

1. Introduction:

Qualcomm Incorporated (NASDAQ:QCOM - News) is the world leader in 3G and next-generation mobile technologies. For 25 years, Qualcomm’s ideas and inventions have driven the evolution of wireless communications, connecting people more closely to information, entertainment and each other. Today, Qualcomm technologies are powering the convergence of mobile communications and consumer electronics, making wireless devices and services more personal, affordable and accessible to people everywhere. For more information, please visit www.qualcomm.com.

In this application, QUALCOMM, Inc. requests a two year experimental license with the possibility of renewal to deploy 4 GPS re-radiation systems for use in QUALCOMM facilities. The experimental license is required so that QUALCOMM can complete R&D efforts on devices with integrated GPS receivers and also verify GPS receiver performance during the manufacturing process. Qualcomm formally operated an experimental license unde call sign WE2XGP (File 0264-EX-RR-2013) with fewer sites.

QUALCOMM’s re-radiation setups will meet the nine requirements defined in section 8.3.28 of NTIA’s “MANUAL OF REGULATIONS AND PROCEDURES FOR FEDERAL RADIO FREQUENCY MANAGEMENT”, and thus not interference with GPS devices outside the QUALCOMM facilities defined in Section 2 of this experiment description. As depicted in Figure 1 in Section 2, the signal from a roof mounted antenna will be routed into specific test areas where the GPS signal will be amplified, attenuated to required power, and re-radiated to a test GPS antenna in close proximity to the devices under test.

2. NTIA Criteria Information

NTIA Criteria Number 1: Individual authorization is for indoor use only, and is required for each device at a specific location

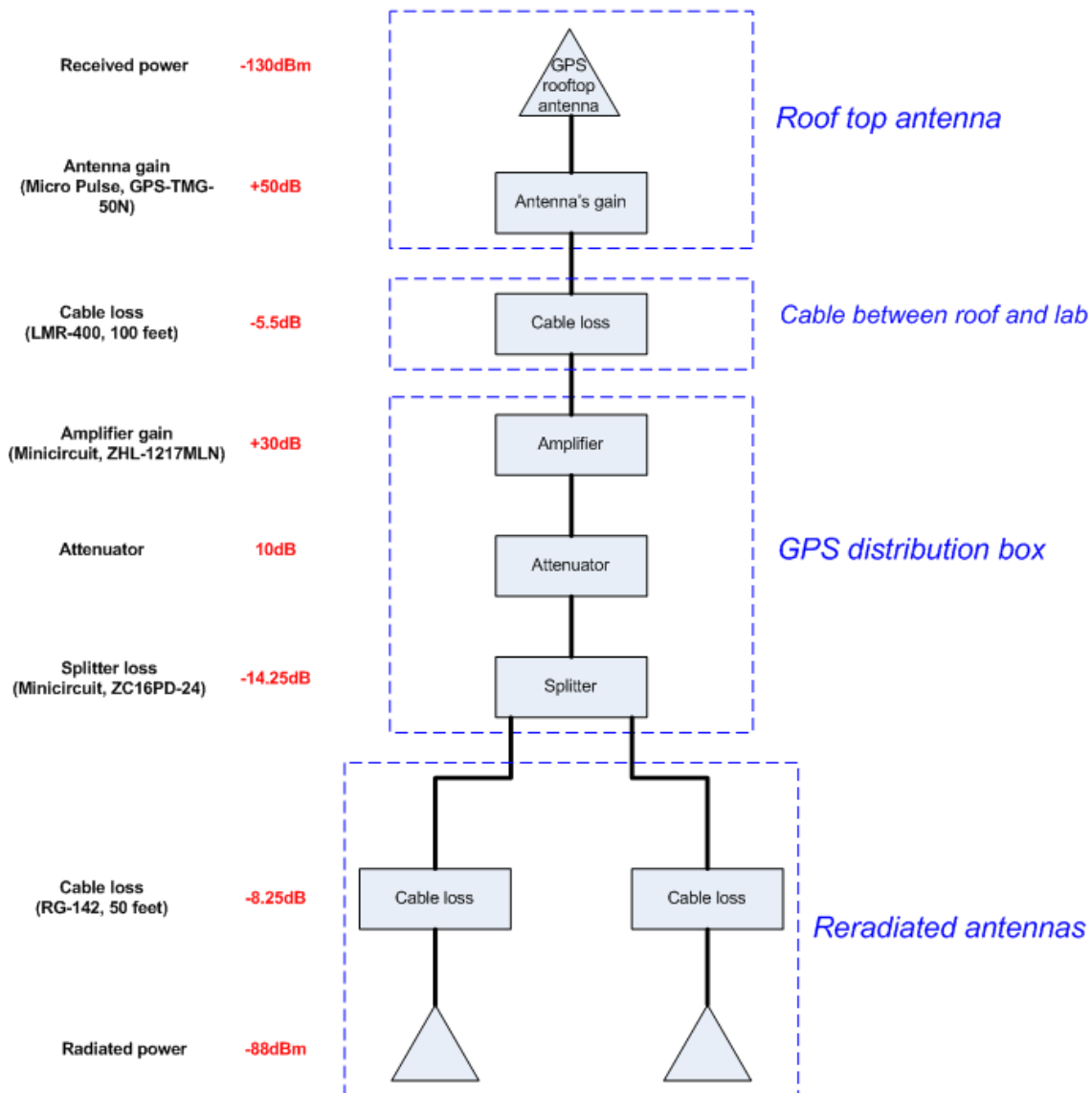
QUALCOMM will install GPS re-radiation devices in three Qualcomm locations in San Diego, CA, as described in the following table. All three sites are QUALCOMM buildings used for manufacturing or research and development. The re-radiation areas will be confined to small areas within each building.

Table 1 GPS Indoor Re-radiation locations

Address	# Floors	Name	Lat	Long
4243 Campus Point Ct , San Diego, CA 92121	2	BB	32 53 16 N	117 13 32 W
5665 Morehouse Drive, San Diego, 92121	7	QRC	32-53-42.9	117-11-43.74
5525 Morehouse Dr, San Diego, CA 92121	2	QRC	32-53-37.6	117-11-52.0
500 Somerset Blvd, Bridgewater, NJ 08807	8	NJ A	40-35-16	74 37 27

Figure 2-1 GPS Indoor Re-radiation setup

QUALCOMM GPS INDOOR RERADIATED SYSTEM



NTIA Criteria Number 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.

QUALCOMM will use the proposed equipment solely for the purpose of experimental R&D test efforts and manufacturing of systems that use GPS receivers.

NTIA Criteria Number 3: Approved applications for frequency assignment will be entered in the GMF.

The frequency of each re-radiation assignment will be 1575.42 MHz (L1-band).

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

Qualcomm request an experimental license duration of two years, with the possibility of renewal.

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

The facilities where the re-radiation devices will be located are all owned, operated, and controlled exclusively by QUALCOMM, Inc.

NTIA Criteria Number 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.)

The maximum emissions from the re-radiation system will be no greater than -140dBm/24 MHz at a distance of greater than 20 feet (6m). It should be noted that the emissions from the QUALCOMM re-radiation system will be 13dB lower then that specified by NTIA. The calculation does not include additional attenuation provided by the building walls.

Table 2 Emissions Calculation at 100 feet

Parameter	Equation	Value	Unit
Re-radiation device EIRP	Fixed	-88	dBm
Path loss at 100 ft (30m) @ 1575 MHz	$FSL = 20 * \log \left[\frac{4\pi d}{\lambda} \right]$	-65.9	dB
Received power at 100 ft (30m)	EIRP+FSL	-153.0	dBm

Table 3 Emissions Calculation for intended coverage distance of 20 feet

Parameter	Equation	Value	Unit
Re-radiation device EIRP	Fixed	-88	dBm
Path loss at 20 ft (6m) @ 1575 MHz	$FSL = 20 * \log \left[\frac{4\pi d}{\lambda} \right]$	-52	dB
Received power at 100 ft (30m)	EIRP+FSL	-140.0	dBm

NTIA Criteria Number 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.

QUALCOMM will post signs in the specific immediate area (within the building) of the GPS re-radiation devices. GPS users outside of the building will not be affected since the zone of potential interference is located within the facility.

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

QUALCOMM will use the proposed equipment solely for the purpose of experimental R&D test efforts and testing of GPS devices during manufacturing.

NTIA Criteria Number 9: "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.

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3. Re-Radiation Equipment Information

The equipment used for QUALCOMM’s indoor re-radiation system is listed in Table 4.

Table 4 GPS Re-Radiation Equipment

Equipment	Manufacturer	Model
GPS Antenna	Micro-pulse 50dB gain	GPS-TMG-50N
Amplifier	Mini-circuits	TBD
RF attenuators	Mini-circuits	TBD
RF Splitters	Mini-circuits	TBD
Re-radiating antenna	Micro-pulse	TBD