

**UNIVERSITI TEKNOLOGI MARA  
CAWANGAN PULAU PINANG**

**THE RADIATION CROSS SECTION  
CHARACTERISTIC ON SLOTTED  
TRIANGLE HOLLOW PYRAMIDAL  
ABSORBER**

**NURALIN SOFIA BINTI SAZALEE**

**Faculty of Electrical Engineering**

July 2017

## **ABSTRACT**

Nowadays absorber is widely use in the industry because of its application. Microwave absorber has been improved from time to time to search the absorbers that have the best absorbing performance. In absorber development, some criteria needed to fulfill such as performance, simple and easy to handle. This project used a pyramidal and pyramidal without slotted to investigate the effect of selective point on the surface of absorber towards microwave absorption performance of the absorber. This study includes the comparison of absorption performance with different type of slotted such as triangle, square and rectangular. Slotted array principal is use to determine the effect of slotted shape at different selective point towards microwave absorption performance. The project use cardboard and carbon as the absorbing material. The hollow pyramidal absorber is measure between frequency 8GHz to 12GHz. This study showed the average, maximum and minimum of absorption performance between un-slotted and slotted design.

## ACKNOWLEDGEMENT

Alhamdulillah, all praises to the Almighty for His bless that I have been able to complete this study on time. Without Your gifts and blessings, none of this would happen. I would like to thank my family for giving me their moral support and financial support throughout this journey.

I would like to express my special gratitude and thanks to my supervisor, Tn Hj Hasnain Bin Abdullah@Idris and also my co-supervisor, Puan Najwa and all lecturers FKE for their patience, valuable advice, support, ideas and guidance throughout this study. His guidance helped me immensely in time of research and writing of this thesis.

I would also like to recognize the assistance of Ahmad Syahmi Bin Yusuf, Mohamad Hakim Bin Ahya Il and Nadrah Binti Kharber, they are research assistants doing master's degree. Beside that, I would like to express my gratitude towards the technician of microwave laboratory En Mohd Soffe. Last but not least, to all my friends for continuous help and moral support in completing this assignment.

## TABLE OF CONTENT

CHAPTER	TITLE	PAGE
	<b>AUTHOR'S DECLARATION</b>	i
	<b>ABSTRACT</b>	ii
	<b>ACKNOWLEDGEMENT</b>	iii
	<b>TABLE OF CONTENTS</b>	iv
	<b>LIST OF TABLES</b>	viii
	<b>LIST OF FIGURES</b>	xi
	<b>LIST OF SYMBOLS</b>	xiv
	<b>LIST OF ABBREVIATIONS</b>	xv
<b>1.0</b>	<b>INTRODUCTION</b>	1
	1.1 Introduction	1
	1.2 Background Of Study	2
	1.3 Problem Statement	3
	1.4 Objectives	3
	1.5 Scope of Study	3
	1.6 Thesis Organization	4
<b>2.0</b>	<b>LITERATURE REVIEW</b>	5
	2.1 Introduction	5
	2.2 Electromagnetic Wave	6
	2.3 Antenna	8
	2.4 Anechoic Chamber	9
	2.5 Microwave Absorber	10
	2.6 Design type of microwave absorber	11
	2.6.1 Wedge shape absorber	11
	2.6.2 Flat laminate shape absorber	11
	2.6.3 Convoluted microwave absorber	12
	2.6.4 Pyramidal microwave absorber	12

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 INTRODUCTION**

The material that faded the energy in electromagnetic waves is known as microwave absorbers in the Radio frequency (RF) field [1]. Microwave absorbers are applied in a wide range of applications to get rid of undesirable radiation that could intervene with a system's operation. Absorbers can be used external to decrease the reflection to particular objects and absorber also applied internal to decrease oscillations made by cavity resonance. They can also be employed to recreate a free space environment by getting rid of reflections in an anechoic chamber [1]. Absorber have many design in the industry such as hollow pyramidal absorber, multilayer dielectric absorber, pyramidal absorber, wedge absorber, twisted pyramidal absorber, and hybrid dielectric absorber [2].

In this project, the type of the absorber that use is hollow pyramidal absorber. These projects focus in the study of seven selective points on the hollow pyramidal absorber. The points are label as A, B, C, D and E, the selective point on the absorber will be explained detail in the chapter 4. The cardboard and carbon is use as the material in this project.