

From: Rik Hansen

To: Leann Nguyen

Date: December 01, 2014

Subject: FCC File# 0846-EX-PL-2014

Message:

1. Please complete your application including latitude, longitude, emission designator, name of person to terminate the system.
 - a. Latitude: 40.016740, Longitude: -105.232588
 - b. I'm not familiar with what an emission designator is. Please provide more detail about the information needed.
 - c. They can contact me to terminate, Rob Osborne, cell: 720-201-8953.
2. In great detail, please describe the purpose of your operation and attach your response as correspondence to this email.
 - a. We test GPS receivers on our satellites to make sure they can receive and react properly to a GPS signal. Our testing is done indoors where a GPS signal is not present or is too weak to pick up. We therefore need to repeat the GPS signal strong enough for the GPS receiver to pick up.
3. In accordance with NTIA manual section 8.3.28, please address each item from 1 through 9 and attach your response as correspondence to this email.
 - i. This is for indoor use. Is it OK for this to cover multiple repeater systems within our building. They would all do the same thing which is repeat GPS signals at expected on orbit levels.
 - ii. This is Experimental RNSS Test Equipment for the purpose of testing GPS receivers. Please see description 2a above for description.
 - iii. I'm assuming this is an FCC action. Please advise if it is a required action on our end.
 - iv. We are asking for the maximum time duration allowed. This will be an indefinite operation as I assume our satellites will always use GPS for location knowledge.
 - v. The area of potential interference is controlled by Ball Aerospace, and Rob Osborne can serve as the point of contact.
 - vi. Our procedures direct the power going into the GPS repeater antenna to be less than -120 dBm. $Loss = 32.45 + 20\log(d) + 20\log(f)$. In our case, $d = 100\text{ft} = 0.03\text{km}$, and $f = 1575.42\text{ MHz}$, so loss at 100ft = 109 dB, and the power at 100ft is -229 dBm.
 - vii. We are not aware of any GPS users in the area.
 - viii. The repeater system will be on at very limited times while active testing is occurring. We can assume less than 80 hours a year.
 - ix. Rob Osborne can serve as the 'Stop Buzzer' point of contact.
4. Please provide a detailed calculation(s) for the link budget specified on item 6 of section 8.3.28.
 - a. Please see 3.vi.

All question answered herein.

Rik Hansen