

Raytheon Missile Systems
Experimental License Application
File Number: 0375-EX-CN-2020

Explanation of Experiment

Background:

Raytheon Missile Systems, through its wholly owned subsidiary Raytheon K-Tech, is seeking an experimental license for continued testing of its telemetry antennas at the general aviation airport in Moriarty, New Mexico. Raytheon K-Tech has developed highly specialized telemetry receiving systems that are sold to all branches of the US military and other federal agencies. The telemetry systems use advanced technology to deliver exceptional performance over distance. The proposed testing is needed to advance development to meet a short deadline required by Raytheon's customer.

The experimental license is intended to use radio signals to work to advance the telemetry systems. This application seeks to extend the authorization originally granted under WP9XMH.

Technical Synopsis:

Spectrum needed: 2200-2290 MHz and 4440-4940 MHz

Areas of Operations: 1 km radius around location 1, 0.8 km radius around location 2

Altitude of drone flights: no more than 400 feet

Time of use: limited to 2-3 hours per day, operations will not take place every day

Description of Experimentation:

Telemetry testing will be conducted to test the telemetry antennas built by Raytheon K-Tech.

Telemetry Testing of Receive Antenna Performance:

Raytheon K-Tech also needs to use the spectrum requested here to test the receive antenna performance specifically in the S and C bands. These tests will operate only on the following frequency bands:

- 2200-2290 MHz
- 4440-4940 MHz

The telemetry tests will use emission designators: 33M6F1D with signal modulation of PCM/FM and 36M4G1D with signal modulation of SOQPSK.

For the telemetry testing, the Quasonix transmitter is used to send actual telemetry data to the telemetry receive antennas being tested. Raytheon K-Tech gathers data on the performance of the receive antennas, analyzes the data reception, and uses the results to improve its antenna technology.

The maximum ERP used for this testing is 20 mW, although much of the testing is conducted at a much lower power level to test the performance of the receivers.

The telemetry testing sends PCM/FM and SOQPSK signals to the telemetry receivers.

Test Configuration:

Raytheon K-Tech has designed this experiment to allow its antennas to track telemetry from transmitters in flight. This particular experiment uses drones rather than high speed aircraft. The drones will fly around the receive antennas in a race track pattern at each of the two flight locations.

The maximum altitude of the drone flight is 400 feet.

At location 1, 34-59-04 N 106-00-23 W, the drone will fly in a race track pattern that has a 1 km radius.

At location 2, 34-59-09 N, 105-57-53 W, the drone will fly in a race track pattern that has a 0.8 km radius.

The goal of the testing is to use a low power transmitter at a relatively close distance that will simulate the angles and transmissions of a high speed aircraft at a much greater distance from the receive antennas. The frequencies requested here are the frequencies that are used by the aircraft that the antennas were designed to track, so they are required for this testing.

In Figure 1 below, there is a Google Earth image of the first test site.



Figure 1: Location 1 Area of Operations

In Figure 2 below, there is a Google Earth image of the second area of operation.



Figure 2: Location 2 Area of Operations

Antenna Information:

The antennas are dipole antennas that have 13 dBi of gain. They need to use the gain to simulate the signals that the receivers are designed to receive.

Stop Buzzer Point of Contact:

In the event that it is necessary to reach a stop buzzer, the person to contact is:

Jim Ortega, Spectrum Manager
Raytheon Missile Systems
(520) 794-0227 – office
James.e.ortega@raytheon.com

Conclusion:

Raytheon K-Tech is seeking an experimental license to continue telemetry tests of the performance of the telemetry receive antennas tracking aircraft in flight. Fixed and mobile transmitters are used for the testing.

For additional information about this application, Anne Linton Cortez, WFS, 520-360-0925 or alc@conspecinternational.com.