

## 28 GHz Experimental License Application

### 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 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.

Qualcomm is conducting 5G R&D tests using prototype base-station (BS) and mobile device (MD) equipment in milli-meter wave bands and is requesting this experimental license to assist it further in developing, validating, and demonstrating this new technology.

### 2 Transmitter Information

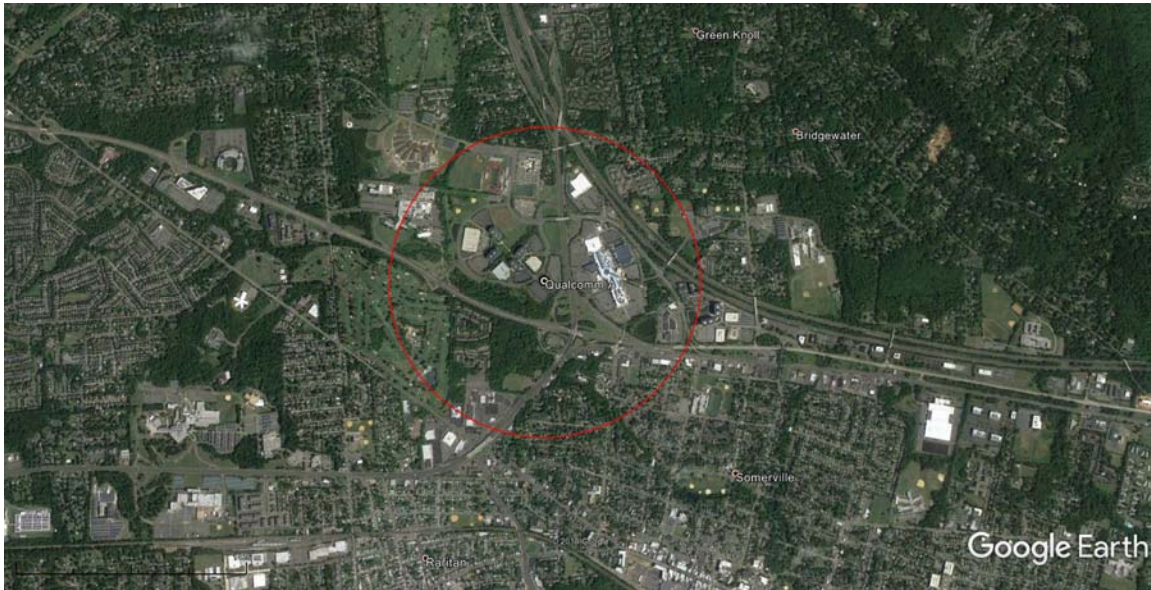
Experimental tests will be conducted in the immediate vicinity of Qualcomm buildings and roads within a 1km range from the centers located at and depicted in figures 1 and 2:

- Qualcomm HQ Sorrento Valley: San Diego, California
- Qualcomm Building A: Bridgewater, New Jersey

Up to 4 base-stations and 3 associated mobile devices per base-station may operate within the highlighted contours at any time.



Figure 1. Sorrento Valley, San Diego, CA region of operation.



**Figure 2. Bridgewater, New Jersey region of operation.**

Base-station transmitters use a highly directional antenna to steer its beam to small service areas at ground level for reception by user equipment. They are physically small and may be fixed to lamp-posts, mounted on mobile laboratory test vans or fixed to building roof tops or walls.

Up to 3 Mobile devices communicate to each base station over an expected range of 200m.

The carrier center frequency can be tuned over the range: 27.5-28.35 GHz

Table 1 indicates the site and antenna information and table 2 the carrier information.

Site #	Location of BS/UE	County	Latitude (center)	Longitude (center)	3dB Beam width	Azimuth	Elevation
1	Base station and mobile device equipment bounded by any location within 1 km radius	San Diego, California	32° 53' 46" N	117° 11' 44" W	BS: 0.7° MD:12°	BS/MD: 0-360°	BS:+1° to -30° UE: ± 40°
2		Bridgewater, New Jersey	40° 35' 6" N	74° 37' 26" W			

**Table 1 Site and antenna information**

Type	Frequency (GHz)	Peak EIRP			W ERP	Emission designator	Modulation /multiplexing
		dBm	dBW	W EIRP			
Base station experimental	27.5-28.35	60	30	1,000	1,000	800MW7XFW	OFDM/TDD
Mobile device equipment experimental	27.5-28.35	36	6	4	4	800MW7XFW	OFDM/TDD

**Table 2 Transmitted carrier Information**

### 3 Interference Coordination

Immediate requests for Qualcomm to stop transmission should be emailed to [qualcomm.transmitter.shutdown@qualcomm.com](mailto:qualcomm.transmitter.shutdown@qualcomm.com). Alternatively, a shutdown request can be communicated to John Forrester of Qualcomm who can be contacted at 858-845-7428 and [jforrest@qti.qualcomm.com](mailto:jforrest@qti.qualcomm.com).

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