

2020 IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications (IMWS-AMP 2020)

**Suzhou, China
29-31 July 2020**



**IEEE Catalog Number: CFP2077Y-POD
ISBN: 978-1-7281-6065-8**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2077Y-POD
ISBN (Print-On-Demand):	978-1-7281-6065-8
ISBN (Online):	978-1-7281-6064-1

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Content

Design of Wideband Wearable Antenna Based on High Conductive Multilayer Graphene Film	1
Shared-aperture Multifunctional Coding Metasurface	4
A Beam-Steering Water-Loaded Dipole Antenna	7
Design and Fabrication of Flexible and Transparent Absorbers in Different Wavebands Based on EHD-Printing Technology	10
A Waveguide-Fed Transmitting Antenna for High Efficiency Microwave Power Transmission	13
A Compact Quint-Band Bandpass Filter with High Selectivity Using Uniform Impedance Resonators (UIRs)	17
Self-biased CPW Circulator with Low Insertion Loss	20
Broadband Dielectric Measurement of LCP Substrate Materials by Differential Phase Length Method	23
Zero-Powered 3rd-Order Intermodulation Generator for Highly-Isolated Wireless Sensing Applications	26
Extracting Complex PCB Substrate Permittivity from a Transmission Line Using the Finite Difference Integral Method from 10 GHz - 100 GHz	29
Low Loss LTCC Ag System for 5G Applications	32
Design and Simulation of Transparent Electromagnetic Shield Based on Ultra-miniaturized Grid with a Wide Band	35
Compact Millimeter-Wave Dual-Polarization Antenna Based on Magneto-Electric Dipole	39
An Effective Method of Collided Signals Separation for Satellite-Based Automatic Identification System	42
Traceable Measurement of Terahertz Spectrum Power and Frequency	45
A Graphene Based Metasurface with Dynamically and Continuously Tunable Scattering Pattern	48
325-400 GHz 2-D Beam Steering Antenna Based on MEMS Micromachining Technology	51
Effective Localized Surface Plasmons Resonator Excited by Substrate Integrated Waveguide	54
Mobile MIMO Antenna Using Mode Analysis	56
A Transparent Broadband Absorbing Metamaterial Based on ITO Structure	59
A Planar Near-field Measurement System for Microwave Power Transmission	62
60 GHz Optimised Nickel-free Gold-plated Enclosed Coplanar Waveguide Liquid Crystal Phase Shifter	65
Quadrature Injection-Locked Frequency Divider 2 for Radio Frequency Interference Reduction	68
Electromagnetic Pulse Coupling Effect Analysis for Outboard Engine System of Vehicle	71
A Random Ergodic Method for Distributed Transmitting Coherent Combination	74
Spoof Plasmonic Waveguide of a Roofed Metallic Grating for Terahertz Applications	77
Design of a Broadband Communication Array Element Antenna in K-band	80
Design of High-isolation Band-notched Via-fed UWB MIMO Antennas with Multi-Objective Optimization	83

A Novel Ka-band Waveguide Slotted Antenna with Wide-band Dual-Polarization	86
Pattern Synthesis of Conformal Antenna Array Based on Convex Optimization Model	90
Multi-Resonant Modes on Resistor-Loaded Metal Strip and Its Application on Absorptive Frequency-Selective Structures	93
Improvement of Thermal Endurance for Integrated Millimeter-Wave Silicon IMPATT Device in μm^2 -Scale	97
A Design of Leaky-Wave System for the High-Speed Rail in the Vacuum Tube	101
Continuously Tunable Phase Shifter Based on Defected Ground Structures	104
A Diode-based Wideband Reconfigurable Power Amplifier	107
Single- And Dual-Band Filtering Power Amplifiers	110
A 2-D Frequency Beam-Scanning Antenna Array Based on Varactor-Embedded Slow-Wave Phase-Shifter	113
Research on a Metamaerial for Electromagnetic Protection of UAV	116
Analysis of Test Distance and Truncation Angle of the Two-dimension Phased Array Radar Antenna	120
Dual-Band Polarization-Independent Rectenna for RF Energy Harvesting	123
Two Dimension Frequency Scanning Antenna with Meta-surface	126
Balanced Dual-band SIW Bandpass Filter with Enhanced Selectivity	129
A Highly Efficient 60 GHz CMOS Doherty Power Amplifier with Adaptive Gate Biases	132
Bandwidth Spread of Microwave Absorber by Integrating Spoof Plasmonic Structure and Resistive Metasurface	135
Study on Wide-angle Scanning Circularly Polarized Phased Array in Ka-band	138
Frequency Tripler Design by Using Dual-Mode Hybrid Coupler for High-Isolation Wireless Sensing	141
A 20GHz LC-VCO for Satellite Microwave Communication Application	145
Portable Omni-directional Micro Deformation Monitoring Radar System	149
Overview of On-Chip Millimetre-wave Passive Circuit Design in Silicon-based Technologies	152
Microwave Absorption Properties of Sandwich-Like Graphene-Carbon Black Composite	155
A Conical-Beam Leaky-Wave Antenna with High Radiation Efficiency	158
Propagation Characteristics of Periodically Slotted Elliptical Waveguides with Different Cross Section Shapes of Dielectric Filling	161
Interleaved-Slotted Annular Leaky-Wave Antenna with Conical Beam	164
A Cylindrical Conformal Leaky Wave Antenna with Omnidirectional Beam	167
Study of 28 GHz Transceiver Module Integrated with LO Source for 5G mmWave Communication	170
Design of A Dual-Frequency Planar Microwave Ablation Antenna	173
Modelling and Performance Analysis of an Efficient Compact Integrated Rectifier-Receiver for SWIPT	176
Simultaneous Wireless Power Transfer and Communications by Recycling Third Harmonics for WPAN Applications	179

Space Power Synthesis Technology of Distributed Jamming System on Motion Platforms	182
Characterizing Microwave Connectors over Temperatures Using Thermal-stable Standards	186
Out-of-band RCS Reduction of a Dipole Antenna Based on Frequency-Selective Metasurface	189
Low-profile SSPP Antenna with Vertical Polarization and Omnidirectional Radiation	192
The Design of a 220GHz Single Sideband Communication System	195
Wideband and Multi-Band Circular Polarization Conversion Metasurfaces	198
Analysis and Verification of Four-Way Gysel Power Divider with Arbitrary Power Dividing Ratio	201
A New Design of Wide Band Equalizer Using Meandering Lines	204
Comparative Study of a Metal Antenna, a Liquid Antenna and a Plasma Antenna	206
mm-Wave Letter-Based Chipless RFID Tags on Cheap Plastic Substrates	209
An Ultra-Wideband Antenna with Unidirectional Radiation Characteristics	213
A Novel Extraction Method for Series Inductance in Schottky Diodes Based on Resonance	215
Reconfigurable DRAs with Liquid Materials	218
High-isolation Dual-polarized Patch Antenna Array	221
Design of a Miniaturized Dual-Polarized Slot-Coupled Patch Antenna Element and Its Sub-array	224
Design of Broadband Amplifier Based on InP DHBT	227
Wideband and Replaceable Cylindrical Dielectric Resonator Antennas	230
Reconfigurable Slotted Antenna Inspired by Multidimensional Modulation	232
Numerical Demonstrations of Thermally Tunable Metamaterials Based on Liquid Metals	235
Tri-band Metasurface for Multi-mode Vector Beam Conversion	238
A Highly Selective and Compact 5G N77 Band Pass Filter Based on HRS IPD Technology	242
Design of Polarization-Insensitive and Wide-Angle Broadband Metamaterial Absorber	245
A 3-D Printed Circularly Polarized Antenna	248
Design of Reflective Coding Metasurface Capable of Switching Six Different Polarization States	250
Tunable Frequency Selection Surface Based on 2.5-D Structure	253
Design of 4th Order Cylinder Filter Suitable for SU-8 Micromachining	256
Novel Dual-Band Bandpass Filters Using Short-Circuited Coupled-Line Resonator	259
A Phase Corrected Substrate Integrated Waveguide Horn Antenna with Air Holes for Narrow Beamwidth in the H-plane	262
Ka-band MMIC LNA Design	265
A Metallic 3D Printed Miniaturized Quasi Log Periodic Koch-Dipole Antenna Using T-Shaped Top Loading	268
Dual-polarized Low-Profile Broadband Microstrip Antenna	271
A Reconfigurable Mixer for 1.8-5GHz Software-Defined Radios	273
Design of Dual-Layer Fabry Perot Cavity Antenna	276
Research on Millimeter-wave Radiation Characteristics of Stereo Air Target	278

A Miniaturized Log-Periodic Dipole Antenna Using Dual-Band Top-Loaded Dipoles as Radiating Elements	281
Application of Hybrid Metasurface for RCS Reduction of Dual Band Slot Antenna	284
Application of Radar Cross Section to Far-field Damage Detection	287
A Planar Integrated Beam Scanning Folded Reflectarray with Circular Polarization for Millimeter-Wave Applications	290
Design of Circuit Analog Absorber Using Characteristic Mode Analysis	293
A Simple Terahertz Orthomode Transducer Based on Equivalent Circuits Analysis	296
Design of CMOS Chip to Waveguide Transition in eWLB Package for Full W-band Applications	299
Design of Dual-band Antenna Based on Half-mode Substrate-integrated Waveguide	302
Design and Realization of an S-band High Performance Frequency Synthesizer for Radar System	305
Conformal Metasurface for Wideband RCS Reduction	308
Design and Optimization of Plane Microstrip Fractal Antenna Based on Y Structure	311
A Fast and Accurate Method for Bond Wires Inductances Extraction Based on Machine Learning Strategy	314
LTCC Wideband 1-To-4 Power Dividing Networks with 90° or 180° Output Phase Differences	317
Extraction of the Complex Permittivity of PCB	320
A Wideband Circularly Polarized Antenna with Stepped-Shaped Patch	323
Broadband Linear Phase Shifting of Terahertz Wave with Low Insertion Loss by Artificial-microstructure Phase Manipulation Chip	325
Based on Diode with 30GHz Bandwidth Terahertz Amplitude Modulator	327
Smart Antenna System with Memcapacitors	329
Highly Compact DRA Array Using Metallic Grid-Shaped Partial Ground Plane	332
Saving the Human Body from Radio Frequency: A Ni-Cu Conductive Tape-based Technique	335
A Low-Profile Horn Antenna at Ka-Band	338
Multilayer Terahertz Modulator Based on VO ₂	341
Bands-Spanned Radiation-Differentiated Antenna (BSRDA)	343
A Miniaturized Frequency-reconfigurable Rat-race Coupler Based on Metasurface	346
Dual-Band Antenna Made of Slow-Wave Substrate Integrated Waveguide	349
Investigation of Rectenna's Bandwidth for RF Energy Harvesting	352
Multi-port Power Combining Grid Array Antenna on Fan-out Wafer Level Packaging	354
A Compact Dual-Band and High-Isolation MIMO Antenna System for 5G Smartphone Applications	357
Phase-Controlled Pattern Diversity Antenna for 360° Continuous Beam Steering	360
Dielectric Resonator Antenna Fed by the Surface-wave Goubau Line	363
Wideband Frequency-Selective Absorber Based on Metal Cross Ring	366
On Study of the Short Conductor Line Used in the Simulation of the Re-Configurable Antenna	369