

Public Abstract

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Title:DESIGN AND TESTING OF HELICAL ANTENNAS FOR A RF TEST FACILITY

RF facilities are necessary to accurately and systematically test multiple types of electronic devices in an electromagnetically quiet environment. Typical RF facilities consist of an anechoic chamber, a room that shields anything inside from external electromagnetic radiation and prevents internal reflections of propagating electromagnetic waves, as well as all necessary transmitting and receiving equipment needed for RF testing.

This paper analyzes the effect that dielectric loading has on helical antennas and presents an innovative design change that compensates for the loading. Traditional design techniques will be compared to the University of Missouri-Columbia's new optimization methods. Increasing the bandwidth of the antennas is accomplished through impedance matching techniques. Two different types of antennas were constructed: a traditional air-core helix and a dielectric-loaded helix wound using the new optimization method. Both the traditional antenna and the optimized antenna dielectrically loaded with a piece of PVC were sent away for commercial validation. These test results are then compared against the University of Missouri's test results using the newly constructed RF facility.

It was shown that MU's optimized method effective in compensating for the dielectric loading in the helix antennas compared to traditional design techniques, and that the results from its in-house testing methods match up well with both commercially provided measurements and CST simulations.