MODIFIED SIERPINSKI GASKET FRACTAL ANTENNA WITH DEFECTED GROUND STRUCTURE

This thesis is presented in partial fulfillment for award of the

Bachelor Of Engineering (Hons) Electrical (Communication)

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JANUARY 2013

ACKNOWLEDGEMENT

ABSTRACT

This work presented the design, simulation and analysis of Fractal Antenna With Defected Ground Structure. The antenna was fabricated on ROGERS 5780 substrate of dielectric constant, $\varepsilon r = 2.33$ with thickness, h of 0.5 mm while the center frequency was 5.8 GHz and using insert feed line. Designing and simulation of the antenna were undertaken by using the commercial electromagnetic simulator, Computer Simulation Technology (CST) Microwave Studio. The Vector Network Analyzer (VNA) was used for measurement and analysis the parameters of the antenna.

The value of the parameters of the antenna was compared between simulation and measurement. The performance of the antenna was improved with the introduction of slot defected ground structure. It was observed that both the measured and simulated values of all the parameters were close with each other and compact size. The performance of the antenna was improved by using defected ground structure at frequency 5.8 GHz.

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CHAPTER 1

INTRODUCTION

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An antenna (or aerial) is an electrical device which converts electric signal into waves, and vice versa. It is usually used with a radio transmitter or radio receiver [1].

Microstrip antenna also known as microstrip antenna is widely used to process ultra-high frequency signals. It consists of a conducting patch of any planar geometry on one side of dielectric substrate which has a ground plane on the other side [2].

Fractal antenna is a new antenna design based on fractal geometry. The concept of fractal geometry is that self-similarity and space filling. The uniqueness of the fractal antenna as compared to the traditional microstrip antenna is that ; it is able to reduce the size of the antenna as well as generating a broadband antenna [3].

The Defected Ground structure (DGS) was introduced in this design to influence the current distribution in the ground plane. Due to the interference of the DGS to the ground plane it can change the characteristic of the transmission line for example capacitance and inductance. The capacitance and inductance were changed and hence improve the electrical performance and resulted in smaller size compared to the conventional microstrip antenna [4][5].

Radio Frequency Identification (RFID) has existed in some form or another for over 40 years. It is a method of automatically identifying a given object/person by storing and remotely retrieving information from small transponders, called RFID tags. These tags have an antenna built into them, which allows for the transmission and reception of radio waves from an RFID transceiver. There are two types of RFID tags; active and passive. Passive tags require no