

Electromagnetically Coupled Small Broadband Disk-loaded Monopole Antenna with a Vertical Ground Plane

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In recent years, there has been increasing demand for various kinds of multi-media services as well as for the downsizing of handheld transceiver units in wireless communication systems. This trend has attracted considerable interest in the development of small and broadband antennas. It has shown that the bandwidth of the small antenna can be improved by using mutual coupling between two radiators that are located in a very close proximity. In this paper, a folded stripline-fed small broadband disk-loaded monopole antenna with a vertical ground plane is presented (Fig. 1). The bandwidth of the proposed antenna could be enhanced by electromagnetic coupling between the shorted rectangular disk and the probe with folded strip line. The measured impedance bandwidth of the proposed antenna for $VSWR < 2$ was 870 MHz (from 1.878 GHz to 2.748 GHz) which is approximately 37.6% at the center frequency of 2.313 GHz. The antenna had the physical dimensions of only $11 \text{ mm} \times 11 \text{ mm} \times 11 \text{ mm}$, which corresponds to the electrical dimensions of $0.085\lambda_0 \times 0.085\lambda_0 \times 0.085\lambda_0$ with respect to its center frequency.

The effect of the vertical ground plane size on radiation pattern and bandwidth was also investigated. Narrow slits were inserted in the vertical ground plane to improve the radiation pattern characteristics of the antenna. It was found that the proper location of the narrow slits could reduce the antenna radiation in the direction of the ground plane more than 3 dBi. Details of the antenna design will be presented in the talk.

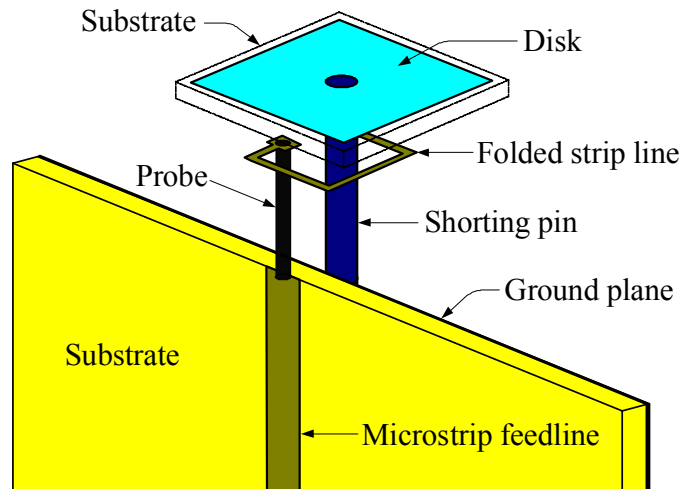


Figure 1. Geometry of the antenna.