

M. S. THESIS DEFENSE

INVESTIGATIONS ON WIDEBAND DIELECTRIC RESONATOR ANTENNA AND ARRAYS ON FINITE GROUND PLANE

By:

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Where: E-203E (The Dean's Conference Room)

When: Friday, April 24/2009 at 1:30 PM

Abstract:

This thesis defense presents the investigation results of the hexagonal and cylindrical dielectric resonator antennas (DRAs) which provide wideband impedance matching and directional radiation patterns with low cross-polarization. The DRAs are excited both using a single coaxial probe and dual coaxial probes in anti-probe arrangements. It has been shown that, by exciting the DRAs using dual coaxial probes, directional radiation patterns with low cross-polarization can be obtained over a wide-bandwidth, which is much superior to the single probe fed DRAs.

The single probe fed hexagonal and cylindrical DRAs provided around 82% of impedance bandwidth ($S_{11} \leq -10$ dB) but with the mix of omni-directional and directional patterns and high cross-polarizations. In comparison to this, the novel dual probe fed DRA shows an impedance bandwidth of 68% but now the antenna shows directional radiation patterns and low cross-polarization levels throughout the matching bandwidth. Similar results have been shown for the proposed novel concentric DRA geometry using a single coaxial probe feed which results in a bandwidth of about 90% but again with high cross-polarization. By employing the dual coaxial probe feed arrangement with the concentric DRA, it results in a bandwidth of 83%. This is 15% more bandwidth than without the concentric DRA, which provided only 68% as mentioned earlier. Further, the radiation patterns are directional with low cross-polarization throughout the band as expected. Three elements linear array was also investigated for beam steering purposes, which can find applications in MIMO antenna systems. A prototype of the single probe fed DRA was fabricated and experimentally verified for impedance matching and radiation patterns. The measurement results are in acceptable agreement with the simulation ones.

You are welcome to attend!!