

**AN INVESTIGATION OF BACK LOBE REDUCTION OF
MICROSTRIP PATCH ANTENNA AT 2.4 GHz USING SLOTS**

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ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious, Most Merciful and Him alone in worthy of all praise. Alhamdulillah, I am very grateful and thankful to the All-Mighty who gave us the ability to complete this project.

I would like to take this opportunity to express my deepest gratitude to my supervisor, En. Mohd Nor Md Tan for all his guidance, ideas, trust, support through this project and thanks for giving me the opportunity to become his students. My sincere appreciation extends to all our friends for being such understanding and open minded for sharing and discussing experience until today and all individuals who were directly and indirectly involved. Thanks for the cooperation.

ABSTRACT

This project focuses on the investigation of back lobe reduction using slots at frequency of 2.4 GHz. The investigations were carried out at two different structures. First, slots on the ground plane and second, slots on the patch itself. The microstrip patch antennas were designed on 1.6 mm FR-4 substrate with dielectric constant of 4.3 and loss tangent of 0.025. The back lobe is reduced from -8.958 dB to -9.870 dB but the resonant frequency is shifted from 2.4 GHz in simulation to 2.5 GHz in measurement.

TABLE OF CONTENTS

	Content	Page
	APPROVAL	i
	DECLARATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	TABLE OF CONTENTS	v
	LIST OF FIGURES	viii
	LIST OF TABLES	x
	LIST OF SYMBOLS AND ABBREVIATIONS	xi
	 CHAPTER 1: INTRODUCTION	
1.1	Background of Study	1
1.2	Problem Statement	2
1.3	Objectives	3
1.4	Scopes of Work	3
1.5	Thesis Organization	4

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Microstrip patch antenna is a metal conductor on a substrate which used for radiating or receiving radio waves. It is an antenna that has a light mass, easy to fabricate, suitable to be placed on almost any type of surface and small size. This antenna has some disadvantages such as narrow bandwidth, small gain and directivity, and low efficiency.

A transmission line Thevenin equivalent of the antenna system in the transmitting mode is shown in Figure 1.1 where the source is represented by an ideal generator, the transmission line is represented by a line with characteristics impedance Z_c , and the antenna is represented by a load $Z_A = (R_L + R_r) + jX_A$ connected to the transmission line. The load resistance R_L is used to represent the conduction and dielectric losses associated with the antenna structure while R_r , referred to as the radiation resistance, is used to represent radiation by the antenna. The reactance X_A is used to represent the imaginary part of the impedance associated with radiation by the antenna [7].