

Link Budget Calculation

	unit	(U1)	(D1)	(D2)
modulation method		FM	FM	CW
perpose		command	mission	beacon
transmitter power	W	50	0.8	0.1
transmit feeder loss	dB	1	0.5	0.5
reception feeder loss	dB	0.5	1	1
antenna noise temperature	K	100	300	300
feeder noise temperature	K	313	313	313
receiver noise temperature	K	527	172	172
distance between R&T antenna	km	739	739	739
wavelength	km	0.00069	0.00069	0.00069
frequency	MHz	437.2	437.2	437.2
absorption coefficient of oxygen	dB/km	0.005	0.005	0.005
absorption coefficient of vapor	dB/km	0	0	0
length of equivalent path of oxygen	km	45.9	45.9	45.9
length of equivalent path of vapor	km	22.9	22.9	22.9
angle of elevation	deg	30	30	30
ground temperature	K	300	300	300
Tm (clear weather)	K	286	286	286
Tm (rain)	K	286.5	286.5	286.5
required Eb/N0	dB	23.2	21	9.6
required S/N	dB	23.2	21	10
hardware deterioration	dB	3.5	3.5	3.5
coding gain	dB	3.1	3.1	0
bit rate	dBHz	30.79	30.79	6.99
modulation loss	dB	3.5	3.5	3.5
antilogarithm of feeder loss		1.12	1.26	1.26
transmitter power	dBW	17	-1	-10
transmit antenna gain	dBi	14.8	2.15	2.15
transmit EIRP	dBW	29.8	-0.3	-9.4
	dbm	59.8	29.7	20.7
transmit antenna pointing loss	dB	1	1	1
path loss	dB	142.6	142.6	142.6
polarization coupling loss	dB	3	3	3
air absorption loss	dB	0.229474	0.229474	0.229474
rain loss	dB	0	0	0