# MICROSTRIP-SLOT COUPLED RECTANGULAR DIELECTRIC RESONATOR ANTENNA THEORETICAL MODELLING & EXPERIMENTS

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Dielectric Resonators (DRs) have received increased interest in recent years for their potential applications in microwave and millimetre wave systems. They have been widely used as a component in shielded microwave circuits such as filter, oscillator and cavity resonators. With an appropriate feed arrangement, they can also be used as antennas, and they offer efficient radiation. Dielectric resonator antennas (DRAs) in cylindrical, rectangular, and hemispherical shaped and other geometries have been reported in the literature. They can be fed using different feed arrangements including an axial probe, microstrip transmission line, microstrip-slot and co-planner waveguide.

In this paper a microstrip-slot coupled RDRA operating at $TE_{111}$ mode is studied both numerically and experimentally. The structure of the RDRA under investigation is shown in Figure 1. It consists of a dielectric resonator with dimensions $19\times19\times9.5mm^3$ and dielectric constant $\varepsilon_r=38$ located on a ground plane of a 50Ω microstrip line and feed through a non resonant narrow slot.

The RDRA is simulated using the Finite Element Method (FEM) using the Hewlett-Packard High Frequency Structure Simulator (HFSS). The effect of the size of the slot on the resonance frequency, impedance bandwidth, radiation patterns and directivity of the antenna is studied. The simulated results are presented and compared with those obtained by experiments. It is shown that the size of the slot can significantly affect the radiation patterns and impedance properties of the RDRA.

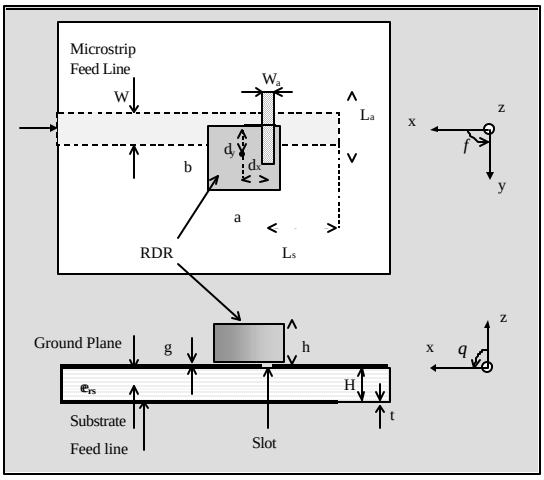


**Figure 1:** The microstrip-slot coupled RDRA structure