

LB3 – LINK BUDGETS - FDMAR

Table A-7: FDMA Return Link Voice Budget		
Satellite and Earth Station Information		
Downlink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.1	-111.1
Uplink elevation angle (degrees)	36.1	36.1
Carrier Information		
Frequency reuse pattern	12.0	12.0
Beam pitch (deg)	0.25	0.25
Number of beams	280.0	280.0
Number of voice channels per beam	128.2	128.2
Information rate (Kbps) plus overhead	5.64	5.64
Modulation	QPSK	QPSK
FEC code rate	0.58	0.58
Transmission rate (kbps)	9.7	9.7
Allocated bandwidth per carrier (kHz)	6.50	6.50
Required total C/N with margin (dB)	3.4	3.4
Uplink		
Uplink frequency (GHz)	2.0	2.0
Uplink EIRP (on-axis) (dBW)	-6.0	-6.0
Uplink atmospheric loss (dB)	0.1	0.1
Uplink free space loss (dB)	190.1	190.1
Fade + head loss (dB)	9.0	9.0
Transponder G/T dBi/K	21.5	21.5
Polarization loss (dB) or dual polarization gain (-)	0.0	0.0
Uplink C/N (dB)	8.0	8.0
C/I inband ATC (dB)	100.0	100.0
C/I inter-beam (dB)	14.8	14.8
C/I adj-channel (dB)	16.0	16.0
Composite uplink C/I (dB)	12.3	12.3
Satellite Transponder		
C/I ATC affecting amplifier backoff (dB)	-41.0	-41.0
Power control tolerance (dB)	1.0	1.0
Per carrier output backoff (dB)	51.9	51.9
Expected C/IM in digital carrier bandwidth at satellite (dB)	19.0	19.0
Downlink		
Downlink frequency (GHz)	11.0	11.0
Satellite EIRP per carrier (dBW)	2.6	2.6
Downlink free space pathloss (dB)	204.7	204.7
Downlink atmospheric loss (dB)	0.1	0.1
Rain availability (%)	99.99	99.99
Downlink rain fade (dB)	2.2	2.2
Pointing + line losses (dB)	1.0	1.0
Earth station on-axis G/T (dBi/K)	31.4	34.5

Downlink C/N (dB)	17.7	20.9
Expected composite downlink C/I (dB)	28.9	28.9
Overall Performance Summary		
Computed uplink or system margin (dB)	2.7	2.9
Downlink margin (dB)	11.4	14.5

Table A-8: FDMA Return Link Data Budget

Satellite and Earth Station Information		
Downlink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.1	-111.1
Uplink elevation angle (degrees)	36.1	36.1
Carrier Information		
Frequency reuse pattern	12.0	12.0
Beam pitch (deg)	0.3	0.3
Number of carriers per beam	1.0	1.0
Information rate (Kbps) plus overhead	38.9	38.9
Modulation	16-QAM	16-QAM
FEC code rate	0.50	0.50
Transmission rate (kbps)	77.9	77.9
Allocated bandwidth per carrier (kHz)	26.0	26.0
Required total C/N with margin (dB)	7.4	7.4
Uplink		
Uplink frequency (GHz)	2.0	2.0
Uplink EIRP (on-axis) (dBW)	-6.0	-6.0
Uplink atmospheric loss (dB)	0.1	0.1
Uplink free space loss (dB)	190.1	190.1
Fade + head loss(dB)	0.6	1.0
Transponder G/T dBi/K	21.5	21.5
Polarization loss (dB) or dual polarization gain (-)	0.0	0.0
Uplink C/N (dB)	10.4	10.0
C/I inband ATC (dB)	100.0	100.0
C/I inter-beam (dB)	14.8	14.8
C/I adj-channel (dB)	16.0	16.0
Composite uplink C/I (dB)	12.3	12.3
Satellite Transponder		
C/I ATC affecting amplifier backoff(dB)	-41.0	-41.0
Power control tolerance (dB)	1.0	1.0
Per carrier output backoff (dB)	46.0	46.0
Expected C/IM in digital carrier bandwidth at satellite (dB)	19.0	19.0
Downlink		
Downlink frequency (GHz)	11.0	11.0
Satellite EIRP per carrier (dBW)	8.5	8.5
Downlink free space pathloss (dB)	204.7	204.7
Downlink atmospheric loss (dB)	0.1	0.1
Rain availability (%)	99.99	99.99

Downlink rain fade (dB)	2.2	2.2
Pointing + line losses (dB)	1.0	1.0
Earth station on-axis G/T (dBi/K)	31.4	34.5
Downlink C/N (dB)	17.6	20.7
Expected composite downlink C/I (dB)	28.9	28.9
Overall Performance Summary		
Computed uplink or system margin (dB)	0.0	0.0
Downlink margin (dB)	0.1	0.6