

**A DESIGN OF 2.5GHz SIERPINSKI CARPET FRACTAL
ANTENNA FOR ISM BAND APPLICATION**

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FACULTY OF ELECTRICAL ENGINEERING,

UNIVERSITI TEKNOLOGI MARA

MALAYSIA



AMALINA SYAZWANI BT. AHMAD SUHAIMI

FACULTY OF ELECTRICAL ENGINEERING

40450 SHAH ALAM, SELANGOR DARUL EHSAN,

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ABSTRACT

This work proposes a design of Sierpinski Carpet Fractal Antenna (SCFA) operates at 2.5 GHz for ISM band application. Industrial, scientific and medical (ISM) radio bands are internationally reserved for use by industrial, scientific and medical equipment such as process heating, microwave oven and medical diathermy equipment. These devices were limited to certain bands of frequencies because the devices cause electromagnetic interference that may disrupt radio communication. The use of fractal geometry in antenna design can provides a good method for achieving the desired miniaturization and multiband properties. So the Sierpinski Carpet Fractal Antenna was chosen for ISM band application. The Sierpinski Carpet Fractal Antenna is designed and fabricated on FR-4 substrate, with dielectric constant of 4.3, copper thickness of 0.035 mm and substrate thickness of 1.6mm. This antenna is designed and simulated by software which is Computer Simulation Technology (CST) Microwave Studio Suite 2014. The fabricated antenna design is measured using vector network analyzer (VNA). The both results, simulation and measurement were observed and analyzed.

TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
CHAPTER 1 INTRODUCTION		
1.1	INTRODUCTION	1-3
1.2	PROBLEM STATEMENT	3
1.3	OBJECTIVES	4
1.4	SCOPE OF WORK	4
1.5	THESIS ORGANIZATION	5
CHAPTER 2 LITERATURE REVIEW		
2.1	INTRODUCTION TO ANTENNA	
2.1.1	ANTENNA THEORY	6
2.1.2	MICROSTRIP ANTENNA	7-8
2.1.3	FRACTAL ANTENNAS	8-9
2.1.4	FRACTAL GEOMETRY	9
2.1.5	TYPES OF FRACTAL ANTENNAS	10
2.1.5.1	SIERPINSKI CARPET FRACTAL ANTENNA	11
2.1.6	ANTENNA PROPERTIES	11
2.1.6.1	VOLTAGE STANDING WAVE RATIO (VSWR)	12
2.1.6.2	RETURN LOSS	12
2.1.6.3	GAIN	13
2.1.6.4	BANDWIDTH	13
2.1.7	FEEDING TECHNIQUES	14
2.1.7.1	MICROSTRIP LINE FEED	14
2.1.7.2	COAXIAL FEED	15
2.1.7.3	INSET-FED	16
CHAPTER 3 METHODOLOGY		
3.1	INTRODUCTION	17-18
3.2	FLOWCHART	19-20
3.3	ANTENNA SPECIFICATION	21
3.4	ANTENNA CONFIGURATIONS	22
3.4.1	DESIGN OF CONVENTIONAL MICROSTRIP ANTENNA	22-24
3.4.2	DESIGN OF MICROSTRIP FEED LINE	24
3.4.3	DESIGN OF SIERPINSKI CARPET FRACTAL ANTENNA	25-27
3.5	COMPARISON BETWEEN CONVENTIONAL PATCH ANTENNA DIMENSION AND SECOND ORDER OF SCFA	28

CHAPTER 1

INTRODUCTION

The goal of this project is to design the Sierpinski Carpet Fractal Antenna using 2.5 GHz for industrial, scientific and medical (ISM) band application which has properties beneficial and useful to modern wireless communication.

The fractal antenna has been chose for this project because the fractal type has several advantages. The fractal shapes discovered can radiate electromagnetic energy well and have properties that are advantageous over traditional antenna types. Antenna can be used to improve the functionality of modern wireless communication receiver such as cellular handsets.

1.1 INTRODUCTION

Nowadays through the high technology demand, antenna has be an important role in the technology. An antenna is an electromagnetic radiator that creates an electromagnetic field that proceeds out from the transmitting antenna to the receiver's antenna, which then converts the electromagnetic wave into electrical signals that are applied to the receiver's input stages. Antennas can be in several types which are omni-directional, directional, and semi-directional. The most common antenna that has been broadly used is microstrip antenna. Microstrip patch antenna having many applications for microwave frequency bands [1]. The simple characteristic of the