

# Broadband Antenna System for Uniform Field Generation

Joseph D. Brunett\* and Valdis V. Liepa

Radiation Laboratory, Electrical Engineering and Computer Science Department,  
The University of Michigan, Ann Arbor

An antenna system operating from DC to over a GHz has been constructed for the purpose of inducing wideband uniform fields across an object. This system is a practical implementation of a similar antenna system analyzed previously (C. Cheon, *PhD. Thesis*, University of Michigan, 1992). The figure below shows a sketch of the antenna system and the instrumentation used in creating the uniform field. The antenna is of V-design with carbon loaded absorbing cones and resistors placed at the terminating end of the structure to minimize field reflections. The system has been constructed in a shielded semi-anechoic chamber above a metal ground plane. Because of the systems T.E.M. design, the antenna's low frequency cutoff is essentially 0 Hz (d.c.) while the high frequency cutoff of the system is limited only by the physical accuracy of the feed region construction. Although the carbon foam RF energy absorbing cones located at the terminated end of the field prove ineffective below 100 MHz, the antenna system works within the wide spectrum noted due to the addition of simple loading resistors on the terminating ends of the antenna. These resistors allow for low frequency operation. The maximum field strength in the uniform field region is limited by the breakdown voltage between the antenna structure and the ground plane at the feed location, the power handling ability of the resistors, and the capabilities of the sources and amplifiers used. The system we currently have constructed is capable of generating field up to 100 V/m over the range of 10 kHz to 1 GHz. The main applications of this antenna system include radiated electromagnetic immunity testing for CE EMC requirements and the generation of uniform plane-waves for aperture coupling measurements.

