File Number 0444-EX-PL-2010

FCC experimental License application for GPS repeater: Woods Hole Oceanographic Institution Carlson Lane laboratory

NTIA manual - http://www.ntia.doc.gov/osmhome/redbook/8_5_10.pdf

8.3.28 Use of Fixed Devices That Re-Radiate Signals Received From the Global Positioning System

Except as otherwise authorized under Part 7.14, federal agencies and departments may, under the following conditions, operate fixed devices that re-radiate signals received from the Global Positioning System (GPS).

1. Individual authorization is for indoor use only, and is required for each device at a specific site.
    - A single repeater will be installed indoors at the Woods Hole Oceanographic Institution Carlson Lane Laboratory.

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.
    - This equipment will be used to test GPS receivers that are part of ocean buoy and autonomous vehicle assemblies. The buoys and vehicles have electronic components that are exposed during assembly and prevent testing outdoors.

3. Approved applications for frequency assignment will be entered in the GMF.
    - Acknowledged.

4. The maximum length of the assignment will be two years, with possible renewal.
    - Acknowledged.

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 Carson Lane Laboratory GPS signal, based on calculations shown in number 6, will be contained within the property controlled by the Woods Hole Oceanographic Institution.

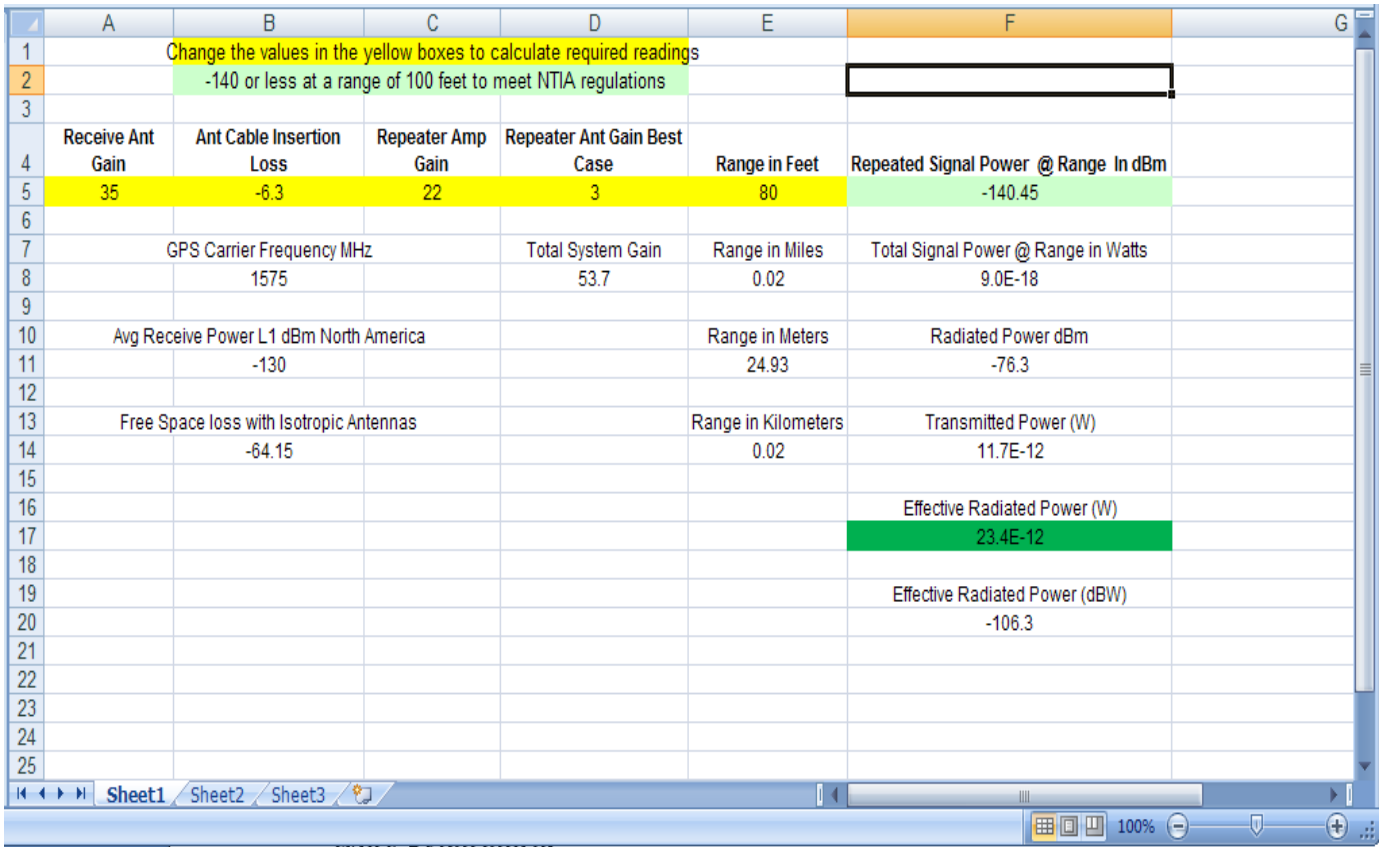
6. The maximum equivalent isotropically radiated power (EIRP) must be such that the calculated emissions are no greater than -140 dBm/24 MHz as received by an isotropic antenna at a distance of 100 feet (30 meters) from the building where the test is being conducted. The calculations showing compliance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

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.
    - There are no military or civilian agencies (airport/fire/police) near the Carlson Lane Laboratory. The repeater will be mounted on an interior wall within the laboratory. The Carlson Lane Lab is surrounded by a wooded area. The closest residents are more than 350 feet from the proposed antenna location.

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

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' will be the Woods Hole Oceanographic security office who is available 24 hours every day.
    - Woods Hole Security phone number: 508-289-3280
    - Carlson Lane reception M-F 8am – 5pm 508-289-3400

Calculations to address item #6:
GPS Source provides excel spreadsheet calculator.



	A	B	C	D	E	F	G
1	Change the values in the yellow boxes to calculate required readings						
2	-140 or less at a range of 100 feet to meet NTIA regulations						
3							
4	Receive Ant Gain	Ant Cable Insertion Loss	Repeater Amp Gain	Repeater Ant Gain Best Case	Range in Feet	Repeated Signal Power @ Range In dBm	
5	35	-6.3	22	3	80	-140.45	
6							
7	GPS Carrier Frequency MHz			Total System Gain	Range in Miles	Total Signal Power @ Range in Watts	
8	1575			53.7	0.02	9.0E-18	
9							
10	Avg Receive Power L1 dBm North America				Range in Meters	Radiated Power dBm	
11	-130				24.93	-76.3	
12							
13	Free Space loss with Isotropic Antennas				Range in Kilometers	Transmitted Power (W)	
14	-64.15				0.02	11.7E-12	
15							
16						Effective Radiated Power (W)	
17						23.4E-12	
18							
19						Effective Radiated Power (dBW)	
20						-106.3	
21							
22							
23							
24							
25							

Sheet1 Sheet2 Sheet3

100%