

Screen Printed Dipole Antenna for Army Textile Platforms

Kate Duncan⁽¹⁾, Rex Hall⁽²⁾, and Gary Katulka⁽²⁾

⁽¹⁾ US Army, S&TCD- CERDEC, APG, Maryland 21005

⁽²⁾ US Army, ARL - WMRD, APG, MD, 21005

To support the ever-increasing demand for more communication systems for the soldier, novel antenna systems integrated onto clothing are being investigated in order to maintain free-range of movement without degrading antenna performance. Textile antennas show great promise due to their ease of integration onto the fabric, and are inherently lightweight as well as flexible relative to conventional antennas. In this paper, we present antennas printed on textiles for body wearable applications. The antennas are screen printed onto the fabric of Battle Dress Uniform (BDU) samples to provide a smooth integration onto clothing while preserving the original properties of the textiles involved. The electrical properties of the fabric have been characterized along with an examination of the impact due to environmental conditions such as moisture on the dielectric properties of the textile. Our investigation characterizes the performance of the antenna as a planar element, and then we explore bending conditions that resemble those of a worn garment. We show that the antennas are tolerant to clothing bends without significantly degrading the performance of the antenna. Measured return loss and radiation pattern characteristics of textile antennas are compared with theoretical simulations.