Raytheon Missile Systems
Renewal Application Exhibit
Redstone Arsenal Facility GPS Re-radiation Systems
Call Sign: WF2XVU
File Number: 0400-EX-CR-2017

Exhibit 1 – Overview and Explanation

Overview: Raytheon Missile Systems is filing this application to request renewed authorization to use GPS re-radiation systems at its production facility in Redstone Arsenal, Alabama. In recent years, virtually every product developed by Raytheon Missile Systems incorporates one or more GPS receivers, so the need to use GPS re-radiation systems to test those receivers has proliferated across the company and now includes many more programs, including all of the programs working at the Redstone Arsenal facility. This application is being filed renew authorization for GPS re-radiation systems for all of the programs that are operating in the Redstone Arsenal building.

There are seven locations requested in this application. The locations, all indoors, are listed in a chart that follows this Exhibit. The chart has essential information regarding the location, whether the installation will be hooded, and how much time the GPS re-radiation system will be in use. The chart is followed by a separate link budget for each location. The Raytheon facility at the Redstone Arsenal Army Base has one large building with a main building area and six separate production areas. Because the building is large, Raytheon will be installing seven separate re-radiation systems, and their locations are far enough apart that each has its own distinct geographic coordinates. Each installation is listed as a separate location.

Synopsis:

- All seven locations are indoors, at a secure Raytheon facility at Redstone Arsenal.
- All GPS re-radiation systems are used for GNSS testing.
- Power level (EIRP) at 100 feet from the re-radiating antenna is -160.8 dBm for L1 and -158.6 dBm for L2. Link budgets are attached.
- Raytheon Missile Systems has posted signs that GPS re-radiation is in use.
- The Stop Buzzer point of contact is Bart Turner, 520-794-0227.

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 Bart Turner, Spectrum Manager, Raytheon Missile Systems, 520-794-0227 or bartholomew.d.turner@raytheon.com, or Anne Linton Cortez, 520-360-0925 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 in Attachment A. 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 and what percentage of the time the GPS re-radiation system will be in use.

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 renewal of WF2XVU for two years, and it will seek renewals when timely.

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 installation locations listed on Attachment A are in a building at the Raytheon facility located on the Redstone Arsenal Army Base. As such, 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 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.

   One installation will be hooded to further protect from interference: In the Main Building, the GPS re-radiation system will be operated under a hood. The hooded re-radiating antenna is positioned merely inches from the receive antennas for testing.

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 will post 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:

   Bart Turner, Spectrum Manager, Raytheon Missile Systems

   520-794-0227 (office)
   bartholomew.d.turner@raytheon.com

   Mr. Turner will keep 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.

For questions regarding this application, please contact Bart Turner, Spectrum Manager, Raytheon Missile Systems or Anne Cortez, Counsel, 520-360-0925 or alc@conspecinternational.com.

ATTACHMENT A – Locations of GPS Re-radiation Kit Installations
File Number:

The Huntsville GPS re-radiation locations being renewed are set forth in the table below. Each location is in a different part of the building at 7745 Eagle Road, Redstone Arsenal, Alabama. The last two columns show A) how much the re-radiation system is used over the air, rather than being hard-wired to the receiver in the Raytheon product under test, and B) whether some or all of the use of the re-radiation system is hooded, which provides additional shielding to further attenuate the GPS signal and prevent it from being perceived in the immediate vicinity of the hooded testing.

Site Number:	Latitude:	Longitude:	% of Time in Use	Hoods in use
Main Building	34-37-38	86-35-43	20%	Yes
Site 1	34-37-41.96	86-35-45.72	20%	No
Site 2	34-37-43	86-35-42.6	20%	No
Site 3	34-37-42	86-35-39	20%	No
Site 4	34-37-40	86-35-37	20%	No
Site 5	34-37-37	86-35-37	20%	No
Site 6	34-37-35	86-35-39	20%	No

Link budgets for each of the sites listed in the table above are attached below.

Location: Main Building, Latitude 34-37-38 N Longitude 86-35-43 W

Use: Re-radiation system will be hooded and used 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: Site 1, Latitude 34-37-42 N Longitude 86-35-46 W

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: Site 2, Latitude 34-37-43 N Longitude 86-35-43 W

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: Site 3, Latitude 34-37-42 N Longitude 86-35-39 W

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: Site 4, Latitude 34-37-40 N Longitude 86-35-37 W

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: Site 5, Latitude 34-37-37 N Longitude 86-35-37 W

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: Site 6, Latitude 34-37-35 N Longitude 86-35-39 W

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