2022 52nd European Microwave Conference (EuMC 2022)

Milan, Italy
27-29 September 2022

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**EuMW01 : EuMW/EuMC Opening Session**
Chair: Luca Perregrini, Università di Pavia, Italy  
Co-Chair: Alessandra Costanzo, Università di Bologna, Italy  
11:20–13:00, Tuesday 27th September 2022, Space 3-4

(NA) **Welcome Address: Opening of the European Microwave Week 2022**  
Luca Perregrini, EuMW General Chair

(NA) **EuMA Welcome Address**  
Frank van den Bogaart, EuMA President

(NA) **Greetings from the IEEE MTT-S**  
Rashaunda Henderson, IEEE MTT-S President

(NA) **Greetings from the EuMW 2022 Platinum Sponsor: Keysight Technologies**

(NA) **Technical Program of EuMW 2022**  
Maurizio Bozzi, EuMW General TPC Chair

(NA) **Announcements and Notifications**  
Alessandra Costanzo¹, Luca D’Antonio²  
¹EuMC Chair; ²EuMC Co-Chair

(NA) **Quantum Technology: Where Maxwell Meets Schrödinger**  
Dana Z. Anderson, University of Colorado Boulder, USA

(NA) **EuMW Awards Ceremony**  
Andy Gibson, EuMA Award Chair

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**EuMC01 : Microwave Through Terahertz Measurement Techniques**
Chair: Nick Ridler, NPL, UK  
Co-Chair: Kamran Ghorbani, RMIT University, Australia  
09:00–10:40, Tuesday 27th September 2022, Amber 3

(NA) **Recent Progress in mm-Wave Wafer-Level Characterization Techniques to Accelerate 6G Deployment** (Invited Keynote)  
Andrej Rumiantsev, MPI, Taiwan

1 **A Transmission Method for Conductivity Extraction of Printed Silver Ink**  
Michael Ehrngruber, Simone Neermann, Gerald Gold, FAU Erlangen-Nürnberg, Germany

5 **16-Term On-Wafer Calibration with Leaky Standards and Flexible Algorithm Definition**  
Friedbert van Raay, Fabian Thome, Christian Friesicke, Roger Lozar, Sebastian Krause, Michael Mikulla, Rüdiger Quay, Fraunhofer IAF, Germany

9 **Generalized Thru-Reflect-Line Calibration for the Measurement of Waveguide Devices up to the Third Harmonic: First Results**  
Antonio Morini¹, Marco Farina¹, Marco Guglielmi², Piero Angeletti³, Petronilo Martín-Iglesias³  
¹Università Politecnica delle Marche, Italy; ²Universitat Politècnica de València, Spain; ³ESA-ESTEC, The Netherlands

13 **Contactless Flanges and Rail System for mm-Wave and THz Testing**  
Lingyun Ren, Dhanraj Doshi, Yonghui Shu, Eravant, USA
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EuMC02: Novel Transceiver Concepts
Chair: Almudena Suarez Rodriguez, Universidad de Cantabria, Spain
Co-Chair: David Ricketts, North Carolina State University, USA
09:00–10:40, Tuesday 27th September 2022, Amber 5

16  🎯 Judging Aperture Efficiency for Multi-Tone Arrays (Invited Keynote)
Anton N. Atanasov¹, Mark S. Oude Alink¹, Frank E. van Vliet²
¹Universiteit Twente, The Netherlands; ²TNO, The Netherlands

20  🎯 Interferometric Receiver Architecture for Multifunction Wireless Systems
Seyed Ali Keivaan, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada

24  🎯 OFDM Upconverting Transmitter Using a Frequency Multiplier
Dhecha Nopchinda, University College London, UK

28  🎯 Packaged Ka-Band GaN HEMT High Power Transmit Module for Sat-Com Applications
Mohammed Ayad, Zineb Ouarch, Rabha Ousedrat, Philippe Sin, Philippe Fellon, Philippe Auxemery, UMS, France

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EuMC03: Focussed Session Advances in Terahertz Technologies for Communication and Sensor Applications
Chair: Dirk Nüßler, Fraunhofer FHR, Germany
Co-Chair: Andreas Grimm, Forschungsfabrik Mikroelektronik Deutschland, Germany
09:00–10:40, Tuesday 27th September 2022, Brown 1-2

28  🎯 Technology for the Heterointegration of InP DHBT Chiplets on a SiGe BiCMOS Chip for mm-Wave MMICs
Marko Rausch¹, Thomas Flisgen¹, Christoph Stölmacker¹, Andrej Stranz², Andreas Thies¹, Ralf Doernner¹, Hady Yacoub¹, Wolfgang Heinrich¹
¹FBH, Germany; ²Fraunhofer IZM, Germany

32  🎯 Miniaturized Photonic Terahertz Receivers for Imaging and Sensing
Lauri Schwenson¹, Simon Nellen¹, Sebastian Lauck¹, Milan Deumer¹, Konstantin Wenzel¹, Robert B. Kohlhaas¹, Lars Liebermeister¹, Steffen Breuer¹, Martin Schell², Björn Globisch²
¹Fraunhofer HHI, Germany; ²Technische Universität Berlin, Germany

36  🎯 Terahertz Imaging Arrays for Industrial Inline Measurements
Dirk Nüßler¹, Fabian Friederich²
¹Fraunhofer FHR, Germany; ²Fraunhofer ITWM, Germany

40  🎯 Towards High-Capacity THz-Wireless P2MP Communication Systems for 6G
Oliver Stiwe, Robert Elschner, Andreas Maaßen, Stefan Weide, Colja Schubert, Ronald Freund, Fraunhofer HHI, Germany

44  🎯 Energy Efficient ADC for Low Fan-Out MIMO Sub-THz Imaging System in SiGe:BiCMOS Technology
Max Uhlmann¹, Raphael Hussung², Mohamed H. Eissa¹, Andreas Keil², Fabian Friederich², Gunter Fischer¹, Philip Ostrovsky²
¹IHP, Germany; ²Fraunhofer ITWM, Germany
EuMC04: Non-planar Filters I

Chair: Cristiano Tomassoni, Università di Perugia, Italy
Co-Chair: Giuseppe Macchiarella, Politecnico di Milano, Italy
14:20–16:00, Tuesday 27th September 2022, Amber 4

(NA) **Enhancing the Performance and Compactness of 3D-Printed Microwave Filters with Shape Optimization** *(Invited Keynote)*
Adam Lamecki, Michał Baranowski, Łukasz Balerwski, Michał Mrozowski, Gdańsk University of Technology, Poland

48 **Novel Dual-Band In-Line Filters Using Coaxial Dual-Post Resonances**
Uwe Rosenberg¹, Smain Amari²
¹OHB System, Germany; ²RMC, Canada

52 **Utilization of Higher Order Dual-Post Resonance Modes for Advanced Coaxial Filter Designs**
Uwe Rosenberg¹, Smain Amari²
¹OHB System, Germany; ²RMC, Canada

56 **Transmission Zeros in In-Line Filters by Using Source-to-Load Paths with Suppressed Spurious Frequencies**
Abdul Rehman, Enrique López-Oliver, Cristiano Tomassoni, Università di Perugia, Italy

60 **EM-Based Design of Microwave Filters and Diplexers: Full-Wave Coupling Matrix and its Narrowband Counterpart**
Valentin de la Rubia, Universidad Politécnica de Madrid, Spain

EuMC05: Focussed Session Sustainable Microwave Electronics

Chair: Anthony Ghiotto, IMS (UMR 5218), France
Co-Chair: Alessandra Costanzo, Università di Bologna, Italy
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(NA) **Low Environmental Impact RF Devices for IoT Applications** *(Invited Keynote)*
Georges Zakka El Nashef, CISTEME, France

64 **Reconfigurable Screen-Printed Patch Antenna on Paper for 4G and 5G Applications**
T.H. Le Dam¹, Victor Thenot², Gaël Depres², Thierry Lacrevaz¹, Gregory Houzet¹, T. Phu Vuong¹, Pascal Xavier¹
¹IMEP-LaHC (UMR 5130), France; ²Arjowiggins, France

68 **A Novel Additively-Manufactured Pressure Transducer for Zero-Power Wireless Sensing**
Valentina Palazzi¹, Manos Tentzeris², Federico Alimenti¹, Paolo Mezzanotte¹, Luca Roselli¹
¹Università di Perugia, Italy; ²Georgia Tech, USA

72 **Wearable Coplanar-Fed 2.45GHz-Rectenna on a Flexible 3D-Printable Low-Cost Substrate**
Giusy Battistini, Giacomo Paolini, Diego Masotti, Alessandra Costanzo, Università di Bologna, Italy

(NA) **High Speed, Low Power, and Low Cost Solutions for a Connector-Free World** *(Invited Keynote)*
Nicolas Darbel, STMicroelectronics, France
EuMC06 : Focussed Session Microwave Systems for Cryosphere Monitoring

Chair: Marco Pasian, Università di Pavia, Italy
Co-Chair: Pedro Espín-López, CTTC, Spain
16:40–18:20, Tuesday 27th September 2022, Amber 2

76 C Multi-Spectral Analysis of Dry Alpine Seasonal Snowpack
M. Lodigiani¹, Lorenzo Silvestri¹, R. Barella², C. Marin², B. Di Mauro³, R. Colombo⁴, C. Notarnicola⁵, Marco Pasian¹
¹Università di Pavia, Italy; ²Eurac Research, Italy; ³CNR-ISP, Italy; ⁴Università di Milano-Bicocca, Italy

80 C A Novel Approach for Calculating the Internal Layers of Snowpacks Using a S-Band Radar
P.F. Espín-López¹, Marco Pasian²
¹CTTC, Spain; ²Università di Pavia, Italy

83 C Investigation of Cryosphere Processes in the Boreal Forest Zone Using Ground-Based SAR
J. Jorge Ruiz¹, J. Lemmetyinen¹, J. Lahtinen², J. Uusitalo², T. Häkkilä², A. Kontu¹, J. Pulliainen¹, J. Praks³
¹FMI, Finland; ²Harp Technologies, Finland; ³Aalto University, Finland

87 C Evaluation of UWB Radar Module for Snow Water Equivalent Monitoring
Kristian G. Kjelgård, Tor S. Lande, University of Oslo, Norway

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¹CNR-IFAC, Italy; ²CNR-IREA, Italy; ³Università di Milano-Bicocca, Italy; ⁴CNR-ISP, Italy; ⁵Eurac Research, Italy; ⁶Università di Pavia, Italy; ⁷ARPA VDA, Italy
EuMC07: Permittivity Measurement Techniques
Chair: Xiaobang Shang, NPL, UK
Co-Chair: Dominique Schreurs, KU Leuven, Belgium
16:40–18:20, Tuesday 27th September 2022, Amber 3

(NA) Quasi-Optic Permittivity Measurements from 50 to 750GHz (Invited Keynote)
Roger Appleby1, Elena Saenz2, Michal Mrnka3, Richard Wyld4
1Roger Appleby Millimetre Wave Consulting, UK; 2ESA-ESTEC, The Netherlands;
3University of Exeter, UK; 4TK Instruments, UK

95 Accurate Determination of Dielectric Properties in Small, High-Permittivity Dielectric Cylinders
N. Tagdulang1, P. Krkotic1, A. Diez1, M. Pont2, J.M. O’Callaghan1
1Universitat Politècnica de Catalunya, Spain; 2CELLS-ALBA, Spain

Felix Bachbauer, K. Lomakin, Tim Pfahler, Gerald Gold, FAU Erlangen-Nürnberg, Germany

103 Relative Permittivity Measurements with SIW Resonant Cavities at mm-Wave Frequencies
Gabriele Federico1, Anouk Hubrechsen2, Diego Caratelli1, A. Bart Smolders2
1Antenna Company, The Netherlands; 2Technische Universiteit Eindhoven, The Netherlands

107 Characterisation of Dielectric Materials at G-Band (140–220GHz) Using a Guided Free-Space Technique
Minjie Shu1, Xiaobang Shang2, Nick Ridler2, Mira Naftaly2, Cheng Guo1, Anxue Zhang1
1XJTU, China; 2NPL, UK

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EuMC08: Non-planar Filters II
Chair: Richard Snyder, RS Microwave, USA
Co-Chair: Miguel A.G. Laso, Universidad Pública de Navarra, Spain
16:40–18:20, Tuesday 27th September 2022, Amber 4

(NA) Recent Advances on True Inline Filters with Transmission Zeros (Invited Keynote)
Giuseppe Macchiarella, Politecnico di Milano, Italy

111 High-Power Ka-Band Bandpass Filter Based on Movable Dielectric-Loaded TE_01δ Mode Resonators
Paolo Vallerotonda1, Fabrizio Cacciamani1, Luca Pelliccia1, Cristiano Tomassoni2, Vittorio Tornielli di Crestvolant3
1RF Microtech, Italy; 2Università di Perugia, Italy; 3ESA-ESTEC, The Netherlands

115 Compact Ultra-Wideband Bandpass Filter Using Additively Manufactured TM-Mode Dielectric Resonators
Abdalrahman Widaa1, Fabrizio Cacciamani2, Luca Pelliccia2, Cristiano Tomassoni3, Vittorio Tornielli di Crestvolant4, Michael Höft1
1CAU, Germany; 2RF Microtech, Italy; 3Università di Perugia, Italy; 4ESA-ESTEC, The Netherlands

119 Micromachined on Silicon Miniaturized Ka-Band Diplexer for Ground-Segment User Terminals
Davide Tiradossi1, Luca Pelliccia1, Stefano Moscato2, Antonio Traversa2, Giandomenico Cannone3, Petar Jankovic4, Fabrizio De Paolis4
1RF Microtech, Italy; 2SIAE MICROELETTRONICA, Italy; 3Independent Researcher, Italy; 4ESA-ESTEC, The Netherlands

123 Ka-Band Cavity Filter Manufactured in 3D-Printed Alumina Technology
F. Aquino1, Davide Tiradossi1, Luca Pelliccia1, A. De Padova2, Francesco Vitulli2, Sergio Di Nardo2, François Deborgies3
1RF Microtech, Italy; 2Thales, Italy; 3ESA-ESTEC, The Netherlands
EuMC09: Oscillators and Phase Shifters
Chair: Nils Weimann, Universität Duisburg-Essen, Germany
Co-Chair: Lorenz-Peter Schmidt, FAU Erlangen-Nürnberg, Germany
16:40–18:20, Tuesday 27th September 2022, Amber 5

(NA) Millimeter-Waves Propagation in Real In-Building Environment (Invited Keynote)
Marco Fantuzzi, JMA Wireless, Italy

127 Achieving a Relative Bandwidth of 176% with a Single PLL at up to 12.5GHz
Tobias T. Braun, Jan Schöpfel, Aldo J. Marquez M., Nils Pohl, Ruhr-Universität Bochum, Germany

131 Analysis of a Self-Oscillating Mixer Based on a Slow-Wave Structure
Mabel Pontón, Franco Ramírez, Sergio Sancho, Almudena Suárez, Universidad de Cantabria, Spain

135 Digital-Controlled High-Linearity Phase Shifter Using Vernier Ladder Network for Beyond 5G Phased Array Antenna
Ren Imanishi, Hideyuki Nosaka, Ritsumeikan University, Japan

139 Push-Push Oscillator Based on Packaged Space-Qualified Components Operating at 11.8GHz
D. Trofimowicz¹, P. Kant¹, E. Lia², J.J. Michalski¹
¹SpaceForest, Poland; ²ESA-ESTEC, The Netherlands

EuMC10: Devices for Sub-THz Front-Ends
Chair: Joachim Oberhammer, KTH, Sweden
Co-Chair: Guillaume Ducournau, IEMN (UMR 8520), France
16:40–18:20, Tuesday 27th September 2022, Suite 2

(NA) Challenges and Future of Sub-THz Communications Using CMOS Integrated Circuits (Invited Keynote)
Minoru Fujiishima, Hiroshima University, Japan

143 A 232–242GHz Coherent Transmitter with 1.2mW Peak Radiated Power in 28nm CMOS
Sumeet Londhe, Eran Socher, Tel Aviv University, Israel

147 THz Broadband Antenna on GaAs Using Laser-Structured Fused Silica Matching Layer
Marius Kretschmann¹, Christian Bohn¹, Benjamin Nuss¹, Akanksha Bhutani¹,
Axel Tessmann², Arnulf Leuther², Thomas Zwic¹
¹KIT, Germany; ²Fraunhofer IAF, Germany

151 Performance Comparison of Broadband Optical Modulators for 40GSPS All-Optical ADC
Joseph Fasbinder, Kai Wei, Afshin S. Daryoush, Drexel University, USA

(NA) Reconfigurable Intelligent Surface Technology: 6G System Enabler and Implementation Challenge (Invited Keynote)
Tung Phan, Joonas Kokkoniemi, Nhan Nguyen, Ping Jack Soh, Nuuati Tervo,
Marko E. Leinonen, Visa Tapio, Aarno Pärssinen, Markku Juntti, University of Oulu, Finland
EuMC11: Interconnects and Packaging
Chair: Amelie Hagelauer, Fraunhofer EMFT, Germany
Co-Chair: Akanksha Bhutani, KIT, Germany
09:00–10:40, Wednesday 28th September 2022, Amber 1

Industrial Solutions and Perspectives on Chip Packaging for mm-Wave Transceivers
(Invited Keynote)
Alessandro Fonte, Antonio Traversa, Stefano Moscato, Giulio Favre, SIAE MICROELETTRONICA, Italy

Broadband Circuit Board Interconnects Based on Anisotropic Conductive Adhesives
Kevin Erkelenz, Noah Sielck, Alexander Koelpin, Arne F. Jacob, Technische Universität Hamburg, Germany

EM Modeling and Measurement of 3D-RDL Interconnects in LGA Package for 5G RF SIP Applications
M.W. Rousstia, S. Kits, J. Zhao, R. Gajadharsing, Ampleon, The Netherlands

E-Band Phased Array eWLB Package Evaluation
Ahmed Shehata Abdellatif, Wenyao Zhai, Hari Krishna Pothula, David Wessel, Huawei Technologies, Canada

EuMC12: Multiport, Reconfigurable and Beamsteering Antennas
Chair: Anthony Ghiotto, IMS (UMR 5218), France
Co-Chair: Alessandra Costanzo, Università di Bologna, Italy
09:00–10:40, Wednesday 28th September 2022, Amber 2

Wide-Band, Wide-Scan, Long Slot Array for Satcom Applications in K/Ka-Band (Invited Keynote)
Adham Mahmoud, Ronan Sauleau, Mauro Ettorre, IETR (UMR 6164), France

Wideband Quadruple-Differentially-Fed Aperture-Coupled Stacked Patch Antenna
Timothée Le Gall1, Anthony Ghiotto2, Stefan Varault1, Gwenaël Morvan1, Bruno Louis1, Grégoire Pillet1
1Thales, France; 2IMS (UMR 5218), France

Fully-Integrated Dielectric Image Line Phased Array with Liquid Crystal Phase Shifters at W-Band
Henning Tesmer, Ersin Polat, Dongwei Wang, Rolf Jakoby, Technische Universität Darmstadt, Germany

Nonlinear Circuit Model of IDCs on Ferroelectric Nanomaterial for Reconfigurable Applications
S. Trovarello1, A. Di Florio Di Renzo1, M. Aldrigo2, Diego Masotti1, M. Dragoman2, Alessandra Costanzo1
1Università di Bologna, Italy; 2IMT Bucharest, Romania

A New Wideband and Passive Tx & Rx SatCom Antenna Module for Beam Steering in the K- and Ka-Band
Engelbert Tyroller, Stefan Lindenmeier, Universität der Bundeswehr München, Germany
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EuMC13: Imaging for Biomedical Applications
Chair: Panos Kosmas, King’s College London, UK
Co-Chair: Simona Di Meo, Università di Pavia, Italy
09:00–10:40, Wednesday 28th September 2022, Amber 3

(NA)  Solution of Complex Bioelectromagnetic and Biomedical Problems with Machine Learning (Invited Keynote)
Luciano Tarricone¹, Alfredo de Cillis¹, Caterina Merla², Giuseppina Monti¹, Marco Zappatore¹
¹Università del Salento, Italy; ²ENEA, Italy

183  PDMS Unidirectional Antenna Array for Microwave Breast Screening
Milad Mokhtari, Milica Popović, McGill University, Canada

187  Waveguide Array Applicator for Microwave Medical Imaging
M. Babák, J. Vrba, Czech Technical University in Prague, Czechia

191  Pulsed RF for Breast Screening: Chirp Z-Transform and Signal Decluttering
Leonardo Fortaleza, Milica Popović, McGill University, Canada

195  Preliminary Study of Breast Cancer Detection Using a Computational Microwave Imaging System
Rupesh Kumar, Vincent Fusco, Okan Yurduseven, Queen’s University Belfast, UK

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EuMC14: Non-planar Passive Components
Chair: Antonio Morini, Università Politecnica delle Marche, Italy
Co-Chair: Luca Pelliccia, RF Microtech, Italy
09:00–10:40, Wednesday 28th September 2022, Amber 4

(NA)  Smooth-Profiled Rectangular Waveguide Filters (Invited Keynote)
Jabir Hussain¹, Jamil Ahmad¹, Iván Arregui¹, Petronilo Martín-Iglesias², Israel Arnedo¹,
Txema Lopetegi¹, Miguel A.G. Laso¹
¹Universidad Pública de Navarra, Spain; ²ESA-ESTEC, The Netherlands

199  Full-Band E-Plane Waveguide Phase Shifters with Self-Compensating Characteristics for THz Circuits and Systems
Jie Deng, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada

203  Compact 5G N77 Bandpass Filter Design Mixing IPD and MIS Technologies
C. Laporte, L. Schwartz, E. Saugier, S. Charley, H. Ezzeddine, STMicroelectronics, France

207  Wideband Compact Dielectric-Less Launcher of an X-Band Ferrite Faraday Rotator
Antonio Morini¹, A. di Donato¹, Marco Farina¹, D. Mencarelli¹, D. Salimbeni²,
D. Serluca², A. Fattori², L. Rondini², F. Serrano²
¹Università Politecnica delle Marche, Italy; ²Rheinmetall, Italy

210  Three-Step Monoblock Waveguide Twist
Matteo Oldoni¹, Stefano Moscato², Dario Tresoldi²
¹Politecnico di Milano, Italy; ²SIAE MICROELETTRONICA, Italy
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EuMC15 : Load Modulated Power Amplifiers
Chair: Gavin Watkins, Toshiba, UK
Co-Chair: Roberto Quaglia, Cardiff University, UK
09:00–10:40, Wednesday 28th September 2022, Brown 1-2

(NA) Balancing the Unbalanced: Using the OLMBA for PA Load Mismatch Mitigation (Invited Keynote)
Roberto Quaglia 1, Jeff R. Powell 2, Kauser Chaudhry 1, Steve Cripps 1
1 Cardiff University, UK; 2 Skyarma, UK

214 Wideband Sequential Circulator Load Modulated Amplifier with Back-Off Efficiency Enhancement
Han Zhou, Jose-Ramon Perez-Cisneros, Christian Fager, Chalmers University of Technology, Sweden

218 90W 15dB OBO Reflective-Type DPA
Florian Dietrich, Muh-Dey Wel, Renato Negra, RWTH Aachen University, Germany

222 A LoadInsensitive Doherty Power Amplifier with Better Than -39dBc ACLR on 2:1 VSWR Circle Using a Constant 50Ω Trained Pre-Distorted Signal
Gagan Deep Singh 1, Dieuwert Mul 1, Hossein Mashad Nemati 2, Morteza S. Alavi 1,
Leo C.N. de Vreede 1
1 Technische Universität Delft, The Netherlands; 2 Huawei Technologies, Sweden

226 A 3.5G 500W Asymmetric Doherty Amplifier Employing Subharmonic Oscillation Suppression
Zhi Geng, Yi Zhu, Fred van Rijs, John Gajadharsing, Ampleon, The Netherlands

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EuMC16 : Advances in Electromagnetic Modeling and Analytical Methods
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Co-Chair: Walter Fuscaldo, CNR-IMM, Italy
09:00–10:40, Wednesday 28th September 2022, Suite 1

(NA) Numerical Analysis of SIW Devices and RLSA Antennas for the Design of Large Structures Capable of Broadband Radiation and Near-Field Shaping (Invited Keynote)
Massimiliano Casaletti 1, Matthieu Bertrand 2, Guido Valerio 1, Mauro Ettorre 3
1 GeePs (UMR 8507), France; 2 Thales, France; 3 IETR (UMR 6164), France

230 Effective TE-Polarized Bessel-Beam Excitation for Wireless Power Transfer Near-Field Links
Edoardo Negri 1, Francesca Benassi 2, Walter Fuscaldo 3, Diego Masotti 2,
Paolo Burghignoli 1, Alessandra Costanzo 2, Alessandro Galli 1
1 Università di Roma “La Sapienza”, Italy; 2 Università di Bologna, Italy; 3 CNR-IMM, Italy

234 Excitation in Time-Domain Analyses: A Pivotal Element for Accurate Simulations
Junhong Gu 1, Roy van Krieken 1, Martin Štumpf 2, Ioan E. Lager 1
1 Technische Universität Delft, The Netherlands; 2 Brno University of Technology, Czechia

238 An Analytical Model to Approximate the Radiation Conductance of Microstrip Gaps
Benedikt Sievert, Marvin Degen, Jan Taro Svejda, Daniel Erni, Andreas Rennings,
Universität Duisburg-Essen, Germany

242 Lasing Threshold Conditions for Transversal Modes of Twin Graphene-Covered Circular Quantum Wires
Daria O. Herasymova 1, Sergii V. Dukhopelnykov 1, Ronan Sauleau 2
1 NASU, Ukraine; 2 IETR (UMR 6164), France
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EuMC17: EuMC Posters
Chair: Marco Pasian, Università di Pavia, Italy
Co-Chair: Simona Di Meo, Università di Pavia, Italy
10:40–13:00, Wednesday 28th September 2022, Exhibition Hall

246  An Ultra-Compact Power Divider for MMIC Applications
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     Macquarie University, Australia

250  Uniaxially Symmetrical T-Junction OMT with 45-Degree Tilted Branch Waveguide
     Ports
     Hidenori Yukawa, Yu Ushijima, Toru Takahashi, Toru Fukasawa, Yoshio Inasawa,
     Naofumi Yoneda, Moriyasu Miyazaki, Mitsubishi Electric, Japan

254  Filtering Waveguide Cavity Couplers with Tight Amplitude Balance
     Xun Chen¹, Yi Wang², Qiang Shao³, Talal Skaik², Qingfeng Zhang¹
     ¹SUSTech, China; ²University of Birmingham, UK; ³Foshan University, China

258  Hybrid TM-Mode / Coaxial Triple-Band Bandpass Filter
     Kennet Braasch, Daniel Miek, Patrick Boe, Fynn Kamrath, Michael Höft, CAU, Germany

262  A Substrate Integrated Waveguide Frequency Switchable Filter Using Vanadium
     Dioxide Tuners
     Maxime Agaty, Claire Dalmay, Aurelian Crunteanu, Pierre Blondy, XLIM (UMR 7252),
     France

266  Reconfigurable Parametric Mid-Infrared Frequency Up/Down Conversion Using
     Multimode Plasmon Resonances in Graphene Ribbon Metasurfaces
     A.M. Lerer¹, G.S. Makeeva², V.V. Cherepanov¹
     ¹Southern Federal University, Russia; ²Penza State University, Russia

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     Fabricated Air-Filled Waveguide
     Jakub Sorocki, Krzysztof Wincza, Slawomir Gruszczynski, Ilona Piekarz, AGH UST, Poland

278  Characterization of the Dielectric Properties of Commercially Available Low-Loss
     UV-Curable Resins from 60GHz to 90GHz
     P. Escobari Vargas¹, E. Meyer¹, F. Chiappini², Alessandro Garufo³, Stefania Monni²,
     Ulf Johannsen¹, Ad C.F. Reniers¹
     ¹Technische Universiteit Eindhoven, The Netherlands; ²CITC, The Netherlands; ³TNO, The
     Netherlands

282  On-Wafer Characterization and Modelling of InP Resonant Tunnelling Diodes up to
     500GHz
     Simone Clochiatti¹, Robin Schmidt², Enes Mutlu¹, Michael Dieudonne³, Werner Prost¹,
     Dominique Schreurs², Nils Weimann¹
     ¹Universität Duisburg-Essen, Germany; ²KU Leuven, Belgium; ³Keysight Technologies,
     Belgium

286  Using RCS Radial Pattern Combined with Multi-Path Effect for Automotive Radar
     Simulations
     Mohammad Saifo¹, Alexander Ioffe², Markus Stefer², Markus Clemens¹
     ¹Bergische Universität Wuppertal, Germany; ²Aptiv Services Deutschland, Germany

290  2-D Scattering and Absorption of E-Polarized Plane Wave by a Circular Dielectric Wire
     with Partial Graphene Cover
     Iryna Mikhailikova¹, Sergii V. Dukhopelnykov²
     ¹V.N. Karazin Kharkiv National University, Ukraine; ²NASU, Ukraine
EuMC18: Interconnects and Packaging for Sub-Millimeter-Wave Applications
Chair: Mehmet Kaynak, IHP, Germany
Co-Chair: Mario Pauli, KIT, Germany
11:20–13:00, Wednesday 28th September 2022, Amber 1

(NA) Recent Advances in System in Package (Invited Keynote)
Amelie Hagelauer², Marco Dietz², Robert Weigel², Thomas Zwick³, Akanksha Bhutani³
1Fraunhofer EMFT, Germany; 2FAU Erlangen-Nürnberg, Germany; 3KIT, Germany

Mechanically Flexible Dielectric Waveguides and Bandstop Filters in Glass Technology at G-Band
Thomas Galler¹, Malte Schulz-Ruhtenberg², Tobias Chaloun¹, Christian Waldschmidt¹
1Universität Ulm, Germany; 2LPKF, Germany

Aerosol Jet Printed Millimeter Wave Interconnects in D-Band
Georg Gramlich, Robert Huber, Uli Lemmer, Thomas Zwick, KIT, Germany

A 300GHz Waveguide Cavity Filter Fabricated by 3D Screen Printing Technology
Talal Skaik¹, Milan Salek¹, Yi Wang¹, Peter G. Huggard², Peter Hunyor², Hui Wang²,
Kay Reuter³
1University of Birmingham, UK; 2STFC RAL, UK; 3Fraunhofer IFAM, Germany

A 300GHz Waveguide Cavity Filter Fabricated by 3D Screen Printing Technology
Talal Skaik¹, Milan Salek¹, Yi Wang¹, Peter G. Huggard², Peter Hunyor², Hui Wang²,
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Talal Skaik¹, Milan Salek¹, Yi Wang¹, Peter G. Huggard², Peter Hunyor², Hui Wang²,
Kay Reuter³
1University of Birmingham, UK; 2STFC RAL, UK; 3Fraunhofer IFAM, Germany

Differential Bondwire Interface for Chip-to-Chip and Chip-to-Antenna Interconnect Above 200GHz
Joachim Hebeler¹, Luca Steinweg², Thomas Zwick¹
1KIT, Germany; 2Technische Universität Dresden, Germany

EuMC19: Antenna and Array Characterization Techniques
Chair: David Prinsloo, ASTRON, The Netherlands
Co-Chair: Yang Hao, Queen Mary University of London, UK
11:20–1:00, Wednesday 28th September 2022, Amber 2

(NA) Air-Filled Substrate Integrated Technology — A Paradigm for High Performance
Antenna Systems (Invited Keynote)
Kamil Yavuz Kapusuz, Sam Lemey, Hendrik Rogier, Ghent University, Belgium

Contactless Antenna Radiation Efficiency Measurement Within Reverberation Chambers: Sensitivity Improvement
François Sarrazin¹, Adhane Labdouni¹, Wafa Krouka¹, Julien de Rosny², Elodie Richalot¹
1ESYCOM (UMR 9007), France; 2ESPCI Paris, France

Broadband Antenna Radiation Pattern Measurement from Backscattering Coefficient in a Reverberation Chamber
François Sarrazin¹, Ariston Reis¹, Lotfy Zeghoudi¹, Philippe Besnior², Elodie Richalot¹
1ESYCOM (UMR 9007), France; 2IETR (UMR 6164), France

Spherical mm-Wave Anechoic Chamber for Accurate Far-Field Radiation Pattern Measurements
Ad C.F. Reniers, Anouk Hubrechsen, Gabriele Federico, I.A. Bronckers, A. Bart Smolders,
Technische Universiteit Eindhoven, The Netherlands

Inter-Beam Modulation Prediction and Test for Multi-Beam Active Arrays with Beam-Hopping Capability
I. Herrero-Sebastián, A. Martin-González, A. Montesano, D. Peña, F. Cano, D. Alvarez,
Airbus, Spain
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EuMC20: Multi-Functional and Multi-Band Planar Filtering Devices
Chair: Roberto Gomez-Garcia, Universidad de Alcalá, Spain
Co-Chair: Michael Höft, CAU, Germany
11:20–13:00, Wednesday 28th September 2022, Amber 4

(NA)  Coupling Matrix Based Design of Filters with Pole Generating Couplings (Invited Keynote)
Michał Mrozowski¹, Adam Lamecki¹, Maciej Jasiński¹, Roberto Gómez-García²
¹Gdansk University of Technology, Poland; ²Universidad de Alcalá, Spain
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Input-Reflectionless Two-Branch Channelized Passive Dual-Band Bandpass Filters
Mohamed Malki, Li Yang, Roberto Gómez-García, Universidad de Alcalá, Spain
329

Multifunctional Switchable Filter Using Shorted Coupled-Line Sections
Minahil Shirazi¹, David Chatzichristodoulou¹, Abdul Quddious², Noshernaw Shoaih³,
Dimitra Psychogiou⁴, Symeon Nikolaou¹, Photos Vryonides¹
¹Frederick Research Center, Cyprus; ²University of Cyprus, Cyprus; ³NUST, Pakistan;
⁴University College Cork, Ireland
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Input-Absorptive High-Order Wideband Balun Bandpass Filters with Quasi-elliptic-Type Response
Li Yang, Roberto Gómez-García, Universidad de Alcalá, Spain
337

Self-Packaged Dual-Band Filter with High Selectivity and Low Radiation Loss
Hanyu Tian, Yuandan Dong, UESTC, China

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EuMC21: Power Amplifiers Linearization Techniques
Chair: Anding Zhu, University College Dublin, Ireland
Co-Chair: José Carlos Pedro, Universidade de Aveiro, Portugal
11:20–13:00, Wednesday 28th September 2022, Brown 1-2

(NA)  Modeling and Compensation of AlGaN/GaN HEMT Dynamic Nonlinearities (Invited Keynote)
José Carlos Pedro, João L. Gomes, Luis C. Nunes, Filipe M. Barradas, Universidade de Aveiro, Portugal
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A 60GHz CMOS Power Amplifier with Combined Adaptive-Bias and Linearizer in 28nnm Process
Kyung Pil Jung¹, Tae Hwan Jang², Oung Soon Choi¹, Chul Soon Park¹
¹KAIST, Korea; ²Hanyang University, Korea
345

Accelerating Model Adaptation of Multi-Metric Digital Predistortion for RF Power Amplifiers Using Composited Quadratic Loss Function
Hang Yin, Chenhao Chu, Anding Zhu, University College Dublin, Ireland
349

A 28GHz 22FDX PA with 31.5% Peak PAE and Output Power of 21dBm in CW, 18.5dBm in QPSK, and 12.5dBm in 64QAM
Z. Al-Husseini¹, S. Syed², P.V. Testa¹, G. Katzman², G. Bossu¹, Z. Zhao¹, S. Moss²,
C. Tianbing²
¹GlobalFoundries, Germany; ²GlobalFoundries, USA
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GaN Power Amplifier Linearization Using Second Harmonic Injection into the Input
Farhad Abbasnezhad, Majid Tayarani, Adib Abrishamifar, Vahid Nayyeri, IUST, Iran
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EuMC22: Simulation-Oriented Characterization of Microwave Devices
Chair: Gian Guido Gentili, Politecnico di Milano, Italy
Co-Chair: Simone Bastioli, RS Microwave, USA
11:20–13:00, Wednesday 28th September 2022, Suite 1

(NA) An Overview of Leaky-Mode Effects on Printed-Circuit Transmission Lines (Invited Keynote)
David R. Jackson1, Francisco Mesa2, Alessandro Galli3, Paolo Baccarelli4, Paolo Burghignoli5, Giampiero Lovat3, Walter Fuschino5
1 University of Houston, USA; 2 Universidad de Sevilla, Spain; 3 Università di Roma “La Sapienza”, Italy; 4 Università di Roma Tre, Italy; 5 CNR-IMM, Italy

357 Accelerated Partial Inductance Evaluation via Cubic Spline Interpolation for the PEEC Method
Daniele Romano1, Fabrizio Loreto1, Giulio Antonini1, Ivana Kovačević-Badstübner2, Ulrike Grossner2
1 Università dell’Aquila, Italy; 2 ETH Zürich, Switzerland

Simulation-Based Miniaturization of Microwave Passive Components with Explicit Equality Constraint Correction
Slawomir Kozieł1, Anna Piętrenko-Dabrowska2
1 Reykjavik University, Iceland; 2 Gdańsk University of Technology, Poland

Noise in Coherently Radiating Periodic Structures Beam Forming Networks
Carlos Biurrun-Quel, Carlos del-Río, Universidad Pública de Navarra, Spain

RF MEMS Switch Design Methodology by Electromagnetic Simulations and Machine Learning
Loukas Michalas1, Kriton Konstantinidis2, Paola Farinelli3, Danilo P. Mandic2, George Konstantinidis1
1 FORTH, Greece; 2 Imperial College London, UK; 3 RF Microtech, Italy

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EuMC23: Additive Manufacturing for Microwave Components
Chair: Giuseppe Addamo, CNR-IEIIT, Italy
Co-Chair: Oscar Antonio Peverini, CNR-IEIIT, Italy
14:20–16:00, Wednesday 28th September 2022, Amber 1

(NA) Trends and Prospects of All-Metal 3D-Printing Technologies for Next-Generation Space-Borne Antenna Systems (Invited Keynote)
Oscar Antonio Peverini1, Giuseppe Addamo1, Flaviana Calignano2, Mauro Lumia1, Diego Giovanni Manfredi2, Giuseppe Virone1
1 CNR-IEIIT, Italy; 2 Politecnico di Torino, Italy

373 Additively Manufactured WR15 Waveguide to Microstrip Transition for Broadband V-Band Applications
A. Hofmann, L. Klein, K. Lomakin, M. Sippel, Gerald Gold, FAU Erlangen-Nürnberg, Germany

377 Additive Manufactured CPW Lines Cured by Intense Pulse Light for Automotive Microwave Applications
Adamantia Chletsou1, Alexandra Bannon1, Xenophon Konstantinou1, Lauren Reimnitz2, John Locke3, John Papapolymerou1
1 Michigan State University, USA; 2 PulseForge, USA; 3 Ford, USA

381 Evaluation of Crosstalk Between Additively Manufactured Slotted Waveguides in mm-Wave Applications
K. Lomakin1, S. Alhasson2, Gerald Gold1
1 FAU Erlangen-Nürnberg, Germany; 2 NXP Semiconductors, Germany
EuMC24: Novel Array Topologies and Beamsteering Techniques
Chair: Wim van Cappellen, ASTRON, The Netherlands
Co-Chair: Nuno Borges Carvalho, Universidade de Aveiro, Portugal
14:20–16:00, Wednesday 28th September 2022, Amber 2

Wideband Connected Slot Arrays at mm-Wave Frequencies (Invited Keynote)
Alexander van Katwijk, Daniele Cavallo, Technische Universiteit Delft, The Netherlands

Thinned Array with Steerable Nulls to Cancel Grating Lobe for Automotive Radar Applications
Masato Kohtani¹, Sungwoo Cha¹, Paul Schmalenberg², Jae Lee², Linjie Li³, Toshihiko Takahata¹, Shinji Yamaura¹, Toshihiko Matsuoka¹, Gabriel M. Rebeiz³
¹MIRISE Technologies, Japan; ²Toyota, USA; ³University of California, San Diego, USA

Site-Specific Ultra-Low-Sidelobe Phased Array Topologies for Sparse Areas of Particular Shape
Yanki Aslan, Technische Universiteit Delft, The Netherlands

Compact 5.2GHz Reflection-Type Retrodirective Array Using Butler Matrix with Broadside Couplers
Yusaku Honma, Jean Temga, Takashi Shiba, Noriharu Suematsu, Tohoku University, Japan

Phase Adjustment for Beamforming Arbitrarily-Shaped Phased Arrays
Ricardo A.M. Pereira, Nuno Borges Carvalho, Universidade de Aveiro, Portugal

EuMC25: Sensing in Biological Systems I
Chair: Luciano Tarricone, Università del Salento, Italy
Co-Chair: Francesca Apollonio, Università di Roma “La Sapienza”, Italy
14:20–16:00, Wednesday 28th September 2022, Amber 3

Status on Microwave Dielectric Spectroscopy for Cellular Analysis (Invited Keynote)
Katia Grenier, David Dubuc, LAAS-CNRS, France

Investigation of Hydrogel Skin Phantoms Using Terahertz Time-Domain Spectroscopy
Divya Jayasankar¹, A.I. Hernandez-Serrano¹, Rachel A. Hand¹, Jan Stake²
¹University of Warwick, UK; ²Chalmers University of Technology, Sweden

In vivo Skin-Type Classification Using Millimeter-Wave Near-Field Probe Spectroscopy
Damaris Hecht, Tim Pfahler, Ingrid Ullmann, Thomas Alstidl, Nadia Amer, Yi Jin, Björn Eskofier, Martin Vossiek, FAU Erlangen-Nürnberg, Germany

Penetration Depth in Multilayered Biological Tissues Using a Compact Microwave Biosensor
Joséphine Masini, Rania Shahbaz, Frédérique Deshours, Georges Alquié, Chainae El Bastami, Hamid Kokabi, GeePs (UMR 8507), France

Millifluidic Sensor Designed to Perform the Microwave Dielectric Spectroscopy of Biological Liquids
Y. Kozhemyakin¹, S. Rehault-Godbert², David Dubuc¹, Katia Grenier¹
¹LAAS-CNRS, France; ²UMR BOA, France
EuMC26: Advanced Filters in Compact Realizations
Chair: Photos Vryonides, Frederick University, Cyprus
Co-Chair: Dimitra Psychogiou, University College Cork, Ireland
14:20–16:00, Wednesday 28th September 2022, Amber 4

Recent Progress on Multi-Configurable RF Filters (Invited Keynote)
Dimitra Psychogiou¹, Roberto Gómez-García²
¹University College Cork, Ireland; ²Universidad de Alcalá, Spain

BAW Filter for Space Applications at 4.2GHz
D. Mercier¹, T. Claret¹, M. Sansa¹, C. Hellion¹, J. Delprato¹, Y. Lamy¹, S. Ballandras², L. Carpentier³, J. Galdeano⁴
¹CEA-Leti, France; ²Frechnsys, France; ³CNES, France; ⁴ESA-ESTEC, The Netherlands

Quasi-Elliptic SAW Filters Using Multi-Resonant Acoustic-Wave Lumped-Element Resonator Stages
Mohammed R.A. Nasser, Dimitra Psychogiou, University College Cork, Ireland

High-Performance Inline Bandpass Filters Using Stub-Loaded Resonators with Internal and External Frequency-Variant Couplings
Vinay B. Narayane, Girish Kumar, IIT Bombay, India

Coupling Matrix Approaches for the Synthesis of Acoustic Wave Multiport Functions
L. Acosta, E. Guerrero, C. Caballero, J. Verdú, P. de Paco, Universitat Autònoma de Barcelona, Spain

EuMC27: Integration of Power Amplifiers
Chair: Zoya Popovic, University of Colorado Boulder, USA
Co-Chair: Gregor Lasser, Chalmers University of Technology, Sweden
14:20–16:00, Wednesday 28th September 2022, Brown 1-2

Wideband Transmit-Receive MMICs for Scalable Phased Arrays (Invited Keynote)
Charles Campbell, Deep C. Dumka, Kevin W. Kobayashi, Paul B. Schmid, Qorvo, USA

High Performance Stacked-FETs in 0.25μm GaN Technology for S-Band Power Amplifiers
Gjjs van der Bent, Peter de Hek, Rob Knight, Frank E. van Vliet, TNO, The Netherlands

A 10W 6–12GHz GaN MMIC Supply Modulated Power Amplifier
Connor Nogales¹, Zoya Popović¹, Gregor Lasser²
¹University of Colorado Boulder, USA; ²Chalmers University of Technology, Sweden

An Efficient and Fast Reverse Buck Converter for High-Power Envelope-Tracking Systems
Sophie Paul¹, Nikolai Wolff¹, Christophe Delepaut², Wolfgang Heinrich¹, Olof Bengtsson¹
¹FBH, Germany; ²ESA-ESTEC, The Netherlands

Embedding of High Power RF Transistor Dies in PCB Laminate
Ioannis Peppas¹, Hiroaki Takahashi¹, Jim Yip², Erich Schlaffer³, Helmut Paulitsch¹, Wolfgang Bösch¹
¹Technische Universität Graz, Austria; ²Cantor Technologies, UK; ³AT&S, Austria
**EuMC28: Developments in Electromagnetic Computational Techniques**

*Chair: Małgorzata Celuch, QWED, Poland*
*Co-Chair: Michal Mrozowski, Gdańsk University of Technology, Poland*

14:20–16:00, Wednesday 28th September 2022, Suite 1

1. **Recent Advances in Hybrid Solver Technology for EM Simulations** *(Invited Keynote)*
   - Ralf Beyer¹, Ralf Ihmels², Peter Krauß¹, Thomas Sieverding¹
   - ¹Mician, Germany; ²Mician, USA

2. **Two-Dimensional TE Series Node Transmission-Line Modelling Based on Unstructured Triangular Meshes**
   - Kaiqi Yan, Ana Vukovic, Phillip Sewell, University of Nottingham, UK

3. **Computation of Time Domain Scattering Parameters Through the Numerical Inversion of the Laplace Transform**
   - Fabrizio Loreto¹, Giuseppe Pettanice¹, Daniele Romano¹, Martin Štumpf², Ioan E. Lager³, Giulio Antonini¹
   - ¹Università dell’Aquila, Italy; ²Brno University of Technology, Czechia; ³Technische Universität Delft, The Netherlands

4. **An Efficient Two-Step Leapfrog HIE-FDTD Method with More Relaxed Stability Condition**
   - Ankit Kumar Pandey, Alok Kumar Saxena, IIT Jammu, India

5. **An Optimized Six-Step LOD-FDTD Method Using the Artificial Anisotropy Parameters**
   - Alok Kumar Saxena¹, Kumar Vaibhav Srivastava²
   - ¹IIT Jammu, India; ²IIT Kanpur, India

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**EuMC29: Sensing in Biological Systems II**

*Chair: Katia Grenier, LAAS-CNRS, France*
*Co-Chair: Caterina Merla, ENEA, Italy*

16:40–18:20, Wednesday 28th September 2022, Amber 3

1. **Bioelectromagnetic Research Based on Lessons Learned, Reliable Techniques and Microscopic Models: The Challenge of 5G** *(Invited Keynote)*
   - Micaela Liberti, Francesca Apollonio,Università di Roma “La Sapienza”, Italy

2. **A Hybrid Correlation-Dicke Radiometer for Internal Body Thermometry**
   - Jooeun Lee, Gabriel Santamaría Botello, Robert Streeter, Kaitlin Hall, Zoya Popović, University of Colorado Boulder, USA

3. **Towards Tumor Detection with a Microwave Ablator Based on Dielectrometry**
   - Martin Schüßler¹, Markus Paravicini¹, Carolin Hessinger¹, Robin Neuder¹, Frank Hübner², Thomas J. Vogl², Rolf Jakoby¹
   - ¹Technische Universität Darmstadt, Germany; ²Universitätsklinikum Frankfurt, Germany

4. **System Considerations and Analog Baseband Design for an FMCW Radar-Based Breast Cancer Detection**
   - Martin Maier, Vadim Issakov, Technische Universität Braunschweig, Germany

5. **Improvement of Breast Shape in a Female Whole-Body Model: A Numerical Evaluation of the Exposure to 2.45GHz Plane Wave**
   - Noemi Dolciotti, Micol Colella, Simona D’Agostino, Francesca Apollonio, Micaela Liberti,Università di Roma “La Sapienza”, Italy
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EuMC30 : Substrate Integrated Waveguide and Multilayer Techniques
Chair: Bart Nauwelaers, KU Leuven, Belgium
Co-Chair: Tarek Djerafi, INRS-EMT, Canada
16:40–18:20, Wednesday 28th September 2022, Amber 4

(NA)  
**Power Handling Capabilities of SIW and AFSIW Transmission Lines and Circuits**  
(Invited Keynote)  
Anthony Ghiotto, IMS (UMR 5218), France

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**Multilayer Universal Transitions Between Substrate Integrated Waveguides and Rectangular Waveguides**  
Uros Jankovic1, Shakti Singh Chauhan2, Ananjan Basu2, Djuradj Budimir3  
1Military Technical Institute, Serbia; 2IIT Delhi, India; 3University of Westminster, UK

484  
**A Vertical Transition Between Microstrip Line and Air-Filled SIW at Ka-Band**  
Jingwen Zhang1, Yvan Duroc2, Ke Wu3, Anthony Ghiotto4, Tan-Phu Young1  
1IMEP-LaHC (UMR 5130), France; 2Laboratoire Ampère (UMR 5005), France; 3Polytechnique Montréal, Canada; 4IMS (UMR 5218), France

488  
**A Comparative Study of Two Wideband 8×8 Butler Matrices for Millimeter-Wave Bands**  
Mehri Borhani Kakhki, Ahmed Shehata Abdellatif, Hari Krishna Pothula, David Wessel, Huawei Technologies, Canada

492  
**A Vertical Transition Between Microstrip Line and Air-Filled SIW at Ka-Band**  
Jingwen Zhang1, Yvan Duroc2, Ke Wu3, Anthony Ghiotto4, Tan-Phu Young1  
1IMEP-LaHC (UMR 5130), France; 2Laboratoire Ampère (UMR 5005), France; 3Polytechnique Montréal, Canada; 4IMS (UMR 5218), France

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EuMC31 : Power Amplifiers Performance Improvement Techniques
Chair: Kevin Morris, University of Bristol, UK
Co-Chair: Vittorio Camarchia, Politecnico di Torino, Italy
16:40–18:20, Wednesday 28th September 2022, Brown 1-2

(NA)  
**Doherty Power Amplifiers for Sub-6GHz and Beyond 6GHz: Challenges and Design Approaches**  
(Invited Keynote)  
Anna Picciolo, Vittorio Camarchia, Politecnico di Torino, Italy

496  
**A 24–31GHz 28nm FD-SOI CMOS Balanced Power Amplifier Robust to 3:1 VSWR for 5G Application**  
G. Diverrez1, E. Kerhervé1, Andreaia Cathelin2  
1IMS (UMR 5218), France; 2STMicroelectronics, France

500  
**Power Amplifier Design Using Interactive Multi-Objective Visualization**  
Stefan Stroessner, Reyes Lucero, Jacob Kravits, Alec Russell, Seth Johannes, Kyri Baker, Joseph Kasprzyk, Zoya Popović, University of Colorado Boulder, USA

504  
**A 1.6–2.2GHz Continuous Class-F Power Amplifier with Compact Harmonically Controlled Networks**  
Shinichi Tanaka, Eri Tsuji, Shibaura Institute of Technology, Japan

508  
**Combining Class J and Inverse Class F Continuous Modes for a Highly Efficient Broadband Power Amplifier**  
Alex Pitt, Tommaso Cappello, Kevin Morris, University of Bristol, UK
### EuMC32: Microwave Sensing Devices

Chair: Ferran Martín, Universitat Autònoma de Barcelona, Spain  
Co-Chair: Daniel Segovia-Vargas, Universidad Carlos III de Madrid, Spain  
16:40–18:20, Wednesday 28th September 2022, Suite 1

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<td>A Generalized Noncontact Vital-Sign Sensing System Based on MIMO FMCW Radar Sensors</td>
<td>Cheng Cao, Xiuping Li, Xin Liu, BUPT, China</td>
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<td>A Method to Retrieve the Output Variables in Reflective-Mode Phase-Variation Sensors</td>
<td>Mahmoud Elgeziry¹, Ferran Paredes¹, Paris Vélez¹, Filippo Costa², Simone Genovesi², Ferran Martín¹</td>
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<td>¹Universitat Autònoma de Barcelona, Spain; ²Università di Pisa, Italy</td>
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<td>Precise Active Sensor Design for Monitoring in Biological and Industrial Applications</td>
<td>Sandra Santiago-Melas¹, Daniel Segovia-Vargas¹, Adrián Amor-Martín¹, Vicente González-Posadas²</td>
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<td>¹Universidad Carlos III de Madrid, Spain; ²Universidad Politécnica de Madrid, Spain</td>
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<td>Dual Band CSRR Fluidic Sensor with 3D Printed Channel</td>
<td>Zsolt Szabó, PPKE, Hungary</td>
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### EuMC33: Conceptual Progress in Antenna Design

Chair: Simone Genovesi, Università di Pisa, Italy  
Co-Chair: Ioan E. Lager, Technische Universität Delft, The Netherlands  
09:00–10:40, Thursday 29th September 2022, Amber 1

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<td>Elizabeth Bekker, Akanksha Bhutani, Lucas Giroto de Oliveira, Theresa Antes, Thomas Zwick, KIT, Germany</td>
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<td>Reconfigurable Switched Beam Filtenna Based on Corner Cube Reflector and Combline SIW Resonator</td>
<td>Hossein Sarbandi Farahani, Behrooz Rezaee, Wolfgang Bösch, Technische Universität Graz, Austria</td>
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<td>A Review of PA-Antenna Co-Design: Direct Matching, Harmonic Tuning and Power Combining</td>
<td>Martijn de Kok¹, Stefania Monni², Marc van Heijningen², Alessandro Garufo², A. Bart Smolders¹, Ulf Johannsen¹</td>
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<td>¹Technische Universität Eindhoven, The Netherlands; ²TNO, The Netherlands</td>
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<td>540</td>
<td>A Compact 2-D Phased Array Fed by 4×4 Butler Matrix Without Crossover in Broadside Coupled Stripline for Sub-6GHz 5G Applications</td>
<td>Jean Temga, Takashi Shiba, Noriharu Suematsu, Tohoku University, Japan</td>
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EuMC34: Novel Antennas for 5G and Beyond 5G Communication Systems
Chair: Zhinong Ying, Sony, Sweden
Co-Chair: Marta Martinez-Vázquez, Renesas Electronics, Germany
09:00–10:40, Thursday 29th September 2022, Amber 2

(NA) Antenna Technologies for B5G and 6G Mobile System (Invited Keynote)
Zhinong Ying, Sony, Sweden

544 5G mm-Wave Dual-Orthogonal Polarized Antenna Array
Mohjaba Sohrabi1, Ronny Hahnel1, Dirk Plettemeier1, Stefan Schindler2,
Hans-Dieter Wohlmuth2
1Technische Universität Dresden, Germany; 2Infineon Technologies, Germany

548 Evolutionary Optimized Pixelated Antennas for 5G IoT Communication
Dominik Mair, Markus Unterladstaetter, Michael Renzler, Thomas Ussmueller, Universität Innsbruck, Austria

552 A Dual-Band Millimeter Wave SRR Loaded Printed Monopole with Annular Slot MIMO Antenna for 5G Applications
Priyank Mishra1, Maharana Pratap Singh1, Aditi Sharma2, Kumar Vaibhav Srivastava2,
Saptarshi Ghosh1
1IIT Indore, India; 2IIT Kanpur, India

556 Design of a Dual-Polarized SIW Cavity-Backed Self-Quadruplexing Antenna for mm-Wave 5G Applications
Amar D. Chaudhari1, Soumava Mukherjee2
1IIT Delhi, India; 2IIT Jodhpur, India

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EuMC35: Integration and Miniaturization of Filter Components
Chair: Anthony Ghiotto, IMS (UMR 5218), France
Co-Chair: Roberto Gomez-Garcia, Universidad de Alcalá, Spain
09:00–10:40, Thursday 29th September 2022, Amber 4

(NA) Passive Circuit Integration: Multi-Dimensional Evolution from Micro-Scale Components to Large-Scale Systems (Invited Keynote)
Ke Wu, Polytechnique Montréal, Canada

560 A 3D Slow-Wave Transmission Line Approach for the Design of Ka-Band CMOS Compact Filters
O. Occello1, L. Boukhezdar1, Marc Margalef-Rovira2, M. Barragan1, Cedric Durand3,
L. Vincent4, Philippe Ferrari1
1TIMA (UMR 5159), France; 2IEMN (UMR 8520), France; 3STMicroelectronics, France;
4CIME Nanotech, France

564 A Compact Millimeter-Wave On-Chip DGS-Based Bandstop Filter with Two Transmission Poles in CMOS Technology
Samundra K. Thapa, Baichuan Chen, Adel Barakat, Ramesh K. Pokharel, Kyushu University, Japan

568 A Miniaturized X-Band High-Index Supercavity Resonator in Microstrip Technology
Zahra Manzoor, Michael Dimitri Sinanis, Vahagn Mkhitaryan, Omer Yesilyurt,
Alexander V. Kildishev, Dimitrios Peroulis, Purdue University, USA

572 Miniaturized 6-Bit Phase-Change Capacitor Bank with Improved Self-Resonance Frequency and Q
Tejinder Singh, Raaafat R. Mansour, University of Waterloo, Canada
EuMC36: Wireless Power Transmission Recent Advances
Chair: Diego Masotti, Università di Bologna, Italy
Co-Chair: Martino Aldrigo, IMT Bucharest, Romania
09:00–10:40, Thursday 29th September 2022, Brown 1-2

(NA) UHF RFID-Based Wireless Power Transfer for Implantable Devices (Invited Keynote)
Leena Ukkonen, Lauri Sydänheimo, Toni Björninen, Tampere University, Finland

576 A New Wheel-Spoke Transmitter for Efficient WPT Based on Frequency Diversity
Enrico Fazzini, Alessandra Costanzo, Diego Masotti, Università di Bologna, Italy

580 Design of Multiple-Transmitter WPT System with Angular Misalignment Estimation
from Mutual Inductance Tracking
Seong-Jin Kim, Jeong-Wook Kim, Hyo-Won Lee, Hyunyoung Cho, Ju-Ik Oh, Jong-Won Yu, KAIST, Korea

584 Realization of a Passive UHF RFID Sensor Platform for the Detection of Damages on a
Concrete Reinforcement
Djordje Gunjic, Jasmin Walk, Moritz Fischer, Thomas Ussmueller, Universität Innsbruck, Austria

588 Wireless Power Charging System with DC Combined 3-Dimensional Receiver
Hyo-Won Lee, Jeong-Wook Kim, Seong-Jin Kim, Sang Hyuck Han, Ji-Hoon Lee, Jong-Won Yu, KAIST, Korea

EuMC37: Technological Advances for Integrated Antenna Design
Chair: Matthias Geissler, IMST, Germany
Co-Chair: Daniel Segovia-Vargas, Universidad Carlos III de Madrid, Spain
11:20–13:00, Thursday 29th September 2022, Amber 1

(NA) Electromagnetic Simulations of mm-Wave and Sub-THz Antennas Embedded in Real Systems (Invited Keynote)
Simona Bruni, Marta Arias Campo, Enrico Tolin, Winfried Simon, Oliver Litschke, IMST, Germany

592 A New GNSS Micro-Diversity System
Emanuel Panholzer, Stefan Lindenmeier, Universität der Bundeswehr München, Germany

596 The TREN1 Project: Development of a Galileo-Based GNSS Receiver and Antenna for Railway Safety-Related Applications
M. Puccitelli1, L. Marradi1, G. Pastore1, H. Al Bitar2, A.M. Tobie2, R. Guidi3, G. Galgani3, F. Inzirillo4, F. Rodriguez5, A. Martinelli5, Y.B. Yossef6, D. Lopour7
1Thales, Italy; 2Thales, France; 3EikonTech, Italy; 4MERMEC, Italy; 5Telespazio, Italy; 6Saphyrion, Switzerland; 7EUSPA, Czechia

600 Polarization Reconfigurable Patch Antenna Using ScDDAs
Rozenn Allanic1, Denis Le Berre1, Cédric Quendo1, Douglas Silva De Vasconcellos2, Virginie Grimal2, Damien Valente2, Jérôme Billoué2
1Lab-STICC (UMR 6285), France; 2GREMAN (UMR 7347), France

604 Dual-Band Structure-Shared Antenna With Large Frequency Ratio Using HMSIW Cavity
Yu Lei Yang, Xian Qi Lin, Yi Hong Su, Feng Xiao, UESTC, China
EuMC38: Advances in Antennas for Sensing and Testing

Chair: Dirk Heberling, RWTH Aachen University, Germany
Co-Chair: Lars Jacob Foged, Microwave Vision Group, Italy
11:20–13:00, Thursday 29th September 2022, Amber 2

(NA) Recent Developments in Probe Array Technology for NF and FF Antenna Testing (Invited Keynote)
Lars Jacob Foged, Francesco Saccardi, Microwave Vision Group, Italy

608 A Large Distance Focus Dielectric Fresnel-Based Lens Antenna for Millimeter Wave Radar
Niklas Muckermann, Jan Barowski, Nils Pohl, Ruhr-Universität Bochum, Germany

612 Rotationally Symmetric Lens Antenna with Biconical Feed for Broadband Measurement Applications
Z. Tian¹, Benedikt Sievert¹, M. Eube², P. Hildenhagen², Daniel Erni¹, Andreas Rennings¹
¹Universität Duisburg-Essen, Germany; ²RF-Frontend, Germany

616 Fully 3-D Printed Dielectric End-Fire Antenna Fed by Hollow Rectangular Waveguide Stefan Simion, MTA, Romania

620 A LHCP Printed Cross Dipole Antenna for Glacial Environmental Sensor Networks
Muhammad Abdur Rehman Hashmi, Paul V. Brennan, University College London, UK

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EuMC39: Broadband Coupler and Divider Design Techniques
Chair: Ke Wu, Polytechnique Montréal, Canada
Co-Chair: Alexander Kölpin, Technische Universität Hamburg, Germany
11:20–13:00, Thursday 29th September 2022, Amber 4

Enrico Massoni, STMicroelectronics, Italy

624 Circular Gysel Divider for the Frequency Range from 18GHz to 26GHz
Jasmin Gabsteiger¹, Christopher Beck², Marco Dietz¹, Robert Weigel¹, Fabian Lurz²
¹FAU Erlangen-Nürnberg, Germany; ²Technische Universität Hamburg, Germany

628 Improved Bandwidth 4- and 5-Branch Hybrids Using Stepped Mainline Impedance Technique
Jatin Khare¹, Praween Kumar Nishad², Debapratim Ghosh²
¹University of Texas at Austin, USA; ²IIT Bhubaneswar, India

632 Broadband Improved Directivity Microstrip Coupler Using Doubly Wound Planar Inductors
Praween Kumar Nishad, Debapratim Ghosh, IIT Bhubaneswar, India

636 Super-Compact, High-Performance Rat-Race Coupler for Sub-1GHz 5G Applications
Vahid Iramnejad¹, Stuart Barth², Daniel Oluami³
¹FH Kärnten, Austria; ²ACAMP, Canada; ³Infineon Technologies, Austria
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EuMC40: Near-field Wireless Power Transfer
Chair: Giuseppina Monti, Università del Salento, Italy
Co-Chair: Jasmin Grosinger, Technische Universität Graz, Austria
11:20–13:00, Thursday 29th September 2022, Brown 1-2

(NA) Analysis of Inductive Power Transfer Systems Using High Efficiency Oscillators
(Invited Keynote)
Almudena Suárez Rodriguez, Universidad de Cantabria, Spain

640 Unchain Wireless Power — The Future of NFC Wireless Charging
D. Lopez-Diaz, O. Kronschläger, P. Thüringer, U. Neffe, NXP Semiconductors, Austria

644 Near-Field Chipless-RFID System Based on Hybrid Time/Frequency Domain Encoding
and Power Splitter Reader
Amirhossein Karami-Horestani, Ferran Paredes, Ferran Martin, Universitat Autònoma de Barcelona, Spain

648 Optimal Coupling for Capacitive Wireless Power Transfer with One Repeater
Ben Minnaert1, Giuseppina Monti2
1Universiteit Antwerpen, Belgium; 2Università del Salento, Italy

652 A 6.78MHz Current Detector Using PCB Transformer for Responsible Wireless Power
Transfer
Seonhye Jang, Sunju Kim, Jaeyong Lee, Changkun Park, Soongsil University, Korea

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EuMC41: Metasurfaces and Applications
Chair: Francisco Medina, Universidad de Sevilla, Spain
Co-Chair: Pierre Blondy, XLIM (UMR 7252), France
11:20–13:00, Thursday 29th September 2022, Suite 1

(NA) Using Metamaterials to Enhance Medical Sensing and Imaging (Invited Keynote)
Panagiotis Kosmas, King’s College London, UK

656 Meta-Gaps for Mechanically Reconfigurable Phased Arrays
D. Elliott Williams, Ali Hajimiri, Caltech, USA

660 Frequency Controlled Polarization Rotating Transmitarray for Polarimetric Radar
Applications
Tim Freialdenhoven1, Maurice Scipers2, Thomas Dallmann1
1Fraunhofer FHR, Germany; 2RWTH Aachen University, Germany

664 Study of a 3D FSS-Based Printed Radome Demonstrator for a Patch Antenna at 3.6GHz
T.H. Le Dam1, Alejandro Niembro-Martin1, Thierry Lacreva1, Gregory Houzet1,
Camille Delfaut1, Damien Paulet1, Nadege Reverdy-Brulas4, Q. Bao Duong5,
T. Phu Vuong1
1IMEP-LaHC (UMR 5130), France; 2Schneider Electric, France; 3UGA-IUT1, France; 4LGP2
(UMR 5518), France; 5S.mart Grenoble Alpes, France

668 Investigation of a Digitally-Reconfigurable Metasurface for Magnetic Resonance
Imaging
Marius Lippke1, Endri Stoja1, Dennis Philipp2, Simon Konstandin2, Jürgen Jenne2,
Thomas Bertuch1, Matthias Günther2
1Fraunhofer FHR, Germany; 2Fraunhofer MEVIS, Germany
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EuMC42 : Advances in Antenna Arrays
Chair: Yang Hao, Queen Mary University of London, UK
Co-Chair: Marianna Ivashina, Chalmers University of Technology, Sweden
14:20–16:00, Thursday 29th September 2022, Amber 2

(NA)

- Challenges and Outlook for Radar Antenna Technologies (Invited Keynote)
  Piotr Marek Kamiński¹, Alessandro Garufo², Dave Bekers², Erio Gandini³, Cristina Yepes², Stefania Monni²
  ¹Airbus, Germany; ²TNO, The Netherlands; ³ESA-ESTEC, The Netherlands

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- Direct Analytical Synthesis of Broadside Inline Antenna Arrays
  Matteo Oldoni¹, Stefano Moscato², Steven Caicedo Mejllones¹, Cristian Franceschet³
  ¹Politecnico di Milano, Italy; ²SIAE MICROELETTRONICA, Italy; ³Università di Milano, Italy

(NA)

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- A G-Band Horn and OMT Platelet Array
  Mark A. McCulloch¹, Jack Ross Graham², Danielle George¹, Keith Grainge¹, Créidhe O’Sullivan²
  ¹University of Manchester, UK; ²National University of Ireland, Ireland

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- High Gain Omnidirectional Array Antenna Using SIW Technology
  Ahmad Emaeddin¹, Saeideh Shad², B.L.G. Jonsson¹
  ¹KTH, Sweden; ²Boise State University, USA

- A G-Band Horn and OMT Platelet Array
  Mark A. McCulloch¹, Jack Ross Graham², Danielle George¹, Keith Grainge¹, Créidhe O’Sullivan²
  ¹University of Manchester, UK; ²National University of Ireland, Ireland

- High Gain Omnidirectional Array Antenna Using SIW Technology
  Ahmad Emaeddin¹, Saeideh Shad², B.L.G. Jonsson¹
  ¹KTH, Sweden; ²Boise State University, USA

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EuMC43 : Focussed Session Efficient Millimeter-Wave Communications for Mobile Users
Chair: Elmine Meyer, Technische Universiteit Eindhoven, The Netherlands
Co-Chair: Ulf Johannsen, Technische Universiteit Eindhoven, The Netherlands
14:20–16:00, Thursday 29th September 2022, Amber 5

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- A W-Band Low-Power Gilbert Cell Mixer with Image Rejection in 130nm SiGe BiCMOS Technology
  Kateryna Smirnova¹, Mehmet Kaynak², Ahmet Çağrı Ulusoy¹
  ¹KIT, Germany; ²IHP, Germany

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- Demonstration of Flexible mm-Wave Digital Beamforming Transmitter Using Sigma-Delta Radio-over-Fiber Link
  Husileng Bao¹, Zhongxia Simon He¹, Filippo Ponzini², Christian Fager¹
  ¹Chalmers University of Technology, Sweden; ²Ericsson, Italy

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- Mutual Coupling Analysis of Open-Ended Ridge and Ridge Gap Waveguide Radiating Elements in an Infinite Array Environment
  Yingqi Zhang, Artem R. Vilenskiy, Marianna V. Ivashina, Chalmers University of Technology, Sweden

700

- Effect of Phase-Noise on the Distributed Massive MIMO Networks
  Jafar Banar, Thomas Eriksson, Chalmers University of Technology, Sweden

704

- A mm-Wave Hybrid Stirring Technique for Over-the-Air Testing in Reverberation Chambers
  N. Farid¹, Anouk Hubrechsen², J. Fridén³, Ulf Johannsen¹, A. Bart Smolders², L.A. Bronckers²
  ¹Technische Universiteit Eindhoven, The Netherlands; ²AntenneX, The Netherlands; ³Ericsson, Sweden
EuMC44 : Energy Harvesting and Antennas Solutions for WPT
Chair: Jasmin Grosinger, Technische Universität Graz, Austria
Co-Chair: Nuno Borges Carvalho, Universidade de Aveiro, Portugal
14:20–16:00, Thursday 29th September 2022, Brown 1-2

(NA) WPT as an Enabler of Space Exploration (Invited Keynote)
Nuno Borges Carvalho, Universidade de Aveiro, Portugal

708 Reflector-Based Power Output Maximization and Near-Field Detuning-Mitigation in Miniaturized Tightly-Coupled Flexible Rectenna Arrays
Mahmoud Wagih¹, Steve Beeby²
¹University of Glasgow, UK; ²University of Southampton, UK

712 Screen Printing of a Flexible Dual-Band Antenna on a New Biocomposite Based on a Flax Fiber Laminate
A. Sennouni¹, J.-M. Floc'h¹, S. Guéret², F. Callebert³, A.-C. Tarot¹
¹IETR (UMR 6164), France; ²GDS Composites, France; ³Groupe Depestele, France

716 An Energy Harvester for a Battery-Free Wireless Sensor System on a Marine Propulsion Shaft
Van Ai Hoang, Young Chul Lee, Mokpo National Maritime University, Korea

720 Dynamically Reconfigurable Broadband SP3T Switch Powered by WPT for Antenna Switching Applications
Asif Bilal¹, Abdul Quddious¹, Sasan Ahdi Rezaieh², Stavros Iezekiel¹,
Marco A. Antoniades¹
¹University of Cyprus, Cyprus; ²University of Queensland, Australia

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EuMC45 : Metasurfaces
Chair: Ferran Martín, Universitat Autònoma de Barcelona, Spain
Co-Chair: Vahid Nayyeri, IUST, Iran
14:20–16:00, Thursday 29th September 2022, Suite 1

(NA) Glide Symmetries and Their Practical Implications in Periodic Structures (Invited Keynote)
Oscar Quevedo-Teruel, KTH, Sweden

724 A Rasorber with a Selective In-Band Transmission Response Between Wide Absorption Bands
Aditi Sharma¹, Mondeep Saikia¹, Saptarshi Ghosh², Kumar Vaibhav Srivastava¹
¹IIT Kanpur, India; ²IIT Indore, India

728 Broadband Radar Cross Section Reduction Using Generalized Phase-Polarization Cancellation
Ali Ghadimi, Mohammad Shirmohammadkarimi, Mohammad Soleimani, Vahid Nayyeri,
IUST, Iran

732 Efficient Modeling of Nonlinear Graphene as a Surface Boundary Condition in the Finite-Difference Time-Domain Method
Fatemeh Moharrami¹, Vahid Nayyeri²
¹TCI, Iran; ²IUST, Iran

736 Resonances in the E-Polarized Terahertz Wave Scattering and Absorption by a Graphene Strip On-Substrate Grating
Fedir O. Yevtushenko, Sergii V. Dukhopelnykov, NASU, Ukraine
EuMC Closing Session
Chair: Alessandra Costanzo, Università di Bologna, Italy
Co-Chair: Luca D’Antonio, JMA Wireless, Italy and Marco Pasian, Università di Pavia, Italy
16:40–18:20, Thursday 29th September 2022, Brown 1-2

(C) EuMC Closing Session Welcome
Alessandra Costanzo 1, Luca D’Antonio 2, Marco Pasian 3
1 EuMC Chair; 2 EuMC Co-Chair; 3 EuMC TPC Chair

(C) New Trends and Advances in Wireless Communications — The Paradigm of the Smart Electromagnetic Environment
Andrea Massa, Università di Trento, Italy

(C) Meeting the Challenges of Connectivity Technologies for Today and Tomorrow
Frederic Gianesello, STMicroelectronics, France

(C) EuMC Awards Ceremony
Giuseppe Macchiarella, EuMW 2022 Awards Chair

(C) EuMC Closing Remarks
Luca Perregrini, EuMW 2022 General Chair

(C) Invitation to EuMW 2023
Thomas Zwick, EuMW 2023 General Chair

EuMIC/EuMC01: Receivers
Chair: Friedel Gerfers, Technische Universität Berlin, Germany
Co-Chair: Frank van den Bogaart, TNO, The Netherlands
09:00–10:40, Tuesday 27th September 2022, Amber 2

(C) Transmit/Receive Modules for ECM AESA: Architectures and Enabling Components
(Invited Keynote)
Andrea Bentini, Elettronica, Italy

(C) A 67GHz 23mW Receiver Utilizing Complementary Current Reuse Techniques
Jesse Moody, Stefan Lepkowski, Travis Forbes, Sandia National Laboratories, USA

(C) 28GHz Down-Conversion Mixer with RF Back-Gate Excitation Topology in 22nm FD-SOI
Massinissa Nabet, Martin Rack, L. Nyssens, Jean-Pierre Raskin, Dimitri Lederer, UCLouvain, Belgium

(C) A 60GHz Four-Element Beam-Tapering Receive Phased Array
Geon Ho Park 1, Tae Hwan Jang 2, Chul Soon Park 1
1 KAIST, Korea; 2 Hanyang University, Korea

(C) A 8–18GHz Low Noise Variable Gain Amplifier with 30dB Gain Control Range
Kutay Altintas 1, Tahsin Alper Ozkan 1, Melik Yazici 1, Mehmet Kaynak 2, Yasar Gurbuz 1
1 Sabanci University, Türkiye; 2 IHP, Germany
EuMC/EuMC02: Wireless Systems for Mobile Communication and Radar

Chair: Jonas Hansryd, Ericsson, Sweden
Co-Chair: Holger Maune, OvG Universität Magdeburg, Germany
14:20–16:00, Tuesday 27th September 2022, Amber 5

756  E-Band Ultra-Low-Noise (4.5dB) and High-Power (27dBm) GaN T/R Front-End MMIC
Erdin Ture, Fabian Thome, Dirk Schwantuschke, Michael Mikulla, Rüdiger Quay, Fraunhofer IAF, Germany

760  Long-Reach E-Band HPA for 5G Radio Link
Alberto Colzani1, Matteo Fumagalli1, Alessandro Fonte1, Antonio Traversa1, Erdin Ture2
1 SIAE MICROELETTRONICA, Italy; 2 Fraunhofer IAF, Germany

764  Opportunities, Progress and Challenges in Active Heatsink Antenna Arrays for 5G and Beyond
Yanki Aslan, Technische Universität Delft, The Netherlands

768  Highly Integrated Real-Time Imaging MIMO D-Band Radar for Industrial Applications
S. Leuchs1, C. Krebs1, S. Güttgemann1, S. Wickmann1, J. Perske1, H. Cetinkaya1, Nils Pohl1, B. Fischer2, Enrico Tolin3, Marta Arias Campo3, Simona Bruni3, J. Romstadt4, H. Papurcu4, T. Haschke5, T. Huge6
1 Fraunhofer FHR, Germany; 2 IMS Messsysteme, Germany; 3 IMST, Germany; 4 Ruhr-Universität Bochum, Germany; 5 SMS group, Germany

772  D-Band Backhaul and Fronthaul Solutions for 5G Radio Access Network
Mario G.L. Frecassetti1, Juan F. Sevillano2, David del Río2, Mehmet Izzet Saglam3, Antti Lamminen4, Vladimir Ermolov4
1 Nokia, Italy; 2 Ceit, Spain; 3 Turkcell Technology, Türkiye; 4 VTT Technical Research Centre of Finland, Finland

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EuMIC/EuMC03: THz Communication Systems in D and H bands: from Circuits to System-level

Chair: Guillaume Ducournau, IEMN (UMR 8520), France
Co-Chair: Joachim Oberhammer, KTH, Sweden
14:20–16:00, Tuesday 27th September 2022, Suite 2

776  mm-Wave and Sub-THz Integrated Circuits for Wireless Link Applications:
Technology and Research Trends (Invited Keynote)
Maurizio Pagani, Huawei Technologies, Italy

780  Polarisation Multiplex in 300GHz Wireless Communication Link Using Orthomode Transducer
Simon Haussmann1, Dominik Wrana1, Benjamin Schoch1, Axel Tessmann2, Ralf Henneberger3, Ingmar Kalffass1
1 Universität Stuttgart, Germany; 2 Fraunhofer IAF, Germany; 3 Radiometer Physics, Germany

784  Sub-THz Radio Communication Links from Research to Field Trial
M. Babay1, M. Moretto2, P. Perrault1, R. Bara-Maillet1, P. Mcillree1, E. Froger1, P. Di Prisco2, P. Lopez1
1 Nokia, France; 2 Nokia, Italy

784  A D-Band High-Gain Antenna Module Combining an In-Package Active Feed and a Flat Discrete Lens
J.L. Gonzalez-Jimenez, F. Foglia Manzillo, A. Hamani, A. Siligaris, A. Clemente, C. Dehos, CEA-Leti, France
788  Anomalous CMOS-Compatible Signal-to-Noise Enhancer Enabling a Filter-Less 14.5 dB C/IMD Boost in Slowly Modulated LTV RF Circuits
Hussein M.E. Hussein, Cristian Cassella, Northeastern University, USA

792  A W- to Ka-Band Frequency Converter for Ultra-High Throughput Satellite Systems
Alessandro Barigelli, Sergio Di Nardo, Francesco Vitulli, Ernesto Limiti, Patrick E. Longhi, Lorenzo Pace, François Deborgies
1Thales, Italy; 2Università di Roma “Tor Vergata”, Italy; 3ESA-ESTEC, The Netherlands

796  Compact Harmonic Transmitter and Receiver Architectures for Multifunction Wireless Systems
Yasser Bigdeli, Pascal Burasa, Ke Wu, Polytechnique Montréal, Canada

800  Numerical Comparison of Plane Wave Propagation Inside Realistic Anatomical Models and Multilayer Slabs
Micol Colella, Simona Di Meo, Micaela Libertà, Marco Pasian, Francesca Apollonio
1Università di Roma “La Sapienza”, Italy; 2Università di Pavia, Italy

804  Reconfigurable Dual-Type Sensor for Resonant and Broadband Liquid Materials Characterization
Ilona Piekarz, Sławomir Gruszczynski, Krzysztof Wincza, Jakub Sroci, AGH UST, Poland

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A Wideband Sensor for Complex Permittivity of Carasau Bread Dough Based on a Double Ridge Waveguide

C. Macciò¹, M.B. Lodi¹, N. Curreli², A. Melis¹, G. Mazzarella¹, Maurizio Bozzi³, A. Fanti¹
¹Università di Cagliari, Italy; ²IIT, Italy; ³Università di Pavia, Italy

EuMC/EuRAD01: Automotive Radar II

Chair: Thomas Zwick, KIT, Germany
Co-Chair: Kevin Cinglant, ZF Group, France
14:20–16:00, Wednesday 28th September 2022, Amber 5

(NA) Status and Trends in Automotive Radars (Invited Keynote)
Marlene Harter, Hochschule Offenburg, Germany

(NA) Instantaneous Ego-Motion Estimation Using a Coherent Radar Network
Marcel Hoffmann¹, Lena Krabbe¹, Christian Schüßler¹, Peter Gulden², Martin Vossiek¹
¹FAU Erlangen-Nürnberg, Germany; ²Indie Semiconductor, Germany

(NA) Doppler Beam Sharpening for High-Resolution Imaging in Dynamic Automotive Scenes
S.L. Cassidy, S. Pooni, Anum Pirkani, E.G. Hoare, Mikhail Cherniakov, Marina S. Gashinova, University of Birmingham, UK

(NA) Influence of Ramp Timing Dither on Modulation-Based Radar Target Simulators
Pirmin Schoeder, Vinzenz Janoudi, Timo Grebner, Arne Martin, Christian Waldschmidt, Universität Ulm, Germany

(NA) Non-Invasive Axle-Based Vehicle Classification Utilising Tracking Radar Technology
V.R.J. Deville¹, C.M. Lievers², J.H. Manton¹
¹University of Melbourne, Australia; ²Sensys Gatso Group, The Netherlands
EuMC/EuRAD02: Novel Antennas for Space Applications

Chair: Piero Angeletti, ESA-ESTEC, The Netherlands
Co-Chair: Stefania Monni, TNO, The Netherlands
16:40–18:20, Wednesday 28th September 2022, Amber 2

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<td>Low-Profile Highly Directive 2D-Beam-Steering Antenna in Ka-Band with 3D-Printed All-Dielectric Sub-Wavelength Deflectors</td>
<td>Thi Quynh Van Hoang, Matthieu Bertrand, Erika Vandelle, Brigitte Loiseaux, Thales, France</td>
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<td>Numerical Investigation About the Impact of Struts on the European Space Agency Deep Space Antennas Efficiency and Sidelobes</td>
<td>D. Arenare¹, F. Pelorossi², F. Concaro², Marco Pasian¹</td>
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<td>A Mechanically Steered Antenna Using a Moving Part Based on Gap Waveguide</td>
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<td>Link Budget and Design Approach of a Non-Terrestrial 5G Automotive Antenna</td>
<td>Umais Tayyab¹, Hans-Peter Petry², Ashish Kumar¹, Md. Golam Robbani¹, Thomas Wack³, Matthias A. Hein¹</td>
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<td>¹Technische Universität Ilmenau, Germany; ²DeSK, Germany; ³Wiegand, Germany</td>
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EuMC/EuRAD03: EuMC/EuRAD Posters

Chair: Fabiola Colone, Università di Roma “La Sapienza”, Italy
Co-Chair: Nicolò Delmonte, Università di Pavia, Italy
16:00–18:20, Wednesday 28th September 2022, Exhibition Hall

| **868** | Increased Coding Capacity of Chipless RFID Tags Using Radiation Pattern Diversity | Florian Requena, Nicolas Barbot, Darine Kaddour, Etienne Perret, LCIS (EA 3747), France |
| **872** | A Multicarrier Communication Method to Increase Radio Coverage for UHF RFID | Jasmin Walk¹, Martin Maderboeck¹, Georg Sad¹, Manuel Ferdik², Moritz Fischer¹, Thomas Ussmueller¹ |
|       | ¹Universität Innsbruck, Austria; ²MCI, Austria |
| **876** | Antenna Design for 5G-Based Train-Centric Control System | Dong-Jin Lee¹, Sang-Jin Oh², In-June Hwang³ |
|       | ¹KRRI, Korea; ²C to C tech, Korea; ³KRISS, Korea |
| **880** | Analysis of Onboard Channel Measurements for Train Communication Scenarios in the Context Towards 6G Enabling Technologies | Johann Lichtblau¹, Kariem Elkholy², Alexander Koelpin¹ |
|       | ¹Technische Universität Hamburg, Germany; ²FAU Erlangen-Nürnberg, Germany |
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Benoît Lesur¹, Anaël Lohou¹, Fabien Péleau¹, Alain Karas¹, Romain Contreres²
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