FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING TECHNOLOGY

DESIGN OF A CIRCULARLY POLARIZED MICROSTRIP ANTENNA FOR UWB APPLICATIONS

CHE WAN UMI AISHA BINTI CHE WAN AHMAD RUZI

Bachelor of Electronics Engineering Technology (Telecommunication) with Honors

2023

DESIGN OF A CIRCULARLY POLARIZED MICROSTRIPANTENNA FOR UWB APPLICATIONS

CHE WAN UMI AISHA BINTI CHE WAN AHMAD RUZI

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology
(Telecommunication) with Honors

Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2023

UNIVERSITI TEKNIKAL MALAYSIA MELAK
FAKULTI TEKNOLOGI KEJUTERAAN ELEKTRIK DAN ELEKTRONIK

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : Design Of A Circularly Polarized Microstrip Antenna For Uwb Applications.

Sesi Pengajian : 2019/2020

Saya Che Wan Umi Aisha Binti Che Wan Ahmad Ruzi mengaku membenarkan laporan Projek Sarjana Muda ini disimpan di Perpustakaan dengan syarat-syarat kegunaan seperti berikut:

1.Laporan adalah hakmilik Universiti Teknikal Malaysia Melaka.
2.Perpustakaan dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3.Perpustakaan dibenarkan membuat salinan laporan ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4.Sila tandakan (✓):

☑ **SULIT***	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
☑	(Mengandungi maklumat terhad yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
☑ **TIDAK TERHAD**	

DR. MUHAMMAD INAM ABBASI
Senior Lecturer
Department of Electronic And Computer Engineering Technology
Faculty Of Electrical and Electronic Engineering Technology
University Teknikal Malaysia Melaka

(TANDATANGAN PENULIS) (COP DAN TANDATANGAN PENYELIA)

Alamat Tetap:
Lot 4549
Jalan Tembesu 1,
Kampung Titian Berayun
24100 Kijal, Kemaman
Terengganu

Tarikh:14/1/2023 Tarikh:

DECLARATION

I declare that this project report entitled Design of a Circularly Polarized Microstrip Antenna for UWB Applications is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : _____

Student Name : CHE WAN UMI AISHA BINTI CHE WAN AHMAD RUZI

Date :14/1/2023

APPROVAL

I hereby declare that I have checked this project report and, in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology with Honors.

Signature : 

Supervisor Name : Dr Muhammad Inam Abbasi

Date : 15/01/2023

DEDICATION

To my lovely father and my beloved mother, I dedicate this work by mine through times, difficult and full with turbulence. They calmly stood by comforting and cheering. They ingraining on me crave to memorize and made give up. They too have been my source of motivation and provide me quality when i nearly allow up. They moreover persistently give their ethical, otherworldly, enthusiastic and money related back. From that, I would have get to tall quality instruction from an early age. In conclusion, to my brothers, that shared their words of the counsel and support to finish this study conjointly to shut companions continuously backed me through a long time of studies.

ASTRACT

The a circularly polarized microstrip antenna designed for UWB applications is described in this work. Because they are portable and make it simple to sample unidirectional radiation with circular polarization, microstrip patch antennas are frequently utilized. Patch antennas have a relatively small bandwidth, which restricts its use in ultra-wideband (UWB) applications. It is suggested to use an ultra-wideband enhancement strategy that is totally based on patch antenna multi-mode evaluation. ultra-wideband antenna design using CST microwave software to patch antenna circular polarization antenna design CST microwave software design and design antenna optimization. Print the circuit before printing make sure to measure the size of the circuit should match the size of the +VE board to do mirror x on the logo or picture. PCB process chemicals to turn on the power grid. Set the temperature to 40°C and the development time to 2 minutes. roller, set board +VE. Then, make sure the temperature is between 40°C and 46°C. A photoresist stripper chemical that allocates the +VE board in the mesh and performs top and bottom immersion. Then, the printed circuit board (PCB) cutter needs to ensure that the board is dry before the cutting process. Finally, the vector network analyzer uses the concept of measurement by waves that are transmitted and reflected as signals through the device under test.

ABSTRAK

Antena jalur mikro terpolar bulat yang direka untuk aplikasi UWB diterangkan dalam kerja ini. Kerana ia mudah alih dan memudahkan untuk mencuba sinaran satu arah dengan polarisasi bulat, antena tampalan jalur mikro sering digunakan. Antena tampalan mempunyai lebar jalur yang agak kecil, yang mengehadkan penggunaannya dalam aplikasi jalur lebar ultra (UWB). Adalah dicadangkan untuk menggunakan strategi peningkatan jalur lebar ultra yang benar-benar berdasarkan penilaian berbilang mod antena tampalan. reka bentuk antena jalur lebar ultra menggunakan perisian gelombang mikro CST untuk menampal antena reka bentuk antena polarisasi bulatan reka bentuk perisian gelombang mikro CST dan pengoptimuman antena reka bentuk. Cetak litar sebelum mencetak pastikan untuk mengukur saiz litar harus sepadan dengan saiz papan +VE untuk melakukan cermin x pada logo atau gambar. Bahan kimia proses PCB untuk menghidupkan grid kuasa. Tetapkan suhu kepada 40°C dan masa pembangunan kepada 2 minit. penggelek, papan set +VE. Kemudian, pastikan suhu antara 40°C dan 46°C. Bahan kimia penjalur fotoresist yang memperuntukkan papan +VE dalam jaringan dan melakukan rendaman atas dan bawah. Kemudian, pemotong papan litar bercetak (PCB) perlu memastikan papan tersebut kering sebelum proses pemotongan. Akhir sekali, penganalisis rangkaian vektor menggunakan konsep pengukuran oleh gelombang yang dihantar dan dipantulkan sebagai isyarat melalui peranti yang diuji.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my gratitude to my supervisor, Dr Muhammad Inam Abbasi for their precious guidance, words of wisdom and patient throughout this project.

I am also indebted to Universiti Teknikal Malaysia Melaka (UTeM) and my father for the financial support which enables me to accomplish the project. Not forgetting my fellow colleague, for the willingness of sharing his thoughts and ideas regarding the project.

My highest appreciation goes to my parents, and family members for their love and prayer during the period of my study. An honorable mention also for all the motivation and understanding.

Finally, I would like to thank all the staffs at the fabricated laboratory, fellow colleagues and classmates, the Faculty members, as well as other individuals who are not listed here for being co-operative and helpful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

δ	-	Voltage Angle
εr	-	Dielectric constant
w_f.	-	Width Frequency
%	-	Percentage
λg	-	Relationship Between

LIST OF ABBREVIATIONS

GHZ	:	Gigahertz Frequency
mm	:	Millimeter
dB	:	Decibel

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Using an ultra-wideband antenna for communication (UWB). Antenna with an ultra-wideband There are a few industrial packages at the ultra-wideband system antenna, such as function sensing, which has a high decision and high accuracy, and UWB communication in particular benefits from high-decision features. The antennas are constructed in the form of an adamantine on package (AOP) due to the low profile, low transmission loss, and reduced noise of the ultra-wideband antenna UWB positioning system. It is necessary to use a circularly polarized (CP) antenna. Multipath interference and fading loss are reduced by CP functions, which may also lessen the effects. There is an important need for a circularly polarized (CP) ultra-wideband (UWB) antenna with a low length, and UWB antennas have drawn a lot of attention. The Vivaldi antenna is the one that is utilized the most frequently. Ultra-wideband UWB antennas have come up in recent years. The use of a planar spiral antenna is also rather common in circularly polarized ultra-wideband UWB packages.

Ultra-wideband (UWB) antennas are gaining popularity and are becoming increasingly common. appealing in current and future wireless communication architectures. People usually excessive call for the wi-fi transmission rate and UWB residences consisting of excessive records charge, low electricity intake and occasional cost. Multi narrow-band antennas can be updated using a UWB antenna. The bandwidth of the antenna's working frequency range determines the needed antenna performance aspects, such as entrance impedance, radiation pattern, gain, efficiency, and so on, which can help to decrease the number of antennas. Ultra-wideband antenna (UWB) conversation structures has the potential to provide a lot of capacity, reduced multipath fading, and low latency electricity requirement.

1.2 PROBLEM STATEMENT

UWB antennas can be utilized in numerous applications whereas circular polarization given them an included advantage that's required in particular applications. Numerous analysts have proposed different methods to attain the circular polarization. Be that as it may, in most to proposed procedures that circular polarization is accomplished at a fetched of debasement of other antenna execution parameters. This work proposes a point by point examination of an optimized method to realize circular polarization without influencing the antenna execution.

1.3 OBJECTIVE OF PROJECT

Main objectives of this work are :

a) To design an ultra-wide band antenna with circular polarization.
b) To optimize the proposed antenna design based on different design configurations.
c) To fabricate the proposed antenna and measure scattering parameter using network analyzer.

1.4 SCOPE OF PROJECT

The scope of this project are as follows :

a) Antenna design using CST microwave software.
b) Optimization using CST microwave software based on the S11 results.
c) Fabrication using FR4 material.
d) Measurement using VNA.