Project Name: TRISAT-R Project
Satellite name: TRISAT-R
Version: 1.0
Date of Last Revision: 27.11.2019
Changes:

Uplink budget calculation

Parameters	Values	Units
Frequency:	145.9	MHz
Emission type:	F1D	
Modulation:	GMSK	
Data rate:	1000	bps
Protocol:	CCSDS	

Ground Station:			
Transmitter Power Output:		5	watts
	In dBW:	7	dBW
	In dBm:	37	dBm
Transmission Line Losses:		-1.0	dB
Connector, Filter or In-Line Switch Losses:		-1.0	dB
Antenna Gain:		13.4	dBiC
Ground Station EIRP:		18.4	dBW
Path losses:			
Ground Station Antenna Pointing Loss:		-1.0	dB
Antenna Polarization Losses:		-4.0	dB
Path Loss:		-153.6.8	dB
Atmospheric Losses:		-3.0	dB
Ionospheric Losses:		-1.0	dB
Rain Losses:		0.0	dB
Isotropic Signal Level at Ground Station:		-144.2	dBW
Spacecraft:			
------- Eb/No Method -------			
Spacecraft Antenna Pointing Loss:		-2.0	dB
Spacecraft Antenna Gain:		0.0	dBiC
Spacecraft Transmission Line Losses:		-1.0	dB
Spacecraft LNA Noise Temperature:		150	K
Spacecraft Transmission Line Temp.:		270	K
Spacecraft Sky Temperature:		290	K
S/C Transmission Line Coefficient:		0.7943	
Spacecraft Effective Noise Temperature:		436	K
Spacecraft Figure of Merrit (G/T):		-27.4	dB/K
S/C Signal-to-Noise Power Density (S/No):		55.0	dBHz
System Desired Data Rate:		1000	bps
	In dBHz:	30	dBHz
Telemetry System Eb/No:		25	dB
Telemetry System Required Bit Error Rate:		1.00E-06	
Telemetry System Required Eb/No:		18.0	dB
System Link Margin:		**7.0**	dB

Downlink Budget Calculation

Parameters	Values	Units
Frequency:	436.5	MHz
Emission type:	F1D	
Modulation:	GMSK	
Data rate:	1000	bps
Protocol:	CCSDS	

Spacecraft:		
Spacecraft Transmitter Power Output:	1.6	watts
In dBW:	2.0	dBW
In dBm:	32.0	dBm
Spacecraft Transmission Line Losses:	-1.0	dB
S/C Connector, Filter or In-Line Switch Losses:	0.0	dB
Spacecraft Antenna Gain:	0.0	dBiC
Spacecraft EIRP:	-3.959	dBW

Path losses:		
Spacecraft Antenna Pointing Loss:	-1.0	dB
Antenna Polarization Loss:	-1.5	dB
Path Loss:	-163.1	dB
Atmospheric Loss:	-2.2	dB
Ionospheric Loss:	-0.2	dB
Rain Loss:	0.0	dB
Isotropic Signal Level at Ground Station:	-171.9	dBW
Ground Station:		

------- Eb/No Method -------		
Ground Station Antenna Pointing Loss:	-2.0	dB
Ground Station Antenna Gain:	16.2	dBiC
Ground Station Transmission Line Losses:	-1	dB
Ground Station LNA Noise Temperature:	50	K
Ground Station Transmission Line Temp.:	100	K
Ground Station Sky Temperature:	450	K
G.S. Transmission Line Coefficient:	0.7943	
Ground Station Effective Noise Temperature:	428	K
Ground Station Figure of Merrit (G/T):	-11.1	dB/K
G.S. Signal-to-Noise Power Density (S/No):	43.6	dBHz
System Desired Data Rate:	1000	bps
In dBHz:	30.0	dBHz
Telemetry System Eb/No:	18.6	dB
Telemetry System Required Bit Error Rate:	1.00E-06	
Telemetry System Required Eb/No:	10	dB
System Link Margin:	**8.6**	dB