



Attachment to FCC Application for Conventional Experimental License (ELS File No. 0671-EX-CN-2022)

1. Introduction

Dell Inc. (dba Dell Technologies) is a leading innovator that partners with other industry leaders in data analytics and artificial intelligence to deliver expertise and a broad portfolio of solutions for deriving data-driven insights wherever business demands. Dell assists its customers accelerate intelligent outcomes by aligning their business and information technology with a data-first approach, and then putting their data to work to achieve success at any scale. This approach enables customers to fast-track innovation and differentiate with data so they can grow without boundaries.

2. Description of Application and Experiment

By this application, (Dell FRN: 0031249345) seeks to supplement its existing experimental license issued under call sign WM2XAQ to operate at another location – Franklin, Massachusetts -- to support its research and development. Operation at this additional location will allow Dell to enhance its review and evaluation of different applications of fifth generation (5G) stand-alone (SA) technology associated with 5G open radio access network (O-RAN) architecture. Because Dell currently has a pending application on file to modify its license under WM2XAQ, submitted under ELS File No. 0128-EX-CM-2022, ELS will not allow it to file another application to modify that license. Accordingly, it is submitting this application as a request for new license.

Dell is working with partner companies that develop equipment for use in the 5G SA C-Band spectrum, also known as Band N78, using third generation partnership project (3GPP) standards. As part of its technology validation effort, Dell plans to conduct a series of tests with remote radio units (RRU), distribution units (DU), and centralized units (CU) at one or more locations, restricted to the frequency of 3700 - 3800 MHz in Band N78.

Specifically, the purposes of the tests are to evaluate:

- The radio propagation characteristics of the N78 band (3.7 – 3.8 GHz) for indoor installation only;
- End to-end Open RAN Front-End architecture; and
- Duplex mode (TDD) 5G NR/SA using the N78 band (3.7 – 3.8 GHz)

The proposed additional operations will benefit the public interest by allowing Dell to enhance its pre-commercial testing and review of new products outside of a lab environment (e.g., in an anechoic chamber or faraday cage), but in a controlled and managed manner, as described below.



3. Technical Specifications

a. Location of Test Site:

Dell proposes to conduct indoor-only tests at locations within its facilities at 50 Constitution Blvd, Franklin, MA (coordinates: 42° 3' 21.816" N, 71° 23' 59.136" W (NAD83)).

b. Frequencies Requested:

Dell proposes to use spectrum that is licensed to Verizon in the 3700-3800 MHz band at the proposed site; the use of the spectrum will be coordinated with Verizon.

c. Power Levels:

Dell proposes to operate fixed base stations with a peak effective radiated power (ERP) that will not exceed 0.865 Watts. Mobile units will operate with a peak ERP not to exceed 0.865 Watts.

d. Type of Emission, Modulation Technique, and Bandwidth Required:

Operations will be conducted primarily with the emissions and modulation techniques specified in the application (*i.e.*, Orthogonal Frequency Division Multiplexing (OFDM) with the emission designator 100MW7W). If other emission modes and modulation techniques are utilized, in no event will the emissions extend beyond the frequency bandwidth or band requested.

Dell does not propose to supply station identification as set forth in Section 5.115 of the Commission's Rules, 47 C.F.R. § 5.115 (2020).

e. Equipment To Be Used:

The experimentation at the site will consist of a maximum of 20 base radio units (RRUs) operating at any given time with the number of User Equipment (UE) not to exceed 20 for the operations authorized under the license requested by this application. The RRUs will use the transmission parameters and operate inside the geographic region defined above under Item 3a. As noted above, the RRUs and UEs will be operated in spectrum licensed to Verizon, and the use of the spectrum will be coordinated with Verizon.

Equipment from multiple equipment manufacturers will be used in this experiment. The RRU devices to be deployed initially are prototypes, but the manufacturers are in process of completing formal equipment authorization. During the testing, all prototype devices will be operated in a manner to maintain compliance with FCC rules. Specifically, the RRUs supporting tests to be conducted in Band N78 (3.7 – 3.8 GHz) will be operated in compliance with Part 27, Subpart O of the FCC's rules. Omni-directional antennas will be used with the RRUs within a maximum equivalent isotropic radiated power (EIRP) and antenna gain constraints as specified within the FCC's rules.



f. Antenna Information and Compliance with RF Exposure Limits:

Dell will comply with all Federal Aviation Administration (FAA) and FCC rules and regulations regarding the installation and operation of antennas and their support structures. The antennas to be deployed under the authority requested will not extend more than six meters above ground or more than six meters above a building.

All power levels will comply with the limits set forth in the FCC's rules, including those relating to human exposure to radiation. In addition, all personnel who will operate the equipment are knowledgeable as to the effects of RF energy and will have the ability to control their exposure.

4. Interference Protection and Coordination

Dell plans to conduct its tests indoors deploying an experimental network in a highly controlled environment. It does not plan to operate outdoors. Considering the signal attenuation caused by multiple walls and other obstructions, Dell has calculated that the worst-case field strength of its proposed operations will be -105 dBm at a distance of 150 feet from its building (with 95% of the signal attenuated to a field strength of -115 dBm at 150 feet). Accordingly, Dell does not anticipate that its proposed operations will cause interference to other operations.

Moreover, as noted in Item 3b above, Dell proposes to coordinate the use of the spectrum with Verizon. Verizon will have the ability to contact Dell to request a shutdown of transmissions operated under the experimental license in the unlikely event any interference occurs. Equipment can be shut down immediately, if the need arises, by contacting the interference coordinator ("stop buzzer") identified below.

Dell has also reviewed the list of registered incumbent FSS and FES earth stations available on the FCC's website at <https://docs.fcc.gov/public/attachments/DA-20-823A2.xls> to evaluate the potential for causing interference to those stations. A list of those entities located within 5 miles of the test site requested in this application is attached under Exhibit A.

Given: (a) the low field strength of Dell's proposed operations outside of its facilities, as discussed above, (b) the fact that there will be no line-of-sight from Dell's facilities to any FES or FSS facilities, and (c) FCC and FES facilities are not pointed to the horizon, Dell does not believe that its proposed operations will create a potential for interference to these licensees. Moreover, Dell understands that FSS and FES licensees may be in the process of transitioning to spectrum other than the 3700-3800 MHz band that Dell seeks to use, because of the authorization granted to Verizon under Auction 107 and because of frequency relocation deadlines established by the FCC in connection with Auction 107. Thus, these licensees may not be currently operating in the 3700-3800 MHz band.



5. Contact Information

a. Technical Contact:

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Exhibit A - List Proposed of Incumbent Earth Stations Within 5 miles of Dell's Test Facilities – 3700-3800 MHz					
Licensee	Call Sign(s)	Class	Street	City	County/State
Corporation of the Presiding Bishop of the Church	E190793	FES	91 Jordan Road	Franklin	Norfolk, MA