

X-Band Data N2 Downlink RF Power Budgets - Main Line					
Component	G [dB]	Input Power [dBm]	Output Power [dBm]	Max Input Power [dBm]	Comments
DUT					
Transmitted Power @ Transmitter port	-	-	40,0	N/A	EWC30 Pout at output DSN filter (900830_X-040-753_User_Manual_Annex FM2_v1.0)
Connector Saver #2	-0,1	40,0	39,9	-	R340200302B Attenuation corresponds to SV Microwave 95077 measured previously
RF Cable W10	-1,2	39,9	38,8	47,8	MCJ088D, G from cable characterization.
Connector Saver #3	-0,1	38,8	38,7	-	R340200302B . Attenuation corresponds to SV Microwave 95077 measured previously
DSN Filter	-0,6	38,7	38,1	-	Attenuation corresponds to EM filter measured previously
Connector Saver #4	-0,1	38,1	38,0	-	SV Microwave 95077. Attenuation corresponds to other SV Microwave 95077 measured previously
CEGSE - Main line					
Input Power @ CEGSE port	-	38,0	-	-	
RF Cable W2	-1,2	38,0	36,8	47,8	MCJ088D + (Adapter#3) PE9212. Attenuation corresponds to other MCJ088D measured previously
RF Cable W3	-0,5	36,8	36,3	47,8	MCJ088D, G from cable characterization.
RF Cable W4	-1,0	36,3	35,3	47,8	PE91337 (AD#1) + MCJ088D + (Adapter#1) PE9312 , G from characterization.
Bidirectional Coupler (IN-OUT)	0,0	35,3	35,3	50,0	Mini-circuits ZGBDC35-93HP+, G from characterization.
Fixed Attenuator	-19,6	35,3	15,7	43,0	Mini-circuits BW-N20W20+, G from characterization.
RF Cable W5	-1,3	15,7	14,4	47,8	PE91337 (AD#2) + MCJ088D-0-0197-3Q03Q0 + PE91337 (AD#3). G from cable characterization.
CEGSE Variable Attenuator 10dB step	-20,7	14,4	-6,3	30,0	Agilent 8496B-001, G from characterization.
RF Cable W6	-1,5	-6,3	-7,8	-	UT-141-FORM-0315-380580/A, G from characterization.
SMA to N adapter	-0,1	-7,8	-7,9	-	PE9104. Attenuation is estimated.
Output Power @ CEGSE port	-	-	-7,9	-	
Interconnection Elements - Main line					
RF Cable XRF4.02	-4,2	-7,9	-12,0	54,7	UFB197C-0-1969-7GU7GU, G from characterization.
Noise Generator (TestBed)					
Noise Source (dBm/Hz)	-	-	-99,0	-	Noise density -130dBm/Hz to -93dBm/Hz (1dB step) in 2GHz bandwidth
Power Output (dBm)	-	-	-55,0	-	Carrier Level -55 to -5 dBm
Noise Source (dBm)	-	-	-6,0	-	In 2GHz bandwidth
RF Cable PE300-60-03	-0,5	-6,0	-6,5	-	G from characterization.
External Attenuator ATT10.01 (01)	-10,0	-6,5	-16,5	-	PE7005-10. Attenuation is estimated.
X-Band Upconverter TestBet	22,0				Measured Gain: 22dB@0dB attenuation.
	0,0	-16,5	5,5	10,0	Internal variable attenuator 0 to 30dB from XBUC.
RF Cable SRF3.02	-37,5	5,5	-32,0	-	10m N(M)-SMA(M) To connect N2 port. G from characterization.
Output Noise Power @TestBed port			-32,0	-	
GS-GSE - Main line					
Received Power @ N1 GSE port	-	-32,0	-	-	
RF Cable XRF3.12 (N1)	-2,1	-32,0	-34,2	51,7	PE301-60, G characterization from XFR3.12.
Received Power @ N2 GSE port	-	-12,0	-	-	
X Band External Attenuators	-30,1	-12,0	-42,2	33	G from characterization.
RF Cable XRF3.13 (N2)	-2,2	-42,2	-44,3	51,7	PE301-60, G characterization from XFR3.13.
X-Band Matrix and Attenuator (N1-DC1)	-30,6	-33,8	-64,4	30	Measured Value from XBMA03.
	0,0				Variable attenuation.
X-Band Matrix and Attenuator (N2-DC2)	-30,6	-33,8	-64,4	30	Measured Value from XBMA03.
	0,0				Variable attenuation.
RF Cable XRF3.06	-1,2	-64,4	-65,5	48	MCJ088D. G characterization from XRF3.06.
X-Band Downconverter N2	29,1	-65,5	-36,5	10,0	Measured Gain: 25,1dB@4dB attenuation. NF 11dB from ATR.
	0,0				Internal variable attenuator from XBDC.
RF Cable XRF3.08	-0,5	-36,5	-37,0	51,7	PE301-60. G characterization from XRF3.08.
Demodulator (D)		-37,0	N/A	-10	Nominal values: -30dBm to -40dBm, -10dBm to -50dBm acceptable values.
Eb/N0					
Received Power (dBm)	-	-42,2	-	-	N1 GS-GSE-FM (R) input port
Received Power Noise (dBm)	-	-32,0	-	-	N2 GS-GSE-FM (R) input port
Received Power Noise in (dBm/Hz)	-	-125,0	-	-	Power Spectral Density.
Bit Rate (dB.Hz)	-	80,8	-	-	
Estimated C/N0 @N2, N1 GS-GSE (dB. Hz)	-	82,9	-	-	
Required C/N0 (dB.Hz)	-	86,6	-	-	for QPSK @ BER <=1E-6, Coding Gain for CC 7 1/2, 1dB implementation loss
Eb/No estimated (dB)	-	2,1	-	-	
X-Band Data Downlink Resume (N2)					
Parameter	Condition				
	Nominal	Maximum Levels			
CEGSE Variable Attenuator 10dB step	-20,7	-0,7			
Noise Source (dBm/Hz)	-99,0	-93,0			
Pin Demodulator	-37,0	-26,0			