



**Attachment to FCC Application for Experimental License
(ELS File No. 0038-EX-CN-2024; FRN 0031249345)**

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. We help our customers accelerate intelligent outcomes by aligning their business and IT with a data first approach, and then put 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.

By this application, Dell seeks an experimental license identical to the special temporary authority (STA) it received under call sign WV9XSP, ELS File No. 1223-EX-ST-2023, which is scheduled to expire on 1/29/2024. Due to delays and other unanticipated events, Dell will not be able to complete its testing by that date. Accordingly, this application seeks authority to continue its testing. As provided under Section 5.61(c) of the Commission's rules, 47 C.F.R. § 5.61(c)(2022), this application is also intended to serve as an extension of Dell's authority to operate as permitted under its STA pending action on this application.

The following information is provided in support of this request:

2. Description of Experiment

The requested experimental license will support Dell's review and evaluation of different applications of fifth generation (5G) stand-alone (SA) technology associated with 5G open radio access network (O RAN) architecture.

Dell is working with partner companies that develop equipment for use in the 5G SA CBRS spectrum, also known as Band N48, 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 two locations, restricted to the frequency of 3.55-3.70 GHz in Band N48.

The purposes of the tests are to evaluate:

- The radio propagation characteristics of the N48 band (3.55 - 3.70 GHz) for indoor installations.
- End to end Open RAN Front End architecture; and
- Duplex mode (TDD) 5G NR/SA using the N48 band (3.55 - 3.70 GHz)

The proposed operations will benefit the public interest by enabling 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 Sites:

Dell proposes to conduct the proposed tests at its facilities located in

- Apex, North Carolina at 5800 Technology Drive, Apex NC 27539 (coordinates: 35° 41' 34.3176" N, 78° 50' 39.5154" W (NAD83)); and
- Framingham, Massachusetts at 81 Morton Street, Framingham MA 01702 (coordinates: 42°16' 44.0214" N, 71° 24' 7.4658" W (NAD83)).

b. Frequencies Requested:

Dell will coordinate its experimental operations in the 3.55-3.70 GHz band with Spectrum Access System (SAS) Federated Wireless.

c. Power Levels:

The product will comply with Power requirements as per FCC § 96.41 General radio requirements Category A CBSD.

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

Operations will be conducted with the emissions and modulation techniques specified in the application (i.e., Orthogonal Frequency Division Multiplexing (OFDM)) with the emission designator 40MOD7W). Other modulation techniques and bandwidths will also be tested, but in no event will the emissions extend beyond the frequency band requested. Modification to its experimental license will be requested should Dell need to operate outside of these limitations.

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.

e. Equipment To Be Used:

The testing will involve the deployment of not more than 3 base radio units operating at any given time per site location and not more than 10 UEs per site location. The RRUs will use the transmission parameters and operate within 0.10 kilometers of each site locations listed in Item 3a. As noted above, the RRUs and User Equipment (UE) will be operated in CBRS spectrum, and the use of the spectrum will be coordinated with Federated Wireless.

Equipment from multiple equipment manufacturers will be operated under the authority requested in this application. The RRU devices to be deployed initially are prototypes, but they are in process of completing formal equipment authorization. All prototypes will be tested in a manner to determine compliance with FCC rules. Moreover, the RRUs supporting Dell's tests conducted in Band N48 (3.55 - 3.70 GHz) will be operated in compliance with Part 96 - Citizens Broadband Radio Service of the FCC's rules. Omni directional antennas will be used with the RRUs within a maximum equivalent isotropically radiated power (EIRP) and antenna gain constraints as specified within the FCC's rules. The antennas used are 5dBi +/- 0.5dBi.



f. **Antenna Information and Compliance with RF Exposure Limits:**

Antennas will be installed only indoors at the test site locations listed in Item 3a.

All operations will comply with the requirements set forth in the FCC rules relating to human exposure to radiation (*i.e.*, FCC KDB 447498), including the requirements related to signage and training. All personnel who will operate equipment under this experimental authority are knowledgeable as to the effects of RF energy and will have the ability to control their exposure.

4. **Interference Protection and Coordination**

As explained in the accompanying "Supplement" submitted with this application, Dell plans to conduct its tests indoors deploying an experimental network in a highly controlled environment. It does not propose to operate outdoors under the authority it has requested. Considering the signal attenuation caused by multiple walls and other obstructions at the test site locations, Dell expects to maintain a worst-case field strength of its proposed operations at -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).

Nevertheless, as noted in Item 3b above, Dell proposes to coordinate the use of the spectrum with Federated Wireless, an SAS. Federated Wireless will have the ability to contact Dell to request a shutdown of transmissions operated under the 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 Dell's proposed test facilities is attached under Exhibit A. As explained in the accompanying "Supplement," Dell plans to advise these licensees of its proposed operations and provide them with its "Stop buzzer" contact information, as discussed in greater detail below.

In sum, Dell does not believe that its proposed operations will create a potential for interference to these licensees, given: (1) the low field strength of Dell's proposed operations outside of its facilities, as discussed above, (2) the fact that there will be no line-of-sight from Dell's facilities to any FES or FSS facilities, which are not pointed to the horizon, and (3) Dell will advise these licensees of its operations.. Moreover, Dell understands that FSS and FES licensees may be in the process of transitioning to spectrum other than the 3550-3700 MHz band that Dell seeks to use. Thus, these licensees may not be currently operating in the 3550-3700 MHz band.

Nevertheless, upon grant of the instant application and prior to commencement of any experimental operations, Dell proposes to advise all FSS and FES licensees listed in Exhibit A of the details of its proposed operations (*e.g.*, dates and times of operation) so that they monitor for interference from Dell's operations. In the unlikely event any interference occurs, these licensees may contact Dell's stop buzzer identified below and Dell will immediately cease operations until such interference is resolved.



5. Duration of Test

As explained in Item 1, Dell planned to conduct its testing for a limited period of less than 6 months at the two locations specified in Item 3a, and it obtained an STA under ELS File No. 1223-EX-ST-2023, in order to do so. Due to unanticipated delays, Dell will not be able to complete its testing by the expiration of the STA (January 29, 2024), and it is filing this application to obtain identical authority under an experimental license. Obtaining a license rather than another STA will also accommodate possible additional delays in Dell's test plans.

6. Contact Information

a. Technical Contact:

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b. Stop Buzzer Contact:

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c. FCC Legal Contact

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Exhibit A - List of Incumbent Earth Stations Within 5 miles of Dell's Test Facilities Proposing To Operate Indoors in the 3.55 3.70 GHz Band						
Licensee	Callsign	Class	Street	City	County/State	Coordinates (NAD 83)
iHeartMedia + Entertainment, Inc.	E190096	FES	2132 Ten-Ten Road	Apex	Wake, NC	35-42-50.15 N; 78-49-4.14 W
Ventana Television, Inc.	E191121	FES	2132 Ten-Ten Road	Apex	Wake, NC	35-42-49.84 N; 78-49-3.96 W
Ting Fiber, Inc.	E181631	FES	155 Treatment Plant Rd	Holly Springs	Wake, NC	35-38-46.8 N; 78-50-54.6 W
Corporation of the Presiding Bishop of the Church	E190695	FES	590 Bryan Drive 1811 Seabrook Avenue	Apex Cary	Wake, NC	35-43-54.51 N; 78-51-44.49 W 35-45-14.57 N; 78-46-22.42 W

Note: There are no incumbent FSS or FES earth station licensees within 5 miles of Dell's test facilities located at Framingham, MA.