

Raytheon

23030 Ladbroke Drive

Sterling, VA 20166

GPS Distribution system power calculation.

Lab

GPS Signal Analysis Lab

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.2444	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90
GPS RF Attenuator	-10	dB	-69.3	1E-10	117.49
LMR-240-LLPL Coax loss per foot	-0.088	dB			
Coax Length	100	feet			
Total Coax Loss	-8.8	dB	-78.1	2E-11	15.488
GPS Transmitting Antenna Gain	3	dB	-75.1	3E-11	30.903
Distance from transmit antenna	0.01	meters			
Distance from transmit antenna	0.0328	feet			
Pathloss to unit under test	5.7771	dB	-69.323	1E-10	116.87181
Signal level at unit under test ERIP to ERP			-71.463	7E-11	71.401898
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100	feet			
Pathloss to 100 ft	-63.903	dB	-139	1E-17	1.258E-05
Signal level at 100 ft ERP			-141.14	8E-18	7.686E-06

GPS Source L1 Active Antenna

GPS Source A11 Amplifier

10 dB attenuator at A11 Amp output

Based upon loss at 1200MHz

GPS Source L1P- Passive GPS Antenna

<----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm

GPS Signal Analysis Lab

Frequency	1575.4	MHz	Signal Level			
Wavelength	0.1904	meters	dBm	Watts	picoWatts	
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001	
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59	GPS Source L1 Active Antenna
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90	GPS Source A11 Amplifier
GPS RF Attenuator	-10	dB	-69.3	1E-10	117.49	10 dB attenuator at A11 Amp output
LMR-240-LLPL Coax loss per foot	-0.099	dB				Based upon loss at 1500MHz
Coax Length	100	feet				
Total Coax Loss	-9.9	dB	-79.2	1E-11	12.023	
GPS Transmitting Antenna Gain	3	dB	-76.2	2E-11	23.988	GPS Source L1P- Passive GPS Antenna
Distance from transmit antenna	0.01	meters				
Distance from transmit antenna	0.0328	feet				
Pathloss to unit under test	3.6103	dB	-72.59	6E-11	55.084677	
Signal level at unit under test ERIP to ERP			-74.73	3E-11	33.653544	
Distance from transmit antenna	30.48	meters				
Distance from transmit antenna	100	feet				
Pathloss to 100 ft	-66.07	dB	-142.27	6E-18	5.929E-06	
Signal level at 100 ft ERP			-144.41	4E-18	3.622E-06	<----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm

X bay

GPS Signal Analysis X Bay Port 1

Frequency	1227.6	MHz	Signal Level			
Wavelength	0.2444	meters	dBm	Watts	picoWatts	
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001	
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59	GPS Source L1 Active Antenna
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90	GPS Source A11 Amplifier
GPS RF Attenuator	0	dB	-59.3	1E-09	1174.90	No attenuator needed with longer cable
LMR-240-LLPL Coax loss per foot	-0.088	dB				Based upon loss at 1200MHz
Coax Length	230	feet				
Total Coax Loss	-20.24	dB	-79.54	1E-11	11.117	
GPS Transmitting Antenna Gain	3	dB	-76.54	2E-11	22.182	GPS Source L1P- Passive GPS Antenna
Distance from transmit antenna	0.01	meters				
Distance from transmit antenna	0.0328	feet				
Pathloss to unit under test	5.7771	dB	-70.763	8E-11	83.889915	
Signal level at unit under test ERIP to ERP			-72.903	5E-11	51.251875	
Distance from transmit antenna	30.48	meters				
Distance from transmit antenna	100	feet				
Pathloss to 100 ft	-63.903	dB	-140.44	9E-18	9.03E-06	
Signal level at 100 ft ERP			-142.58	6E-18	5.517E-06	<----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm

GPS Signal Analysis X Bay Port 2

Frequency	1227.6	MHz	Signal Level			
Wavelength	0.2444	meters	dBm	Watts	picoWatts	
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001	
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59	GPS Source L1 Active Antenna
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90	GPS Source A11 Amplifier
GPS RF Attenuator	0	dB	-59.3	1E-09	1174.90	No attenuator needed with longer cable
LMR-240-LLPL Coax loss per foot	-0.088	dB				Based upon loss at 1200MHz
Coax Length	230	feet				
Total Coax Loss	-20.24	dB	-79.54	1E-11	11.117	
GPS Transmitting Antenna Gain	3	dB	-76.54	2E-11	22.182	GPS Source L1P- Passive GPS Antenna
Distance from transmit antenna	0.01	meters				
Distance from transmit antenna	0.0328	feet				
Pathloss to unit under test	5.7771	dB	-70.763	8E-11	83.889915	
Signal level at unit under test ERIP to ERP			-72.903	5E-11	51.251875	
Distance from transmit antenna	30.48	meters				
Distance from transmit antenna	100	feet				
Pathloss to 100 ft	-63.903	dB	-140.44	9E-18	9.03E-06	
Signal level at 100 ft ERP			-142.58	6E-18	5.517E-06	<----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm

GPS Signal Analysis X Bay Port 1

Frequency	1575.4	MHz	Signal Level			
Wavelength	0.1904	meters	dBm	Watts	picoWatts	
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001	
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59	GPS Source L1 Active Antenna
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90	GPS Source A11 Amplifier
GPS RF Attenuator	0	dB	-59.3	1E-09	1174.90	No attenuator needed with longer cable
LMR-240-LLPL Coax loss per foot	-0.099	dB				Based upon loss at 1500MHz
Coax Length	230	feet				
Total Coax Loss	-22.77	dB	-82.07	6E-12	6.209	
GPS Transmitting Antenna Gain	3	dB	-79.07	1E-11	12.388	GPS Source L1P- Passive GPS Antenna
Distance from transmit antenna	0.01	meters				
Distance from transmit antenna	0.0328	feet				
Pathloss to unit under test	3.6103	dB	-75.46	3E-11	28.446629	
Signal level at unit under test ERIP to ERP			-77.6	2E-11	17.379241	
Distance from transmit antenna	30.48	meters				
Distance from transmit antenna	100	feet				
Pathloss to 100 ft	-66.07	dB	-145.14	3E-18	3.062E-06	
Signal level at 100 ft ERP			-147.28	2E-18	1.871E-06	<----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm

GPS Signal Analysis X Bay Port 2

Frequency	1575.4	MHz	Signal Level			
Wavelength	0.1904	meters	dBm	Watts	picoWatts	
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001	
GPS Receive Antenna amplifier gain	37.7	dB	-92.3	6E-13	0.59	GPS Source L1 Active Antenna
GPS RF Amplifier gain	33	dB	-59.3	1E-09	1174.90	GPS Source A11 Amplifier
GPS RF Attenuator	0	dB	-59.3	1E-09	1174.90	No attenuator needed with longer cable
LMR-240-LLPL Coax loss per foot	-0.099	dB				Based upon loss at 1500MHz
Coax Length	230	feet				
Total Coax Loss	-22.77	dB	-82.07	6E-12	6.209	
GPS Transmitting Antenna Gain	3	dB	-79.07	1E-11	12.388	GPS Source L1P- Passive GPS Antenna
Distance from transmit antenna	0.01	meters				
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Signal level at unit under test ERIP to ERP			-77.6	2E-11	17.379241	
Distance from transmit antenna	30.48	meters				
Distance from transmit antenna	100	feet				
Pathloss to 100 ft	-66.07	dB	-145.14	3E-18	3.062E-06	
Signal level at 100 ft ERP			-147.28	2E-18	1.871E-06	<-----Potential system exceeding limits

Compliant if signal level at 100 ft ERP is less than -140 dBm