

DESCRIPTION OF RESEARCH PROJECT

Pursuant to Sections 5.3(j) and Section 5.61 of the Federal Communications Commission’s rules, 47 C.F.R. §§ 5.3(j) and 5.61, CCO Fiberlink, LLC (“Charter”), a limited liability company and subsidiary of Charter Communications, Inc., seeks Special Temporary Authority (“STA”) for 180 days, beginning September 15, 2017, to test and evaluate coverage, capacity, and propagation characteristics in the 3550-3700 MHz band. The proposed operations will advance Charter’s understanding of technology and network potential in the 3550-3700 MHz band and will advance the potential deployment of fixed wireless services.

Location of Testing

Charter will conduct outdoor fixed testing within a radius of 8 km from the specified fixed locations in each of Centennial and Englewood, Colorado.

Description of Testing

Charter will deploy the experimental fixed antennas on existing structures, and will test the radio link between each base station antenna and another end user antenna sequentially on a portable mast placed at fixed locations within the test area.

Charter will evaluate propagation characteristics, conduct connectivity and throughput testing in the vicinity of each device, and assess individual performance of each vendor’s equipment.

Radio Equipment Description

For the testing, Charter will use 17 different models of fixed equipment. The technical information below provides the greatest bandwidth and power levels that will be used for each piece of prototype equipment.

Equipment	Category ¹	Fixed or mobile	Tx Power mW	EIRP (dBm)	ERP (watts)	Mean or Peak Power	Frequency Tolerance (%)	Emission Designator	Signal Modulation Format(s)
Prototype 1	B	Fixed	8000	56.0	242.66	Peak	+/- 0.0005	80M0W9W	Digital, 256 QAM
Prototype 2	B	Fixed	37767	54.8	184.08	Peak	+/- 0.0005	60M0W9W	Digital, 256 QAM
Prototype 3	B	Fixed	251	40.0	6.10	Peak	+/- 0.0005	10M0W8W	OTFS ²
Prototype 4	B	Fixed	1000	43.0	12.16	Mean	+/- 0.000001	20M0D7D	256 QAM/64 QAM/16 QAM
Prototype 5	B	Fixed	1000	43.0	12.16	Mean	+/- 0.000001	20M0D7D	256 QAM/64 QAM/16 QAM

¹ Category A and B radios are defined in Sections 96.3 and 96.41 of the FCC’s rules. See 47 C.F.R. §§ 96.3 and 96.41.

² “Orthogonal Time Frequency and Space” is a proprietary vendor signal modulation format.

Prototype 6	B	Fixed	1000	43.0	12.16	Mean	+/- 0.000001	20M0D7D	256 QAM/64 QAM/16 QAM
Prototype 7	B	Fixed	1000	37.0	3.06	Mean	+/- 0.000005	20M0W7W	64 QAM, 16 QAM, QPSK, BPSK
Prototype 8	B	Fixed	2000	47.0	30.55	Mean	+/- 0.000005	20M0W9W	256QAM/64QAM/16 QAM/QPSK
Prototype 9	B	Fixed	2000	47.0	30.55	Mean	+/- 0.000005	20M0W9W	256QAM/64QAM/16 QAM/QPSK
Prototype 10	B	Fixed	2000	50.0	60.95	Mean	+/- 0.000005	20M0F9W	256QAM/64QAM/16 QAM/QPSK
Prototype 11	B	Fixed	251	33.0	1.22	Mean	+/- 0.000001	20M0W7W	64QAM/16QAM/QPSK
Prototype 12	B	Fixed	199	35.0	1.93	Peak	+/- 0.000001	20M0W7W	64QAM/16QAM/QPSK
Prototype 13	A	Fixed	199	25.5	0.22	Peak	+/- 0.000001	20M0W7W	64QAM/16QAM/QPSK
Prototype 14	B	Fixed	316	47	30.6	Mean	+/-0.000001	20M0W7D	64QAM/16QAM
Prototype 15	B	Fixed	200	38	3.9	Mean	+/-0.000001	20M0W7D	64QAM/16QAM
Prototype 16	B	Fixed	200	33	1.2	Mean	+/-0.00005	80M0W9W	256QAM, 64QAM
Prototype 17	B	Fixed	200	23	0.12	Mean	+/-0.00005	40M0W9W	64 QAM

Protection Against Interference

Charter has taken a number of steps to protect against interference. In particular, the two base station locations were chosen specifically to avoid risk of physical interference. Both sites are on existing structures, and the equipment will not extend more than 6 meters above those structures. Individual “end user device” test locations were also selected specifically to avoid physical interference conflicts, which will be further lessened due to the limited duration of the test, as well as the continuous presence of test engineers at each location under test. Charter understands it must accept 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 Fixed Satellite Service (“FSS”) earth stations operating in the 3600- 3650 MHz band in the areas in which Charter seeks to conduct testing. Charter is aware of the grandfathered 3650-3700 MHz FSS station in Cheyenne, Wyoming (to the north) and has verified all intended test operations are outside its coordination zone. Charter also identified all grandfathered 3650-3700 MHz “NN” Wireless Broadband Licensees with registered locations within 30 km of the requested testing areas and will coordinate individually to avoid impacting their existing operations.

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

Restrictions on Operation

Charter does not seek authority to perform a market study under the requested license and will retain control 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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