EXHIBIT 1
Experimental License Renewal
Form 405 File #0471-EX-CR-2017
Call Sign: WG2XWN

Overview

Raytheon Company ("Raytheon") is filing this application to renew its experimental license for continued use of a global positioning service ("GPS") re-radiation system at its facilities at 22270 Pacific Boulevard, Dulles, Virginia ("Facility"). Multiple products at the Facility utilize GPS for positioning information and timing technologies that are embedded into the wireless technologies under development. The GPS re-radiation system is required for the testing of GPS technologies that are embedded into the communications systems that Raytheon is developing in this lab.

Compliance with NTIA Manual Section 8.3.28

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

This GPS re-radiation system is installed indoors in a laboratory with access that is limited to authorized personnel only.

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.

 n/a

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

n/a

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

Raytheon requests renewal for two (2) years in order to continue product development and testing.

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

The Facility is secured and under the sole control of Raytheon with access only to authorized personnel.

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.)

The GPS device is installed deep within the Facility and far from any exterior walls. The attached link budget shows that the signal strength *at 100 feet from the re-radiating antenna* is below -140 dBm/24 MHz.

There have been no changes to the equipment from the prior application.

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 the lab where the 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 a re-radiation system 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.

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License Contact Information

For questions about this license, please contact:

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Use: Re-radiation system used 100% for testing

installed: indoors

Manufacturer: all components are part of GPS Source, maximum gain specifications.

GPS Signal Analysis - L1 Link Budget

Frequency	1575.42	MHz		Signal Level	
Wavelength	0.19042541	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-126.7	dBm	-126.7	2.1E-16	0.000213796
GPS Receive Antenna amplifier gain	38.5	dB	-88.2	1.5E-12	1.51
GPS RF Amplifier gain	49	dB	-39.2	1.2E-07	120226.44
GPS RF Attenuator	-20	dB	-59.2	1.2E-09	1202.26
LMR240 Coax loss per foot	-0.101	dB			
Coax Length	210	feet			
Total Coax Loss	-21.21	dB	-80.41	9.1E-12	9.099
GPS Transmitting Antenna Gain	3	dB	-77.41	1.8E-11	18.155
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-36.38969194	dB	-113.8	4.2E-15	0.00416899
Signal level at unit under test EIRP to ERP			-115.9	2.5E-15	0.002547011
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-66.06999119	dB	-143.5	4.5E-18	4.48746E-06
Signal level at 100 ft ERP			-145.6	2.7E-18	2.74158E-06

* Specification per GPS Performance Standard, dated Feb 23, 2007.
* GPS Source L1L2-2GA, Max gain
* GPS Source GPSRKL12, Max gain; RMS116, Max gain

* Typical loss per foot @ 1575.5; connector/coupler loss not included (increases loss)

GPS Signal Analysis - L2 Link Budget

Frequency	1227.6	MHz		Signal Level	
Wavelength	0.244379277	meters	dBm	Watts	picoWatts
GPS Input Signal Level	-134.5	dBm	-134.5	3.5E-17	3.54813E-05
GPS Receive Antenna amplifier gain	41.5	dB	-93	5E-13	0.50
GPS RF Amplifier gain	49	dB	-44	4E-08	39810.72
GPS RF Attenuator	-20	dB	-64	4E-10	398.11
LMR240 Coax loss per foot	-0.089	dB			
Coax Length	210	feet			
Total Coax Loss	-18.69	dB	-82.69	5.4E-12	5.383
GPS Transmitting Antenna Gain	3	dB	-79.69	1.1E-11	10.740
Distance from transmit antenna	1	meters			
Distance from transmit antenna	3.2808399	feet			
Pathloss to unit under test	-34.22290244	dB	-113.9	4.1E-15	0.004061718
Signal level at unit under test EIRP to ERP			-116.1	2.5E-15	0.002481474
Distance from transmit antenna	30.48	meters			
Distance from transmit antenna	100.0000002	feet			
Pathloss to 100 ft	-63.9032017	dB	-143.6	4.4E-18	4.372E-06
Signal level at 100 ft ERP			-145.7	2.7E-18	2.67104E-06

* Specification per GPS Performance Standard, dated Feb 23, 2007.
* GPS Source L1L2-2GA, Max gain
* GPS Source GPSRKL12, Max gain; RMS116, Max gain

* Typical loss per foot @ 1227.6; connector/coupler loss not included (increases loss)