

Explanation of Need for Modification

Raytheon Missile Systems (Raytheon) is a US defense contractor that develops innovative technologies that can be used by the military. Currently, Raytheon's innovation labs in Rancho Cucamonga, California have been working on the development of a new broadband technology. This application proposes to continue the experimentation, using higher power to extend the operational range of the product, 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: 71-76 GHz, 81-86 GHz, 92-94 GHz
- Power level: 10 W output power, 2 MW ERP,
- Antenna gain: 50 dBi, sends a pencil beam that is high capacity and can travel 10 mi.
- Location: Remote test range to facility in Van Nuys, CA, bi-directional link

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 modification application seeks to increase the power levels used in the experimentation to explore how to optimize operations of the technology over greater distances with the same data integrity.

Reducing the size, weight and power needed by broadband data links is essential when working in harsh climates. 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. The technology under development offers significant advances in power consumption, rapid deployment, and effective high-speed data transmissions under all conditions.

The purpose of the experimentation is to continue the development of Raytheon's advanced, high-power, solid state W-band technology for communications applications. The advanced development will enhance the feasibility of using the technology for robust communications systems that are portable and rapidly deployable. This expanded testing will include measuring the performance of

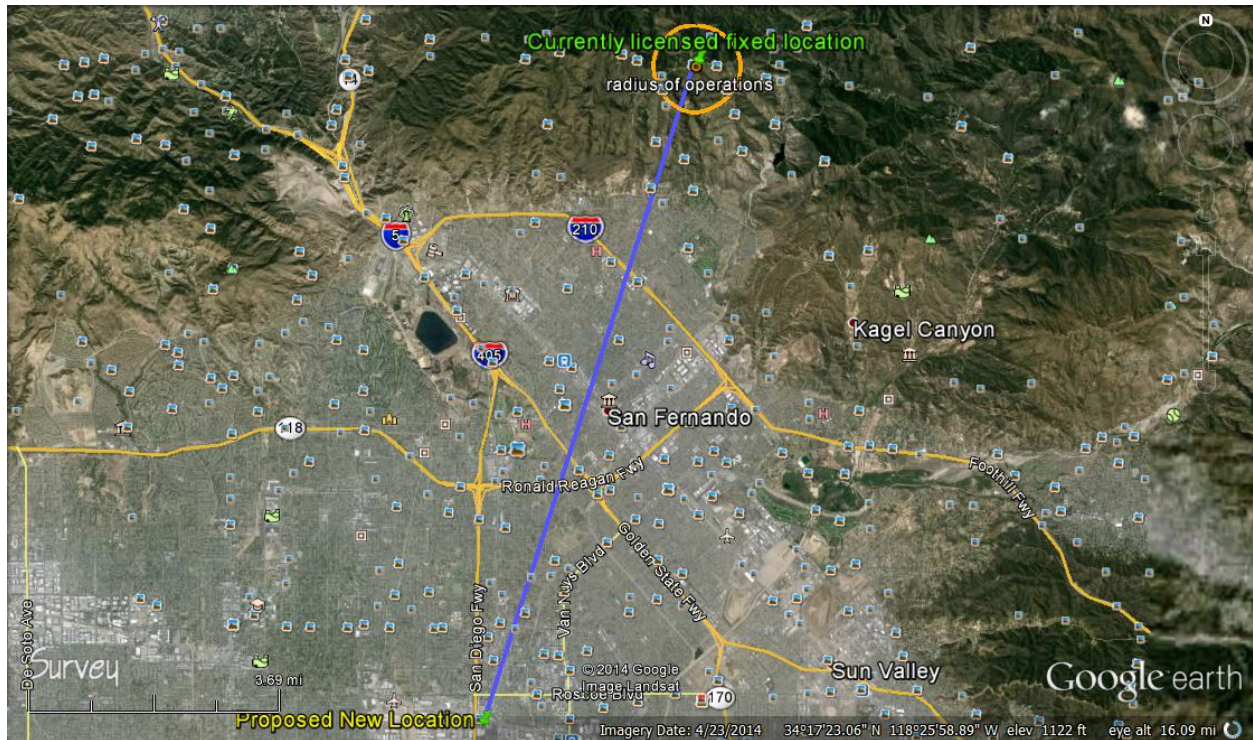
prototype 50 Gbps, high frequency (71-76, 81-86, and 92-94 GHz), static communication links at a separation of 10 miles between the transmitters. The test will take place at the ITT Loop Canyon Antenna Test facility.

Need for increased power: At this point, Raytheon needs to extend its experimentation by exploring performance characteristics over greater distances, when the radios are operating at up to 2 MW ERP. Because the technology uses high gain antennas, the beamwidth is very narrow. The increased power level is required because the experimentation is seeking to expand the data link path to 10 miles, which will allow much greater applicability of the technology. At these frequencies, the existing low powered operations will not allow testing across the 10 mile path. The power increase is accomplished using high gain antennas, which narrows the beamwidth, reducing the chance of interference.

Location of Testing: The image below shows an overview of the proposed test link. The northern end of the link is already the center point of the currently licensed operations at the ITT Loop Canyon Antenna test facility. The proposed southern end of the new link is at the ITT Van Nuys Antenna Test facility which has the equipment in place to evaluate the performance of the system under development.

Northern end: 34-21-10 N, 118-25-00 W

Southern end: 34-12-51 N, 118-28-17 W



Stop Buzzer Point of Contact:

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Conclusion:

Raytheon's advanced solid state data link research program has reached a point in its experimentation where it needs to expand the radius of its operations to see if the technology under development can be used across 10 mile distances, to expand the utility of the system. This application seeks to increase the authorized power level to 2 MW ERP to allow for the 10 mile testing. If the testing proves successful, the technology is expected to be used by DARPA and to be adaptable for commercial use in the future.

If there are any questions about this application or the proposed use of the spectrum, please contact Thomas J. Fagan, Spectrum Manager, Raytheon Missile Systems, 520-794-0227 or tjfagan@raytheon.com, or Anne Linton Cortez, Washington Federal Strategies, 520-360-0925 or alc@conspecinternational.com.