



Fig. 1. Designed 16×16 slotted waveguide array antenna structures

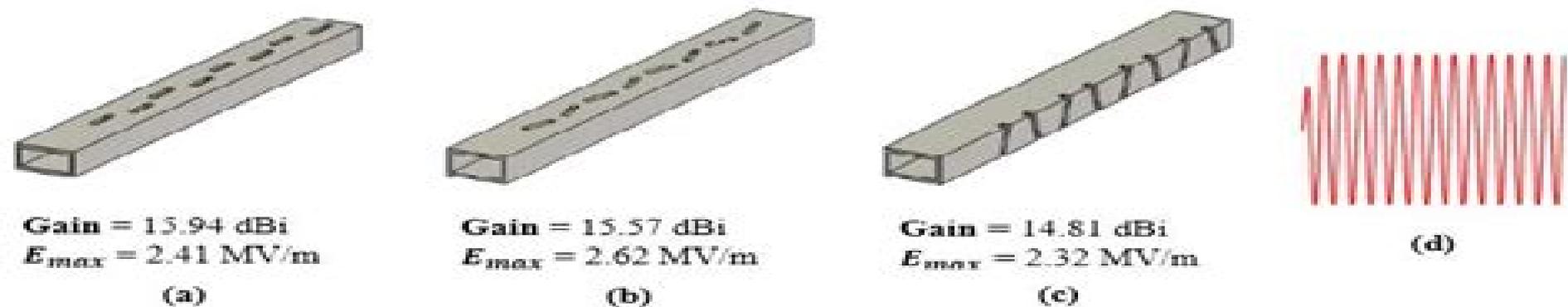


Fig. 2. Gain and maximum E field results (a) 8×1 longitudinal linear slot

Slotted Waveguide Array Antenna

Robert R. Redfield



Slotted Waveguide Array Antenna:

Slotted Waveguide Array Antennas Lars Josefsson, Sembiam Rajagopal Rengarajan, 2018 Slotted waveguide antenna arrays are used in radar communication and remote sensing systems for high frequencies They have linear polarization with low cross polarization and low losses but can also be designed for dual polarizations and phase steered beams Slotted Waveguide Array Antennas is the first comprehensive treatment of these antennas from an engineering perspective It provides readers with a thorough foundation in applicable theories as well as hands on instruction for practical analysis design manufacture and use of important types of waveguide slot arrays It goes beyond some of the commonly discussed topics and ventures into areas that include higher order mode coupling and edge effects performance optimisation in terms of bandwidth and pattern performance and manufacturing tolerances With specific examples of waveguide array designs accompanied by detailed illustrations and antenna characteristics the book is a must have reference for engineers involved in antenna design development and applications IET Digital Library

Compact Slot Array Antennas for Wireless Communications Alan J. Sangster, 2018-11-11 This book describes and provides design guidelines for antennas that achieve compactness by using the slot radiator as the fundamental building block within a periodic array rather than a phased array It provides the basic electromagnetic tools required to design and analyse these novel antennas with sample calculations where relevant The book presents a focused introduction and valuable insights into the relevant antenna technology together with an overview of the main directions in the evolving technology of compact planar arrays While the book discusses the historical evolution of compact array antennas its main focus is on summarising the extensive body of literature on compact antennas With regard to the now ubiquitous slot radiator it seeks to demonstrate how despite significant antenna size reductions that at times even seem to defy the laws of physics desirable radiation pattern properties can be preserved This is supported by an examination of recent advances in frequency selective surfaces and in metamaterials which can if handled correctly be used to facilitate physics defying designs The book offers a valuable source of information for communication systems and antenna design engineers especially thanks to its overview of trends in compact planar arrays yet will also be of interest to students and researchers as it provides a focused introduction and insights into this highly relevant antenna technology

Slotted Substrate Integrated Waveguide Array Antenna & Feed System Bronte MacIntosh-Hobson, 2008 In this thesis we investigate substrate integrated waveguides and their application as a slotted waveguide antenna array The standard slotted waveguide antenna is designed following Elliot s modified design procedure Elliot s modified design procedure not only takes into account the effects of mutual coupling from the neighboring slots in the array but also the internal higher order modes that are scattered off adjacent slots The antenna is then converted to a slotted substrate integrated waveguide antenna by carefully placing two rows of metallic via holes to simulate the sidewalls of the rectangular waveguide The size and location of the via holes are calculated such that they contain the electromagnetic fields inside the

substrate integrated waveguide with negligible leakage loss and that the substrate integrated waveguide has the same propagation constant and characteristic impedance as its equivalent rectangular waveguide Integrating the waveguide into a substrate allows the entire circuit to be fabricated within the substrate and eliminates the need for complicated transitions that link a rectangular waveguide to a planar circuit The antenna is fed by a 50 shielded stripline The stripline is shielded by two rows of via holes placed symmetrically on each side of the trace of the stripline The transition is composed of a single via hole that links the shielded stripline to the substrate integrated waveguide Back to back transitions between a shielded stripline and a substrate integrated waveguide are designed and simulated for three different frequency bands C band Ku band Ka band The bandwidth of the transitions ranged from 20 35% in all cases A back to back transition was fabricated for the C band The fabrication was done by hand using electrical tape for the stripline inner conductor and screws as the via holes The bandwidth of the measured results show a smaller bandwidth compared to the simulated results This disparity is due to the imperfections associated with fabricating the transition by hand A uniform antenna array of 8 slots is designed and simulated with the feed network A good radiation pattern with sidelobes 14dB below the main beam is observed The antenna has an impedance bandwidth of 1GHz at the operating frequency of 15GHz

Slotted Substrate Integrated Waveguide Array Antenna & Feed System MacIntosh-Hobson Bronte.,2008

Vibrator and Slot Antenna Arrays for Modern

Applications Mikhail V. Nesterenko,Victor A. Katrich,Sergey L. Berdnik,Oleksandr M. Dumin,Anatoliiy I. Luchaninov,Dmitriy V. Gretsikh,2024-11-22 This book provides solutions to a complex of internal and external problems of electromagnetics associated with the development of theory construction of mathematical models and the development of rigorous methods for calculating the electrodynamic characteristics of radiating structures and antenna arrays with impedance vibrator and slot elements The issues related to the impedance synthesis of antenna arrays and analysis of large aperture rectenna arrays are considered Solutions to the problems of determining the electrodynamic characteristics of impedance vibrators slot and multi element radiators with arbitrary geometric and electrophysical parameters are obtained within the framework of a unified methodological approach to constructing asymptotic solutions of integral equations for currents This approach made it possible to study a number of new vibrator slotted and combined vibrator slotted structures and their multi element systems The original research results reveal the possibilities of using such structures as basic elements for creating modern antenna waveguide devices operating in the range from meter to millimeter wavelengths which have new technical characteristics and functionalities This book is intended for senior and postgraduate students and researchers working in the fields of radiophysics radio engineering and antenna feeder design The book covers the following topics Excitation of Electromagnetic Fields in Electrodynamic Volumes with Coordinate Boundaries General Aspects of the Theory of Thin Impedance Vibrators and Narrow Slots in a Quasi One Dimensional Approximation Impedance Vibrators Antenna Arrays Slotted Waveguide Antenna Arrays Combined Vibrator Slot Antenna Arrays Impedance Synthesis for Vibrator Antenna Arrays Impedance

Synthesis for Slot Antenna Arrays Large Aperture Rectenna Arrays of Wireless Power Transmission Systems Ultrawideband Combined Vibrator Slot Antenna Arrays [Phased Array Antenna Handbook, Third Edition](#) Robert J. Mailloux,2017-11-30 This completely revised third edition of an Artech House classic Phased Array Antenna Handbook Second Edition offers an up to date and comprehensive treatment of array antennas and systems This edition provides a wealth of new material including expanded coverage of phased array and multiple beam antennas New modern machine learning techniques used for analysis are included Additional material on wideband antennas and wideband coverage in array antennas are incorporated in this book including new methods devices and technologies that have developed since the second edition A detailed treatment of antenna system noise sections on antenna pattern synthesis developments in subarray technology and in depth coverage of array architecture and components are additional new features of this book The book explores design elements that demonstrate how to size an array system with speed and confidence Moreover this resource provides expanded coverage of systems aspects of arrays for radar and communications Supported with numerous equations and illustrations this practical book helps evaluate basic antenna parameters such as gain sidelobe levels and noise Readers learn how to compute antenna system noise design subarray geometries for given bandwidth scan and sidelobe constraints and choose array illumination tapers for given sidelobe levels **Array and Phased Array Antenna Basics** Hubregt J. Visser,2006-02-03 Reflecting a growing interest in phased array antenna systems stemming from radar radio astronomy mobile communications and satellite broadcasting Array and Phased Array Antenna Basics introduces the principles of array and phased array antennas Packed with first hand practical experience and worked out examples this is a valuable learning tool and reference source for those wishing to improve their understanding of basic array antenna systems without relying heavily on a thorough knowledge of electromagnetics or antenna theory Features a general introduction to antennas and explains the array antenna principle through discussion of the physical characteristics rather than the theory Explores topics often not covered in antenna textbooks such as active element pattern array feeding means of phase changing array antenna characterisation sequential rotation techniques and reactively loaded arrays Guides the reader through the necessary mathematics allowing them to move onto specialist books on array and phased array antennas with a greater understanding of the topic Supported by a companion website on which instructors and lecturers can find electronic versions of the figures An ideal introduction for those without a background in antennas this clear concise volume will appeal to technicians researchers and managers working in academia government telecommunications and radio astronomy It will also be a valuable resource for professionals and postgraduates with some antenna knowledge [Substrate Integrated Antennas and Arrays](#) Yu Jian Cheng,2018-09-03 Substrate Integrated Antennas and Arrays provides a single source for cutting edge information on substrate integrated circuits SICs substrate integrated waveguide SIW feeding networks SIW slot array antennas SIC traveling wave antennas SIW feeding antennas SIW monopulse antennas and SIW multibeam antennas Inspired by the author

s extensive research this comprehensive book Describes a revolutionary SIC based antenna technique with the potential to replace existing antenna technologies Examines theoretical and experimental results connected to electrical and mechanical performance Explains how to overcome difficulties in meeting bandwidth gain and efficiency specifications Substrate Integrated Antennas and Arrays offers valuable insight into the state of the art of SIC and SIW antenna technologies presenting research useful to the development of wireless communication base station antennas portable microwave point to point systems collision avoidance radars conformal antennas and satellite antennas A Computational Model for the Slotted Waveguide Array Antenna M. Dich, Technical University of Denmark. Electromagnetics Institute, DTH., EMI., 1994

Slotted Waveguide Array Antenna Chee Hui Chong, Chee Seong Fong, 1998 *Radar Technology* Guy

Kouemou, 2010-01-01 In this book Radar Technology the chapters are divided into four main topic areas Topic area 1 Radar Systems consists of chapters which treat whole radar systems environment and target functional chain Topic area 2 Radar Applications shows various applications of radar systems including meteorological radars ground penetrating radars and glaciology Topic area 3 Radar Functional Chain and Signal Processing describes several aspects of the radar signal processing From parameter extraction target detection over tracking and classification technologies Topic area 4 Radar Subsystems and Components consists of design technology of radar subsystem components like antenna design or waveform design Slotted waveguide array antennas for synthetic aperture radar M. Dich, Danmarks Tekniske Højskole.

Elektromagnetisk Institut, DTH., EMI., TUD., 1991 **Broadband Slotted Waveguide Array Antenna** Yogesh Tyagi, 2018 This chapter describes the design and development of broadband slotted waveguide array SWA antenna Conventional SWA antenna offers a few percentages of bandwidth which can be enhanced using proposed novel differential feeding technique which electrically divides large resonating SWA into wideband subarrays by creating virtual shorts This chapter discusses concepts to achieve broadband nature of SWA antennas design development and characterization of edge fed slotted waveguide array antenna coupling slot fed SWA antenna and high efficiency broadband slotted waveguide array The developed SWA antennas are characterized and their measured results are presented The developed prototype of proposed SWA antenna demonstrates measured return loss better than 17 dB over 7.6% bandwidth and achieves 90.2% antenna efficiency This chapter also briefs about planar broadband SWA antenna and its prototype development and characterization

Slotted Wave-guide Antenna Array (volnovodno-shchelevaya Antennaya Reshetka). G. A. Evstropov, FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO., 1967 The proposed antenna consists of a waveguide array with oblique slots To decrease mutual effects and increase the permissible distance between the radiators metal strings are placed between the adjacent waveguides parallel to their longitudinal axes **Antenna Engineering Handbook** John Volakis, 2018-11-05 The gold standard reference on the design and application of classic and modern antennas fully updated to reflect the latest advances and technologies This new edition of the bible of antenna engineering has been updated to

provide start to finish coverage of the latest innovations in antenna design and application You will find in depth discussion of antennas used in modern communication systems mobile and personal wireless technologies satellites radar deployments flexible electronics and other emerging technologies including 5G terahertz and wearable electronics Antenna Engineering Handbook Fifth Edition is bolstered by real world examples hundreds of illustrations and an emphasis on the practical aspects of antennas Featuring 60 chapters and contributions from more than 80 renowned experts this acclaimed resource is edited by one of the world s leading antenna authorities This edition features all of the classic antenna types plus new and emerging designs with 13 all new chapters and important updates to nearly all chapters from past editions Antenna Engineering Handbook Fifth Edition clearly explains cutting edge applications in WLANs automotive systems PDAs and handheld devices making it an indispensable companion for today s antenna practitioners and developers Coverage includes Antenna basics and classic antennas Design approaches for antennas and arrays Wideband and multiband antennas Antennas for mobile devices and PDAs automotive applications and aircraft Base station and smart antennas Beamforming and 5G antennas Millimeter wave and terahertz antennas Flexible wearable thin film origami dielectric and on chip antennas MIMO antennas and phased arrays Direction finding and GPS antennas Active antennas Low profile wideband antennas Nanoantennas Reflectors and other satellite and radio telescope antennas Low frequency HF VHF UHF ECM and ESM antennas Impedance matching techniques and material characteristics Metastructured and frequency selective surfaces Propagation and guided structures Computational techniques and toolsets Indoor and outdoor measurements

IEEE AP-S Conference on Antennas and Propagation for Wireless Communications ,2000 [Eighth International Conference on Antennas and Propagation, 30 March - 2 April 1993](#) ,1993 [International Aerospace Abstracts](#) ,1999 **Phased Array Antennas** Arthur A. Oliner,George H. Knittel,1972 [Quasi-optical Control of Intense Microwave Transmission](#) Jay L. Hirshfield,Michael I. Petelin,2005

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