

## **Ultra Wideband (UWB) Slot Antenna Array for Low Profile, High Power Applications**

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Interest in ultra-wideband (UWB) antenna arrays on printed circuit boards (PCBs) has aimed to increase bandwidths and reduce the size of multi-narrow band antenna configurations. Additionally, with the rapid growth of mm wave antennas for vehicle applications and disjoint 5G spectrum allocations, this class of array is needed more than ever. However, several drawbacks prevent wider use. These include low power handling, limited bandwidth regardless of finite array size, and lack of modular assembly which partly stems from arrays based on connected elements or current sheets. These inter-element connections may be short, resistive, or capacitive. Their transmit power capability is limited in part due to the reduced metal area from the dipole or bowtie antennas. Conversely, slot antennas contain more metal for same antenna class. As such, heat dissipation is greater, enabling greater transmit powers. Waveguide slot antennas are employed in high power arrays, but are bulky, large, and expensive, even though very light weights are possible.

We aim to produce a low profile, UWB slot array on PCB for greater power handling. Our goal is to demonstrate a 9:1 bandwidth (2-18GHz). Earlier slot arrays were simply connected slots (D. Cavallo, et. al., IEEE Phased Array Symposium, Waltham, MA, 2016) and only exhibited a 5:1 bandwidth in simulation. In this paper, the bandwidth is almost doubled to 9:1 with an improved feed and a single frequency selective surface (FSS) superstrate. The greater bandwidth is due to the optimized slot bowtie elements and feed. The element-to-element spacing is 8.34mm corresponding to a high frequency of 18GHz. The high frequency is limited by the half-wavelength spacing requirement and the low frequency is limited by the finite array length and presence of a ground plane. Simulations showed an active VSWR of  $< 3$  across 2-18GHz with 5dB nominal gain. The array can be fabricated entirely on printed circuit boards. A prototype with measurements will be shown at the conference.