SIERPINSKI GASKET FRACTAL ANTENNA WITH I-SHAPED DEFECTED GROUND STRUCTURE

A thesis submitted to fulfill the requirement for the award of the Bachelor of Engineering (Hons) Electronic (Communication).

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ABSTRACT

This work presents the design and fabrication of a Sierpinski gasket fractal antenna with I-Shaped defected ground structure (DGS) with the operating frequency 5.8 GHz. The proposed antenna was designed and simulated by using Computer Simulation Technology (CST) and fabricated on Rogers RT/Duroid 5880 substrate with dielectric constant, ε_r of 2.2 with the substrate thickness 0.38 mm and copper thickness 0.0175 mm. The fabricated antenna was measured by using Vector Network Analyzer (VNA) to measure all the parameters of the antenna such as return loss, Voltage Standing Wave Ratio (VSWR), bandwidth and input impedance. The significance of the I-Shaped defected ground structure was to enhance the overall performance of the antenna. Performance of the proposed antenna is discussed in terms of return loss, VSWR, directivity, input impedance, bandwidth and radiation pattern.

There were two measurements made which are without stub matching and with the implementation of stub matching. Without stub matching, the operating frequency measurement result was shifted to 5.735 GHz from center frequency of 5.8 GHz with return loss of -26.464 dB. After implementing of stub matching to the prototype antenna, the measured result was close to the simulated value which is the operating frequency 5.818 GHz and the return loss is -33.405 dB. The prototype antenna has behavioral of unidirectional antenna. The proposed antenna was very compact in size and the simulated and measured values of the parameters of the antenna concurs well.

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