

A. The answer for NAIT Manual 8.3.28

1. LG will use the GPS Repeater Indoors only at address provided.
2. LG will use the GPS Repeater for Experimental RNSS Test Equipment purposes. LG will be testing the GPS receivers in the GM OnStar electronic Module that LG manufactures and provides to GM.
3. We agree.
4. 2 year registration
5. GPS Repeater will be used at LG's contracted building address 7300 Fifteen Mile Road Sterling Heights, MI 48312
6. Emission -142.41 db @ 200 ft inside building
7. We understand.
8. We agree.
9. Robert Welch / 248-302-3623 / robert.welch@lge.com / 1307 Allen Dr. Troy MI 48083

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.

LGE Answer: LG will use the GPS Repeater Indoors only at address provided.

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.

LGE Answer: LG will use the GPS Repeater for Experimental RNSS Test Equipment purposes. LG will be testing the GPS receivers in the GM OnStar electronic Module that LG manufactures and provides to GM.

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

LGE Answer: We agree.

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

LGE Answer: 2 year registration

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

LGE Answer: GPS Repeater will be used at LG's contracted building address 7300 Fifteen Mile Road Sterling Heights, MI 48312

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.)

LGE Answer: Emission -142.41 db @ 200 ft inside building

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.

LGE Answer: We understand.

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

LGE Answer: We agree.

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.

LGE Answer: Robert Welch / 248-302-3623 / robert.welch@lge.com / 1307 Allen Dr.

Troy MI 48083

B. The purpose of GPS repeater usage:

LG will use the GPS Repeater for Experimental RNSS Test Equipment purposes.

LG will be testing the GPS receivers in the GM OnStar electronic Module(Automotive part) that LG manufactures in China and provides to GM.

C. Calculation for Link budget:

I. Coaxial Cable Attenuation & Power Handling Calculation

1.Product : LMR-240 (GPS Source company)

2.Frequency: 1575 MHz

3.Attenuation(db/100feet): 10.127

4.Attenuation(db/100ntrs): 33.226

5.Average Power:0.19kw

6.Run length(feet):82

7.Total run Attenuation(db):8.3

8. Efficiency(%):14.8

II. Repeater Budget Calculator

1.Rceive Ant Gain: 36

2.Ant Cable Insertion Loss:-8.3

3.Repeater Amp Gain:30

4.Repeater Amp Gain(Best Case):3

5.Range in feet:200

6.Repeated Signal Power@Range In dBm:-142.41---> Answer item 6 of NTIA Section 8.3.28

7.Total signal power@range in Watts:5.7e-18

8.GPS Carrier Frequency(MHz):1575

9.Free space loss with isotropic Antennas:72.11

10.Total system gain:56.7
11.Range in miles:0.04
12.Effective Radiated Power dBm:-72.45
13.Effective Radiated Power(dBW):-102.45
14.Avg Receive Power in dBm Noth America:-130
15.Reference Dipole Gain:2.15
16.Transmitted Power(W):2.9e-11
17.Range in Kilometers:0.06
18.Effective Isotropic Radiated Power (dBm):-70.30
19.Effective Isotropic Radiated Power (dBW):-100.30
20.Typical Value @ L1 -130.0dBm @ L2 -127.5 dBm
21.Range in Meters:60.9600
22.Effective radiated Power(W):5.7e-11