

Table A-15: Modified Wimax Forward Data Link Budget

Satellite and Earth Station Information		
Uplink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.10	-111.10
Downlink elevation angle (degrees)	36.10	36.10
Carrier Information		
Frequency reuse	4.00	4.00
Subcarrier reuse	3.00	3.00
Beam pitch (deg)	0.25	0.25
Number of beams	280.00	280.00
Total subcarriers	256.00	256.00
Number of data subcarriers	192.00	192.00
Carrier bandwidth (MHz)	2.50	2.50
Number of data subcarriers per beam	60.00	63.00
Percentage of power in data subcarriers (%)	86.00	86.00
Information burst rate (Kbps) per subcarrier	22.58	22.58
Burst rate per beam (Kbps) plus overhead	1354.80	1422.54
Modulation	16-QAM	16-QAM
FEC code rate	0.67	0.67
Transmission rate (kbps) per burst	33.87	33.87
Allocated bandwidth per subcarrier (kHz)	10.94	10.94
Required total C/N with margin (dB)	9.58	9.58
Uplink		
Uplink frequency (GHz)	12.88	12.88
Uplink EIRP (on-axis) (dBW)	34.15	37.14
Uplink atmospheric loss (dB)	0.11	0.11
Rain availability (%)	99.99	99.99
Uplink rain fade (dB)	4.52	4.52
Uplink free space pathloss (dB)	206.05	206.05
Transponder G/T dBi/K	2.20	2.20
Uplink C/N (dB)	29.00	31.99
C/I adj-channel	22.00	22.00
C/I Crosspole Isolation (including rain depole) (dB)	23.01	23.01
Composite uplink C/I (dB)	19.47	19.47
Satellite Transponder		
Power control error (dB)-per user	0.50	0.50
Power control error (dB)-per uplink	1.00	1.00
Per carrier output backoff (dB)	45.91	46.12
Expected C/IM in digital carrier bandwidth at satellite (dB)	12.50	12.50
Downlink		
Downlink frequency (GHz)	2.19	2.19
Satellite EIRP per carrier (dBW)	54.99	54.77
Downlink free space pathloss (dB)	190.87	190.87
Downlink atmospheric loss (dB)	0.06	0.06
Average fade and head loss (dB)	3.00	3.00
Earth station on-axis G/T (dBi/K)	-28.00	-28.00
Polarization loss (dB)	3.00	3.00
Downlink C/N (dB)	19.38	19.17

C/I inter beam (dB)	15.26	15.26
Overall Performance Summary		
Computed uplink or system margin (dB)	0	0
Downlink margin (dB)	0	0

Table A-16: Modified Wimax Forward Voice Link Budget

Satellite and Earth Station Information		
Uplink name	Las Vegas, (6.3 m)	Las Vegas, (9.3 m)
Satellite longitude (degrees) (- = West)	-111.10	-111.10
Downlink elevation angle (degrees)	36.10	36.10
Carrier Information		
Frequency reuse	4.00	4.00
Subcarrier reuse	3.00	3.00
Beam pitch (deg)	0.25	0.25
Number of beams	280.00	280.00
Total subcarriers	256.00	256.00
Number of data subcarriers	192.00	192.00
Carrier bandwidth (MHz)	2.50	2.50
Number of data subcarriers per beam	34.00	34.00
Percentage of power in data subcarriers (%)	86.00	86.00
Number of pilots	8.00	8.00
Information burst rate (Kbps) per subcarrier	11.29	11.29
Number of time slots per frame	8.00	8.00
Number of subcarriers per voice call	3.00	3.00
Information rate per voice user (Kbps)	4.23	4.23
Activity factor	0.40	0.40
Number of simultaneous voice channels per beam	227	227
Modulation	QPSK	QPSK
FEC code rate	0.67	0.67
Transmission rate (kbps) per burst	16.93	16.93
Allocated bandwidth per subcarrier (kHz)	10.94	10.94
Required total C/N with margin (dB)	3.72	3.72
Uplink		
Uplink frequency (GHz)	12.88	12.88
Uplink EIRP (on-axis) (dBW)	36.61	39.81
Uplink atmospheric loss (dB)	0.11	0.11
Rain availability (%)	99.99	99.99
Uplink rain fade (dB)	4.52	4.52
Uplink free space pathloss (dB)	206.05	206.05
Transponder G/T dBi/K	2.20	2.20
Uplink C/N (dB)	31.46	34.66
C/I adj-channel	22.00	22.00
C/I Crosspole Isolation (including rain depole) (dB)	23.01	23.01
Composite uplink C/I (dB)	19.47	19.47
Satellite Transponder		
Power control error (dB)-per user	0.50	0.50
Power control error (dB)-per uplink	1.00	1.00
Per carrier output backoff (dB)	43.44	43.44

Expected C/I in digital carrier bandwidth at satellite (dB)	12.50	12.50
Downlink		
Downlink frequency (GHz)	2.19	2.19
Satellite EIRP per carrier (dBW)	40.56	40.56
Downlink free space pathloss (dB)	190.87	190.87
Downlink atmospheric loss (dB)	0.06	0.06
Average fade and head loss (dB)	3.00	3.00
Earth station on-axis G/T (dBi/K)	-28.00	-28.00
Polarization loss (dB)	3.00	3.00
Downlink C/N (dB)	4.96	4.96
C/I inter beam (dB)	15.26	15.26
Overall Performance Summary		
Computed uplink or system margin (dB)	0.07	0.08
Downlink margin (dB)	0.10	0.10