Downlink

Mode	FM		CW	
Spacecraft				
Antenna Type	Monopole		Monopole	
Orbit Altitude	375	[km]	375	[km]
Maximum Transmission Distance	1372.55	[km]	1372.55	[km]
Elevation Angle	10	[deg]	10	[deg]
Spacecraft Transmitter Power Output	0.8	[watts]	0.1	[watts]
Downlink Frequency	437.6	[MHz]	437.6	[MHz]
Spacecraft Total Transmission Line Losses	1.6	[dB]	1.6	[dB]
Spacecraft Antenna Gain	4.8	[dBi]	4.8	[dBi]
Spacecraft EIRP	2.2	[dBW]	-6.8	[dBW]
Downlink Path				
Spacecraft Antenna Pointing Loss	0.0	[dB]	0.0	[dB]
S/C-to-Ground Antenna Polarization Loss	0.5	[dB]	0.5	[dB]
Path Loss	148	[dB]	148.0	[dB]
Atmospheric Loss	1.1	[dB]	1.1	[dB]
Ionospheric Loss	0.8	[dB]	0.8	[dB]
Rain Loss	0.0	[dB]	0.0	[dB]
Isotropic Signal Level at Ground Station	-148.2	[dBW]	-157.2	[dBW]
Ground Station (EbNo Method)				
Ground Station Antenna Pointing Loss	0.2	[dB]	0.2	[dB]
Ground Station Antenna Gain	18	[dBi]	18	[dBi]
Ground Station Total Transmission Line Losses	1.9	[dB]	1.9	[dB]
Ground Station Effective Noise Temperature	490	[K]	490	[K]
Ground Station Figure of Merit(G/T)	-10.8	[dB/K]	-10.8	[dB/K]
G.S. Signal-to-Noise Power Density(S/No)	69.4	[dBHz]	60.4	[dBHz]
System Desired Data Rate	1200	[bps]		[bps]
Telemetry System Eb/No for the Downlink	38.6	[dB]		[dB]
Demodulation Method Selected	AFSK/FM		CW	
Forward Error Correction Coding Used	None			
System Allowed or Specified Bit-Error-Rate	0.00001			
Demodulator Implementation Loss	0	[dB]		[dB]
Telemetry System Required Eb/No	23.2	[dB]		[dB]
Eb/No Threshold	23.2	[dB]		[dB]
System Link Margin	15.4	[dB]		[dB]
Ground Station Alternative Signal Analysis Method (SNR Computation)				
Ground Station Antenna Pointing Loss	0.2	[dB]		[dB]
Ground Station Antenna Gain	18	[dBi]		[dBi]
Ground Station Total Transmission Line Losses	1.9	[dB]		[dB]
Ground Station Effective Noise Temperature	490	[K]		[K]
Ground Station Figure of Merit(G/T)	-10.8	[dB/K]		[dB/K]
Signal Power at Ground Station LNA Input	-132.3	[dBW]		[dBW]
Ground Station Receiver Bandwidth(B)	0.5	[kHz]		[kHz]
G.S. Receiver Noise Power(Pn=kTB)	-161.7	[dBW]		[dBW]
Signal-to-Noise Power Ratio at G.S. Rcvr	29.9	[dB]		[dB]
Analog or Digital System Required S/N	23.2	[dB]		[dB]
System Link Margin	6.7	[dB]		[dB]

Uplink

Ground Station		
Antenna Type	Cross Yagi Antenna 2 stack	
Ground Station Latitude	34.725	[deg]
Ground Station Longitude	137.725	[deg]
Elevation Angle	10	[deg]
Ground Station Transmitter Power Output	50	[watts]
Uplink Frequency	145.8	[MHz]
Ground Stn. Transmission Line Losses	3.6	[dB]
Antenna Gain	16	[dBi]
Ground Station EIRP	29.4	[dBW]
Uplink Path		
Ground Station Antenna Pointing Loss	0.1	[dB]
Gnd-to-S/C Antenna Polarization Loss	0.5	[dB]
Path Loss	138.5	[dB]
Atmospheric Loss	1.1	[dB]
Ionospheric Loss	0.7	[dB]
Rain Loss	0	[dB]
Isotropic Signal Level at Spacecraft	-111.5	[dBW]
Spacecraft (EbNo Method)		
Spacecraft Antenna Pointing Loss	0	[dB]
Spacecraft Antenna Gain	4.8	[dBi]
Spacecraft Total Transmission Line Losses	2	[dB]
Spacecraft Effective Noise Temperature	220	[K]
Spacecraft Figure of Merit(G/T)	-20.6	[dB/K]
S/C. Signal-to-Noise Power Density(S/No)	96.5	[dBHz]
System Desired Data Rate	1200	[bps]
Command System Eb/No	65.7	[dB]
Demodulation Method Selected	AFSK/FM	
Forward Error Correction Coding Used	None	
System Allowed or Specified Bit-Error-Rate	0.00001	
Demodulator Implementation Loss	0	[dB]
Telemetry System Required Eb/No	23.2	[dB]
Eb/No Threshold	23.2	[dB]
System Link Margin	42.5	[dB]
Spacectraft Alternative Signal Analysis Method (SNR Computation)		
Spacecraft Antenna Pointing Loss	0	[dB]
Spacecraft Antenna Gain	4.8	[dBi]
Spacecraft Total Transmission Line Losses	2	[dB]
Spacecraft Effective Noise Temperature	220	[K]
Spacecraft Figure of Merit(G/T)	-20.6	[dB/K]
Signal Power at Spacecraft LNA Input	-108.6	[dBW]
Spacecraft Receiver Bandwidth(B)	10	[kHz]
Spacecraft Receiver Noise Power(Pn=kTB)	-165.2	[dBW]
Signal-to-Noise Power Ratio at G.S. Rcvr	56.5	[dB]
Analog or Digital System Required S/N	23.2	[dB]
System Link Margin	33.3	[dB]