

Raytheon Missile Systems
Exhibit to Experimental License Application
Call Sign: WG2XGW
File Number: 0291-EX-CR-2017

Explanation of Experimentation, Need for Spectrum, Advancement of Radio Art

Overview:

Raytheon Missile Systems (Raytheon) builds and tests various missiles which are developed for the US military and other US-government approved customers. Those missiles are tested by Raytheon in a number of ways including testing the command and control radio systems on the missiles and testing of the telemetry systems which send data back to control points to deliver key information on the missile flight and the health of the missile systems while in flight. The results of this testing advance the technologies built into the systems and ensure effective monitoring and control of missiles in flight so that Raytheon's products will perform as required when they are used by a customer.

In this application, Raytheon is seeking authority to undertake testing which will provide enhanced and more efficient telemetry systems which are essential to monitoring the flight of the missiles.

Purpose of Experimentation:

Raytheon is seeking to renew this experimental license to develop radio systems that operate in the S band spectrum to advance aeronautical telemetry. Raytheon's engineers and scientists are investigating the properties of the spectrum and the functioning of the radios to improve performance of its products. The goals are to understand better how information is transmitted most efficiently over this spectrum and to develop telemetry systems that are more secure. Through these tests, Raytheon's engineers are seeking to optimize use of the spectrum to ensure secure, reliable, timely transmission of the essential telemetry data. This requires taking some time to develop radio systems, test their functioning, improve the systems, and hone the technology, so that the new radio systems can be developed into systems that are ready for use on Raytheon's products to better serve its customers. The radio systems examine ways of maximizing telemetry data throughput on this spectrum, minimizing the need for re-transmission of data, securing the data transmission, and ensuring that the transmission stream can withstand any potential for RF interference.

The experiments involve both the development of new radios and new software that can be used in conjunction with the radios to ensure the most efficient and secure use of spectrum for aeronautical telemetry. The radio development includes development of specialized antennas and use of various signals and modulations to create the best telemetry system possible.

Locations of the testing:

Raytheon is renewing experimental authorization to operate in two locations. The first is in the lab at the Raytheon facility in Tucson, Arizona. This experimentation is where much of the development of these systems takes place.

The second location is for airborne, mobile use of the antennas in an area within a 120 km radius of the Raytheon facility. Because the radio development is intended to explore how the spectrum can be most effectively used to transmit telemetry data, it is necessary to test the systems in flight to see how they operate and determine what limitations need to be addressed and how to optimize operations in a real-world environment.

Antenna Power:

Most of the operations will use a power level and ERP of only 5 W. However, on occasion, there are some transmitters that will need to use the full 40 W requested in the application. This is a rare occurrence.

Need for an experimental license:

Raytheon is currently seeking this authorization for its independent research and development of improved technologies to be deployed on its products. There may be a time in the future when additional work and testing will be conducted under contracts with the US military in the future. At this point in time, the work must be done in accordance with an FCC experimental license, because there is no specific contract in place covering this radio development work.

As explained above, Raytheon delivers its products primarily to the US Department of Defense. Therefore, the telemetry technology that Raytheon is developing and testing operates on spectrum that the Department of Defense uses for telemetry. An experimental license is required for the use of this spectrum to develop systems that are usable by the expected customer.

Stop Buzzer:

The stop buzzer point of contact for the proposed operation is:

Thomas J. Fagan, Spectrum Manager
Raytheon Missile Systems
520-794-0227
tjfagan@raytheon.com

Conclusion:

Raytheon is seeking to renew its experimental radio license for the development of advanced missile telemetry, using frequencies in the S band. The program of experimentation is expected to deliver high-performance telemetry systems that will withstand interference and maximize data-throughput.

For questions about the application, please contact either Thomas J. Fagan, see above, or Anne Linton Cortez, alc@conspecinternational.com or 520-360-0925.