

## Dual Band Circularly Polarized Monopole Antenna For Wlan

This book presents a comprehensive insight into the design techniques for different types of CP antenna elements and arrays. In this book, the authors address a broad range of topics on circularly polarized (CP) antennas. Firstly, it introduces to the reader basic principles, design techniques and characteristics of various types of CP antennas, such as CP patch antennas, CP helix antennas, quadrifilar helix antennas (QHA), printed quadrifilar helix antennas (PQHA), spiral antenna, CP slot antennas, CP dielectric resonator antennas, loop antennas, crossed dipoles, monopoles and CP horns. Advanced designs such as small-size CP antennas, broadband, wideband and ultra-wideband CP antennas are also discussed, as well as multi-band CP antennas and dual CP antennas. The design and analysis of different types of CP array antennas such as broadband CP patch arrays, dual-band CP arrays, CP printed slot arrays, single-band and multi-band CP reflectarrays, high-gain CP waveguide slot antennas, CP dielectric resonator antenna arrays, CP active arrays, millimetre-waveband CP arrays in LTCC, and CP arrays with electronically beam-switching or beam-steering capabilities are described in detail. Case studies are provided to illustrate the design and implementation of CP antennas in practical scenarios such as dual-band Global Navigation Satellite Systems (GNSS) receivers, satellite communication mobile terminals at the S-band, Radio Frequency Identification (RFID) readers at 2.4 GHz, and Ka-band high-speed satellite communication applications. It also includes the detailed designs for a wideband Logarithmic spiral antenna that can operate from 3.4-7.7 GHz. In addition, the book offers a detailed review of the recent developments of different types of CP antennas and arrays. Presents comprehensive discussions of design techniques for different types of CP antennas: small-size CP antennas, broadband CP antennas, multi-band CP antennas and CP arrays. Covers a wide range of antenna technologies such as microstrip antennas, helix, quadrifilar helix antenna, printed quadrifilar helix antenna, dielectric resonator antennas, printed slots, spiral antennas, monopoles, waveguide slot arrays, reflectarrays, active arrays, millimetre-wave arrays in LTCC, electronically beam-switching arrays and electronically beam-steerable arrays. Reviews recent developments in different types of CP antennas and arrays, reported by industries, researchers and academics worldwide. Includes numerous case studies to demonstrate how to design and implement different CP antennas in practical scenarios. Provides both an introduction for students in the field and an in-depth reference for antenna/RF engineers who work on the development of CP antennas. Circularly Polarized Antennas will be an invaluable guide for researchers in R&D organizations; system engineers (antenna, telecom, space and satellite); postgraduates studying the subjects of antenna and propagation, electromagnetics, RF/microwave/millimetre-wave systems, satellite communications and so on; technical managers and

professionals in the areas of antennas and propagation.

The book presents basic and advanced concepts of circularly polarized antennas, including design procedure and recent applications. Cross dipole antennas, microstrip antennas, helical antennas, quadrifilar helix antennas, frequency independent antennas, horn antennas, omnidirectional circularly polarized antennas and radial line array antennas are discussed. With abundant examples, the book is an essential reference for researchers and engineers. The desired objective of this book is to investigate diversity and mutual coupling effects on MIMO antenna designs for WLAN/WiMAX/LTE applications, controlled with diversity and ground modification techniques including equivalent circuit diagrams. Diversity techniques in MIMO antennas leading to the performance improvement ratings are demonstrated and deliberated. The book contributes towards the development of 2:1 VSWR MIMO antennas with diversity techniques for indoor/outdoor applications for high data rate, QOS, and SNR. The improved MIMO antenna structures are investigated and presented in this book including part of massive MIMO to provide the important aspects of emerging technology. Aimed at researchers, professionals and graduate students in electrical engineering, electromagnetics, communications and signal processing including antenna theory and design, smart antennas, communication systems, this book: Investigates real time MIMO antenna designs for WLAN/WiMAX/LTE applications. Covers effects of ECC, MEG, TARC, and equivalent circuit. Addresses the coupling and diversity aspects of antenna design problem for MIMO systems. Focus on the MIMO antenna designs for the real time applications. Exclusive chapter on 5G Massive MIMO along with case studies throughout the book.

This book discusses the latest developments and outlines future trends in the fields of microelectronics, electromagnetics and telecommunication. It includes original research presented at the International Conference on Microelectronics, Electromagnetics and Telecommunication (ICMEET 2019), organized by the Department of ECE, Raghu Institute of Technology, Andhra Pradesh, India. Written by scientists, research scholars and practitioners from leading universities, engineering colleges and R&D institutes around the globe, the papers share the latest breakthroughs in and promising solutions to the most important issues facing today's society.

This book constitutes the refereed proceedings of the First International Conference on Smart Trends in Information Technology and Computer Communications, SmartCom 2016, held in Jaipur, India, in August 2016. The 106 revised papers presented were carefully reviewed and selected from 469 submissions. The papers address issues on smart and secure systems; technologies for digital world; data centric approaches; applications for e-agriculture and e-health; products and IT innovations; research for knowledge computing.

This book is a collection of best selected research papers presented at the

Conference on Machine Learning, Deep Learning and Computational Intelligence for Wireless Communication (MDCWC 2020) held during October 22nd to 24th 2020, at the Department of Electronics and Communication Engineering, National Institute of Technology Tiruchirappalli, India. The presented papers are grouped under the following topics (a) Machine Learning, Deep learning and Computational intelligence algorithms (b) Wireless communication systems and (c) Mobile data applications and are included in the book. The topics include the latest research and results in the areas of network prediction, traffic classification, call detail record mining, mobile health care, mobile pattern recognition, natural language processing, automatic speech processing, mobility analysis, indoor localization, wireless sensor networks (WSN), energy minimization, routing, scheduling, resource allocation, multiple access, power control, malware detection, cyber security, flooding attacks detection, mobile apps sniffing, MIMO detection, signal detection in MIMO-OFDM, modulation recognition, channel estimation, MIMO nonlinear equalization, super-resolution channel and direction-of-arrival estimation. The book is a rich reference material for academia and industry.

Recent developments in soft-computation techniques have paved the way for handling huge volumes of data, thereby bringing about significant changes and technological advancements. This book presents the proceedings of the 3rd International Conference on Emerging Current Trends in Computing & Expert Technology (COMET 2020), held at Panimalar Engineering College, Chennai, India on 6 and 7 March 2020. The aim of the book is to disseminate cutting-edge developments taking place in the technological fields of intelligent systems and computer technology, thereby assisting researchers and practitioners from both institutions and industry to upgrade their knowledge of the latest developments and emerging areas of study. It focuses on technological innovations and trendsetting initiatives to improve business values, optimize business processes and enable inclusive growth for corporates, industries and education alike. The book is divided into two sections; 'Next Generation Soft Computing' is a platform for scientists, researchers, practitioners and academics to present and discuss their most recent innovations, trends and concerns, as well as the practical challenges encountered in the field. The second section, 'Evolutionary Networking and Communications' focuses on various aspects of 5G communications systems and networking, including cloud and virtualization solutions, management technologies, and vertical application areas. It brings together the latest technologies from all over the world, and also provides an excellent international forum for the sharing of knowledge and results from theory, methodology and applications in networking and communications. The book will be of interest to all those working in the fields of intelligent systems and computer technology.

The communication field is evolving rapidly in order to keep up with society's demands. As such, it becomes imperative to research and report recent advancements in computational

intelligence as it applies to communication networks. The Handbook of Research on Recent Developments in Intelligent Communication Application is a pivotal reference source for the latest developments on emerging data communication applications. Featuring extensive coverage across a range of relevant perspectives and topics, such as satellite communication, cognitive radio networks, and wireless sensor networks, this book is ideally designed for engineers, professionals, practitioners, upper-level students, and academics seeking current information on emerging communication networking trends.

The book proposes new technologies and discusses innovative solutions to various problems in the field of communication, circuits, and systems, as reflected in high-quality papers presented at International Conference on Communication, Circuits, and Systems (IC3S 2020) held at KIIT, Bhubaneswar, India from 16-18 October 2020. It brings together new works from academicians, scientists, industry professionals, scholars, and students together to exchange research outcomes and open up new horizons in the areas of signal processing, communications, and devices.

Wireless communications have become invaluable in the modern world. The market is going through a revolutionary transformation as new technologies and standards endeavor to keep up with demand for integrated and low-cost mobile and wireless devices. Due to their ubiquity, there is also a need for a simplification of the design of wireless systems and networks. The Handbook of Research on Advanced Trends in Microwave and Communication Engineering showcases the current trends and approaches in the design and analysis of reconfigurable microwave devices, antennas for wireless applications, and wireless communication technologies. Outlining both theoretical and experimental approaches, this publication brings to light the unique design issues of this emerging research, making it an ideal reference source for engineers, researchers, graduate students, and IT professionals.

This book contains proceedings of the International Conference on Advances in Computing, Control and Communication Technology (IAC3T) organized by Centre for Computer Education, Institute of Professional Studies, University of Allahabad during March 25-27, 2016 at Allahabad. A total of 138 full papers were submitted to the conference, out of which about 40 papers were accepted and finally 35 papers were presented during the conference. This book contains these papers. The conference was a major multidisciplinary conference organized with the objective to expose the participants to the emerging trends in the area of computing, control and communication technology. The conference intended to serve as a major international forum for the exchange of ideas and to provide an interactive platform to the students (budding engineers), engineers, researchers and academicians to exchange their innovative ideas and experiences in the area of advancements in computing, control and communication technology.

The field of antenna engineering has been advancing at a remarkable pace to support modern communication systems. Recently, significant progress has been made in the development of new antennas and techniques targeted for applications in medical, defense, health care, communication, etc. The motivation of this project is to present cutting-edge research materials in the field of antennas for modern wireless communication.

Printed antennas have become an integral part of next-generation wireless communications and have been found to be commonly used to improve system capacity, data rate, reliability, etc. This book covers theory, design techniques, and the chronological regression of the printed antennas for various applications. This book will provide readers with the basic conceptual knowledge about antennas along with advanced techniques for antenna design. It covers a variety of analytical techniques and their CAD applications and discusses new applications of printed antenna technology such as sensing. The authors also present special reconfigurable antennas such as ME dipole, polarization, feeding, and DGS. The book will be useful to students as an introduction to design and applications of antennas. Additionally,

experienced researchers in this field will find this book a ready reference and benefit from the techniques of research in printed antennas included in this book. Following are some of the salient features of this book: Covers a variety of analytical techniques and their CAD applications Discusses new applications of printed antenna technology such as sensing Examines the state of design techniques of printed antenna Presents special reconfigurable antennas such as ME dipole, polarization, feeding, and DGS

The book addresses surrogate-assisted design of antenna arrays, in particular, how surrogate models, both data-driven and physics-based, can be utilized to expedite procedures such as parametric optimization, design closure, statistical analysis, or fault detection. Algorithms and design frameworks are illustrated using a large variety of examples including real-world printed-circuit antenna and antenna array structures. This unique compendium contains introductory materials concerning numerical optimization, both conventional (gradient-based and derivative-free, including metaheuristics) and surrogate-based, as well as a considerable selection of customized procedures developed specifically to handle antenna array problems.

Recommendations concerning practical aspects of surrogate-assisted multi-objective antenna optimization are also given. The methods presented allow for cost-efficient handling of antenna array design problems (involving CPU-intensive EM models) in the context of design optimization and statistical analysis, which will benefit both researchers, designers and graduate students.

GPS and GNSS Technology in Geosciences offers an interdisciplinary approach to applying advances in GPS/GNSS technology for geoscience research and practice. As GPS/GNSS signals can be used to provide useful information about the Earth's surface characteristics and land surface composition, GPS equipment and services for commercial purposes continues to grow, thus resulting in new expectations and demands. This book provides case studies for a deeper understanding of the operation and principles of widely applied approaches and the benefits of the technology in everyday research and activities. Presents processing, methods and techniques of GPS/GNSS implementation that are utilized in in-situ data collection in design and systems analysis Offers an all-inclusive, critical overview of the state-of-the-art in different algorithms and techniques in GPS/GNSS Addresses both theoretical and applied research contributions on the use of this technology in a variety of geoscience disciplines This conference proceedings summarizes invited publications from the two IDES (Institute of Doctors Engineers and Scientists) International conferences, both held in Bangalore/ India. This volume presents the first part of the proceedings of the Mediterranean Conference on Information & Communication Technologies (MedICT 2015), which was held at Saidia, Morocco during 7–9 May, 2015. MedICT provides an excellent international forum to the researchers and practitioners from both academia as well as industry to meet and share cutting-edge development. The conference has also a special focus on enabling technologies for societal challenges, and seeks to address multidisciplinary challenges in Information & Communication Technologies such as health, demographic change, wellbeing, security and sustainability issues. The proceedings publish high quality papers which are closely related to the various theories, as well as emerging and practical applications of particular interest to the ICT community. This first volume provides a compact yet broad view of recent developments in devices, technologies and processing, and covers recent research areas in the field including Microwave Devices and Printed Antennas, Advances in Optical and RF Devices and Applications, Signal Processing and Information Theory, Wireless and Optical Technologies and Techniques, Computer Vision, Optimization and Modeling in Wireless Communication Systems, Modeling, Identification and Biomedical Signal Processing, Photovoltaic Cell & Systems, RF Devices and Antennas for Wireless Applications, RFID, Ad Hoc and Networks Issues.

This book deals with the design, numerical simulation, state of the art fabrication processes

and methods, qualitative and quantitative tests, and measurement techniques of wearable and flexible antennas of different topologies, such as: Planar Inverted F, Printed Monopoles, Micropoles and Microstrips. Novel trends, materials, and fabrication and measurement techniques used in this vital field of antenna systems are also discussed. To the best of the editor's knowledge, at the time of publication, there are no published books targeting the vital topic of flexible antennas specifically and/or serving as a complete reference. There are only a few books on wearable antennas that deal with specific applications and this has initiated a motivation to propose a book that would serve as a complete technical reference of the addressed technology. This book can serve as a reference source for Research and Development scientists, RF and antenna engineers working in this vital field; moreover, it could be used as a text book for Antenna Theory and Advanced Antennas courses which are mainly offered for graduate students.

A guide to broadband microstrip antennas, offering information to help you choose and design the optimum broadband microstrip antenna configurations for your applications, without sacrificing other antenna parameters. The text shows you how to take advantage of the light-weight, low volume benefits of these antennas, by providing explanations of the various configurations and simple design equations that help you analyze and design microstrip antennas with speed and confidence. This practical resource presents an understanding of the radiation mechanism and characteristics of microstrip antennas, and provides guidance on designing new types of planar monopole antennas with multi-octave bandwidth. The authors explore how to select and design proper broadband microstrip antenna configurations for compact, tunable, dual-band and circular polarization applications. Moreover, the work compares all the broadband techniques and suggests the most attractive configuration. This volume presents selected papers from the 2nd International Conference on Optical and Wireless Technologies, conducted from 10th to 11th February, 2018. It focuses on extending the limits of currently used systems encompassing optical and wireless domains, and explores novel research on wireless and optical techniques and systems, describing practical implementation activities, results and issues. The book will serve as a valuable reference resource for academics and researchers across the globe.

Omnidirectional antenna with high gain, low profile, vertical polarization, even CP polarization is very difficult to design, although it is from the dipole. In this book, a novel idea that the running wave in the coaxial wire is disturbed by the orthogonal slot array on the cylindrical metal shell is introduced, which radiates the CP wave in omni-direction. When feeding on two ends of the coaxial wire respectively, there will appear left hand circularly polarized (LHCP) omnidirectional radiation or right hand circularly polarized (RHCP) omnidirectional radiation. By introducing the T-shaped feed structure, the coaxial wire with slot array can conveniently produce the LHCP and RHCP radiation diversity with one end feeding. In the further, combining with the directional antenna, it will generate the pattern diversity in the half-sphere space. The antenna of the coaxial wire with slot array can further transform into conical CP beam antenna if the coaxial wire becomes into a conical frustum. By introducing the PIN diode into the slot, the antenna of the coaxial wire with slot array can radiate the reconfigurable directional beam by switching the states of the PIN diodes. By introducing a novel switchable microwave circuit, the omnidirectional /directional pattern switchable antenna can be realized easily. This book proposes a continues method to develop the potentialities of the omnidirectional antenna. And the readers can study the method or ideas of the omnidirectional slots antenna, even graft the CP or diversity methods to other antennae.

The book discusses the recent research trends in various sub-domains of computing, communication and control. It includes research papers presented at the First International Conference on Emerging Trends in Engineering and Science. Focusing on areas such as optimization techniques, game theory, supply chain, green computing, 5g networks, Internet of

Things, social networks, power electronics and robotics, it is a useful resource for academics and researchers alike.

With the increased adoption of RFID (Radio Frequency Identification) across multiple industries, new research opportunities have arisen among many academic and engineering communities who are currently interested in maximizing the practice potential of this technology and in minimizing all its potential risks. Aiming at providing an outstanding survey of recent advances in RFID technology, this book brings together interesting research results and innovative ideas from scholars and researchers worldwide. Current Trends and Challenges in RFID offers important insights into: RF/RFID Background, RFID Tag/Antennas, RFID Readers, RFID Protocols and Algorithms, RFID Applications and Solutions. Comprehensive enough, the present book is invaluable to engineers, scholars, graduate students, industrial and technology insiders, as well as engineering and technology aficionados.

Dual Band Circularly Polarized Monopole Antenna Design for RF Energy Harvesting Compact Leaky-wave Antenna and Dual-band Circularly Polarized Slotted Monopole Antenna Circularly Polarized Antennas John Wiley & Sons

This symposium will treat a wide range of subjects on antennas, propagation and electromagnetic wave theory The following topics are just examples, and the scopes in this symposium will not be limited to them A Antennas B Propagation C Electromagnetic Wave Theory D Special Topics

This book examines mechatronics and automatic control systems. The book covers important emerging topics in signal processing, control theory, sensors, mechanic manufacturing systems and automation. The book presents papers from the 2013 International Conference on Mechatronics and Automatic Control Systems in Hangzhou, held in China during August 10-11, 2013.

The research work presented in this dissertation involves a low profile multifunction antenna design for the automotive market. The antenna covers the Long Term Evolution (LTE) bands, the world's cellular bands, the Global Positioning System (GPS) band and the Satellite Digital Audio Receiver System (SDARS) band. It covers an operation frequency bandwidth of 125% extending in frequencies from 698 MHz to 2700 MHz. The antenna is comprised of an Ultra Wide Band (UWB) monopole antenna top loaded with a rectangular plate and a dual band, single layer and single feeding pin patch antenna. The design, simulated and measured results of the two antenna elements are presented and carefully discussed in detail. The research begins by presenting a novel dual band, single layer and a single feeding pin patch antenna that receives the Right Hand Circularly Polarized (RHCP) GPS satellite signals (1574.42 MHz - 1576.42 MHz), the Left Hand Circularly Polarized (LHCP) SDARS satellite signals (2320 MHz - 2345 MHz) and the Vertically Linearly Polarized (VLP) SDARS terrestrial signals. The antenna has excellent circularly polarized gain radiation pattern at high elevation angles and acceptable vertically linearly polarized gain radiation pattern at the antenna horizon. The research presents next a novel low profile UWB antenna. The UWB antenna is constructed of a monopole hollow cylinder top loaded with a rectangular plate to reduce its height and a shorting hollow cylindrical post and a ground sleeve to significantly increase its operational frequency bandwidth. The antenna has an operating frequency bandwidth of 125% extending in frequencies from 698 MHz to 3000 MHz. It provides a uniform gain radiation pattern in the horizon direction. Lastly, the integration of the dual band patch antenna and UWB monopole antenna is presented and discussed. The patch antenna has excellent circularly polarized gain pattern at high elevation angles and acceptable gain pattern in the horizon direction. It meets the specification required by SiriusXM. The UWB antenna has a uniform radiation pattern in the horizon direction. The antenna module is low profile and has a fairly reduced footprint size; which qualify it to be an excellent candidate for the automotive industry.

This new volume provides an abundance of information on new biomedical applications being

used today. The book covers a wide range of concepts and technologies, discussing such modern technological methods as the Internet of Things, e-pills, biomedical sensors, support vector machines, wireless devices, image and signal processing in e-health, and machine learning. It also includes a discussion on software implementation for the devices used in biomedical applications. The different types of antennas, including antennas using RF energy harvesting for biomedical applications, are covered as well.

This book is a collection of the best research papers presented at the 8th International Conference on Innovations in Electronics and Communication Engineering at Guru Nanak Institutions Hyderabad, India. Featuring contributions by researchers, technocrats and experts, the book covers various areas of communication engineering, like signal processing, VLSI design, embedded systems, wireless communications, and electronics and communications in general, as well as cutting-edge technologies. As such, it is a valuable reference resource for young researchers.

This volume presents selected papers from the 3rd International Conference on Optical and Wireless Technologies, conducted from 16th to 17th March, 2019. It focuses on extending the limits of currently used systems encompassing optical and wireless domains, and explores the latest developments in applications like photonics, high speed communication systems and networks, visible light communication, nano-photonics, wireless, and MIMO systems. The proceedings contain high quality scholarly articles, giving insight into the analytical, experimental, and developmental aspects of systems, techniques, and devices in these spheres. This volume will prove useful to researchers and professionals alike.

This book addresses the true innovation in engineering design that may be promoted by blending together models and methodologies from different disciplines, and, in this book, the target was exactly to follow this approach to deliver a new disruptive architecture to deliver these next-generation mobile small cell technologies. According to this design philosophy, the work within this book resides in the intersection of engineering paradigms that includes “cooperation”, “network coding”, and “smart energy-aware frontends”. These technologies will not only be considered as individual building blocks, but re-engineered according to an inter-design approach resulting in the enabler for energy efficient femtocell-like services on the move. The book aims to narrow the gap between the current networking technologies and the foreseen requirements that are targeted at the future development of the 5G mobile and wireless communications networks in terms of the higher networking capacity, the ability to support more users, the lower cost per bit, the enhanced energy efficiency, and adaptability to new services and devices (for example, smart cities, and the Internet of things (IoT)).

This book focuses on elementary concepts of both radio frequency energy harvesting (RFEH) and wireless power transfer (WPT), and highlights their fundamental requirements followed by recent advancements. It provides a systematic overview of the key components required for RFEH and WPT applications and also comprehensively introduces the pioneering research advancements achieved to date. The state-of-the-art circuit design topologies for the two different applications are presented mainly in terms of antenna operating frequencies, polarization characteristics, efficient matching network circuits, rectifier topologies, and overall rectenna systems. The book serves as a single point of reference for practicing engineers and researchers searching for potential sources and elements involved in the

RFEH system as well as in the WPT system, and need rapid training and design guidelines in the following areas:

- Different sensing elements used in RFEH and WPT
- Inclusions of mathematical expressions and design problems
- Illustration of some design examples and performance enhancement techniques

Techniques based on the method of modal expansions, the Rayleigh-Stevenson expansion in inverse powers of the wavelength, and also the method of moments solution of integral equations are essentially restricted to the analysis of electromagnetic radiating structures which are small in terms of the wavelength. It therefore becomes necessary to employ approximations based on "high-frequency techniques" for performing an efficient analysis of electromagnetic radiating systems that are large in terms of the wavelength. One of the most versatile and useful high-frequency techniques is the geometrical theory of diffraction (GTD), which was developed around 1951 by J. B. Keller [1,2,3]. A class of diffracted rays are introduced systematically in the GTD via a generalization of the concepts of classical geometrical optics (GO). According to the GTD these diffracted rays exist in addition to the usual incident, reflected, and transmitted rays of GO. The diffracted rays in the GTD originate from certain "localized" regions on the surface of a radiating structure, such as at discontinuities in the geometrical and electrical properties of a surface, and at points of grazing incidence on a smooth convex surface as illustrated in Fig. 1. In particular, the diffracted rays can enter into the GO shadow as well as the lit regions. Consequently, the diffracted rays entirely account for the fields in the shadow region where the GO rays cannot exist.

The book comprises selected papers presented at the International Conference on Wireless Communication (ICWiCOM), which is organized by D. J. Sanghvi College of Engineering's Department of Electronics and Telecommunication Engineering. The book focuses on specific topics of wireless communication, like signal and image processing applicable to wireless domains, networking, microwave and antenna design, and telemedicine systems. Covering three main areas – networking, antenna designs and embedded systems applicable to communication – it is a valuable resource for postgraduate and doctoral students.

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