DESIGNING VIVALDI ANTENNA USING CST SOFTWARE

NORHANISAH BINTI MOHD BASRI

A REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF ENGINEERING (HONS.) ELECTRICAL ENGINEERING

FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UITM) MALAYSIA

MAY 2010

ACKNOWLEDGEMENT

First and foremost, I want to thank God for giving me the privilege to enjoy this beautiful stage of my life and the courage to overcome it. Then I would to express my most sincere gratitude to my supervisor, Pn. Norhayati Binti Hamzah for her patience and guidance throughout the course of this project.

This thesis would not have been completed without her support and encouragement also her invaluable time and advice given during the design process of this thesis.
A special thanks to my fellow course mates and friends, for all of the measurement, computer program and technical assistance throughout my final year's project.

I would like to thanks most of the technicians from the Microwave T Center Laboratory, for rendering their professional skills to the helped me in VNA test measurement. And also to some of the Research Analysis from the same laboratory, who has guided me in learning CST Software during designing the antenna. Not to forget, the lab assistant in microwave laboratory that helped me during the setting up and testing of the antenna using the antenna training system to find out the radiation pattern.

To my beloved family who have been offering all round support during the period of my study.

Finally, many thanks go out to all those who have helped me throughout the course of the project.

ABSTRACT

This thesis is concerned with investigations of the different size of opening width and length of the slot flare Vivaldi Antenna. The different size of opening width and length will effect on the VSWR and S11. The Vivaldi Antenna is designed to cover frequency from 2 to 18 GHz, which fall within the operational frequency for the military. The simulation process is by using the CST Microwave Studio Software. In this research, the dimension of antenna is 55mm x 40mm. Then these antennas are constructed using RT/Duroid® 5870 which have dielectric constant ε_r 2.33. The six different sizes of opening length and opening width have been constructed using the CST microwave software. Then, the value of S11 and VSWR are measured at 10 GHz which is the passband frequency between 2 – 18 GHz. The specification of this Vivaldi Antenna for S11 and VSWR is lower than -10 dB and 2.0 respectively. Furthermore, the radiation pattern of the antenna has been produced. Found that the best size is for type 3 compared to the others. At frequency 10 GHz, the value of S11 is -44.25 dB and the value VSWR is 1.01. After found the best result on the size of opening length and opening width, the next stage is the prototype of Vivaldi antenna. Only type 3 is done for the fabrication. This reason are because of the substrate that are using in this antenna are very expensive and are not available in Malaysia. At the end of work, the Vivaldi Antenna has been produces that can be operate between 2 – 18 GHz.

TABLE OF CONTENT