

Raytheon Company (Missiles and Defense – M)  
Experimental License Application  
File Number: 1105-EX-CN-2021

## **Explanation of Experiment**

### **Overview:**

Raytheon Company (Missile and Defense – M) (Raytheon) is the primary missile manufacturer in the US, supplying ordinance ready to operate to the US military. Raytheon's experience with missiles has led its customers to seek missile technology based on some of its existing platforms and knowledge. This has led Raytheon into the development of advanced missile technology as well. This application seeks authorization for the use of a radio that is used in the development and testing of its advanced missiles. The radios incorporated into the missiles support the mission of the missile testing.

### **Need for a License:**

Raytheon has a contract with Army, 800-19-C-3061, to deliver an advanced system. The contract requires rapid development and testing, with radio demonstrations. To achieve the contractual goals, Raytheon needs to work on radio development at its plant site as soon as possible.

### **Technical Synopsis:**

- Spectrum Needed: 2235.0MHz  $\pm$  20MHz, emission is 40 MHz wide, 40MW9D
- Limited Time of Use: only occasional testing at this location
- Limited time of use:4-6 hours per day of radio use
- Limited area of operations: Fixed, indoor laboratory environments. Radius of operations: 100ft.
- Variable power levels will primarily use 1/8 and full power operations: S band with low power being 12.6 W and Full at 50.1 W

### **Description of Operations:**

Raytheon needs to demonstrate performance characteristics of its missile system in future test and demonstration events. The testing at the Tucson plant site is intended to allow the program to work on its missile platform before testing and demonstrations at DoD locations.

This testing proposes to operate the radio in indoor laboratories at the Tucson Raytheon plant site, in fixed installation site configurations. This testing is designed to optimize the interaction among the radios.

### Limited Time of Use:

Testing will take place during workdays between 6 am and 6 pm, but the radios will only be in use intermittently. The duty cycle of the Raytheon radio is limited to 100%, so even when the radio is in use, its use is limited.

### Locations of Testing:

The testing will be conducted at several Tucson plant site, fixed location at the locations depicted in the below Figure 1- 5.



Figure 1. Building 9022, with pushpin marking the lab on the Raytheon Plant



Figure 2. Building 805, with pushpin marking the lab on the Raytheon Plant



Figure 3. Building 840, with pushpin marking the lab on the Raytheon Plant

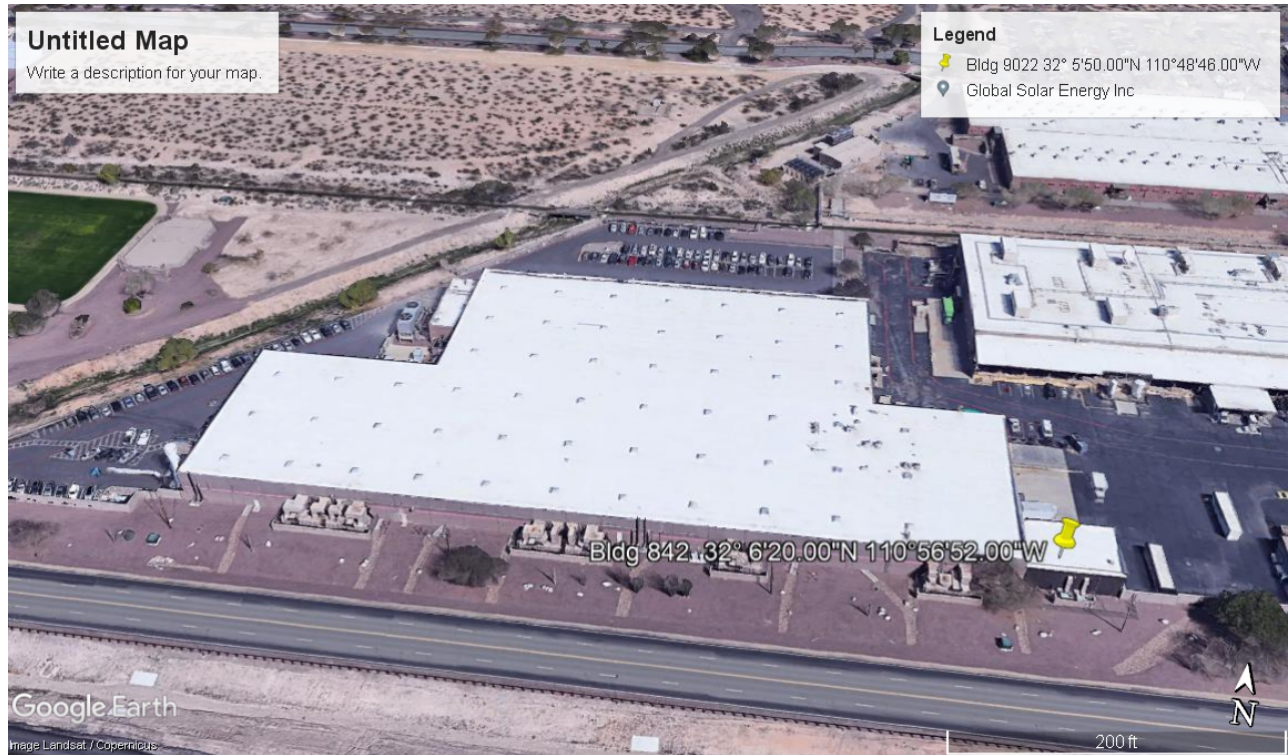


Figure 4. Building 842, with pushpin marking the lab on the Raytheon Plant

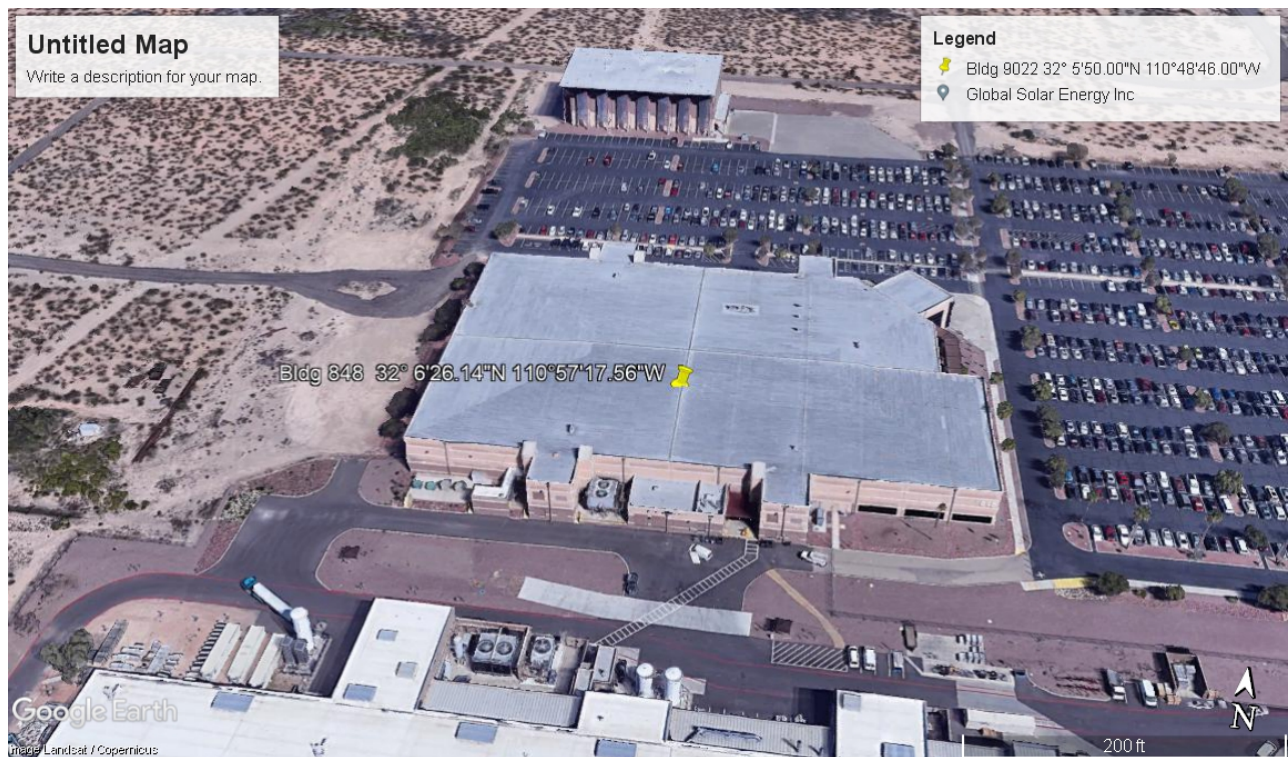


Figure 5. Building 848, with pushpin marking the lab on the Raytheon Plant

<u>Antenna Make</u> e.g. Haigh-Farr, etc.	<u>Antenna Type:</u> Eg: dipole, panel, etc, and polarization	<u>Antenna Gain</u>	<u>Pulsed or CW? If pulsed, PRR, &amp; pulse duration</u> Are frequencies Stepped, swept, or other	<u>Azimuth of operations</u>	<u>Site Elevation</u>	<u>Height of install</u>
Harris Corp.	Patch Antenna	+8.1 dBic	CW	Longitudinal along the missile	2643 ft. (Tucson Elevation)	~53 inches

**Spectrum Use:**

**S band frequencies:** The radios have been designed to operate at 2235.0MHz  $\pm$  20MHz.

The radio will primarily operate using 1/8 and full power operations at 12.6 W and 50.1 W.

**Stop Buzzer Point of Contact:**

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**Conclusion:**

Raytheon is seeking an experimental license for test and development operations. The proposed testing will be limited in nature. The radio use will be limited.