



Instructions for applying for FCC Experimental License for GPS repeater

Date

December 30, 2013

This Instruction is written as a guide for customers that need to apply for a FCC Experimental License in order to install GPS repeaters for various indoor use.

In the United States, the spectrum used to support GPS operations is allocated to the Radio Navigation Satellite Service (RNSS) on a shared basis for Government and non-Government use and is thus managed jointly by FCC and NTIA. The NTIA has placed restrictions on the use of GPS repeaters out of concern for interference to critical Federal RNSS applications (e.g., aviation). There is a process for obtaining NTIA approval to operate GPS repeaters in certain situations which is described in Chapter 8 (8.3.28-8.3.30) of the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management (available at: http://www.ntia.doc.gov/files/ntia/publications/redbook/2013/8_13.pdf).

Or as follows:

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

Except as otherwise authorized under Section 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).

- a. Individual authorization is for indoor use only, and is required for each device at a specific site.
- b. 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.
- c. Approved applications for frequency assignment will be entered in the GMF.
- d. The maximum length of the assignment will be two years, with possible renewal.
- e. The area of potential interference to GPS reception (e.g., military or contractor facility) has to be under the control of the user.
- f. 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.)

- g. GPS users in the area of potential interference to GPS reception must be notified that GPS information may be impacted for periods of time.
- h. The use is limited to activity for the purpose of testing RNSS equipment/systems.
- i. A "Stop Buzzer" point of contact for the authorized device must be identified and available at all times during GPS re-radiator operations.

8.3.29 Use of Land-Based Mobile Devices That Re-Radiate Signals Received From the Global Positioning System

Except as otherwise authorized under Section 7.14, federal agencies and departments may, under the following conditions, operate land-based mobile devices that re-radiate signals received from the Global Positioning System (GPS) at 1575.42 ± 12 MHz (L1).

- a. Use is restricted to inside armored ground vehicles operating within a federal controlled range/facility/installation or cordoned zone.
- b. Applications for frequency assignment shall be applied for as an "NR" station class with a note describing how the device will be used.
- c. Approved applications for frequency assignment will be entered in the GMF.
- d. The maximum length of assignment will be two years, with possible renewal.
- e. The application for frequency assignment shall indicate the agency or department controlled range/facility/installation or cordoned zone of operation and the number of vehicles equipped with these devices.
- f. The entire area of potential interference to GPS reception (e.g., military/federal range/facility/installation or cordoned area) must be under the control of the federal user.
- g. The maximum equivalent isotropically radiated power (EIRP) must be such that the calculated emissions are no greater than -88 dBm/24 MHz at the output of GPS reradiator antenna (-144 dBm/24 MHz at 10 meters as received by an isotropic antenna) from an armored ground vehicle.
- h. GPS users within the area of potential interference to GPS reception must be notified that GPS information may be impacted for periods of time.
- i. A "Stop Buzzer" point of contact for the authorized device must be identified and available at all times during GPS re-radiator operations.
- j. These devices operate on a non-interference, unprotected basis.

8.3.30 Use Inside of Federal Owned Aircraft Devices That Re-Radiate Signals Received From the Global Positioning System

1. Except as otherwise authorized under Section 7.14, federal agencies and departments may, under the following conditions, operate inside an agency/department owned aircraft devices that re-radiate signals received from the Global Positioning System (GPS) at 1575.42 ± 12 MHz (L1) and 1227.6 ± 12 MHz (L2).

- a. In the design of the re-radiator equipment, all practicable efforts shall be taken to attenuate the emissions outside the bands 1575.42 ±12 MHz (L1) and 1227.6 ±12 MHz (L2) as much as possible.
- b. Use of the re-radiator is restricted to transmissions inside federal owned aircraft operating within a federal controlled range/facility/installation/cordoned zone. All locations using aircraft re-radiators are required to have a frequency assignment. System checks shall only be performed while the aircraft is on the ground at a federal controlled range/facility/installation/cordoned zone. In addition, operation of the re-radiator while in flight is limited to use during the final 20 minutes before planned deployment of assets.
- c. Applications for frequency assignment shall be applied for as an "NR" station class with an explanation describing how the device will be used.
- d. Approved applications for frequency assignment shall be entered in the GMF.
- e. The maximum length of frequency assignment shall be two years, with possible renewal.
- f. The application for frequency assignment shall indicate the agency or department, the federal controlled range/facility/installation/cordoned zone of operation and the number of aircraft equipped with these devices.
- g. So as to not interfere with other aircraft, the maximum equivalent isotropically radiated power (EIRP) must be such that the calculated or measured emissions are no greater than -141 dBm/24 MHz as received by an isotropic antenna at a distance of 20 meters from the aircraft skin with all access doors open. The total GPS re-radiator system group delay shall not exceed 200 nanoseconds. ¹⁶
- h. When the re-radiator is being operating on the ground, GPS users within the area of potential interference to GPS reception must be notified that GPS information may be impacted for periods of time.
- i. Federal owned aircraft that use GPS re-radiators shall ensure proper operation of their avionics systems which operate in or near the GPS bands, with the re-radiator active, and should be tested with the aircraft doors open and closed.
- j. A "Stop Buzzer" point-of-contact for the authorized device must be identified and available at all times during the GPS re-radiator operations.
- k. These devices operate on a non-interference, unprotected basis.

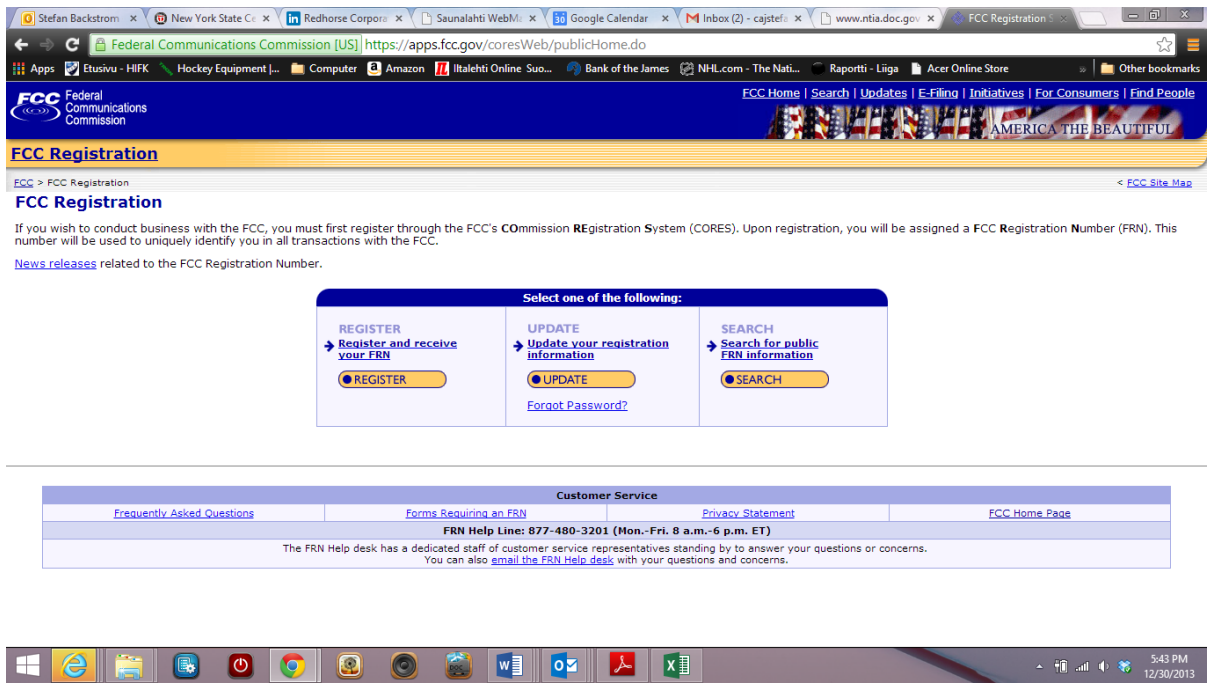
Obtaining an FCC Experimental License

You can obtain an FCC Experimental License to operate a GPS repeater. In the following you can find the step-by-step instructions to file for your license.

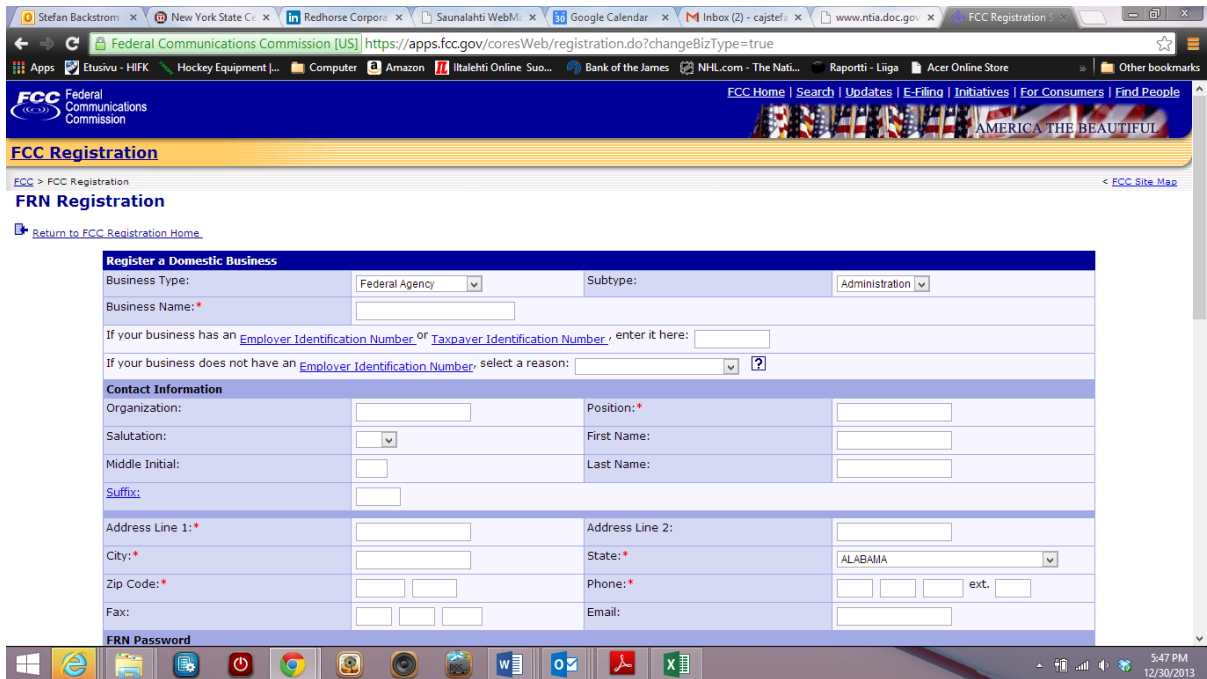
1. Obtain an FCC Registration Number (FRN)

Register at the FCC Commission Registration System (CORES).

<https://svartifoss2.fcc.gov/coresWeb/publicHome.do>



The system will prompt if you are registering as a business or individual. Choose the option that applies and continue. After this step, select the appropriate business type and fill in the additional fields.



After this section has been completed choose "submit" at the bottom of the page. Your FRN number will be generated after submission of this form. Print the confirmation page with the FRN number or make a note of the number for your records.

Obtain your experimental license.

Here you can find detailed instructions on how to fill in Form 442:

https://apps.fcc.gov/oetcf/els/help/442_Help.html

The screenshot shows the FCC.gov website interface for filing Form 442. The page title is "Application For New or Modified Experimental Radio Station Authorization (Form 442)". The main content area is titled "Form 442 - New License/Modification of License". It includes a "Form 442 - New License/Modification of License" section with the following questions and input fields:

- Application Purpose:** *
 - New Authorization: All New Data
 - New Authorization: Uses information from an existing application (i.e. - a template) Please specify the file number:
 - Modification of Existing License (Specify call sign):
- Is confidentiality required for this filing?** * Yes No
- Applicant FCC Registration Number (FRN):** *

A "Notice" is displayed: "If you respond 'YES' to 'Confidentiality' question, please submit a justification as an exhibit along with your application. The justification should state why confidentiality is requested." Below the notice, a red asterisk indicates: "* - Indicates that this field must be completed before this page can be submitted." At the bottom of the form, there are "Proceed" and "Clear" buttons.

Form 442 is used for first time filings for experimental license, while Form 405 is used to renew an existing license. There is also a Special Temporary Authority (STA) option that is valid for six months. Fill in the answers to all questions about your organization and explain the purpose and duration of the license, and click proceed. For first time applicants, you will be entering "all new data."

The first portion of Form 442 contains Items 1 through 5. The majority of the necessary information for Items 1 through 5 will pre-populate with the assigned grantee code information. This information can not be modified. If modifications are required contact the OET Experimental Licensing Branch with the incorrect and correct information, at the following address:

Federal Communications Commission
Office of Engineering and Technology Experimental Licensing Branch
445 12th Street, SW
Washington, D.C. 20554

Or send an email to fccinfo@fcc.gov.

Below is a link to the FCC Experimental Licensing System Users Manual

<https://apps.fcc.gov/oetcf/els/misc/elsweb.pdf>