

Raytheon Missile Systems
Experimental License Modification Application
File Number: 0066-EX-ML-2013

Explanation of Experiment

Overview:

Raytheon Missile Systems (Raytheon) designs and builds missiles for the US Department of Defense and other agencies of the federal government. Raytheon recently was awarded a contract from the Department of Defense which requires it to test new radio systems on its seeker missiles.

Raytheon is filing this experimental license modification application to expand its radar testing under DOTC-12-05-INIT004. The expanded testing will require the use of active radar, because the results of early testing show the need for active systems to achieve the advancements required. This will also require adding two locations to the license.

Synopsis:

- Contract Number: DOTC-12-05-INIT004
- Spectrum needed: 15.7-17.8 GHz
- Signal level: 550 Watts ERP, based on use of a 2 Watt radar transmitter
- Locations: Raytheon Missile Systems facilities in Tucson, AZ, indoor, hooded/shielded operations and outdoor operations over 500 meters between Raytheon buildings.

Nature of the Experimentation:

Raytheon is working on the advanced development of its Radar Seekers. Initially, this was designed as a semi active radar system. After initial testing and radar development, the program needs to add an active radar to the seeker.

Using the semi-active radar system, the test equipment will use a low power transmitter to send a signal to the seeker's radar receiver. Then, the results will be evaluated to fine tune the receiver performance. This will lead to advancements in the performance of the Seeker.

The active radar system will use its own signal reflected off a simulated target. The seeker's radar receiver will use the reflected signal and advanced processing to accomplish the performance goals required by the DOD customer.

Locations for the testing:

For operations in the lab, the radar transmissions will be either hooded or in a shielded enclosure which will provide signal attenuation greater than 40 dB. The testing will be conducted on the radar system, on the lab bench, to work on advanced development of the radar system.

The program must also simulate a real-world performance evaluation to ensure that the improvements made to the radar system, function as planned when incorporated into the missile

system. Outdoor test operations will use a 100 Watt signal that is directional in nature to reach the system being tested. The ERP of the directionalized signal is 14.3 kW. This test must be conducted outdoors to allow the various technologies to perform in free field environment. Operations using the semi-active radar will continue as currently licensed. The distance between the active radar and the target is only 500 meters. This distance is the minimum required for the test, using the least amount of RF energy needed to accomplish the goals.

Indoors:

Location 2, hooded or shielded operations, which attenuate the signal by 40 dB.

Latitude: 32-08-18 N Longitude: 110-55-14 W

Outdoors:

Location 1, Azimuth of operations: 0 ° North, low power signal generator.

Latitude: 32-05-30 N Longitude: 110-56-47 W

Location 3, new, Azimuth of operations: 90 ° East, low power signal generator

Latitude: 32-05-46 N Longitude: 110-57-07 W

Location 4, new, Azimuth of operations: either 180 ° South or 270 ° West, radar operations

Latitude: 32-05-46 N Longitude: 110-56-47 W

Frequencies to be used:

The testing will be sporadic at best. The proposed frequency use will be radar signals – both continuous wave and pulsed operations.

Testing will use, requested frequencies to optimize radar system operations.

For the active radar transmission, the emission will be N0N. The radar pulse is approximately 30 MHz wide. The pulse may use any portion of the licensed spectrum. The duty cycle of the active radar system ranges up to 33%.

No likelihood of harmful interference to other users:

Raytheon has undertaken a preliminary search of other users of frequencies in this band in the Tucson, Arizona area. The spectrum, which is used primarily by the FAA, is not in use by the FAA anywhere near Tucson. This was determined by consulting with the FAA's Western Regional Office and by consulting FAA personnel at the Tucson International Airport.

Raytheon is prepared to undertake frequency coordination with any other entities, as required by the FCC.

Stop Buzzer Point of Contact:

To ensure that no instances of harmful inference occur, Raytheon's Stop Buzzer point of contact is:

Thomas J. Fagan, Spectrum Manager
Raytheon Missile Systems

520-794-0227 (office)
520-465-7087 (cell)
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Conclusion:

Raytheon is seeking an experimental license to continue testing to work on advancements to its Seeker missile technology. The program has been moving quickly to deliver technology advancement in the radar systems, as required by, DOTC 12-05-INIT004.

Raytheon's work will advance the performance of the missile Seeker assembly improving its responsiveness and its precision. The time of use for these frequencies will be limited. The proposed power levels are as low as possible to achieve the goals of the system, and there appears to be no other use of in this frequency band in the Tucson area.

If there are any questions about this application or if any additional information is needed, please contact Thomas J. Fagan, see above, or Anne L. Cortez, Washington Federal Strategies, 520-360-0925 or alc@conspecinternational.com.