DESIGN OF BOW-TIE PATCH ANTENNA WITH SLOT TO IMPROVE THE PERFORMANCE AT 2.5GHZ

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ACKNOWLEDGEMENT

First and foremost, all praise and thanks to Allah, on whom ultimately we depend for sustenance and guidance. Prayers and peace be upon His Prophet Mohammed, the last messenger for all humankind. This thesis would not be completed with the help of others. It is also the result of many experiences at UiTM in the journey of completion my degree certificate from dozens of outstanding individuals who I also wish to acknowledge. Upon completing this research, I would like to thank to En. Mohd Nor Md. Tan for his supervision in completing this project. Thanks also to everyone for their helps and supports especially to Universiti Teknologi Mara (UiTM) and Antenna Research Group (ARG). I have gained a lot of knowledges and experience in completing this research by finding information and handling the experiment for this antenna design. I hope with all this knowledges and experience would contribute to me in my future work. A lot of thanks also to my friends that gives help and support all the time for me to complete this research.

ABSTRACT

This paper presents a design of bow-tie antenna with a rectangular-shape slot on the patch for wireless application. The investigation was carried out with two different design that is a conventional bow-tie antenna and bow-tie antenna with slot on the patch. It was designed to operate with FR-4 substrate (h=1.6mm), with a dielectric constant (ε_r = 4.3) operating at frequency of 2.5GHz. The antennas were simulated using CST Microwave Studio. The antenna was fabricated and measured using Vector Network Analyser (VNA) and tested in anechoic chamber to get the radiation pattern. The results shows an increase in performance of the antenna after slot was added. From result measured, the value of return loss increased from -38.23dB to -40.46dB, the frequency shifted to 2.651GHz with bandwidth remains almost invariant after slot was added.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

Bow- tie antenna is a type of biconical antenna. Biconical antennas are one type of broadband dipole antennas, it is typically produces a bandwidth of three octaves or more. A bow-tie antenna is a two-dimensional version of the biconial antenna design which is widely used for application in short-range UHF television reception. These type of antenna was are also sometimes called butterfly antennas. The biconical antenna has a characteristics of broad bandwidth because it was an example of a travelling wave structure which is the analysis for a theoretical infinite antenna more likely of a transmission line.

The main focus of this research is to design a slot on the patch of bow-tie antenna to increase the performance of the antenna. There are many methods to increase the performance of a micro strip antenna such as add an EBG structure, design a rounded edge of bow-tie and design a slot on the ground of bow-tie antenna. Based on previous research, designing an EBG structure on the patch of micro strip antenna give an improvement in the performance of the antenna, however the paper present that the dimensions of the EBG substrates affect the performance of the antenna when it is close to the loss medium. [1] For micro strip antennas, EBG structures are used in variety of ways, which are mostly produce an effective results except in some cases. The EBG structures are also mostly successful in antenna array