JPSS X-Band High Rate Data Downlink			
Ground Station:		**JPSS HRD Ground Terminal**	
Parameters	**Units**	**Worst-Case Point* in XBA1/ XBA2 Coverage**	**Notes/Data Source**
		** Worst-Case point in coverage of either XBA1 or XBA2 Earth-coverage antennas, i.e. over 0-62 deg from XBA boresight.* *Worst-case point corresponds to 34.2 deg off boresight of XBA1 antenna.*	
Basic Parameters			
Transmit Frequency	MHz	7812.0	Per J2SRD, Table 6.6.2.5.3-1 Carrier Frequency
Information rate	kbps	21794.4	raw data rate from C&DH
CADU rate	ksps	25000.0	data rate after RS (255, 223) encoding
Transmit Data Rate	ksps	50000.0	Per J2SRD, Table 6.6.2.5.3-1 - fully encoded rate, including 1/2 convol. encoding
Min. Ground Elevation Angle	degrees	50.6	Per J2SRD-1589, min. Ground Elevation angle
Spacecraft Altitude	km	824	
SC Antenna Max Nadir Angle	degrees	34.2	angle off nadir +Z
Range	km	1028.01	
Transmit Parameters			
Transmitter Power	W	10.7	
	dBm	40.3	min. power over temperature on 4 transmitters tested - 0.3 dB for
Transmitter Network Loss	dB	-0.86	maximum path loss measured at S/C, hot case and 10% variability
Spacecraft Antenna Gain	dBi	-6.60	per worst-case unit data and SC-level antenna simulation results
EIRP	dBm	32.83	
Channel Parameters			
Space Path Loss	dB	-170.54	
Link Availability	%	99.0%	
Excess Path Loss	dB	-0.50	PER J2 SRD-1502, Includes Scintillation for 0.99 Availability for JPSS HRD Ground Terminal, assumed value (Hawaii X-Band)
Pointing Loss	dB	0.00	Per J2SRD-1518, Included in ground receiver G/T per table footnote
Polarization Loss	dB	-1.57	Based on worst-case S/C AR of 9.7 dB and GS AR of 2.0 (Estimated, J2SRD-1561), for Beta=90
Receiver Parameters			
Ground Station Receiver G/T	dB/K	23.59	Per J2SRD-1564, Table 6.6.2.5.3-1 Ground Station Minimum G/T
Power Summary			
Received Isotropic Power at Ground	dBm	-139.78	Received power into an isotropic (0 dB gain) antenna
Boltzmann's Constant	dBW/K/Hz	-228.60	
C/No at Ground Station	dB-Hz	82.41	
Viterbi Decoder Margin Analysis			
Code symbol rate into Viterbi Decod	ksps	50000.00	over-the-air transmit data rate
Bit Rate out of Viterbi Decoder	kbps	25000.00	CC encoding removed; equals CADU Rate, which includes Reed-Solomon Coding (255, 223, I = 5)
- RS Symbol Rate	dB-Hz	74.0	
Received Eb/No	dB	8.4	
Implementation / Multipath Loss	dB	-2.70	Per J2SRD-1586 and J2SRD-1587
Calculated Eb/No	dB	5.73	
Target BER		1.00E-05	After convolutional decoding portion
Required Eb/No per SRD		4.4	Per J2SRD-1590
Viterbi Decoder Margin		**1.3**	Per J2SRD-1589, HRD Margin requirement > 1.0 dB at 5 deg. El angle
Comments:			
1) **Worst-Case Point in Coverage** on either XBA1 or XBA2 Earth-coverage antennas, i.e. over 0-62 deg from XBA boresight. Corresponds to 34 de			
2) **At Edge of Coverage (EOC)** corresponds to worst-case link margin at 62 deg off XBA boresight			

Figure SC-GND-3318. HRD Detailed Link Calculation