

Raytheon Request for FCC Experimental License (EXP)

File Number: 1016-EX-CN-2020

Date: January 15, 2021 – January 15, 2023

Location:

Oxford FL

Lat/Long 1: 28°55'8.68"N 82°2'5.61"W (Fixed/Mobile)

Lat/Long 1: 28°56'37.84"N 82°2'0.44"W (Fixed/Mobile)

Purpose of Operation:

Frequency authorization is being requested for the period of January 15, 202021 – January 15, 2023 in X-band at frequencies 9010 GHZ, 9190 GHz and 9.55 – 9.65 GHz, in order to test prototype radar arrays in a relevant environment. Outdoor testing, across multiple frequencies as noted above is required to assess hardware compliance with requirements and to continue research and development. Up to two units will be tested over this range simultaneously.

Technical Synopsis for Fixed Locations:

- Spectrum needed: 9010, 9190 and 9.55 – 9.65 GHz
- Power levels requested: 160 W output power, 953.4 kW ERP (peak)
- Location of use: Oxford FL
- Direction of radiation:
 - o Antenna 1.98° Azimuth, 2.1° Elevation at boresite
 - o Each antenna has a +/- 45 degree scan angle

• Stop buzzer contacts:

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STA Explanation:

The purpose of this request for FCC Authorization is to test array compliance to RF performance requirements in a relevant environment. Radar development testing is planned in Oxford, FL.

Test Summary:

The system will transmit pulsed Frequency Modulated (Chirp) waveforms. For all waveform types, the maximum pulse duration is 55 μ s and the maximum duty factor is 22%. It is expected that the radars will be operated periodically during the STA period, < 8 hours a day, up to 7 days a week, for the duration of the STA.

Necessary Bandwidth Calculation Table

FM-Pulsed Radar		
Modulation	LFM	NLFM
Pulse Width (μsec)	55	6
Rise Time (μsec)	0.128	0.128
Fall Time (μsec)	0.128	0.128
Chirp BW (MHz)	2	2.5
Necessary BW (MHz)	12	12
Emission Designator	12M0Q3N	12M0Q3N

RF Hazard Calculations and Site Safety Measures:

Initial calculations show that general public exposure limits will be reached at a 2.25 meters distance and occupational exposure limits at 1.0 meter, using formula (7) from FCC OET Bulletin 65 "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", dated August 1997. These calculations take into account the highest duty factor of 22% and the raster scan pattern utilized by the radar. Raytheon's RF safety group is involved in all testing that requires free space radiation to ensure that no personnel are subjected to RF power density levels exceeding the Maximum Permissible Exposure (MPE) limits of the Part 1.1310 of the FCC Rules and the guidelines in FCC's OET Bulletin Number 65. An RF Safety Control Plan will be in place for the tests. The Plan will define the procedures and controls required to prevent personnel exposure to levels which exceed the MPE. To verify the safety of personnel, an RF survey will be performed at the initial turn-on.

