UPLINK LINK BUDGET SUMMARY

PARAMETERS				A DDG DD + CT MAA	A DDC DD - CE VII - S
Objective		Command	Command	APRS-DP + SF-WARD	
,	f2 ex x)			Mission	Mission
Frequency	[MHz}	435.313	435.313	145.825	145.825
Emission Type		26K0F1D	26K0F1D	26K0F1D	26K0F1D
Modulation		GMSK	BPSK	AFSK	BPSK
Data Rate	[bps]	4800	600	1200	1200
Protocol		AX.25	AX.25	AX.25	AX.25
GROUND STATION					
Ground Station Transmitter	[W]	50.00	50.00	50.00	50.00
Power Output					
	[dBw]	16.99	16.99	16.99	16.99
Ground Station Total	[dB]	3.00	3.00	3.00	3.00
Transmission Line Losses	լահյ	3.00	3.00	5.00	3.00
Antenna Gain	[dBi]	22.00	22.00	22.00	22.00
Ground Station EIRP	[dBw]	35.99	35.99	35.99	35.99
UPLINK PATH					
Ground Station Antenna Pointing	[dB]	1.00	1.00	1.00	1.00
Loss	[ab]	1.00	1.00	1.00	1.00
Ground Station to Spacecraft	נתנו	2.00	2.00	2.00	2.00
Antenna Polarization Loss	[dB]	3.00	3.00	3.00	3.00
Path Loss	[dB]	148.38	148.38	138.88	138.88
Atmospheric Losses	[dB]	1.00	1.00	1.00	1.00
onospheric Losses	[dB]	0.40	0.40	0.40	0.40
Rain Losses	[dB]	0.00	0.00	0.00	0.00
sotropic Signal Level at	` '				
Spacecraft	[dBw]	-117.79	-117.79	-108.29	-108.29
SPACECRAFT (Eb/No Meth	nod)				
Spacecraft Antenna Pointing Loss	[dB]	3.00	3.00	3.00	3.00
Spacecraft Antenna Gain	[dBi]	2.15	2.15	2.15	2.15
Spacecraft Total Transmission	, ,	2.15	2.13	2.13	2,13
Line Losses	[dB]	1.00	1.00	1.00	1.00
Spacecraft Effective Noise					
Temperature	[K]	600.00	600.00	600.00	600.00
Spacecraft Figure of Merit (G/T)	[dB/K]	-26.63	-26.63	-26.63	-26.63
Spacecraft Signal-to-Noise Power	[ub/ K]	-20.03	-20.03	-20.03	-20.03
Density (S/No)	[dBHz]	81.17	81.17	90.67	90.67
System Desired Data Rate	[lanc]	4800	600	1200	1200
4	[bps]				
Command System Eb/No	[dB]	44.36	53.39	59.88	59.88
Specified BER		1.00E-05	1.00E-06	1.00E-05	1.00E-06
Felemetry System Required	[dB]	9.60	4.80	23.20	10.50
Eb/No					
Eb/No Threshold	[dB]	10.60	5.80	24,20	11.50
System Link Margin	[dB]	33.76	47.59	35.68	48.38
SPACECRAFT (SNR Metho	od)				
Signal Power at Spacecraft LNA	[dBw]	-119.64	-119.64	-110.14	-110.14
nput					
Spacecraft Receiver Bandwidth	[Hz]	26000	26000	26000	26000
Spacecraft Receiver Noise Power	[dB]	-156.67	-156.67	-156.67	-156.67
Signal-to-Noise Power Ratio	[dB]	37.03	37.03	46.53	46.53
(SNR) at Spacecraft Receiver	ارسا	07.00	07.00	10.00	10.55
Required SNR for spacecraft	[dB]	14	14	14	14
receiver	լասյ	14	14	14	14
System Link Margin	[dB]	23.03	23.03	32.53	32.53

DOWNLINK LINK BUDGET SUMMARY

PARAMETERS				
		Telemetry and	CIAI	IINTENO
Objective		Mission Data	CW	HNT Mission
Frequency	[MHz]	437.375	437.375	437.375
Emission Type	,	26K0F1D	A1A	26K0F1D
Modulation		GMSK	Morse Code	GMSK
Data Rate	[bps]	4800	20 wpm	4800
Protocol	[sps]	AX.25		AX.25
SPACECRAFT	100,20		1174.20	
Spacecraft Transmitter Power				
Output	[W]	0.8	0.1	0.1
Cutput	[dBw]	-0.97	-10.00	-10.00
Spacecraft Total Transmission	•	0.57	10.00	10.00
Line Losses	[dB]	1	1	1
Spacecraft Antenna Gain	[dBi]	2.15	2.15	2.15
Spacecraft EIRP	[dBw]	0.18	-8.85	-8.85
DOWNLINK PATH	[ubw]	0.16	-0.00	-0.03
	[dB]	1.00	1.00	1.00
Spacecraft to Cround Antonna	[ԱՄ]	1.00	1.00	1.00
Spacecraft-to-Ground Antenna Polarization Loss	[dB]	3.00	3.00	3.00
	[40]	140 42	140 42	140 40
Path Loss	[dB]	148.43	148.43	148.43
Atmospheric Losses	[dB]	1.00	1.00	1.00
Ionospheric Losses	[dB]	0.40	0.40	0.40
Rain Losses	[dB]	0.00	0.00	0.00
Isotropic Signal Level at Ground	[dBw]	-153.64	-162.68	-162.68
Station				
GROUND STATION (Eb/No M	lethod)			1
Ground Station Antenna Pointing	[dB]	1	1	1
Loss				
Ground Station Antenna Gain	[dBi]	22	22	22
Ground Station Total	[dB]	3	3	3
Transmission Line Losses	[]			
Ground Station Effective Noise	[K]	600	600	600
Temperature	[**]			000
Ground Station Figure of Merit	[dB/K]	-8.78	-8.78	-8.78
(G/T)	[0]	0.70	0.70	0.70
Ground Station Signal-to-Noise	[dBHz]	65.17	56.14	56.14
Power Density (S/No)	[dD112]	00.17	50.14	50.14
System Desired Data Rate	[bps]	4800		4800
Telemetry System Eb/No	[dB]	28.36		19.33
Specified BER		1.00E-05		1.00E-05
Telemetry System Required	[dB]	9.60		9.60
Eb/No	լասյ	9.00		9.00
Eb/No Threshold	[dB]	10.60		10.60
System Link Margin	[dB]	17.76		8.73
GROUND STATION (SNR Me	ethod)			
Signal Power at Ground Station		405.74	444.70	444.70
LNA Input	[dBw]	-135.64	-144.68	-144.68
Ground Station Receiver	[T 7]	0.0000	F00	0.000
Bandwidth	[Hz]	26000	500	26000
Ground Station Receiver Noise	f in	457.75	150.00	154.45
Power	[dB]	-156.67	-173.83	-156.67
Signal-to-Noise Power Ratio (SNR) at Ground Station Receiver [dB]		21.03	29.15	11.99
receiver	[dB]	10	10	10
System Link Margin	[dB]	11.03	19.15	1.99
-)Buit	[~~]	11.00	17.110	2.27