CONTENTS

List of Acronyms **xiv**
List of Figures **xvi**
List of Tables **xx**
Preface **xxi**
Chapter 1 **Page**
1. Introduction **1-11**
1.1 Introduction **1**
1.2 Internal Antennas for Mobile Handset **3**
1.2.1 Microstrip Antenna **3**
1.2.1.1 Design of Microstrip Antenna **4**
1.2.1.2 Radiation Mechanism of Microstrip Antenna **4**
1.2.2 The Inverted-F Antenna (IFA) **5**
1.2.2.1 Design of IFA **5**
1.2.2.2 Radiation Mechanism of IFA **6**
1.2.3 Planar Inverted-F Antenna (PIFA) **6**
1.2.3.1 Design of PIFA **7**
1.2.3.2 Radiation Mechanism of PIFA **8**
1.2.4 Monopole Antenna **9**
1.3 Antenna Performance in User Proximitly **9**
1.3.1 Specific Absorption Rate (SAR) **9**
1.3.2 Total Radiation Power (TRP) **10**
1.4 Note **11**

Chapter 2
2. Literature Review **12-31**
2.1 Introduction **12**
2.2 Literatute Review **12**

Chapter 3
3. Compact Multiband Planar Monopole Antenna For Slim Mobile Handset Applications **31-51**
3.1 Introduction **32**
3.2 Antenna Design and Configuration **34**
3.3 Antenna Characterization in Free Space **37**
3.3.1 *S*-parameters Characterization **37**
3.3.1.1 Parametric Analysis **37**
3.3.1.2 Measurement of *S*-parameters **45**
3.3.2 Surface Current Distribution **46**
3.3.3 Far Field Radiation Characteristics **46**
3.4 Antenna Characterization in Mobile Environment **49**

Chapter 4

4. Multi-Band Shorted Monopole Antenna For Handset Applications 52-67

4.1 Introduction **52**

4.2 Antenna Configuration and Design Evolution **52**

4.3 Antenna Characterization in Free Space **56**

4.3.1 *S*-parameters Characterization **56**

4.3.1.1 Parametric Analysis **57**

4.3.1.2 Measurement of *S*-parameters **61**

4.3.2 Surface Current Distribution and Far Field Radiation Patterns **62**

4.3.3 Far Field Radiation Characteristics **62**

4.4 Antenna Characterization in Mobile Environment **65**

Chapter 5

5. Thin Profile Wideband Printed Monopole Antenna for Slim Mobile Handsets Applications 68-82

5.1 Introduction **68**

5.2 Antenna Configuration and Design **70**

5.3 Antenna Characterization in Free Space **73**

5.3.1 *S*-parameters Characterization **73**

5.3.1 Parametric Analysis **75**

5.3.3 Surface Current Distribution **78**

5.3.4 Radiation Characteristics **78**

5.4 Antenna Characterization in Mobile Environment **81**

Chapter 6

6 **PERFORMANCES STUDY OF PLANAR MONOPOLE ANTENNAS IN THE PRESENCE OF USER PROXIMITY 83-100**

6.1 Introduction **83**

6.2 Simulation Model **84**

6.3 Results and Discussion **85**

6.3.1 *S*-parameters Analysis **85**

6.3.2 Peak Realized Gain Analysis **90**

6.3.3 Total Antenna Efficiency Analysis **90**

6.3.4 Specific Absorption Rate (SAR) Analysis **97**

6.3.5 Total Radiated Power (TRP) Analysis **98**

6.4 Discussions **100**

Chapter 7

7 **SUMMARY AND CONCLUSION 101-105**

References 106-131

List of Publications 132-137