

Description of Proposed Experimental Operations

Pursuant to Sections 5.3(j) and Section 5.54(a)(1) of the Federal Communications Commission’s rules, 47 C.F.R. §§ 5.3(j) and 5.54(a)(1), Comcast CBRS, LLC (“Comcast”), a subsidiary of Comcast Cable Communications, LLC, requests authorization to conduct experimental operations under a conventional radio experimental license issued by the Commission for a term of one year commencing on April 15, 2019.

Comcast seeks authorization to conduct pre-commercial outdoor field trials in the 3650–3700 MHz Citizens Broadband Radio Service (“CBRS”) band. The field test will evaluate coverage, throughput, and mobility of equipment and facilities operating in the CBRS band to obtain data and advance Comcast’s understanding of the full potential of the technology and equipment utilized in these experimental operations. The field testing will also evaluate the performance of pre-commercial equipment in the CBRS band. To ensure full compliance with the operational restrictions in the NTIA’s 3.5 GHz exclusion zone, all experimental testing subject to this application will be limited to the 3650–3700 MHz band.

Location of Testing

Comcast will conduct outdoor and indoor fixed and mobile testing in a small targeted portion of the area surrounding King of Prussia, Pennsylvania market within its service territory. Specifically, testing will be conducted within a 15 km radius of the following location:

Locality	Latitude	Longitude
King of Prussia, PA	40° 5' 26.86" N	75° 22' 04.13" W

Description of Testing

The experimental operations will **[[BEGIN CONFIDENTIAL]]** **[[END CONFIDENTIAL]]** within the 15 km radius of the location set forth above. The first type of transmitter will consist of **[[BEGIN CONFIDENTIAL]]** **[[END CONFIDENTIAL]]**. The second type of transmitter will consist of **[[BEGIN CONFIDENTIAL]]** **[[END CONFIDENTIAL]]**. The third type of transmitter will consist of **[[BEGIN CONFIDENTIAL]]** **[[END CONFIDENTIAL]]**.

Through the use of mobile test devices and commercial handsets (i.e. “End User Equipment”), Comcast will evaluate propagation characteristics for model verification, data throughput performance, inter-cell interference, and advanced Spectrum Access System (“SAS”) functionality.

All testing will be conducted within **[[BEGIN CONFIDENTIAL]]** **[[END CONFIDENTIAL]]**.

Radio Equipment Description

The radio equipment that will be used in the proposed experiment will consist of a mix of Category A and Category B transmitters (as those terms are defined in Sections 96.3 and 96.41 of the Commission’s rules).¹ Any **[[BEGIN CONFIDENTIAL]]** [REDACTED] **[[END CONFIDENTIAL]]** will be a Category B transmitter with the technical characteristics shown below. Comcast will utilize lower power Category A radios mounted on **[[BEGIN CONFIDENTIAL]]** [REDACTED] **[[END CONFIDENTIAL]]** and Category A femto radios for **[[BEGIN CONFIDENTIAL]]** [REDACTED] **[[END CONFIDENTIAL]]**. Each type of the proposed radio equipment has been certified by the Commission pursuant to the equipment authorization rules.² Comcast also plans to use prototype radio equipment with the same or similar technical characteristics as the authorized radio equipment.

Comcast will utilize **[[BEGIN CONFIDENTIAL]]** [REDACTED] **[[END CONFIDENTIAL]]** different types of End User Equipment to receive signals from the transmitters in order to evaluate performance of the equipment described above. Specifically, Comcast will utilize the following types of End User Equipment: (1) traditional mobile handsets; (2) USB Mobile Dongle Hotspot Devices; (3) and MiFi Mobile Hotspot devices.

The tables below summarize the technical characteristics of each piece of equipment described above.

Fixed Equipment (3 Models)

Transmitter	Category	Tx Power (W)	EIRP (dBm)	ERP (Watts)	Mean or Peak	Emissions Designator	Frequency Tolerance	Modulation
Type 1 ³	B	N/A	50	61	Mean	20M0W7W	0.00000005	256QAM/64QAM/16QAM/QPSK
Type 2	A	0.5	30	0.6	Mean	20M0W7W	0.0000002	256QAM/64QAM/16QAM/QPSK
Type 3	A	0.5	30	0.6	Mean	20M0W7W	0.0000002	256QAM/64QAM/16QAM/QPSK

¹ See 47 C.F.R. §§ 96.3 and 96.41.

² Type 1 Radio Equipment: Ericsson Remote Radio Unit 2208 - FCC ID:TA8AKRC161711-1; Type 2 Radio Equipment: Ruckus Q910 - An integrated, outdoor CBRS LTE access point - FCC ID: S9GQ910US00; Type 3 Radio Equipment: Ruckus Q710 - A high-capacity, indoor CBRS LTE access point - FCC ID: S9GQ710US00.

³ This transmitter is a directional antenna. The width of the beam at the half-power point is 65.00 degrees. When installed in the testing location described above, three separate antennas will be oriented in the horizontal plane at 0 degrees, 120 degrees, and 240 degrees. All three antennas will be oriented in the vertical plane at 6.80 degrees from horizontal.

End User Equipment (3 Types)

Transmitter Type	Category	Tx Power (mW)	EIRP (dBm)	ERP (Watts)	Mean or Peak	Emissions Designator	Frequency Tolerance	Modulation
Essential PH1 or equivalent	EUD	200	23	0.2	Mean	20M0W7W	0.0000001	64QAM/ 16QAM/QPSK
Dongle	EUD	200	23	0.2	Mean	20M0W7W	0.0000001	64QAM/ 16QAM/QPSK
MIFI	EUD	200	23	0.2	Mean	20M0W7W	0.0000001	64QAM/ 16QAM/QPSK

Protection Against Interference

Pursuant to the Commission’s experimental licensing rules,⁴ Comcast understands that, for purposes of the experimental operations described in this application, it must accept interference from any federal and non-federal incumbent users of the 3650–3700 MHz band and that Comcast’s experimental operation will be conducted on a secondary basis.

Comcast’s experimental operations will be conducted in cooperation with two leading SAS vendors that the Commission has already authorized to operate. Comcast will employ the vendors’ SAS databases when conducting experimental operations to avoid interfering with incumbent users. As previously noted above, although King of Prussia, PA, is located within the NTIA’s coastal exclusion zone for operations in the 3550-3650 MHz band, this application only seeks authority to test operations in the 3650-3700 MHz band.

To ensure prompt resolution of any potential interference events, Comcast will establish a point of contact, available 24/7 during the time when all experiments are conducted. This person will have authority and the ability to disable all transmissions when notified that interference is impacting primary-licensed services. Should interference occur during these testing periods, Comcast will take immediate steps to resolve the interference, including discontinuing operations, or, if appropriate, moving operations to a different channel.

Comcast will coordinate all testing with Fixed Satellite Service (FSS) earth stations and wireless broadband licensees holding grandfathered licenses in the 3650-3700 MHz band. Where the SAS is not capable of coordinating channel assignments via automated systems, Comcast will manually coordinate operations.

Restrictions on Operation

Comcast does not seek authority to perform a commercial market study under the requested experimental license. Comcast will retain control over any prototype equipment utilized in the testing at all times.

⁴ See 47 C.F.R Part 5.

Contact Information

FCC licensing issues:

K.C. Halm
Davis Wright Tremaine LLP
Counsel to Comcast CBRS, LLC
202.973.4287
kchalm@dwt.com

Test Bed Operations:

Ronald Phillips
RF Engineer
1701 JFK Blvd
Philadelphia, PA 19103
Ronald_Phillips@comcast.com
Mobile: 914.954.4771

Field Test Manager (* available at all times for all issues and requests to cease transmissions)

Ronald Phillips
RF Engineer
1701 JFK Blvd
Philadelphia, PA 19103
Ronald_Phillips@comcast.com
Mobile: 914.954.4771