6	
15	15
13.6	12.3
11.8	12.3
8.7	11.1
6.9	10

5.4	7.2
1.5	2.8