

Radio Physics Solutions  
Experimental STA Request  
File Number: 1654-EX-ST-2018

### **Explanation of Experiment and Need for STA**

Radio Physics Solutions (RPS) is developing a radio-based threat detection system. The MiRTLE® patented technology fuses proprietary millimeter wave radar techniques with artificial intelligence to provide instant standoff threat detection of concealed person-borne threats. The system is being developed to detect a range of threats including hand guns, knives, assault weapons, and suicide bomb vests.

### **Need for an STA**

RPS has been asked to demonstrate the MiRTLE technology to in conjunction with the schools' safety experts at the architecture firm of PBK starting as soon after November 15, 2018 as possible. The demonstration is expected to last approximately 30 days from the start. The nature of the demonstration is short, and an STA is appropriate in this instance. Because of the uncertainty of the processing time, RPS is requesting an STA for a 90-day window, so that if the start is delayed until after the first of the year, this STA would still allow for operations.

### **Technical Synopsis**

- Spectrum Needed: 77-110 GHz
- Location: Operations located at recessed building entrance
- Limited time of use: about 8 hours per day, intermittently
- Power level limited: 5 mW signal, with only 47 W ERP

### **Description of Operations**

RPS has been asked to demonstrate its MiRTLE technology at the entrance to the Cy-Fair High School in Cypress, Texas to illustrate its potential effectiveness in detecting threats, in particular to protect schools. The school system has engaged the safety experts at the architecture firm PBK to recommend technologies that will make their schools safer. PBK has identified the MiRTLE technology as a key element to be incorporated into its safety recommendations, and it is requesting this test and demonstration for the school system to see how MiRTLE works and can protect the students. RPS will use its MiRTLE technology to screen people who are entering the school. The screening results will be presented to staff on a real-time basis, allowing them to determine the effectiveness of the technology.

The system works most effectively when it operates across 35 GHz, and RPS is seeking an authorization covering 33 GHz for this demonstration.

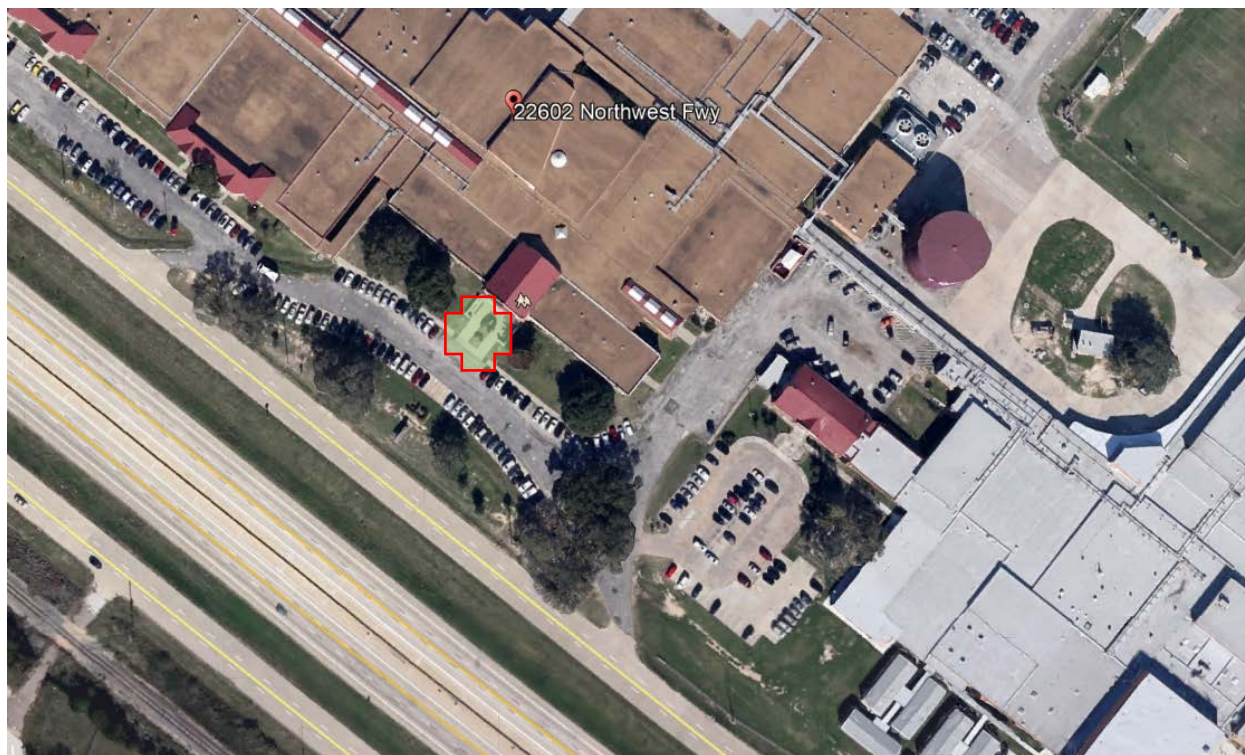
The MiRTLE technology operates from 77-110 GHz. The power level is low, only 5 milliwatts, with an ERP of 47 W. Because the millimeter waves are so short, they are easily absorbed or

scattered by surrounding features such as trees and buildings. The signal propagation will be highly contained in the immediate area of the building. Further, for the MiRTLE detection system to work, the technology needs to be directed toward the people to be screened. The system will be pointed at or below the horizon for this use.

RPS has undertaken other demonstrations under the authority of WM9XDS and WM9XHF. The proposed operations here are similar, with a slight adjustment to the spectrum selected to accommodate previous license conditions.

### **Location of Operations and Time of Use**

The proposed operations will require installation of the RPS technology near the entrance to the school building at 22602 Northwest Freeway, Cypress, Texas. The building entrance, as shown by the red X in *Figure 1* below, is recessed from a portion of the front of the building.



*Figure 1: Entrance to school*

This recessed entrance will provide shielding for the limited amount of side lobe energy, minimizing any prospect of interference.

The demonstrations are expected to take place across a 30-day period, during the school day. The MiRTLE system sweeps through the frequencies, with a sweep taking approximately 0.31 milliseconds. There are approximately 3000 sweeps per second. The time on any frequency per sweep is very brief. When the time of use is divided across the 35 GHz of spectrum requested, RPS determined that the system is in use for only 0.0088 milliseconds per gigahertz ( $88 \mu\text{s}/\text{GHz}$ ). The speed of the sweep will mitigate any potential for interference to other operations using this

spectrum, since most radios do not detect signals that are so brief in duration. A review of typical 70/80/90 GHz data links shows that the typical emission designator for those operations near this proposed demonstration ranges from 0.5 to 2.0 GHz wide, which means that a sweep of this system will overlap any nearby operation for just 44 to 136 microseconds per sweep.

The other operations are all mounted on rooftops, with highly directional antennas, and this operation will be ground based.

If a screening demonstration shows something interesting, the MiRTLE system will be turned off for the participants to discuss what they are seeing and how the system is working.

### **No likelihood of interference to other operations**

RPS is working with spectrum that is very effective in this technological application. However, it is not spectrum that will propagate very far, because the wavelengths are so short. As a result, the signal should be harmless to other operations.

Previous applications submitted by RPS have been approved, and RPS is hoping this application will also be approved. To best demonstrate the technology, it is best to operate it as designed. With that goal in mind, RPS has taken the time to determine the closest radio astronomy telescopes, none of which is anywhere within 500 miles of the proposed demonstration area. Further, there are innumerable natural and man-made obstacles between the test area and any of the observatories. Any radio signal will be attenuated in the immediate area of the proposed operations.

### **Stop Buzzer Point of Contact**

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### **Conclusion**

RPS is seeking an STA to allow it to demonstrate its MiRTLE standoff threat detection system at the Cy-Fair High School in Cypress, Texas to allow the school district the opportunity to evaluate the technology for purposes of determining whether this technology is a possible solution to add school security to protect students, faculty and staff.

Should there be any questions about this application, please contact Anne E. Cortez, Esq. of Washington Federal Strategies, 520-360-0925 or [alc@conspecinternational.com](mailto:alc@conspecinternational.com).