# Selection of Counter RCIED Antennas

Since the making of improvised explosive devices (IEDs) are relatively easy and low cost, they always pose a threat. The RF-controlled RCIED (Radio-controlled IED) is one of the most common explosives of this type. Given the fact that they may be triggered from a considerable distance using low-power transmitters at low frequencies, and the ease with transforming several electronic devices into IED explosive triggers, causes their continuous use.

The most often used method of protecting against RCIEDs is to employ jammer systems to disrupt communication between two RF receivers/transmitters. Vehicle-mounted and manpack RCIED jammer devices can be used for defense. In contrast to manpack systems, which are typically chosen by soldiers moving as task forces, vehicle-mounted jammer systems are often preferred by armored vehicles, SUVs, and commercial vehicles.

IEDs can represent a threat in an extensive frequency band since their RF receivers/transmitters can be easily obtained by modifying any wireless device. As a result, Counter-IED jammer systems must operate across a wide range of frequency bands. Counter-RCIED systems are generally limited to operating frequencies of up to 6000 MHz due to the rapid fading of the RF signal at high frequencies and the cheapness of low-frequency wireless devices.

The frequency ranges of the Counter-RCIED antennas are selected in accordance with the frequencies and power levels of the power amplifiers. While Counter-RCIED jammer systems with narrowband power amplifiers and antennas focus solely on commonly used target frequencies, wideband Counter-IED systems, which are more professional in nature, minimize the risk by jamming the whole frequency band.

Antenom Antenna Technologies has a product family for Counter-RCIED antennas. Antennas in this product family have passed the MIL-STD-810H test procedure and can be used on a vehicle. The Antenom Antenna Technologies product line includes a variety of alternative devices working in the frequency range of 4 MHz to 6000 MHz. The VWBO-05520-1 antenna provides continuous output power up to 100 Watts ranging from 4 MHz to 520 MHz. It is suitable for vehicle-mounted usage with the its spring. The antenna length is 1 meter. Owing to its heat sink, VWBO-20200-1 operates continuously at 160 Watts output power within the frequency range of 4 MHz to 220 MHz. The length of this antenna is 1 meter. It is appropriate to use 1-meter antennas in compact structures.

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The VWBO-20200-1.25 antenna has the same features as the VWBO-20200-1 antenna but is 1.25 meters long, and the VWBO-20200-1.5 antenna is 1.5 meters long while the VWBO-20200-2 antenna is 2 meters long, again having the same features. As the antenna length increases, the gain also increases. Hence, selecting the longest antenna available for the vehicle with Counter RCIED antennas increases the range. On the other hand, the presence of a heat sink in the antenna increases its power range from 100 Watts to 160 Watts resulting in rising in range.

The VWBO-2006000 and VWBO-4006000 antennas are part of Antenom Antenna Technologies' Counter RCIED antenna product line. Both antennas have quite wide band characteristics. The VWBO-2006000 antenna operates between 200 MHz and 6000 MHz, and it is more efficient than the VWBO-20520-1 antenna. The VWBO-2006000 antenna can provide up to 200 Watts of continuous power. As a result, combining these two antennas improves the jammer's range. Additionally, the VWBO-4006000 antenna boosts the system's efficiency by starting its operation at 400 MHz. This antenna performs excellently both as a Counter Drone and a Counter RCIED antenna.

The antennas of Antenom Antenna Technologies' Anti IED product line can be used in variations. Two different usage scenarios depending on the power amplifiers are provided. One of these scenarios covers 4 MHz-400 MHz frequency band with the VWBO-05520-1 antenna and 400 MHz- 6000 MHz with the VWBO-4006000 antenna. Considering VWBO-4006000 is a tiny and compact antenna, it is possible to enhance the impact range by employing more than one antenna if it is intended to divide its frequency band.

A more effective option would be covering the 4 MHz-200 MHz frequency band by using one of the VWBO-20200-1, VWBO-20200-1.25, VWBO-20200-1.5, or VWBO-20200-2 antennas at low frequencies. The output power of these antennas is 160 Watt. In this way, installing the VWBO-2006000 antenna in the 200 MHz – 400 MHz frequency band will perform better at these lower frequencies. The 400 MHz – 6000 MHz band will be covered by the VWBO-4006000 antenna. Thus, the 4 MHz – 6000 MHz frequency band can be covered by 3 antennas.

The threats posed by RCIEDs are discussed in this publication, and it is also noted that these threats are favored because of their low cost. The Antenom Antenna Technologies' product line is discussed in relation to the Counter IED antennas designed for defense against these threats, and also ways to use antennas in the product line to cover the entire frequency band is explained.

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The information presented in this document is subject to change as product enhancements are made. Actual product appearance may vary from the representational photographs. Contact Antenom Sales Department for current specifications.