## CONTENTS

Acknowledgement                   iii
Abstract                           iv
Preface                            vi
List of Figures                    xii
List of Tables                     xvi
List of Charts                     xvii
Appendix                           xviii
List of Symbols and Acronyms       xix

1. Introduction                   1
   1.1. Overview of Electromagnetic-interference  1
   1.2. Motivation                        8
   1.3. Organization of the thesis        13

2. Literature Review              14
   2.1. Electromagnetic-interference      15
   2.2. Research objectives              20
   2.3. Research problem statement       20
   2.4. Chapter Summary                  21

3. Numerical Methods              22
   3.1. Method of Moments (MoM)           22
   3.2. Finite Different Time Domain (FDTD) 22
   3.3. Boundary Element Method (BEM)     23
   3.4. Finite Element Method (FEM)       23
   3.5. Partial Element Equivalent Circuit (PEEC) 24
   3.6. Hybrid methods                   24
   3.7. Proposed Modified Greens Moments (MGM) 25
   3.8. Chapter Summary                  25

4. Theoretical: Emission and Susceptibility  26
   4.1. Radiated emission and susceptibility 26
       4.1.1. Specifications of conductors 27
4.1.2. Investigation for different layouts
4.1.3. Resistance analysis
4.1.4. Inductance analysis
4.1.5. Capacitance analysis
4.1.6. RE-Differential-mode current
4.1.7. RE-Common-mode current
4.1.8. Radiated susceptibility

4.2. Conducted emission and susceptibility
4.2.1. Investigation of Printed-circuit board
4.2.2. Line Impedance Stabilization Network
4.2.3. Conducted susceptibility

4.3. Chapter Summary

5. Experimental setup & Simulation of Emission and Susceptibility

5.1. Conducted Emission and Susceptibility
5.1.1. Design for CE and CS
5.1.2. To design C and L values
5.1.3. CE-Differential-mode current
5.1.4. CE-Common-mode current
5.1.5. Conducted susceptibility

5.2. Radiated emission and susceptibility
5.2.1. Introduction
5.2.2. OATS
5.2.3. General block diagram
5.2.4. Assumptions
5.2.5. Design
5.2.6. RE-Differential-mode current
5.2.7. RE-Common-mode current
5.2.8. Radiated susceptibility

5.3. Adaptive micro-strip antenna
5.3.1. Patch antenna

5.4. Design of Adaptive micro-strip antenna
5.4.1. Design Formulation 66
5.4.2. Effective constant 66
5.4.3. Effective Length 67
5.4.4. Width of strip 67
5.4.5. Resonant Frequency 67
5.4.6. Feeding method 68
5.4.7. Conductance 68
5.4.8. Resonant input resistance 71
5.4.9. Modified Resistance 71
5.4.10. Field components 73
5.4.11. Radiation pattern 73
5.4.12. Far fields 74
5.4.13. Array factor 75
5.4.14. Directivity 75
5.4.15. Dimensions of Ground plane 76
5.4.16. Directivity and Gain 77
5.4.17. Beam Width, Quality and Efficiency 77
5.4.18. Polarization, Return Loss and Cross-section 78
5.5. Design of rectangular micro strip patch antenna 79
5.6. Dual Band Micro strip Patch Antenna 81
5.7. Dual Band Micro strip Patch Antenna Using Dual Patch 81
5.8. Conclusion 82
5.9. Comparison between analytical and simulated analysis 85
5.10. Chapter Summary 86

6. Shielding and micro-strip filter 87
6.1. Introduction 87
6.2. Three Dimensional Green’s function and MGM Solution 87
   6.2.1. 3-D Green’s function 89
   6.2.2. MGM Solution 95
6.3. Micro-Strip Filter 100
   6.3.1. Micro-strip line 100
6.3.2. Micro-strip LPF 101
6.3.3. Design of LPF 102
6.3.4. Specifications 102
6.3.5. Formulation 102
6.3.6. Feeding method 104
6.4. Chapter summary 105

7. Conclusion and Futurescope 107

7.1. Future Scope and limitation 108

Reference 110

Index 125

List of Publications 130