

**UNIVERSITI TEKNOLOGI MARA**

**DESIGN OF COMPACT  
RECONFIGURABLE MICROSTRIP  
UWB FILTENNA STRUCTURE  
WITH WIMAX AND WLAN  
BAND REJECTION**

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## ABSTRACT

Since the allocation of 3.1 – 10.6 GHz band by the Federal Communications Commission (FCC), UWB system has a rapidly progressive development. They are highly demanded in various applications including wideband, multi-functional and high data devices. However, there are some existing narrowband system within UWB spectrum, which cause electromagnetic interference (EMI) and leads to the degradation performance of UWB operation. The research described in this thesis focuses on the concept of the reconfigurable UWB antenna with band rejection characteristics to mitigate the electromagnetic interference between UWB and narrowband communication. By embedding ideal switch in the band rejection element frequency reconfigurability can be achieved. In this thesis, three designs of reconfigurable UWB antenna with band rejection were proposed; namely a reconfigurable UWB antenna with WiMAX band rejection (rUWB-WiMAX), reconfigurable UWB antenna with WLAN band rejection (rUWB-WLAN) and reconfigurable UWB antenna with dual band rejection (rUWB-DBR). The rUWB-WiMAX have impedance bandwidth from 2.99 GHz to 10.58 GHz with band rejection at 3.52GHz by utilizing C-shaped parasitic stripline. Meanwhile, rUWB-WLAN achieved an operating bandwidth from 2.99 – 10.82GHz with VSWR less than 2 except for the WLAN band operating at 4.92 – 5.84 GHz. Dual band rejection with central frequencies of 3.56GHz and 5.52GHz have been generated by integrating both of the band rejection elements from the previous design into one module for the rUWB-DBR. The proposed rUWB-DBR can operate at four modes by configuring the switches ON and OFF. The antenna exhibit omnidirectional radiation pattern and stable gain across the band except the two rejected frequencies. The simulated and measured result were presented and compared to demonstrate the performance of the proposed antennas.

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# TABLE OF CONTENTS

|                                                                    | <b>Page</b>  |
|--------------------------------------------------------------------|--------------|
| <b>CONFIRMATION BY PANEL OF EXAMINERS</b>                          | <b>ii</b>    |
| <b>AUTHOR'S DECLARATION</b>                                        | <b>iii</b>   |
| <b>ABSTRACT</b>                                                    | <b>iv</b>    |
| <b>ACKNOWLEDGEMENT</b>                                             | <b>v</b>     |
| <b>TABLE OF CONTENTS</b>                                           | <b>vi</b>    |
| <b>LIST OF TABLES</b>                                              | <b>x</b>     |
| <b>LIST OF FIGURES</b>                                             | <b>xi</b>    |
| <b>LIST OF SYMBOLS</b>                                             | <b>xvii</b>  |
| <b>LIST OF ABBREVIATION</b>                                        | <b>xviii</b> |
| <br>                                                               |              |
| <b>CHAPTER ONE : INTRODUCTION</b>                                  | <b>1</b>     |
| 1.1 Research Background                                            | 1            |
| 1.2 Problem Statement                                              | 3            |
| 1.3 Objectives Of The Research                                     | 4            |
| 1.4 Scope And Limitation Of Work                                   | 5            |
| 1.5 Thesis Organization                                            | 6            |
| <br>                                                               |              |
| <b>CHAPTER TWO : LITERATURE REVIEW</b>                             | <b>7</b>     |
| 2.1 Introduction                                                   | 7            |
| 2.2 Ultra-Wideband Technology                                      | 8            |
| 2.2.1 Introduction of UWB Technology                               | 8            |
| 2.2.2 Advantages of UWB Technology                                 | 9            |
| 2.2.3 UWB Applications                                             | 10           |
| 2.2.4 Interference between UWB and Narrowband Communication System | 12           |
| 2.2.5 UWB Antenna Specifications                                   | 13           |
| 2.3 Band Rejection Characteristics                                 | 13           |
| 2.3.1 Etching Slot                                                 | 14           |

|                                        |                                                                |           |
|----------------------------------------|----------------------------------------------------------------|-----------|
| 2.3.2                                  | Split Ring Resonators (SRR) and Complementary SRR (CSRR)       | 16        |
| 2.3.3                                  | Parasitic Elements                                             | 19        |
| 2.4                                    | Reconfigurable Antenna                                         | 20        |
| 2.4.1                                  | Reconfigurable UWB Antenna with Band Rejection Characteristics | 22        |
| 2.5                                    | Summary                                                        | 24        |
| <br><b>CHAPTER THREE : METHODOLOGY</b> |                                                                | <b>25</b> |
| 3.1                                    | Introduction                                                   | 25        |
| 3.2                                    | Flowchart Of Reconfigurable UWB Antenna With Band Rejection    | 26        |
| 3.3                                    | Parameters And Specification For Antenna Design                | 29        |
| 3.4                                    | The Technique Of Band-Rejection                                | 29        |
| 3.4.1                                  | Concept Of Parasitic Elements                                  | 29        |
| 3.4.2                                  | Concept Of Etching Slot                                        | 31        |
| 3.5                                    | The Concept Of The Reconfigurable Antenna                      | 33        |
| 3.6                                    | Simulation And Measurement Tools                               | 34        |
| 3.6.1                                  | Computer Simulation Technology (CST)                           | 35        |
| 3.6.2                                  | Vector Network Analyzer (VNA)                                  | 35        |
| 3.6.3                                  | Anechoic Chamber                                               | 37        |
| 3.7                                    | Fabrication Process Using LPKF                                 | 38        |
| 3.8                                    | Design Of Ultra-Wideband Antenna (Reference Antenna)           | 39        |
| 3.8.1                                  | Parametric Analysis                                            | 40        |
| 3.8.1.1                                | <i>Shape Of The Radiating Patch</i>                            | 40        |
| 3.8.1.2                                | <i>Modified Ground Plane</i>                                   | 41        |
| 3.8.1.3                                | <i>Radius Of The Radiating Patch, <math>r</math></i>           | 44        |
| 3.8.1.4                                | <i>Length Of The Ground Plane, <math>L_g</math></i>            | 45        |
| 3.8.2                                  | Results And Discussion                                         | 46        |
| 3.8.2.1                                | <i>Antenna Return Loss, <math>S_{11}</math> (dB)</i>           | 47        |
| 3.8.2.2                                | <i>Antenna Gain And Efficiency</i>                             | 48        |
| 3.8.2.3                                | <i>Surface Current Distribution</i>                            | 49        |
| 3.8.2.4                                | <i>Radiation Pattern</i>                                       | 50        |
| 3.9                                    | Summary                                                        | 52        |