

# CONTENTS

<b>APPROVAL PAGE</b>	
<b>SELF DECLARATION AGAINST PLAGIARISM</b>	
<b>ABSTRACT</b>	<b>i</b>
<b>DEDICATION</b>	<b>ii</b>
<b>ACKNOWLEDGMENT</b>	<b>iii</b>
<b>PREFACE</b>	<b>iv</b>
<b>CONTENTS</b>	<b>v</b>
<b>LIST OF FIGURES</b>	<b>vii</b>
<b>ACHIEVEMENTS</b>	<b>x</b>
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Background . . . . .	1
1.2 Problem Identification . . . . .	2
1.3 Objective . . . . .	3
1.4 Scope of Work . . . . .	3
1.5 Expected Results . . . . .	3
1.6 Research Method . . . . .	4
1.7 Structure of Thesis . . . . .	4
<b>2 BASIC CONCEPTS</b>	<b>6</b>
2.1 Mobile Cognitive Radio Base Station (MCRBS) . . . . .	6
2.2 Ultra Wide Band (UWB) Antenna . . . . .	6
2.2.1 Biconical Antenna . . . . .	7
2.2.1.1 Radiated Fields of Biconical Antenna . . . . .	7
2.2.1.2 Input Impedance of Biconical Antenna . . . . .	8
2.3 Link Budget Analysis . . . . .	11

<b>3</b>	<b>EXPERIMENTAL DESIGN OF ANTENNA FOR MCRBS</b>	<b>13</b>
3.1	Step of The Design . . . . .	13
3.2	Study of MCRBS Parameters and Determination of Antenna Specification . . . . .	14
3.2.1	Determination of Antenna Material . . . . .	16
3.2.2	Antenna Feeding System . . . . .	16
3.3	Design of Antenna Simulations . . . . .	17
3.3.1	Initiation Simulation . . . . .	17
3.3.2	Antenna Simulation with Modifications Element . . . . .	17
3.3.2.1	Dimension Optimization of $a_{lp}$ . . . . .	19
3.3.2.2	Dimension Optimization of $l_c$ . . . . .	20
3.3.2.3	Dimension Optimization of $d_r$ . . . . .	20
3.3.2.4	Dimension Optimization of $d_{sh}$ . . . . .	21
3.4	Verification of Simulation Result . . . . .	21
<b>4</b>	<b>ANTENNA TEST VERIFICATION AND ANALYSIS</b>	<b>25</b>
4.1	Antenna Parameter Test . . . . .	25
4.1.1	Return Loss and Bandwidth . . . . .	25
4.1.2	Radiation Pattern . . . . .	26
4.1.3	Gain of Antenna . . . . .	35
4.2	Real-field Experiment of Communications . . . . .	37
4.2.1	Scenario of The Real-field Experiment of Communications . . . . .	38
4.2.2	Performance Evaluations of The Real-field Experiment of Communications . . . . .	39
4.3	Robust to Wind Test . . . . .	40
4.4	Verification of Performance Test . . . . .	41
<b>5</b>	<b>CONCLUSIONS AND FUTURE WORKS</b>	<b>46</b>
5.1	Conclusions . . . . .	46
5.2	Future Works . . . . .	46
	<b>REFERENCES</b>	<b>47</b>
	<b>APPENDIX A</b>	<b>50</b>
	<b>APPENDIX B</b>	<b>54</b>