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Optimizing Rectangular Microstrip Antenna Performance with Nanofiller Integration

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Abstract : An antenna is an assortment of linked devices that function together to transmit and receive radio waves as a single antenna. Antennas occur in a variety of sizes and forms, but the microstrip patch antenna outperforms other types in terms of effectiveness and prediction. These antennas are easy to generate with discreet benefits. Nevertheless, the antenna's effectiveness will be affected because of the patch's shape above a thick dielectric substrate. As a result, a double-pole rectangular microstrip antenna with nanofillers was suggested in this study. By employing nano-composite substances (Fumed Silica and Aluminum Oxide), which are composites of graphene with nanofillers, the physical characteristics of the microstrip antenna, that is, the elevation of the microstrip antenna substrate and the width of the patch microstrip antenna have been improved in this research. The surface conductivity of graphene may be modified to function at specific frequencies. In order to prepare for future wireless communication technologies, a microstrip patch antenna operating at 93 GHz resonant frequency is constructed and investigated. The goal of this study was to reduce VSWR and increase gain. The simulation yielded results for the gain and VSWR, which were 8.26 dBi and 1.01, respectively.

Keywords : graphene, microstrip patch antenna, substrate material, wireless communication, nanocomposite material
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