Raytheon Missile Systems
Experimental License Renewal Application
Multiple GPS Re-radiation Systems
File Number: 0153-EX-CR-2019

Exhibit 1 – Overview and Explanation

Overview: Raytheon Missile Systems is filing this application to renew its experimental license WD2XKJ. The current license covers 51 locations that are currently using GPS re-radiation systems. In recent years, virtually every product developed by Raytheon Missile Systems has begun to incorporate one or more GPS receivers, so there is an on-going need to use GPS re-radiation systems to test receivers across the company including many programs at the Tucson, AZ, Farmington, NM, and Camden, AR facilities. This application is being filed to renew authorization for the use of GPS re-radiation systems for all of the programs that currently have a need to use GPS re-radiation systems. Some of the programs use the GPS re-radiation systems only for final testing once a hard-wired connection to the GPS receiver is disconnected when the program needs to test the GPS receive antenna and receiver to prove that the whole system is working. Some of the installations are actually in shielded chambers. This application includes those installations because the anechoic chamber door does not have an automatic shutoff if the door is opened.

The 51 locations, all indoors, are listed in a chart that follows this Exhibit, Attachment A. The chart has essential information regarding the location and the percentage of time that the re-radiation system will be used as a transmitter rather that the GPS being directly connected to the receiver under test. The location chart is followed by a separate link budget for each location. Some of the larger buildings have more than one system installed. Those systems are far enough apart to have distinct geographic coordinates. Each such installation is listed as a separate location.

General compliance with NTIA section 8.3.28:

Set forth below are Raytheon's responses to the requirements of 8.3.28 as those answers apply across all the locations. For any information that must be provided on a site-specific basis and for the link budgets, that information follows Attachment A and the information is provided on a location by location basis.

For any questions about this application, please contact Jim Ortega, Spectrum Manager, Raytheon Missile Systems, 520-794-0227 or james.e.ortega@raytheon.com, or Anne Linton Cortez 520-360-0925 or alc@conspecinternational.com.

Compliance with the Requirements of NTIA Manual Section 8.3.28

1. **Individual authorization is for indoor use only and is required for each device at a specific site.**

   Each installation listed in the location chart is an indoor installation, and the location of each is specified in the chart. This application is requesting individual authorizations for each device.

2. **Applications for frequency assignment should be applied for as an XT station class with a note indicating the device is to be used as an "Experimental RNSS Test Equipment for the purpose of testing GPS receivers" and describing how the device will be used.**

   Raytheon requests the assistance of the FCC and NTIA to properly classify the frequency authorizations. All of the proposed installations will be used for the testing of GPS receivers installed on Raytheon products. Attachment A indicates for each location whether the GPS re-radiation system will be used with the re-radiating antenna hooded, installed in an anechoic chamber, or just installed indoors in a secure Raytheon facility.

3. **Approved application for frequency assignment will be entered in the GMF.**

   Raytheon requests the assistance of NTIA and the FCC in entering this data into the GMF.

4. **The Maximum length of the assignment will be two years, with possible renewal.**

   Raytheon is seeking to renew its authorization.

5. **The area of potential interference to GPS reception (e.g., military or contractor facility) has to be under the control of the user.**

   All of the proposed installation locations listed on Attachment A are in buildings at Raytheon facilities. All of the Raytheon facilities are secured facilities, and each building is under the control of Raytheon, no unauthorized visitors are permitted.

6. **The maximum equivalent isotropically radiated power (EIRP) must be such that the calculated emissions are no greater than -140 dBm/24 MHz as received by an isotropic antenna at a distance of 100 feet (30 meters) from the building where the test is being conducted. The calculations showing compliance with this requirement must be provided with the application for**

frequency assignment and should be based on free space propagation with no allowance for additional attenuation (e.g., building attenuation.)

Link Budgets: For each location listed in Attachment A, there are L1 and L2 link budgets attached to this application showing the calculations applicable to that proposed installation of a GPS re-radiation system.

Location in building: Each installation is inside a building at a Raytheon plant site. All installations are far from any outside wall of the building. The attached link budgets for each location show that the signal strength *at 100 feet from the re-radiating antenna* is far below -140 dBm/24 MHz. Thus, the signal strength at 100 feet from the building is going to be significantly lower still, but Raytheon wanted to ensure that the signal strength was attenuated so much that there would be no chance of interference.

Power levels are very low: The link budgets provide information on the signal strength at 1 meter from the re-radiating antenna. This information is provided because at each installation, the antennas being tested are never more than 1 meter from the re-radiating antenna. The calculations then show the signal strength at 100 feet from the re-radiating antenna as well.

Some installations use re-radiation only a small percentage of their operational time: In many installations, the Raytheon product is tested first by connecting a roof-top antenna directly to the antenna port on the product through a hard-wired connection. In those circumstances, the re-radiating system is only used for final testing of the antenna portion of the receiver to ensure it is working properly as part of the whole navigation system on the product. The locations using hard-line installations are identified in Attachment A. At any location for which the percentage of time of re-radiation use is less than 100% of the time of operation of the testing, the rest of the time the GPS rooftop antenna is connected to the receiver by hard-line.

Some installations use hoods to further protect from interference: In some installations, the GPS re-radiation system is operated under a hood. In those instances, the hooded re-radiating antennas are usually positioned merely inches from the receive antennas for testing. These installations are identified in Attachment A.

7. **GPS users in the area of potential interference to GPS reception must be notified that GPS information may be impacted for periods of time.**

Raytheon has posted signs in each location where a re-radiation system is installed alerting those in the area that there are GPS re-radiation systems in use in that area.

8. **The use is limited to activity for the purpose of testing RNSS equipment/systems.**

   Raytheon is requesting authorization to use re-radiation systems at these locations specifically for testing of GPS systems on its products.

9. **A "Stop Buzzer" point of contact for the authorized device must be identified and available at all times during GPS re-radiation operation of the device under any condition.**

   The Stop Buzzer point of contact for all these devices is:

   Jim Ortega, Spectrum Manager, Raytheon Missile Systems

   520-794-0227 (office)
   james.e.ortega@raytheon.com

   Mr. Ortega maintains a list of each location and the telephone number for the operator at each location with him at all times, so that he can initiate shut off a GPS re-radiation system at any time.

Raytheon Missile Systems GPS Re-radiation Application
Attachment A to Exhibit 1 - Locations

Manufacturer	Antenna	GPS Networking	HNRRKIT
	amplifier	GPS Networking	HNRRKIT
	transmit antenna	GPS Networking	HNRRKIT
Installation	height	all installations are indoors	

Location Number	Location: name	Address*	Latitude**	Longitude**	Percent use as re-radiating system ***	L1 & L2 Link Budgets attached
1		hq	32-06-24N	110-56-16W	100	yes
2		hq	32-06-33N	110-56-39W	100	yes
3		Rita Rd.	32-05-31N	110-48-24W	100	yes
4		3350 E. Hemisphere Loop	32-08-18N	110-55-17W	100	yes
5		6880 S. Tucson Blvd.	32-07-39N	110-56-07W	100	yes
6		Farmington, NM	36-39-24N	108-13-36W	100	yes
7		East Camden, AR	33-37-09N	92-45-33W	100	yes
8	Bldg 845E	hq	32 06 14.92N	110 56 17.28W	100	yes
9	Building 805	hq	32 06 26.32N	110 56 39.76W	7	yes
10	Building 9020E	9000 S. Rita Rd.	32 05 39.96N	110 48 27.70W	10	yes
11	Building MO9	3350 e. hemisphere loop	32 08 17.62N	110 55 13.56W	10	yes
12	Building 907B	6880 S. Tucson Blvd.	32 07 38.55N	110 56 06.84W	10	yes
13	Building 801C	hq	32 06 07.73N	110 56 26.39W	10	yes
14	Building 801NE	hq	32 06 11.13N	110 56 23.01W	1	yes
15	Building 801NW	hq	32 06 11.29N	110 56 29.11W	1	yes
16	Bldg 801W	hq	32 06 07.43N	110 56 29.28W	1	yes
17	Bldg 803	hq	32 06 21.82N	110 56 34.93W	100	yes
18	Bldg 804	hq	32 06 21.66N	110 56 36.50W	1	yes

19	Bldg 809E		hq				32 06 13.85N		110 56 22.24W		chambers & hoods		yes
20	Bldg 810		hq				32 06 09.71N		110 56 19.49W		5		yes
21	Bldg 811		hq				32 06 14.55N		110 56 13.90W		1		yes
22	Bldg 840E		hq				32 06 23.06N		110 56 45.30W		40		yes
23	Bldg 840W		hq				32 06 23.06N		110 56 49.58W		40		yes
24	Bldg 842E1		hq				32 06 20.07N		110 56 52.00W		EMI Chamber		yes
25	Bldg 842E2		hq				32 06 20.06N		110 56 52.18W		EMI Chamber		yes
26	Bldg 842E3		hq				32 06 20.07N		110 56 52.46W		EMI Chamber		yes
27	Bldg 842S		hq				32 06 19.91N		110 56 55.23W		25		yes
28	Bldg 842N		hq				32 06 21.84N		110 56 54.50W		5		yes
29	Bldg 842W		hq				32 06 21.13N		110 56 57.40W		5		yes
30	Bldg 843N		hq				32 06 27.26N		110 56 44.86W		chamber & hardline		yes
31	Bldg 843S		hq				32 06 25.92N		110 56 43.58W		chamber & hardline		yes
32	Bldg 845C		hq				32 06 24.95N		110 56 17.35W		100		yes
33	Bldg 845		hq				32 06 26.67N		110 56 18.86W		100		yes
34	Bldg 847E		hq				32 06 22.34N		110 57 14.19W		10		yes
35	Bldg 847W		hq				32 06 22.36N		110 57 19.22W		chamber & hardline		yes
36	Bldg 848S		hq				32 06 25.21N		110 57 18.18W		chamber & hardline		yes
37	Bldg 849		hq				32 06 15.92N		110 57 12.26W		10		yes
38	Bldg 852		hq				32 05 38.47N		110 56 03.79W		100		yes
39	bldg 864		hq				32 05 40.08N		110 55 36.72W		100		yes
40	bldg 907A		6840 S. Tucson Blvd				32 07 39.63N		110 56 07.19W		rerad/hardline & hoods		yes
41	bldg 907C		2424 E. Aragon Road				32 07 41.99N		110 56 06.31W		rerad/hardline & hoods		yes
42	Bldg 908		hq				32 05 46.35N		110 56 47.39W		10		yes
43	Bldg 909		hq				32 05 46.29N		110 57 06.67W		10		yes
44	Bldg 910		hq				32 05 30.02N		110 56 47.16W		10		yes
45	Bldg M01		hq				32 06 29.46N		110 56 46.35W		30		yes
46	Bldg M10		3360 E. Hemisphere Loop				32 08 12.77N		110 55 13.90W		20		yes

47	Bldg M11		6223 S. Palo Verde Rd.				32 08 23.01N		110 54 57.81W		20		yes
48	Bldg9020N		9000 S. Rita Rd.				32 05 40.21N		110 48 28.90W		chamber & hardline		yes
49	Bldg 9022W		9000 S. Rita Rd.				32 05 38.58N		110 48 41.65W		chamber & hardline		yes
50	Bldg 9022C		9000 S. Rita Rd.				32 05 38.99N		110 48 40.00W		chamber & hardline		yes
51	Camden, Arkansas Facility		Camden, AR				33 39 02.00N		92 39 06.12W		50		yes
			* All locations are in Arizona, except 6, 7, & 51. HQ refers to Raytheon Missile Systems headquarters plant at 1151 E. Hermans Road, Tucson, AZ where there are many buildings.				** All Latitude and Longitude information is provided according to WGS84, which is used both in standard GPS units and Google earth				*** For explanations regarding hard-line or hooded use, please see item 6, Exhibit 1		

Location Number: 1, Latitude 32-06-24 N Longitude 110-56-16 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 2, Latitude 32-06-33 N Longitude 110-56-39 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 3, Latitude 32-05-31 N Longitude 110-48-24 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 4, Latitude 32-08-18 N Longitude 110-55-17 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 5, Latitude 32-07-39 N Longitude 110-56-07 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 6, Latitude 36-39-24 N Longitude 108-13-36 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 7, Latitude 33-37-09 N Longitude 92-45-33 W

Use: Re-radiation system used 100% for testing installed antennas

installed: indoors

Manufacturer: all components are part of GPS Networking HNRRKIT

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	7.8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	4.8E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8.4E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5.1E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6.3E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1.3E-10	125.89
GPS RF Attenuator	-22	dB	-91	7.9E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	1.7E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3.4E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1.3E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	7.8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1.4E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8.4E-20	8.43E-08

Location Number: 8, Latitude 32-06-14.92 N Longitude 110-56-17.28 W

Use: Re-radiation system used 100% for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 9, Latitude 32-06-26.32 N Longitude 110-56-39.76 W

Use: Re-radiation system used 7% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 10, Latitude 32-06-26.32 N Longitude 110-56-39.76 W

Use: Re-radiation system used 7% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 11, Latitude 32-08-17.62 N Longitude 110-55-13.56 W

Use: Re-radiation system used 10% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 12, Latitude 32-07-38.55 N Longitude 110-56-06.84 W

Use: Re-radiation system used 10% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 13, Latitude 32-06-07.73 N Longitude 110-56-26.39 W

Use: Re-radiation system used 10% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 14, Latitude 32-06-11.13 N Longitude 110-56-23.01 W

Use: Re-radiation system used 1% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 15, Latitude 32-06-11.29 N Longitude 110-56-29.11 W

Use: Re-radiation system used 1% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 16, Latitude 32-06-07.43 N Longitude 110-56-29.28 W

Use: Re-radiation system used 1% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 17, Latitude 32-06-21.82 N Longitude 110-56-34.93 W

Use: Re-radiation system used 100% for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 18, Latitude 32-06-21.66 N Longitude 110-56-36.50 W

Use: Re-radiation system used 1% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 19, Latitude 32-06-13.85 N Longitude 110-56-22.24 W

Use: Re-radiation system used in anechoic chamber or under a hood for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 20, Latitude 32-06-09.71 N Longitude 110-56-19.49 W

Use: Re-radiation system used 5% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 21, Latitude 32-06-14.55 N Longitude 110-56-13.90 W

Use: Re-radiation system used 1% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 22, Latitude 32-06-23.06 N Longitude 110-56-45.30 W

Use: Re-radiation system used 40% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 23, Latitude 32-06-23.06 N Longitude 110-56-49.58 W

Use: Re-radiation system used 40% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 24, Latitude 32-06-20.07 N Longitude 110-56-52.00 W

Use: Re-radiation system used in anechoic chamber 100% for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 25, Latitude 32-06-20.06 N Longitude 110-56-52.18 W

Use: Re-radiation system used in anechoic chamber 100% for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 26, Latitude 32-06-20.07 N Longitude 110-56-52.46 W

Use: Re-radiation system used in anechoic chamber 100% for testing installed antennas

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 27, Latitude 32-06-19.91 N Longitude 110-56-55.23 W

Use: Re-radiation system used 25% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 28, Latitude 32-06-21.84 N Longitude 110-56-54.50 W

Use: Re-radiation system used 5% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 29, Latitude 32-06-21.13 N Longitude 110-56-57.40W

Use: Re-radiation system used 5% for testing installed antennas, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 30, Latitude 32-06-27.26 N Longitude 110-56-44.86W

Use: Re-radiation system used in anechoic chamber, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 31, Latitude 32-06-25.92 N Longitude 110-56-43.58W

Use: Re-radiation system used in anechoic chamber, hard-wired otherwise

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 32, Latitude 32-06-24.95 N Longitude 110-56-17.35W

Use: Re-radiation system used 100% of time.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 33, Latitude 32-06-26.67 N Longitude 110-56-18.86W

Use: Re-radiation system used 100% of time.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 34, Latitude 32-06-22.34 N Longitude 110-57-14.19W

Use: Re-radiation system used 10% of time; hard-wired otherwise.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 35, Latitude 32-06-22.36 N Longitude 110-57-19.22W

Use: Re-radiation system used in anechoic chamber; hard-wired otherwise.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 36, Latitude 32-06-25.21 N Longitude 110-57-18.18W

Use: Re-radiation system used in anechoic chamber; hard-wired otherwise.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 37, Latitude 32-06-15.92 N Longitude 110-57-12.26 W

Use: Re-radiation system used 10% for testing installed antennas; hard-wired otherwise.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 38, Latitude 32-05-38.47 N Longitude 110-56-03.79 W

Use: Re-radiation system used 100% for testing installed antennas.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 39, Latitude 32-05-40.08 N Longitude 110-55-36.72 W

Use: Re-radiation system used 100% for testing installed antennas.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 40, Latitude 32-07-39.63 N Longitude 110-56-07.19 W

Use: Re-radiation system used for testing installed antennas either hooded or hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 41, Latitude 32-07-41.99 N Longitude 110-56-06.31 W

Use: Re-radiation system used for testing installed antennas either hooded or hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 42, Latitude 32-05-46.35 N Longitude 110-56-47.39 W

Use: Re-radiation system used 10% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 43, Latitude 32-05-46.29 N Longitude 110-57-06.67 W

Use: Re-radiation system used 10% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 44, Latitude 32-05-30.02 N Longitude 110-56-47.16 W

Use: Re-radiation system used 10% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 45, Latitude 32-06-29.46 N Longitude 110-56-46.35 W

Use: Re-radiation system used 30% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 46, Latitude 32-08-12.77 N Longitude 110-55-13.90 W

Use: Re-radiation system used 20% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 47, Latitude 32-08-23.01 N Longitude 110-54-57.81 W

Use: Re-radiation system used 20% for testing installed antennas; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 48, Latitude 32-05-40.21 N Longitude 110-48-28.90 W

Use: Re-radiation system used in anechoic chamber; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 49, Latitude 32-05-38.58 N Longitude 110-48-41.65 W

Use: Re-radiation system used in anechoic chamber; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 50, Latitude 32-05-38.99 N Longitude 110-48-40.00 W

Use: Re-radiation system used in anechoic chamber; otherwise hard-wired.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08

Location Number: 51, Latitude 33-39-02.00 N Longitude 92-39-06.12 W

Use: Re-radiation system used 50% for testing installed antennas.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz	Signal Level		
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-131.1	8E-17	7.78E-05
Signal level at unit under test EIRP to ERP			-133.2	5E-17	4.75E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-160.8	8E-20	8.38E-08
Signal level at 100 ft ERP			-162.9	5E-20	5.12E-08

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz	Signal Level		
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-130	dBm	-130	1E-16	0.0001
GPS Receive Antenna amplifier gain	38	dB	-92	6E-13	0.63
GPS RF Amplifier gain	23	dB	-69	1E-10	125.89
GPS RF Attenuator	-22	dB	-91	8E-13	0.79
LMR400 Coax loss per foot	-0.067	dB			
Coax Length	100	feet			
Total Coax Loss	-6.7	dB	-97.7	2E-13	0.170
GPS Transmitting Antenna Gain	3	dB	-94.7	3E-13	0.339
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-128.9	1E-16	0.000128
Signal level at unit under test EIRP to ERP			-131.1	8E-17	7.83E-05
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-158.6	1E-19	1.38E-07
Signal level at 100 ft ERP			-160.7	8E-20	8.43E-08