

## 2900-3000 MHz Experiment Description

### 1 Introduction

Qualcomm's technologies powered the smartphone revolution and connected billions of people. We pioneered 3G and 4G – and now we are leading the way to 5G and a new era of intelligent, connected devices. Our products are revolutionizing industries, including automotive, computing, IoT, healthcare and data center, and are allowing millions of devices to connect with each other in ways never before imagined. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, all of our engineering, research and development functions, and all of our products and services businesses, including, our QCT semiconductor business. For more information, visit Qualcomm's [website](#), [OnQ blog](#), [Twitter](#) and [Facebook](#) pages.

This experimental license request would support a small communication network contained within a 500-foot radius on Qualcomm's campus in Sorrento Valley, California. The network will be used for research and development of advanced wireless communications systems utilizing wide transmission bandwidths.

The frequency range of 2.9-3 GHz will support experimental development only and this band is not targeted for future wireless communication deployment.

### 2 Experiment Description

Qualcomm has designed a low power communications network to provide RF coverage within a 500-foot radius for purposes of developing next generation wideband wireless technologies around several Qualcomm buildings in the Sorrento Valley area of San Diego.

The low power research and development network is summarized as:

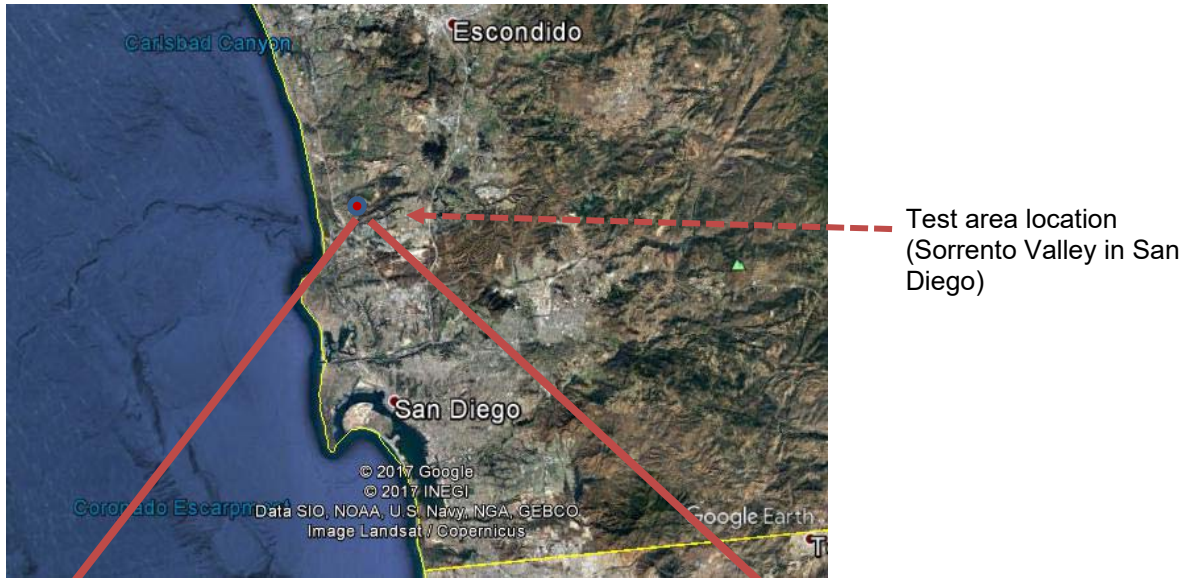
- 5 outdoor sites with directional antennas and maximum EIRP= 1W/100MHz (-50dBm/Hz)
- 1 indoor fixed site with an omni antenna and maximum EIRP= 1W/100MHz (-50dBm/Hz)
- Up to 20 mobile units, each with a maximum EIRP= 0.4W/100MHz (-54 dBm/Hz) that operate within the fixed RF coverage area.

The fixed site physical locations are shown in Figure 1 with the specific location parameters defined in Table 1. Mobile units will operate anywhere within the defined 500-foot radius.

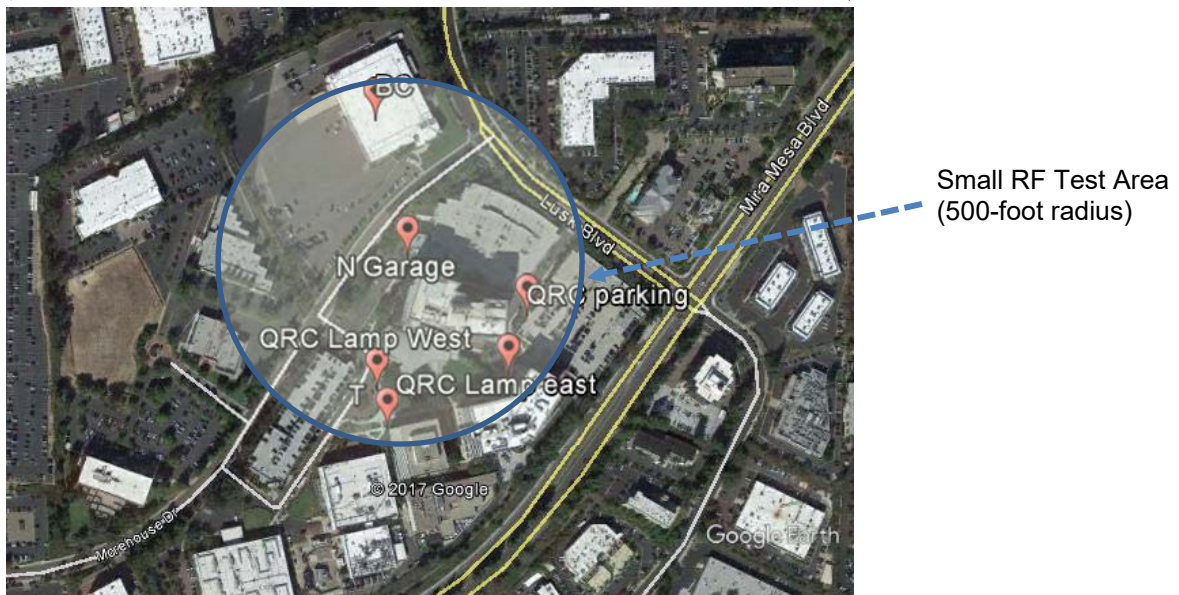
As shown in Figure 2, the network has been specifically designed to keep the required RF energy localized in the development area around the identified Qualcomm buildings. Some design considerations include:

- Directional antennas are utilized to direct RF into the coverage
- Many antennas are orientated into the sides of large buildings greater than 5 stories tall to reduce RF propagation outside the coverage area.
- When possible, physical antenna down tilt has been used to reduce propagation to the horizon direction.

Table 2 lists the maximum transmit power of the fixed and mobile devices in the range of 2.9-3 GHz. Transmission is a 100 MHz bandwidth OFDM signal occupying the full 2.9-3 GHz.



**Test Area zoom**



**Figure 1 Research and Development Test Location**

**Table 1 Transmitter Locations**

Site Name	Indoor/ Outdoor	Antenna Type	Azimuth (deg)	Downtilt (deg)	Antenna Height (Feet)	Address	Lat/Long
QRC Lamp West side	Outdoor	Directional	320	0deg	8.2	5665 Morehouse Dr. San Diego, CA 92121	32 53 44 N / 117 11 47 W
QRC Lamp East side	Outdoor	Directional	40	8.2	5665 Morehouse Dr. San Diego, CA 92121	32 53 44 N / 117 11 42 W	
QRC Parking Garage	Outdoor	Directional	300	10deg	31	5665 Morehouse Dr. San Diego, CA 92121	32 53 46 N / 117 11 42 W
N Garage	Outdoor	Directional	200	10deg	28	5775 Morehouse Dr. San Diego, CA 92121	32 53 48 N / 117 11 46 W
Building T	Outdoor	Directional	340	5deg	21	5565 Morehouse Dr. San Diego, CA 92121	32 53 42 N / 117 11 47 W
BC	Indoor	Omni	Omni	Omni	10	5770 Morehouse Dr. San Diego, CA 92121	32 53 52 N / 117 11 47 W

**Figure 2 Directional Antenna Orientations**



**Table 2 Transmitter Power Information**

Site	Azimuth	Down tilt	Channel Bandwidth	EIRP (dBm/100MHz)	EIRP (W/100MHz)	ERP (Watts/100 MHz)	EIRP (dBm/Hz)
Mobile	Omni	Omni	100 MHz	26	0.40	0.24	-54
QRC Lamp West side	320deg	0deg		30	1.0	0.61	-50
QRC Lamp East side	40deg	0deg					
QRC Parking Garage	300deg	10deg					
N Garage	200deg	10deg					
Building T	340deg	5deg					
BC	Omni	Omni					

### 3 Interference Coordination

Immediate requests for Qualcomm to stop transmission may be emailed to [2.9.test.shutdown@qualcomm.com](mailto:2.9.test.shutdown@qualcomm.com). Alternatively, a shutdown request can be communicated to John Forrester at 858-845-7428 or [jforrest@qti.qualcomm.com](mailto:jforrest@qti.qualcomm.com)