

Q. “Your interpretation of NTIA Manual Section 8.3.27 (f) is incorrect. The manual says, “The equivalent isotropically radiated power (EIRP) must be such that the 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. . . . Applications requesting power greater than the P_{Tmax} calculated at $d = 0$ meters (i.e. 39.3 pW for L1, 23.8 pW for L2, and 21.9 pW for L5) must provide THE DISTANCE FROM THE TRANSMIT ANTENNA TO THE NEAREST EXTERIOR WALL so that reviewing agencies can determine if the requested power meets the maximum EIRP described above.” You must use D = the distance to the nearest exterior wall of the crash test facility building. There is no possibility that government agencies will accept power levels as large as what have been entered in the application.”

A.

Assessment against 8.3.27 section “f”

Maximum Permissible EIRP

Section “f” imposes a maximum permissible EIRP in dBm called “ P_{Tmax} ”, which is calculated according to the following formula:

$$P_{Tmax} = P_R + 20 \log_{10} f + 20 \log_{10}(30 + d) - 27.55$$

Where:

P_{Tmax} is the maximum permissible EIRP in dBm

P_R is the power received at 30 meters from the building (i.e. -140 dBm/24 MHz)

f is frequency in MHz (i.e. 1575.42 for L1, 1227.60 for L2, 1176.45 for L5)

d is the distance between the radiator and the closest exterior wall of the building in meters.

Distance to Nearest Exterior Wall

Section “f” also requires the following: “Applications requesting power greater than the P_{Tmax} calculated at $d = 0$ meters (i.e. 39.3 pW for L1...) must provide the distance from the transmit antenna to the nearest exterior wall so that reviewing agencies can determine if the requested power meets the maximum EIRP described above.”

The following table provides the distance from each repeater’s transmit antenna to the nearest exterior wall.⁵

Repeater	Distance to nearest exterior wall (meters)
1	7.26
2	9.24
3	5.94
4	5.94
5	4.62
6	4.62
7	4.62
8	8.58

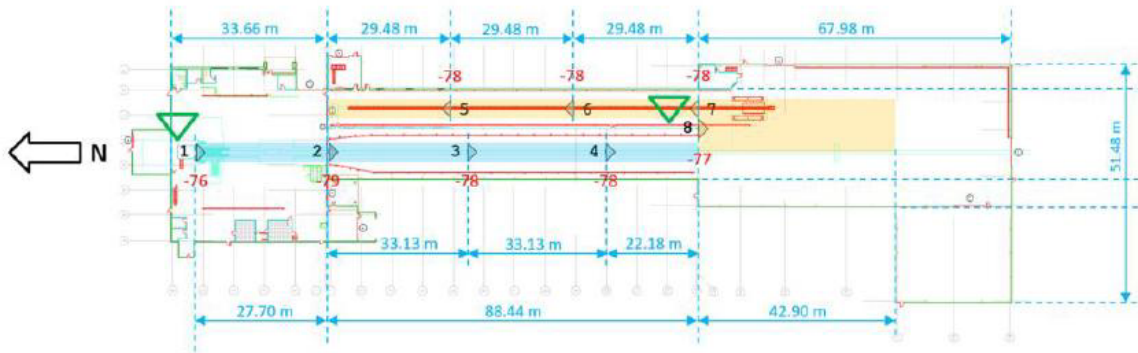
The locations of the GPS Repeaters (with their attached passive transmitting antennas) for which GMRC seeks approval are given in the following table. Repeater 1 is existing and an FCC license has already been acquired for it; only a change in power level and elimination of L2 is being proposed. GMRC proposes to add Repeaters 2, 3, 4, 5, 6, 7, and 8 to the license.

Repeater	Maximum Permissible EIRP (dBm/pW)	Actual EIRP (dBm/pW)	Actual EIRP is less than maximum permissible EIRP?
1	-72.2 / 60.6	-72.7 / 53.9	YES
2	-71.7 / 67.2	-72.5 / 56.0	YES
3	-72.5 / 56.4	-73.4 / 46.2	YES
4	-72.5 / 56.4	-73.4 / 46.2	YES
5	-72.8 / 52.3	-73.4 / 46.2	YES
6	-72.8 / 52.3	-73.4 / 46.2	YES
7	-72.8 / 52.3	-73.4 / 46.2	YES
8	-71.9 / 64.9	-72.4 / 58.2	YES


Below is the aerial view of the crash test facility with the GPS repeater locations (1 is existing; 2, 3, 4, 5, 6, 7, and 8 are proposed).



Below is the system diagram of the crash test facility, showing the GPS repeater locations.



Legend:

-  = Rooftop antenna (outdoors)
-  = GNSS repeater (with attached antenna)¹
-  = Areas requiring coverage
-  = Areas requiring coverage
-  = Repeater power setting (dBm ERP)

NOTE 1: Repeater to be located at center of base of triangle. Orientation of repeater indicated by which way triangle points. E.g. Repeater 1 points south.

Repeater	Transmit ERP L1	Units
1	-76	dBm
2	-79	dBm
3	-78	dBm
4	-78	dBm
5	-78	dBm
6	-78	dBm
7	-78	dBm
8	-77	dBm

Assessment against 8.3.27 section “e”

Section 8.3.27 of the NTIA “Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook)”, Sept 2017 Revision of the Sept 2015 edition, states the following in section “e”:

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

The crash test facility (the building shown earlier) is located inside the GM Milford Proving Grounds, which is a large private access controlled campus surrounded by a fence. Thus this campus, the crash test facility, and indeed the area of potential interference, are under the control of the user.