

Raytheon Missile Systems
Experimental License Renewal Application
File Number: 0672-EX-CR-2019

Explanation of Experiment

Raytheon Missile Systems (Raytheon) is a US defense contractor that develops innovative technologies that can be used by the military. Raytheon's innovation labs, formerly in Rancho Cucamonga, California have been working on the development of a new broadband technology. Raytheon recently moved its Rancho Cucamonga innovation labs to its headquarters in Tucson, Arizona. This part of the innovation program has just completed its move, and now it needs to begin testing in Tucson, in late June. This application seeks to extend indoor testing in Tucson that was initiated under WL9XIU both to meet the demands of a US Department of Defense customer and to test the technology for adaptability for the commercial marketplace. The early research has shown significant results in improving data flow over the new solid-state technology using high frequencies.

Technical Synopsis:

- Spectrum Needed: 73.5, 83.5, 93 GHz
- Power level: 10 W output power, 610 kW ERP
- Antenna gain: 50 dBi, sends a pencil beam that is high capacity
- Location: indoors at 32-06-20 N, 110-56-59 W

Description of Experiment:

Raytheon has been working on a new product that uses high bandwidth solid state W-band (71-76 GHz, 81-86 GHz, and 92-94 GHz bands) technology, making it possible to deliver compact, secure communications systems with orders of magnitude reductions in size, weight and power. This application seeks authorization to conduct testing indoors at a test lab at Raytheon's Tucson headquarters. The experimentation will explore how to optimize operations of the technology with high data integrity.

Reducing the size, weight and power needed by broadband data links is essential when working in harsh climates, from aircraft to the ground, or among aircraft. Traditional point to point technologies operating in this frequency band use large antennas that are buffeted by wind. The buffeting causes a significant drop in data rates, which leads to inefficient communications, lowering of available bandwidth, slowing of vital communications, and wasted power by the transmitters. Buffeting is a particular problem when one or both antennas is in motion. The technology under development offers significant advances in power consumption, rapid deployment, and effective high-speed data transmissions under all conditions, particularly addressing the challenges of mobile operations.

The advanced development will enhance the feasibility of using the technology for robust communications systems that are portable and rapidly deployable. This testing will include measuring the performance of prototype 100 Gbps, high frequency (71-76, 81-86, and 92-94 GHz), static communication links.

RF Safety

Raytheon has an RF safety control plan for this testing that is in full compliance with OET 65 and IEEE C95.

Location of Testing:

The testing will be conducted indoors at a test lab on the Raytheon plant site. The radio energy is concentrated into a very narrow beam with no sidelobes. The link is not long, but the indoor operations will allow for fine-tuning of the transmitters and antennas while the system is accessible. This will help ensure that the technology will perform in the field as required for the upcoming customer demonstration.

Stop Buzzer Point of Contact:

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Conclusion:

Raytheon's advanced solid state data link research program moved to Tucson, and the research needs to continue to fine tune the operations. This testing has been proving productive in developing a long-distance link that can achieve up to 100 Gbps throughput over distances reaching 10 miles. Ongoing testing is required to meet customer requirements as well as internal deadlines.

If there are any questions about this application or the proposed use of the spectrum, please contact Anne Linton Cortez, Washington Federal Strategies, 520-360-0925 or alc@conspecinternational.com.