

**SIERPINSKI CARPET FRACTAL ANTENNA WITH U-SHAPE  
DEFECTED GROUND STRUCTURE (DGS)**

**This thesis is presented in partial fulfilment for the award of the Bachelor of  
Engineering Electronic (Communication) with honours.**

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**18 JULY 2014**

## ACKNOWLEDGEMENT

*In the name of Allah, the Most Mightiest and the Most Gracious.  
Peace and blessings of Allah be upon Prophet Muhammad.*

First of all, I would like to express my gratitude to Almighty God for giving the guidance and strength in making this work a success. I would like to express my sincerest gratitude to those who helped in navigating this long and fruitful journey.

I would like to express my sincerest thanks to my project supervisor, Pn Kamariah Ismail and Dr. Fahmi Hussin@Mohamad for their guidance, great ideas and continuous supports throughout the preparation and completion of this work and not only being a patient and understanding advisor, but for also being a true teacher. Besides, I would like to express my special thanks to En. Mohd Khairil, Research Officer from Microwave Technology Center (MTC) for usage of test and equipment to complete this work.

Nevertheless, my special thanks also to my family for giving a lot of supports, advices and guidance to complete this research, their love and care have brought to this level. Their substantial encouragements and generous support have helped to succeed.

Last but not least, I would like to express my heartfelt thanks to all my friends for the support and encouragement to complete this project. Their passion in giving knowledge is highly appreciated.

## **ABSTRACT**

This work highlights the design and fabrication of Sierpinski Carpet Fractal Antenna with Defected Ground Structure (DGS) at center frequency of 5.8 GHz. The antenna was designed and simulated using the Computer Simulation Technology (CST) software. Rogers RT/Duroid 5880 with thickness of 0.38 mm and dielectric constant of 2.2 is used as a substrate of this antenna while the feeding method was inset feed. After the fabricating process, the parameter of the antenna was measured using a Vector Network Analyzer (VNA). This work consists of two measurement results, which are without and with stub matching. An analysis was conducted to compare the performance of the fractal antenna between the different number of iteration and implementation with DGS and without DGS. The third iteration of Sierpinski Carpet Fractal Antenna resulting to a better gain and produce a small size of antenna. The result shows a good agreement between simulation and measurement and satisfied the specification as well.

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND OF STUDY

Antenna is defined as a means for radiating or receiving radio waves [1]. In other words, antenna is a guiding device operating between free-space to emitting and receiving electromagnetic energy in the form of radio frequency (RF) and microwave. A typical antenna consists of metal conductor where the transmission line is either a coaxial line or a waveguide [2].

The evolution in modern wireless communication systems and increasing of other wireless applications that need wider bandwidth, multiband operation and low profile has initiated antenna research in various directions and one of them is by using fractal antenna geometry. The term fractal describes a family of complex shapes that possess an inherent self-similarity in their geometrical structure. Fractal antenna gained their importance because of having interesting advantages like miniaturization, wideband, multiple resonance and reliability [3].

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