

Sec 8.3.27 Use of Fixed Devices that Re-Radiate Signals Received from the Global Positioning System

- a. We confirm that this individual authorization is for indoor use only, and we are only registering one device per this application
- b. Confirmed that the device will be used for "Experimental RNSS Test Equipment for the purpose of testing GPS receivers". Specifically, the goal is to validate units for PPS detection and PDOP timing. The units require a GPS signal to validate, and the indoor GPS signal is weak, slowing down the validation process. A GPS repeater will greatly reduce the amount of time it takes to validate a unit.
- c. Understood that the approved application will be entered in the GMF
- d. Understood that the maximum length of assignment is two years, with possible renewal
- e. Confirmed that the area of potential interference to GPS reception is under the direct control of the applicant and user.
- f. EIRP must be such that the emissions are no greater than -140 dBm as received by an isotropic antenna at a distance of 30 meters from the building where the test is being conducted. Our calculations indicate that the EIRP at 30 meters from the building will be -157.5 dBm. Please find the calculations below:
 - a) Free space propagation loss with $f(L1) = 1575 \text{ MHz}$, $d = 2 \text{ m}$: $L_p = 20 \log_{10} f + 20 \log_{10}(30 + d) - 27.55 = 20 \log_{10} 1575 + 20 \log_{10}(30 + 2) - 27.55 = 66.5 \text{ dB}$
 - b) $EIRP = -130 \text{ dBm} + 28 \text{ dB} - 19 \text{ dB} + 30 \text{ dB} - 66.5 \text{ dB} = -157.5 \text{ dBm}$.
 - i) -130 dBm is the L1 power in the US
 - ii) +28 dB is the antenna (Tx) gain
 - iii) -19 dB is the cable loss
 - (1) RG58 has 0.475 dB/m loss at 1.5 GHz. We have a 40 m cable
 - iv) + 30 dB is the gain from the receiver (Rx), i.e., the gain from the amplifier
 - v) -66.5 dB is the free-space propagation loss calculated in a)
- g. Notification signs have been posted internally and externally to the building informing users of potential interference in the area due to the use of the GPS repeater.
- h. The use of the repeater is limited to validation of units, i.e., for the purpose of testing RNSS systems.
- i. Gener8 has implemented a "stop buzzer" point of contact for the repeater.
 - a) Contact: Jeremy Law, cell phone: +1-858-228-6423, email: jlaw@gener8.net