PERFORMANCE ENHANCEMENT OF MICROSTRIP ANTENNA WITH DEFECT GROUND STRUCTURE AT FREQUENCY 2.45GHz

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ABSTRACT

This work describes the simulation and measurement of rectangular single patch antenna and array patch antenna at 2.45GHz for defected ground structure (DGS). For designing this microstrip antenna, CST Microwave Studio is used to model the structure of antenna. The single and array patches antenna were fabricated on Rogers RO3003 substrate with a dielectric constant $\varepsilon_r = 3.0$, $\tan \delta = 0.001$ and thickness = 0.75mm.

Combinations of two patches using quarter-wavelength impedance transformers matching technique have been used to design the array antenna. Simulations and measurements have been compared in term of VSWR, return loss, radiation pattern and antenna directivity. The measurements have been done using Vector Network Analyzer (VNA).

The comparison is being made between antenna with DGS and without DGS. It can be observed that single patch antenna with DGS is improved by 16.45 dB for return loss as compared with single patch antenna without DGS. The directivity is decreased by 0.2 dB. The VSWR also is in the range of $1 \leq \text{VSWR} \leq 2$. While for the array antenna with DGS is improved by 7.14% which is 1.5dB for return loss. The directivity of antenna is decreased by 15.01%.

Thus it can be conclude that, the performance of microstrip antenna is enhance while applying defect ground structure to the patch antenna.

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