

Raytheon Missile Systems  
Experimental License Application  
File Number: 0430-EX-PL-2016

## **Explanation of Experiment**

### Overview:

Raytheon Missile Systems (Raytheon) is a defense contractor that builds missile systems for the US government and select, US government approved foreign customers. This application seeks authorization for testing of new technology to be incorporated into several of these missile systems to deliver higher performance to the customer.

### Technical Synopsis:

Spectrum Needed:	420-450 MHz
Power level Requested:	100W, and 100 W ERP
Area of Operation:	all operations will be indoors
Limited time of use:	work days, only occasionally will there be over-the-air transmission

### Description of Proposed Operations:

These radios will be incorporated into a missile system. This is part of a feasibility study for exploring how to deliver much better data to the warfighter in real time. The goal is to deliver automatic real-time position information to the warfighter on the battlefield.

The radios installed need to be tested to determine how they are performing.

This testing is not about developing a new radio but it will examine the usefulness of incorporating this existing radio in these systems. Raytheon will be incorporating its RT1915 radio into some of its other products to work on delivering the data needed on the ground.

### Area of Operation:

All of the proposed testing will take place in various Raytheon labs, as the radio is incorporated and the engineers undertake a feasibility study. All operations will be indoors. It is possible, based on the parameters being studied, that the prototypes could be moved from one lab to another between tests. That is the reason for the radius of operations. The radios will not be in motion while operating, but they may move from lab to lab for different studies.

### Time of Use is Limited:

The proposed feasibility study will incorporate the radios into the Raytheon product. Most of the testing will use a hard wire connection to the product to study the data transfer. However, in some rare instances, the radio transmissions will need to be tested to determine performance and cost-effectiveness. Only in those instances will the radio spectrum be in use. It is expected that the over-the-air testing will be less than 10% of the time needed for the feasibility study. That would mean that the spectrum would be in use less than 4 hours out of a typical 40 hour work week.

Power Level Requested:

The radios are not configurable. They are designed to operate at 100 W with 100 W ERP. So, there is no way to curtail the transmit power.

Characteristics of the Radios – spectrum use is very limited:

These radios are frequency hopping, spread spectrum radios. The radios use from 2-8 channels in the 420-450 MHz band, not all of the band. Because of the nature of frequency hopping, the radios must listen before they transmit to ensure that the radio has hopped to an open channel. Therefore, the chance of any interference to any other spectrum user in this band is extremely limited.

Stop Buzzer Point of Contact:

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Conclusion:

Raytheon is seeking an experimental license to study the feasibility of incorporating one of its radios into a range of its missile system products. The purpose of the testing is to determine if the radios can economically deliver the performance required by Raytheon's customers. The radios will transmit over the air on a very limited basis. Furthermore, the radios are listen-before-transmit, which will minimize the chance of any interference to other users of this spectrum. All operations will be indoors.

Should there be any questions about this application, please contact either Tom Fagan, Spectrum Manager, Raytheon Missile Systems, or Anne Cortez, WFS, [alc@conspecinternational.com](mailto:alc@conspecinternational.com) or 520-360-0925.