

Table of Contents

Chapter 1 Overview of the project

1.1 Introduction	1
1.2 History	1
1.3 Motivation	2
1.4 Objective	2
1.5 Outline	3

Chapter 2 Literature Review4

Chapter 3 Antenna Terminology and Parameters

3.1 Introduction	6
3.2 Radiation Pattern	6
3.3 Directivity.....	8
3.4 Gain	8
3.5 VSWR	9
3.6 Bandwidth	9
3.7 Return Loss	10
3.8 S-Parameter	10

Chapter 4 Slot Antenna Overview

4.1 Introduction	12
4.2 Working of slot antenna	12
4.4 Radiation Pattern of slot antenna	13

Chapter 5 Design approach using CST microwave studio software

5.1 Introduction to CST microwave studio software	15
5.1.1 Advantages of CST software.....	15
5.2 Construction on CST software	15
5.3 Design of the slot at the middle of the conducting sheet	16
5.3.1 Design1.....	16
5.3.2 Design 1 for frequency 2.45 GHz	18
5.3.2 Design 1 for 3.5 GHz frequency.....	20

5.4 Design of the slot at the edge of the metallic sheet.....	22
5.4.1 Design 2.....	22
5.4.2 Design 2 for 2.45 GHz frequency	23
5.3.3 Design 2 for 3.5 GHz frequency	25
5.5 Design of the slot at the top of the metallic sheet	27
5.5.1 Design 3.....	27
Chapter 6 Fabrication of the prototype and performance testing	
6.1 Construction of prototype.....	31
6.2 Measurement Set-up.....	31
6.3 Fabrication of the slot at the top of the metallic patch	32
6.4 Comparison of simulated and Measured results	33
Chapter 7 Conclusion	
7.1 Result and Discussion	35
7.2 Details of the work	35
7.3 Future work	27
References	
List of Figures	
Fig 1.1 Evolution of Wireless Communications.....	2
Fig 3.1 Antenna as a transition device	6
Fig 3.2 Co-ordinate system for antenna analysis	7
Fig 3.3 Radiation pattern lobes	7
Fig 4.1: Schematic diagram of slot antenna	12
Fig 4.2: Voltage and current distribution across a slot	13
Fig 4.4: Radiation pattern of slot antenna	13
Fig 5.1: Schematic diagram of Design 1	16
Fig 5.2 Variation of S_{11} curve with respect to feed positions for Design 1	17

Fig 5.3 Radiation Pattern of Design 1.....	18
Fig 5.4: Variation of S_{11} curve with respect to slot width for 2.45 GHz frequency.....	19
Fig 5.5: Radiation Pattern for Design 1 design for 2.45 GHz frequency	20
Fig 5.6: Variation of S_{11} with respect to slot width for 3.5 GHz frequency.....	20
Fig 5.7: Radiation pattern of Design 1 for 3.5 GHz	21
Fig 5.8: Schematic diagram of Design 2 where slot is placed at the edge of the patch.....	22
Fig 5.9: Variation of S_{11} with respect to feed positions for Design 2	23
Fig 5.10: Variation of S_{11} with slot width for Design 2 designed for 2.45 GHz frequency.....	24
Fig 5.11: Radiation pattern of Design 2 designed for 2.45 GHz frequency	24
Fig 5.12: variation of S_{11} with slot width for Design 2 for 3.5 GHz	25
Fig 5.13: Radiation pattern of Design 2 for 3.5 GHz	26
Fig 5.14: Schematic diagram of Design 3.....	27
Fig 5.15: variation of S_{11} with feed positions (Z) for Design 3.....	28
Fig 5.15: Modification 1	28
Fig 5.16: Modification 2	28
Fig 5.17: Modification 3	29
Fig 5.18: Radiation patterns obtained from design 3.....	30
Fig 6.1: Radiation pattern measurement set up.....	31
Fig 6.2: Fabricated slot antennas	32
Fig 6.3: Slot placed at the top of the metallic patch.....	32
Fig 6.4: Measured and Simulated S_{11} curve for 2.45 GHz.....	33
Fig 6.5: Measured and Simulated S_{11} curve for 3.5 GHz.....	33
Fig 7.1: Dual band approach of proposed antenna	35
Fig 7.2: S_{11} curves obtained for Dual band	35

List of Tables

Table 3.1: Return loss in dB	10
Table 5.1: List of parameters for Design 1	16
Table 5.2: Variation of frequency with feed positions (Design 1)	17
Table 5.3: Variation of return loss value with slot width for Design 1 designed for 2.45 GHz frequency	19
Table 5.4: Obtained results from Design 1 designed for 2.45 GHz frequency	20
Table 5.5: Variation of return loss value with slot width for Design 1 designed for 3.5 GHz frequency	21
Table 5.6: Obtained results from Design 1 designed for 3.5 GHz frequency	21
Table 5.7: List of parameters for Design 2	22
Table 5.8: Variation of frequencies with slot width for Design 2	23
Table 5.9: Variation of return loss value with slot width for Design 2 designed for 2.45 GHz frequency	24
Table 5.10: Obtained results from Design 2 designed for 2.45 GHz frequency	25
Table 5.11: Variation of return loss value with slot width for Design 2 designed for 3.5 GHz frequency	25
Table 5.12: Obtained results from Design 2 designed for 3.5 GHz frequency	26
Table 5.13: List of parameters for Design 3	27
Table 5.14 Observed results from Design 3 for both 2.45 GHz and 3.5 GHz	29