

CONTENTS

ENDORSEMENT LETTER	i
ORIGINALITY STATEMENT	ii
ABSTRACT	iii
AUTHOR'S FOREWORD	iv
GRATITUDE NOTE	v
CONTENTS	vii
LIST OF FIGURES	x
LIST OF TABLES	xii
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Problem Identification	2
1.3 Objective and Contribution	3
1.4 Scope of Problem	3
1.5 Research Method	3
1.6 Writing Systems	4
CHAPTER II BASIC CONCEPTS	6
2.1 Antenna	6
2.2 Antenna Parameters	6
2.2.1 Radiation Pattern	6
2.2.2 Beam Width	7
2.2.3 Directivity	7
2.2.4 Gain	8
2.2.5 Bandwidth	8
2.2.6 Return Loss	8
2.2.7 Impedance	9
2.2.8 VSWR	9
2.3 Microstrip Antenna	10
2.4 Rationing Method	13
2.5 Defected Ground Structure (DGS)	14
2.6 Antenna Textile	14

2.7	Wireless Body Area Network (WBAN)	15
2.8	Industrial, Scientific and Medical (ISM)	16
2.9	Specific Absorption Rate (SAR).....	16
2.10	Telemedicine.....	17
2.11	Phantom	17
CHAPTER III DESIGN MODELS AND SYSTEMS.....		19
3.1	Workflow Program Perform	19
3.2	Antenna Specification.....	20
3.3	Material Selection	21
3.3.1	Substrate Material Selection.....	21
3.3.2	Conductor Material Selection.....	21
3.4	Determination of Rationing Methods	22
3.5	Design Model Based on Calculations	22
3.6	Simulation Result Based on Calculation	26
3.7	Antenna Optimization.....	27
3.7.1	Adjusting Slotted Patch.....	27
3.7.2	Alteration in Ground Plane Dimensions	28
3.8	Final Dimension of The Antenna.....	29
3.9	Simulation Result.....	30
3.10	Phantom Simulation.....	32
3.10.1	Antenna on Wrist Phantom	33
3.10.2	Antenna on Chest Phantom	34
3.10.3	Antenna on Thigh Phantom.....	35
3.11	Selection of Used Phantoms	36
3.12	Bending Flexibility Antenna.....	37
3.12.1	Flexibility Test Results for VSWR, Bandwidth, and Gain Value.....	38
3.13	Comparison of Simulation Results in On and Off-Body Conditions	39
3.13.1	Comparison of VSWR and Bandwidth Results	39
3.13.2	Comparison of Gain Results.....	40
CHAPTER IV ANALYSIS AND MEASUREMENT		41
4.1	Introduction.....	41
4.2	Fabrication of Antennas.....	41

4.3	Principles of Measurement Conduct.....	43
4.4	VSWR and Bandwidth Analysis.....	43
4.4.1	Procedure for Measuring Bandwidth and VSWR	43
4.4.2	Return Loss Measurement Result in Off and On-Body Condition 44	
4.4.3	VSWR Measurement Results in Off and On-Body Conditions ..	45
4.5	Measurement of Gain, Radiation Pattern and Polarization.....	46
4.5.1	Procedure for Gain Measurement, Radiation Pattern and Polarization	46
4.5.2	Radiation Pattern Measurement Results.....	47
4.5.3	Gain Measurement Results.....	48
4.5.4	Polarization Measurement Results	49
4.6	Final Examination.....	51
	CHAPTER V CONCLUSIONS AND SUGGESTIONS.....	53
5.1	Conclusion	53
5.2	Suggestion.....	54
	BIBLIOGRAPHY	55
	APPENDIX.....	58