Measurement of a Low-Profile TACSAT Antenna

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The Army has undertaken anechoic chamber measurements and field test measurements of a wideband low-profile antenna suitable for use as a Tactical Satellite (TACSAT) communications antenna in the 240 – 320 MHz band. To this end, the Army contracted to have an antenna prototype developed with requirements of an operational frequency range if 240 – 320 MHz with a realized gain of 5 dBic over the entire band. The polarization was right hand circularly polarized (RHCP) and the nominal input impedance was 50 Ohms such that the antenna should maintain a voltage standing wave ratio (VSWR) of 2:1 or less over the entire frequency band - relative to a 50 Ohm reference. The nominal area of the antenna was set to be two square feet and the thickness was set to be two inches or less corresponding to approximately 1/40 of a wavelength at the lowest frequency of operation. It was required that the antenna be able to transmit 50 Watts of continuous wave (CW) power. A prototype antenna was delivered to the Army in June, 2015.

The antenna was tested in an anechoic chamber and field tested for comparative purposes with a commercial off the shelf (COTS) antenna (i.e., a crossed dipole.) Of particular importance was the ability of the low-profile antenna to maintain comparable performance with the COTS antenna, but with much lower protrusion from the side of a platform. The tests directly compare this antenna to a commercial antenna. Gain, axial ratio, and patterns are presented detailing the field of view performance. Additionally, the measured signal to noise ratio performance with each antenna resident on a vehicle was obtained. Measured data for this in-situ performance comparison will be presented.