

ENHANCING ANTENNA RADIATION CHARACTERISTICS BY USING ELECTROMAGNETIC BAND GAP STRUCTURES

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In modern wireless communication systems, it is usually required that an antenna structure has a low profile and compact configuration. The dipole antenna is a simple and fundamental radiator in antenna engineering. However, it cannot radiate efficiently near a perfect electric conductor (PEC) ground plane due to the reverse image currents. To solve this problem, an electromagnetic band-gap (EBG) ground plane has been developed to replace the traditional PEC ground plane to improve the radiation efficiency of low profile dipole antennas.

Previous investigations focus on a dipole that is positioned above a ground. In this study we investigate the performance of a dipole near the edge of a ground plane, whose planar property is desired in many wireless communication systems such as internal antenna designs for a wireless local area network (WLAN) subsystem of a notebook computer. It has been demonstrated that the idea of using an EBG ground plane improved the radiation efficiency of a nearby planar dipole antenna. The validity of the idea has been demonstrated by both the FDTD simulations and measured results. The proposed antenna structure has a good potential for wireless communications such as WLAN and radar systems.