Description of Proposed Experimental Operation
STA, Questions No. 4 & 5

David Fritz on behalf of Nokia hereby files this Experimental Application ("Application") to allow Nokia to operate non FCC certified LTE 3GPP Band Class 48 TDD ("CBRS") equipment within the Dallas Fort Worth, Convention Center at the Nokia vendor booth during the Competitive Carriers Association ("CCA") 2017 Annual Convention taking place on October 25, 2017 through October 27, 2017.

The use of the non FCC certified CBRS equipment will help provide convention attendees at the trade show insights into the possibilities of next-generation wireless deployments and use cases for the upcoming CBRS band. The use of non FCC certified CBRS equipment is being requested due to the lack of a commercial FCC certified Spectrum Access System ("SAS") and FCC equipment authorizations are not yet available for the CBRS band.

The experimental operations will be conducted at the location and deployment parameters outlined in Figure1. The experimental operations will utilize the transmitter equipment outlined in Table 1 with maximum transmit and receive distances being no more than 8 feet.

Figure 1:

Experimental Location Parameters
Address: 1201 Houston St, Fort Worth, TX 76102 (Tarrant County)
Coordinates: 32° 45' 00" N 97° 19' 40.8" W NAD-83
Location: Exhibit Hall A, CCA Trade Show Floor, Nokia Booth

Table 1:

Device #	Device Type	Manufacture	Transmitter	Integrated Antenna	Antenna	Maximum EIRP	Emissions Designator
1	Small Cell	Nokia	2 x 250 milliwatts (24 dBm)	Yes	Unity Gain Omni	250 milliwatts (24 dBm)	150MW7D
2	Small Cell	Nokia	2 x 2 watts (33 dBm)	No	3 dBi	4 watts (36 dBm)	150MW7D
3	End User Device	Seowonintech	200 milliwatts (23 dBm)	Yes	10 dBi	2 watts (33 dbm)	80M0W9W

The experimental LTE carrier sizes may vary between 5 MHz and 20 MHz with carrier aggregation combinations not to exceed the use of more than 60 MHz of total CBRS spectrum. Transmit operations will only be deployed within the CBRS frequency range of 3550 MHz to 3700 MHz. Extreme care will be taken to only transmit LTE carriers in portions of the CBRS that would not cause any harmful interference to existing incumbents.

With regards existing shipborne radar incumbent operations between 3500 MHz to 3650 MHz, the Fort Worth, TX Convention Center is located approximately 283 miles North Northwest of the nearest Gulf of Mexico coastline. As seen in Figure 2, the Fort Worth, Tx Convention Center is approximately 15.2 miles just within the yellow line fast track exclusion zone and 192.8 miles outside of the blue revised exclusion zone outlined in the NTIA Technical Report TR-15-517. Based on indoor operations and extreme distances from the Gulf of Mexico, its Nokia's opinion that any experimental transmit operations proposed in this application will have no effect on Shipborne radar operating within 3500 MHz to 3650 MHz.

Figure 2:

Federal Incumbent Exclusion Zones: 3500-3700 MHz

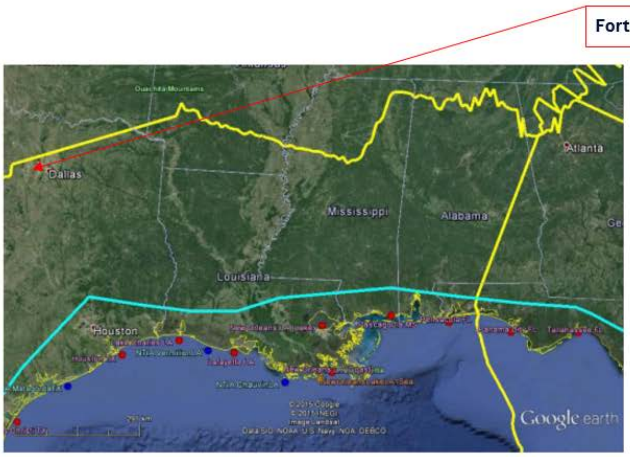


Figure B-17. Shipborne Radar 4–Exclusion zone eastern gulf coast (yellow line–fast track exclusion zone and blue line–revised exclusion zone).

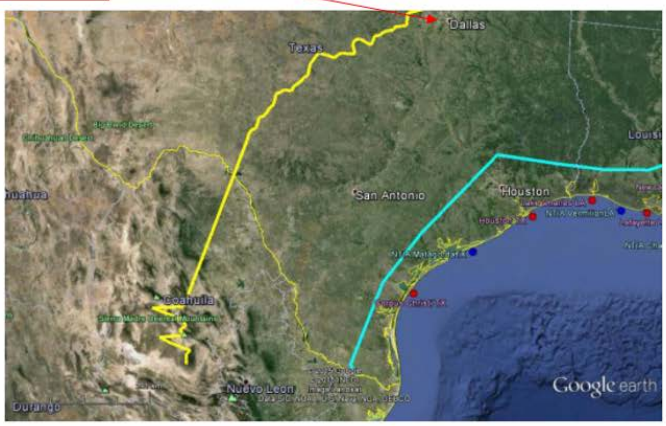


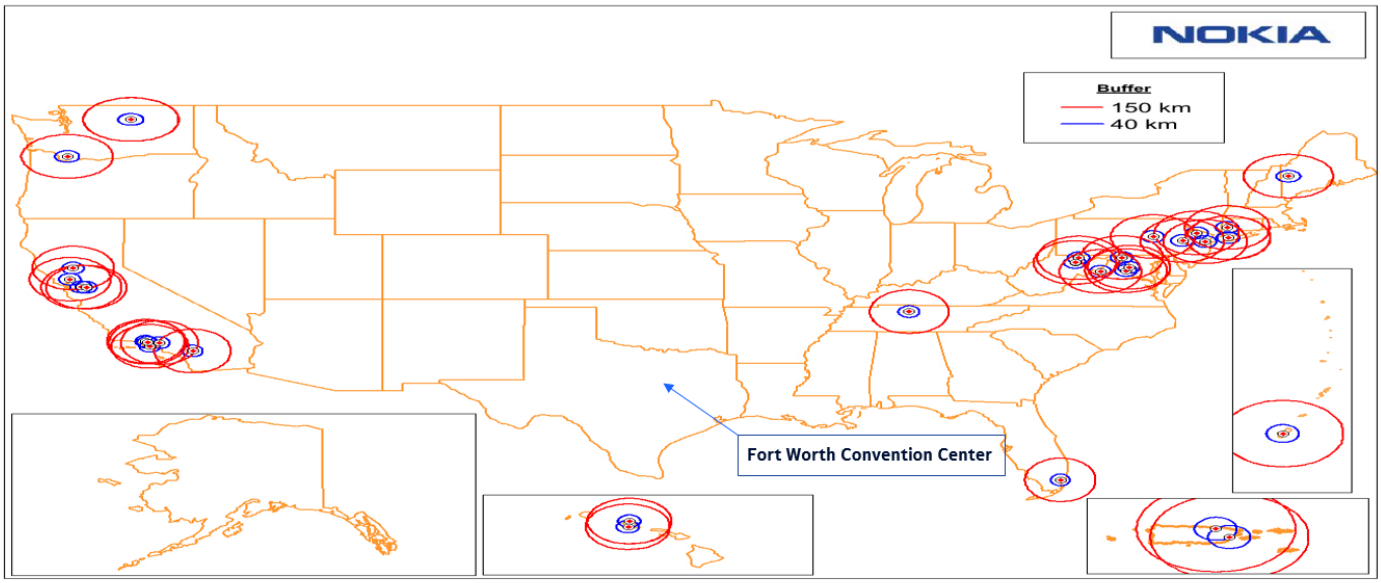
Figure B-18. Shipborne Radar 4–Exclusion zone eastern gulf coast (yellow line–fast track exclusion zone and blue line–revised exclusion zone).

Source: NTIA Technical Report TR-15-517
https://www.its.bldrdoc.gov/publications/2805.aspx

With regards existing Fixed Satellite Service ("FSS") incumbent operations between 3600 MHz to 3700 MHz, the Fort Worth, TX Convention Center is located outside any registered FSS 150 km coordination zone as seen in Figure 3. Based on indoor operations and extreme distances from any existing FSS station, its Nokia's opinion that any experimental transmit operations proposed in this application will have no effect on FSS operations within 3600 MHz to 3700 MHz.

Figure 3:

FSS Exclusion Zones: 3600-4200 MHz

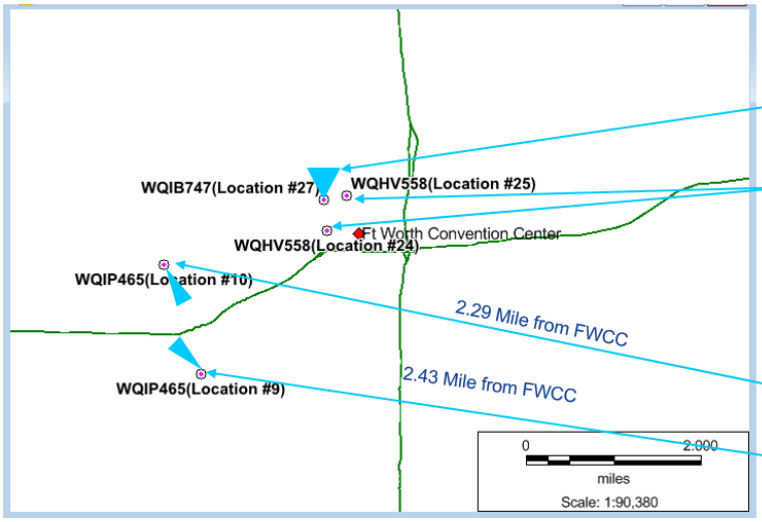


Source: https://www.fcc.gov/general/35-ghz-band-protected-fixed-satellite-servicefss-earth-stations

With regards existing NN Radio Service ("3.65 GHz Part 90") incumbents with deployed operations between 3650 MHz to 3700 MHz, there are only 2 licensees, WQHV558 and WQIB747, that have registered sectors that fall within a 2 miles radius of the Fort Worth, TX Convention Center. As depicted in Figure 4, all registered sectors are operating with "Restricted" equipment that utilized only the lower 25 MHz of the 3.65 GHz Part 90 band, 3650 MHz to 3675 MHz. For any transmit operations within 3650 MHz to 3700 MHz, Nokia will coordinate its experimental operations with WQHV558 prior to turn-up due to that licensees omni directional antennas on registered sectors #24 and #25 that are located within 2 miles of the proposed experimental operations. Based on indoor operations and extreme distances from any existing licensee utilizing the upper 25 MHz of the 3.65 GHz Part 90 band, its Nokia's opinion that any experimental transmit operations proposed in this application will have no effect on any registered Part 90 3.65 GHz incumbent operations within 3675 MHz to 3700 MHz. Out of abundance of caution, Nokia will monitor the FCC ULS for any new 3.65 GHz Part 90 registered sectors that might be added to incumbent licensees during the experimental license grant and make every effort it can to insure its experimental operations will not cause harmful interference to any existing registered stations between 3650-3700 MHz.

Figure 4:

Existing Part 90 Operations within 2 mile radius (FCC ULS 9/21/2017): 3.65-3.7 GHz



120° beamwidth @ 0° True North – Ubiquiti (3.65-3.675 GHz)

Omni Directional – Alvarion (3.65-3.675 GHz)

FCC Link	Call Sign	Status	Radio Service	License Name	Market Code
ULS Link	WQHV558	A	NN	Omega Communications Corporation	NW
ULS Link	WQIB747	A	NN	One Ring Networks, Inc.	NW

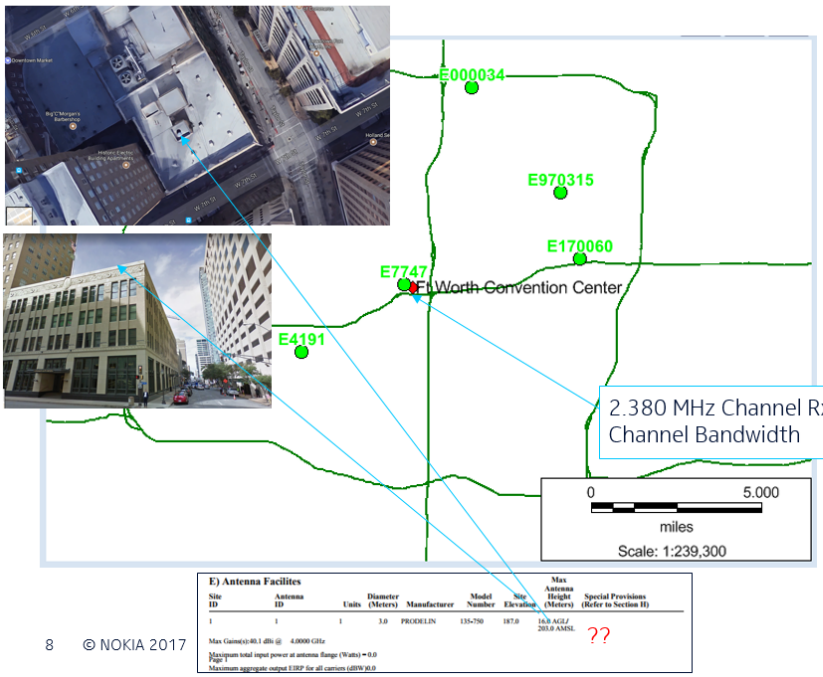
13.5° beamwidth @ 161°– Ubiquiti (3.65-3.675 GHz)

13.5° beamwidth 341.4°– Ubiquiti (3.65-3.675 GHz)

With regards adjacent incumbents with operations above 3700 MHz, there is only one FSS station, E7747, operating within 5 miles of the Fort Worth, TX Convention Center as seen in Figure 5. Based on indoor operations, the deployment of the FSS receive antenna on a building with a high roof top, and the FSS station's relatively small band with being used in the adjacent 500 MHz band, its Nokia's opinion that any experimental transmit operations proposed in this application will have no effect on the adjacent FSS operations above 3700 MHz. In the unlikely event that any adjacent interference is detected, Nokia would immediacy turn off its transmitters and coordinate an increased guard band between any further experimental operations and the adjacent FSS operations receiving interference.

Figure 5:

Adjacent FSS Operation (FCC IBFS 9/21/2017): 3.7-4.2 GHz



UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION
RADIO STATION AUTHORIZATION
Current Authorization : FCC WEB Reproduction
Unofficial Copy

Name: ASSOCIATED PRESS
Call Sign: E7747
File Number: SES-RWL-20040826-01238

Authorization Type: Renewal of License
Non Common Carrier
Grant Date: 09/15/2004 **Expiration Date:** 09/28/2019

Nature of Service: Domestic Fixed Satellite Service

Class of Station: Fixed Earth Stations

A) Site Location(s)

#	Site ID	Address	Latitude	Longitude	Elevation (Meters)	NAD	Special Provisions (Refer to Section H)
1)	1	FORT WORTH, TARRANT, TX	32° 45' 5.0" N	97° 19' 57.0" W	187.0	83	

Licensee certifies antenna(s) comply with gain patterns specified in Section 25.209

Subject to the provisions of the Communications Act of 1934, The Communications Satellite Act of 1962, subsequent acts and treaties, and all present and future regulations made by this Commission, and further subject to the conditions and requirements set forth in this license, the grantee is authorized to construct, use and operate the radio facilities described below for radio communications for the term beginning Tuesday, September 28, 2004 (3 AM Eastern Standard Time) and ending Saturday, September 28, 2019 (3 AM Eastern Standard Time). The required date of completion of construction and commencement of operation is 00/00/0000 (3 AM Eastern Standard Time). Grantee must file with the Commission a certification upon completion of construction and commencement of operation.

B) Particulars of Operations

The General Provision 1010 applies to all receiving frequency bands.
The General Provision 1900 applies to all transmitting frequency bands.
For the text of these provisions, refer to Section H.

#	Frequency	Polarization	Emission	Tx/Rx Mode	Max EIRP /Carrier	Max EIRP Density	Associated Antenna	Special Provisions (Refer to Section H)	Modulation/ Services
1)	3700.0000 - 4200.0000	H,V	200KF3A	R			1		
2)	3700.0000 - 4200.0000	H,V	180KF2D	R			1		
3)	3700.0000 - 4200.0000	H,V	2M50F1D	R			1		

C) Frequency Coordination

#	Frequency Limits(MHz)	Satellite Arc (Deg. Long.) East Limit	Satellite Arc (Deg. Long.) West Limit	Elevation (Degrees) East Limit	Elevation (Degrees) West Limit	Azimuth (Degrees) East Limit	Azimuth (Degrees) West Limit	Max EIRP Density toward Horizon (dBW/4kHz)	Associated Antenna(s)
1)	3700.0000 - 4200.0000	90.0W	140.0W	51.1	30.7	166.6	239.6	0.0	1

E) Antenna Facilites

Site ID	Antenna ID	Units	Diameter (Meters)	Manufacturer	Model Number	Site Elevation	Max Antenna Height (Meters)	Special Provisions (Refer to Section H)
1	1	1	3.0	PRODELIN	135-750	187.0	16.0 AGL/ 203.0 AMSL	

Max Gains(s):40.1 dBi @ 4.0000 GHz
Maximum total input power at antenna flange (Watts) = 0.0
Maximum aggregate output EIRP for all carriers (dBW)0.0

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Grant of this experimental authorization is in the public interest as it will allow Nokia, who will be conducting the experimental operations, to demonstrate the benefits of next generation LTE technology in the new CBRS band. Extreme care will be taken to only transmit in portions of the CBRS that will not cause interference to existing incumbents. In the unlikely event interference is identified to an existing incumbent, experimental operations will be terminated immediately. The FCC, grant of this experimental license will not harm existing incumbent operations.