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Fractal EBG Structure for shielding and reducing the mutual coupling in microstrip patch antenna array

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Abstract **– the electromagnetic band gaps (EBGs) have been considered for the array antenna to reduce the mutual coupling. In this paper, we have developed a novel fractal shape of the EBG for reducing the mutual coupling for wireless application between microstrip patch arrays at 5.9 GHz. We have focused on developing the EBG unit cell based on the conventional mushroom EBG and studying the dispersion diagram for minimizing the unit cell. Here, the modeled miniaturized by increasing the unit cell capacitance and inductance based on fractal structure. The studies show that the initial frequency of the band gap reduced. The S_{21} has reduced more than 30 dB while the EBG cells placed in 2×5 arrangement with the total size of 36mm×68mm×1.6mm. We show that the couple current ratio value is reduced drastically to 0.3% by the shielding while for the basic model it is around 18%. The gain reducing is the unsolved drawbacks in this structure. The simulation of the unit cell and structure has done by HFSS as full-wave software. The experimental results have confirmed the simulation. We have presented a full comparison between current and previous models, which were suggested for this application.**

Index Terms **– electromagnetic band gap; microstrip antenna; surface waves; mutual coupling; WLAN**