Dual-Band Planar Antennas with Monopole Radiation Patterns

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Low profile compact dual-band antennas are often required in mobile communication systems. In this paper, three configurations of dual-band planar antennas with monopole or conical type radiation patterns (symmetric pattern with null on axis and maximum radiation off-axis) are investigated.

Economou and Langley presented a dual-band antenna operating at 900MHz and 1800MHz for mobile communications systems (IEE Proc. Microwaves Antennas Propag., Feb.2002, pp. 41-44). This antenna is a hybrid construction combining a monopole with top loaded patch shorted to the ground plane (Fig.1). Two of the shorting vias are connected between the ground plane and the top patch whereas the other two vias protrude through clearance holes, without making electrical contact, in the top patch. Delaveaud and Jecko patented (US 6750825) a stacked configuration of two post loaded center fed planar antennas (Fig.2) to obtain dual-band operation. As an alternative to these two designs, a center fed planar antenna with four symmetrically placed shorting vias and slots (to introduce additional resonance) is proposed. Figure 3 shows the top view of the antenna. The main features of this antenna are simple construction and smaller size.

Extensive full-wave simulations of these three designs are performed with the EM software tool FEKO. Their performance characteristics including the achievable upper-to-lower frequency ratios, bandwidth, radiation patterns and physical sizes/thicknesses will be presented at the Symposium.

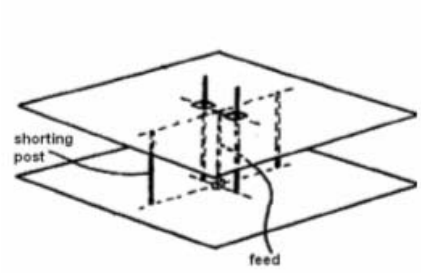

Fig.1

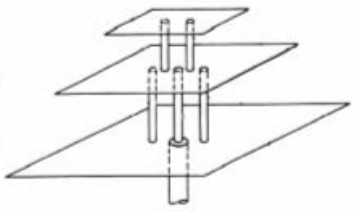

Fig.2

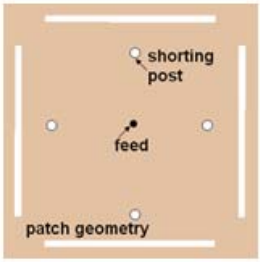

Fig.3