

## **DESCRIPTION OF RESEARCH PROJECT**

Pursuant to Sections 5.3(k) and Section 5.54(a)(1) of the Federal Communications Commission's rules, 47 C.F.R. §§ 5.3(k) and 5.54(a)(1), CCO Fiberlink, LLC ("Charter"), a limited liability company and subsidiary of Charter Communications, Inc., seeks a one-year experimental license, beginning March 1, 2019—or upon grant—to conduct market trials to test and evaluate performance, coverage, throughput and capacity, data latency, morphology, quality of service, and customer acceptability for a Fixed Wireless Access network in the 3550-3700 MHz band for fixed locations with multiple devices.

The proposed operations will advance Charter's understanding of technology, performance, and customer demand in the 3550-3700 MHz band, will advance the potential deployment of fixed wireless services, and will allow Charter to evaluate product and service performance and customer acceptability.

### **Location of Testing**

Charter will conduct its testing and market trials within a radius of 15 km of the following four specified fixed locations in Davidson County, North Carolina.

1. 35° 44' 24.50" N, 80° 21' 56.70" W
2. 35° 53' 4.11" N, 80° 19' 40.59" W
3. 35° 49' 23.40" N, 80° 24' 25.50" W
4. 35° 49' 34.00" N, 80° 19' 59.60" W

### **Description of Testing**

Charter will deploy 3-sector base station radios at four existing communications towers, and install Customer Premise Equipment ("CPE") at trial participant homes, in order to evaluate a CBRS-based LTE Fixed Wireless Access network designed to test the provision of broadband access to unserved and underserved markets. This network will be enabled by a Charter-owned packet core network. During the trial, Charter intends to pilot broadband capability of at least 25 Mbps downstream and 3 Mbps upstream for volunteer residential trial participants. The trial will involve no cost to trial participants.

Charter's fixed base station radio/antenna combinations at the four existing towers sites will test performance and suitability of the radio link between each base station and multiple end user locations, both sequentially and simultaneously. The antennas are directional antennas each covering a 120° sector, oriented at 0°/120°/240° from true north, with a beam width of 65° oriented 8 degrees below horizontal.

End user radio/antenna combinations will be professionally mounted outdoors at strategic locations on or near trial participant premises and oriented to face the nearest serving tower. The number of end user radios will not exceed 250 per base station at any given time. Trial participants will also be provided with FCC-authorized CPE—such as indoor Wi-Fi routers—for the duration of the trial.



Example device installed at a customer premise with wiring connecting to the PoE

Consistent with Section 5.602 of the FCC's rules, 47 C.F.R. § 5.602, participants in the trial will be advised of the temporary nature of the service and that all trial devices will be either rendered inoperable or retrieved by Charter at the end of the trial. All such units will be retrieved by Charter at the conclusion of the trials. No participants will be charged in connection with the trial or the services provided and Charter will retain ownership of the equipment at all times.

Charter will evaluate the individual performance of each transmitter and piece of end user equipment. Performance will be evaluated through a combination of remote measurement, end-user-initiated measurement, and participant surveys.

### **Radio Equipment Description**

For the testing, Charter will use a combination of equipment on the tower sites—Ericsson Band 48 Radio Unit in partnership with Ericsson's Baseband Unit— and one model of fixed transmitting/receiving CPE equipment at each customer location—Seowon LTE Outdoor CPE. Charter intends to replace the Ericsson equipment with upgraded Ericsson equipment at some point during the trial, subject to availability and successful lab testing. The technical information below provides the greatest bandwidth and power levels that will be used for each piece of equipment that could be used during this trial.

Vendor	Category	Tx Power dBm	Tx Power mW	Mean or Peak Power	EIRP (dBm)	Frequency Tolerance (%)	Emission Designator	Modulation Format(s)
Ericsson	B	38.5	20000	P	50	0.00010%	20M0W7W	256QAM/64QAM/16QAM
Ericsson	B	34	2512	P	57	0.00010%	100MW7W	256QAM/64QAM/16QAM
Seowon	B	23	200	P	33	0.00010%	40M0W7W	256QAM/64QAM/16QAM

### Protection Against Interference

Charter has taken a number of steps to protect against interference. From a physical interference standpoint, all installations will be existing communications towers, with CPE units extending no more than 3 meters above the existing structure's roofline. As the towers are existing, and no equipment will extend above the towers, no additional risk to aviation is posed by the equipment.

Charter understands it must accept RF interference from any federal and non-federal incumbent users of this band and that all Charter operations will be on a secondary basis. With regard to existing users, Charter has confirmed there are no protected Fixed Satellite Service ("FSS") earth stations operating in the 3550-3700 MHz band in the areas in which Charter seeks to conduct testing. Additionally, the requested sites are greater than 150 miles inside the NTIA-published shipboard exclusion zone for the nearest coastal areas, as well as well separated from any other published CBRS dynamic protection areas.

Secondly, all radios, both base station and CPE due to their status as Category B CPE, will be operated under the control of Federated Wireless' provisionally approved SAS, in a manner consistent with CBRS band service rules. Charter intends to use the same SAS capabilities to avoid employment of CBRS channels with potential to interfere with nearby WISP operations in the 3.65-3.70 GHz "NN" band.

Finally, as transmit levels of the proposed radios comply with approved CBRS band operations, Charter expects limited RF propagation distances as well as limited and localized aggregative contribution to the RF noise floor.

## **Restrictions on Operation**

Charter will retain ownership over the equipment in the testing at all times.

## **Contact Information**

Point of contact for FCC licensing issues:

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Point of contact for questions about testing operations:

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The following individual will be available 24/7 during all testing and has authority and ability to immediately cease all operations:

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