

2023 Antenna Measurement Techniques Association Symposium (AMTA 2023)

**Renton, Washington, USA
8-13 October 2023**



**IEEE Catalog Number: CFP23J49-POD
ISBN: 979-8-3503-3566-8**

**Copyright © 2023, Antenna Measurement Techniques Association (AMTA)
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: CFP23J49-POD
ISBN (Print-On-Demand): 979-8-3503-3566-8
ISBN (Online): 978-1-7362351-5-7

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 Contents

| | |
|--|-----|
| Session 1: Space Applications <i>Chair: Jonathan L. Frasch, The Boeing Company</i> | |
| 0664_0931_000014: Optimization of In-Vehicle Connectivity through Simulation-Augmented Antenna Measurements , Benoit Derat ¹ , Mert Celik ¹ , Winfried Simon ² , David Schaefer ² , Adrian Fleidl ³ , Konstantin Schorp ³ , ¹ Rohde & Schwarz GmbH & Co. KG, ² IMST GmbH, ³ BMW Group | N/A |
| 0746_1123_000039: BIOMASS Calibration Transponder Antenna Measurements in ESA-ESTEC HERTZ Facility , Ines Barbary ¹ , Luis Rolo ¹ , Eric Van Der Houwen ¹ , Mauro Bandinelli ² , Davide Bianchi ² , Dean Rowsell ³ , Mike Royle ³ , ¹ European Space Agency, ESTEC, ² IDS Ingegneria Dei Sistemi, ³ C-Core | 9 |
| 0746_1123_000042: Using the Three-Antenna Gain Method to Improve Measurement Accuracy for VHF Satellite and Space Applications , Bennett Gibson-Dunne ¹ , Greg Brzezina ² , Ken Oueng ² , Adrian Momciu ² , ¹ University of Waterloo, ² Canadian Space Agency at the David Florida Lab | 13 |
| Session 2: Recent European Activities on Antenna Measurements (EurAAP/EuCAP Convened Session) <i>Chair: Tian Hong Loh, National Physics Laboratory</i> | |
| 0746_1123_000071: Updated Status on the Activities of the EurAAP Working Group on Antenna Measurements , Lucia Scialacqua ¹ , Tian Loh ² , Javier Fernández Álvarez ³ , Michael Mattes ³ , Lars Foged ¹ , Manuel Sierra-Castañer ⁴ , ¹ Microwave Vision Italy, ² National Physical Laboratory, ³ DTU, ⁴ Universidad Politécnica de Madrid | 19 |
| 0746_1123_000087: Recent Activities of a European Union Joint Research Project on Metrology for Emerging Wireless Standards , Tian Hong Loh ¹ , Wei Fan ² , Djamel Allal ³ , Akram Alomainy ⁴ , Frédéric Pythoud ⁵ , Emrah Tas ⁵ , ¹ National Physical Laboratory, ² Aalborg University, ³ Laboratoire national de métrologie et d'essais, ⁴ Queen Mary University of London, ⁵ The Federal Institute of Metrology METAS | 23 |
| 0746_1123_000090: Simulation Based Uncertainty Analysis for Radiation Pattern Measurements Using an Active Radar Module , Anna Granich ¹ , Murat Sözer ¹ , Dirk Heberling ^{1,2} , ¹ Institute of High Frequency Technology, RWTH Aachen University, ² Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR | 29 |

| | |
|--|----|
| 0746_1123_000091: Bistatic Measurements of Binary Reconfigurable Intelligent Surfaces in a CATR , Florian Reher, Henrik Jansen, Dirk Heberling, Institute of High Frequency Technology, RWTH Aachen University | 34 |
| 0746_1123_000065: Observing a mm-Wave Metamaterial Lens from the Perspectives of Near-to-Far Field and CATR , Sungtek Kahng ¹ , Yejune Seo ¹ , Jaewon Koh ¹ , Woogon Kim ¹ , Dongjin Lim ² , Jongpil Kim ² , ¹ Incheon National University, ² C&G Microwave Co. Ltd. | 39 |
| Session 3: Standards and Characterization <i>Chair: John Locke, Molex Connected Mobile Solutions</i> | |
| 0746_1123_000024: The Demystification and Measurement of Receiving Efficiency , Ryan Cutshall, Justin Dobbins, Raytheon Technologies | 45 |
| 0746_1123_000076: Revision Progress: IEEE Std 1720 Recommended Practice for Near-Field Antenna Measurements , Lars Jacob Foged ¹ , Justin Dobbins ² , Vince Rodriguez ³ , Jeff Fordham ³ , Vikass Monebhurrun ⁴ , ¹ MVG, ² Raytheon Technologies, ³ AMETEK / NSI-MI Technologies, ⁴ CentraleSupélec | 52 |
| 0746_1123_000136: Progress on the development of IEEE Std 1128 - Recommended Practice on Absorber Evaluation , Zhong Chen ¹ , Vince Rodriguez ² , Lars Foged ³ , ¹ ETS-Lindgren, Inc., ² AMETEK / NSI-MI Technologies, ³ MVG | 56 |
| 0746_1123_000113: A 5G NR FR1 UWB Antenna as Benchmark for the Development of IEEE Standard P2816 , Vikass Monebhurrun ¹ , Satyajit Chakrabarti ² , Richelieu Quoi ³ , ¹ CentraleSupélec, ² Society for Applied Microwave Electronics Engineering and Research (SAMEER), Ministry of Electronics and Information Technology (MeitY), ³ ART-Fi | 59 |
| 0746_1123_000054: Modified Thru-Reflect-Match Polarimetric Calibration Technique for Focused Beam Systems , Jeffrey Massman ¹ , Michael Havrilla ² , ¹ Air Force Research Laboratory (AFRL), ² Air Force Institute of Technology | 61 |

Session 4: Antenna Design and Analysis*Chair: Claudio Curcio, University of Naples Federico II*

0746_1123_000013: Performance Comparison of Traditionally Manufactured and Additively Manufactured Luneburg Lenses, Anna Stumme, Alexander Golding, Mark Dorsey, US Naval Research Laboratory 69

0746_1123_000105: Horn Antenna Manufacturing Using Additive Manufacturing Techniques, Jeffrey Fordham, Jon Swarner, Edwin Barry, NSI-MI Technologies 75

0746_1123_000096: On the limitations of off-normal-incident measurement of reflectivity performance of microwave absorbers, Vince Rodriguez¹, Amin Enayati², ¹NSI-MI Technologies, ²E&C Anechoic Chambers NV 81

0746_1123_000127: Breaking the Limits: A High Performance Dual-Polarized Ultrawideband Antenna for Radar and Communication Systems, Syed Jehangir, Jorge Salazar-Cerreno, Advanced Radar Research Center (ARRC), The University of Oklahoma 86

Session 5: Imaging, Algorithms, and Processing Techniques*Chair: Marion Baggett, NSI-MI Technologies*

0746_1123_000022: Novel Application of Compressed Sensing in Cylindrical Mode Filtering for Far-Field Antenna Measurements, Zhong Chen¹, Stuart Gregson², Yibo Wang¹, ¹ETS-Lindgren, Inc., ²Next Phase Measurements 91

0746_1123_000034: A Novel Data Processing Technique for Calibrating Low Frequency Antennas with Long Ring Down Time in An Extrapolation Range, Yibo Wang¹, Zhong Chen¹, Dennis Lewis², Wayne Cooper², ¹ETS-Lindgren, Inc., ²The Boeing Company 96

0746_1123_000036: Machine Learning Based Fourier Phase Retrieval for Planar Near-Field Antenna Measurements, Marc Dirix¹, Stuart Gregson²³, ¹Antenna Systems Solutions, ²Next Phase Measurements, ³Queen Mary University of London 102

| | |
|--|-----|
| Session 6: Antenna Measurements I <i>Chair: Zhong Chen, ETS-Lindgren</i> | |
| 0746_1123_000057: Measurements on Extended Long Objects for Radar Field Probes , Pax Wei, The Boeing Company | 111 |
| 0746_1123_000010: A New Closed Form Field Asymptotic Expansion Applied to Far-field Evaluation of Antenna Arrays at Short Range Lengths , Benoit Derat, Rohde and Schwarz GmbH & Co. KG | 117 |
| 0746_1123_000019: Electric-Field Pattern Measurements of Acoustically Driven Piezoelectric Field Emitters , Srinivas Prasad Mysore Nagaraja, Brook Feyissa, Tristan Wilson, Jack Bush, Darmindra Arumugam, Jet Propulsion Laboratory | 123 |
| 0746_1123_000053: Constrained FoV Radiated Power as a Figure of Merit of Phased Arrays , Alejandro Antón Ruiz ¹ , Samar Hosseinzadegan ² , John Kvarnstrand ² , Klas Arvidsson ² , Andrés Alayón Glazunov ³ , ¹ University of Twente, ² Bluetest AB, ³ University of Linköping | 128 |
| 0746_1123_000081: Compact RCS Test Range Field Probing using a Shorted Antenna as Target , Gil Yemini ¹ , Stefano Sensani ¹ , Andrea Giacomini ² , Lars Foged ² , Marcel Boumans ³ , Matan Kahanov ⁴ , Maria Baskin ⁴ , Ilan Kaplon ⁴ , ¹ ORBIT/FR Engineering Ltd. MVG, ² Microwave Vision Italy, ³ Antenna Measurement Experts GmbH, ⁴ Center of Technology, Rafael | 134 |
| 0746_1123_000083: Evaluation of the Far-Field Pattern Radiated by a Long AUT in Presence of an Infinite Perfectly Conducting Ground Plane from Spherical Spiral Near-Field Measurements , Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozzi, University of Salerno | 139 |

| | |
|--|-----|
| Session 7: Near-field Measurements I <i>Chair: Nathaniel Roman, The Boeing Company</i> | |
| 0746_1123_000009: Design and performance comparison of 3D metal printed near field probe for K-Ka band , Ilia Agnihotri, Kymeta Corporation | 147 |
| 0746_1123_000014: Antenna Coupling Evaluation Based on Accurate Measured Source Models and Simulations , Lucia Scialacqua ¹ , C. J. Reddy, Lars Foged ¹ , ¹ Microwave Vision Italy, ² Altair Engineering, Inc | 152 |

| | |
|---|-----|
| 0746_1123_000017: Planar Wide Mesh Scanning using Multi-Probe Systems , Fernando Rodriguez Varela ¹ , Manuel Sierra-Castañer ² , Francesco Saccardi ³ , Lucia Scialacqua ³ , Lars Foged ³ , ¹ Universidad Rey Juan Carlos de Madrid, ² Universidad Politécnica de Madrid, ³ Microwave Vision Italy | 158 |
| 0746_1123_000029: A Simple Non-Linear Planar Near-Field Antenna Measurement System , Jason Jerauld, Tarron Teeslink, Felix Yuen, Nathan Landy, Tom Driscoll, Echodyne Corporation | N/A |
| 0746_1123_000123: On the Use of Probe Signal Derivatives in Spherical Near-Field Antenna Measurements , Olav Breinbjerg ¹ , Kyriakos Kaslis ² , ¹ ElMaReCo, ² Technical University of Denmark | 169 |
| 0746_1123_000045: Impact of Missing Absorber on Near Field Measured Antenna Patterns , Yanyan Zhang, Rodney Vaughan, Simon Fraser University | N/A |

| | |
|--|-----|
| Session 8: Poster Session I <i>Chair: Amanuel Haile, The Boeing Company</i> | |
| 0746_1123_000032: Phase Measurement for 5G NR Modulated-Signal Using Rapid Spherical Near-Field System with Probe-Receiver Combined Array , Jong-Hyuk Lim ¹² , Jungkuy Park ¹ , Dong-Woo Kim ² , Soon-Soo Oh ² , ¹ Radio Research Agency, ² Chosun University | N/A |
| 0746_1123_000117: Optical Fiber Link Millimeter Wave Antenna Measurement System Using the Lock-in Amplifier , Satoru Kurokawa ¹ , Anton Widarta ¹ , Michitaka Ameya ¹ , Masanobu Hirose ² , ¹ National Institute of Advanced Industrial Science and Technology, ² 7G aa Co., Ltd. | 187 |
| 0746_1123_000048: Range-Doppler imaging method based on FFT-MUSIC for FMCW radar , Sangdong Kim ¹ , Bong-seok Kim ¹ , Jonghun Lee ¹ , Tarun Chawla ² , Greg Skidmore ² , Ram Narayanan ³ , ¹ DGIST, ² remcom, ³ Pennsylvania State University | 190 |
| 0746_1123_000058: Near Field Measurement and Analysis in Frequency Ranges of 20 GHz to 90 GHz , Jungkuy Park, Sol Choi, Korea Radio Research Agency | 196 |

| | |
|--|-----|
| 0746_1123_000068: Designing 3D-printed Patch Antennas with Varying Infill Densities , Bibek Kattel, Winn Hutchcraft, Richard Gordon, University of Mississippi | 201 |
| 0746_1123_000070: An Investigation on SLA-Printed Waveguide Components at 10 GHz - 15 GHz , Snorre Skeidsvoll, Cosme Culotta-Lopez, QuadSAT ApS | N/A |
| 0746_1123_0000125: Enhancing On-Chip Antenna Calibration: A Hybrid Multi-Axis Scanner Enabling Near-Field and Far-Field Measurements for Over-the-Air Calibration , Edgar Oblitas ¹ , Jorge Salazar-Cerreno ¹ , Andy Bonthron ² , Edmond Megerdichian ² , Ivan Rodionov ² , Maha Achour ² , ¹ Advanced Radar Research Center (ARRC), The University of Oklahoma, ² Metawave Corporation | 211 |
| 0746_1123_000073: New Designs for a Feed Fence to reduce the direct coupling to the Quiet Zone on Compact Ranges , Mark Ingerson, Vince Rodriguez, Daniel Janse van Rensburg, Anil Tellakula, NSI-MI Technologies | 217 |
| 0746_1123_000074: Diverse Utilization of an Anechoic Chamber for Automated Electronic Warfare (EW) Testing in Support of Explosive Ordnance Disposal (EOD) , Joseph Friedel, David Oyediran, Thomas Higdon, NSWC-IH | 223 |
| 0746_1123_000060: Proficiency test for verification of measurement identity of antenna calibration between Korea accreditation agencies , Jeongan Lee, Youngho Kim, Sol Choi, Jonghyuk Lim, Jongkuy Park, Radio Research Agency | N/A |
| 0746_1123_000086: Testing of a Dielectric-Filled Ridged Waveguide System for Oil/Water Ratio Measurements , Jose Alvarez, Aramco Americas: Aramco Research Center – Houston | 235 |
| Session 9: Computational Electromagnetics and Numerical Methods <i>Chair: Amedeo Capozzoli, University of Naples Federico II</i> | |
| 0746_1123_000114: The Electric Multipole Produced by an SAE J2954 Wireless Power Transfer System Employing DD Couplers , James McLean, Robert Sutton, TDK Corp. | 241 |
| 0746_1123_000035: Compressive Sensing Applied to Planar Near-Field Based Array Antenna Diagnostics for Production Testing , Clive Parini ¹ , Stuart Gregson ² , ¹ Queen Mary University of London, ² Next Phase Measurements | 247 |

| | |
|---|-----|
| 0746_1123_000023: Predication of Planar Near-Field Measurements Based on Full-Wave Three-Dimensional CEM Measurement Simulation , Rostyslav Dubrovka ¹ , Robert Jones ¹ , Clive Parini ¹ , Stuart Gregson ² , ¹ Queen Mary University of London, ² Next Phase Measurements | 253 |
| Session 10: Antenna Measurements II | |
| <i>Chair: Francesco Saccardi, Microwave Vision Group</i> | |
| 0746_1123_000129: A Self-Contained and Airbourne SDR Transciever System for UAS based Antenna Pattern Measurement and Phased Array Radar Calibration Validation , Khuda Burdi ¹ , Antonio Segales ¹ , Caleb Fulton ¹ , Daniel Wasielewski ² , Igor Ivic ² , Jorge Salazar-Cerreno ¹ , Robert Palmer ¹ , ¹ Advanced Radar Research Center (ARRC), The University of Oklahoma, ² National Oceanic and Atmospheric Administration (NOAA) | 261 |
| 0746_1123_000101: Estimating Uncertainties of System Level RF Parameters of Transponder Spacecraft Payloads , Edwin Barry, Pieter Betjes, Patrick Pelland, Daniël Janse van Rensburg, AMETEK / NSI-MI Technologies | 265 |
| 0746_1123_000046: Exploration of UAV-based testing and qualification of NGSO earth stations , Andrian Buchi, Ondrej Pokorny, Snorre Skeidsvol, Sigurd Petersen, QuadSAT ApS | 271 |
| 0746_1123_000027: NIST's Antenna Gain and Polarization Calibration Service Re-instatement , Joshua Gordon ¹ , Benjamin Moser ² , ¹ National Institute of Standards and Technology (NIST), ² Colorado School of Mines | 277 |
| 0746_1123_000052: A Squat Cylinder-Dihedral Dual Calibration Device for Compact Ranges at UHF , Hirsch Chizerver ¹ , Brett Haisty ¹ , Laura Suzuki ² , ¹ Delta Sigma Company, ² Applied Research Associates. | 283 |
| 0746_1123_000132: Characterizing Compact Antenna Test Range Using Advanced Computational Techniques , Venkata Bhyrava Murthy Devata, Altair Engineering | 289 |

| | |
|--|-----|
| Session 11: Near-Field Measurements II <i>Chair: Francesco D'Agostino, University of Salerno</i> | |
| 0746_1123_000069: Evaluation of Near-Field to Far-Field Transformation Accuracy Based on Reference Radiation Models , Arun Bhatt ¹ , Afroditi Kyrligkitsi ¹ , Thomas Gemmer ¹ , Adam Tankielun ¹ , Hendrik Bartko ¹ , Benoit Derat ¹ , Thomas Dallmann ² , ¹ Rohde and Schwarz GmbH & Co. KG, ² Radio Technologies for Automated and Connected Vehicles Research Group, TU Ilmenau | 295 |
| 0746_1123_000077: Accurate Evaluation of Antenna Measurement Range Performance with the SWE Transmission Formula , Francesco Saccardi, Andrea Giacomini, Lars Foged, Microwave Vision Italy | 301 |
| 0746_1123_000079: Design and Validation of Quasi Ideal Ultra-Wideband 3dB/180° Couplers for High Precision Spherical Near-Field Probes , Andrea Giacomini ¹ , Francesco Saccardi ¹ , Vincenzo Schirosi ¹ , Antoine Raulais ¹ , Lars Foged ¹ , Jean-Marc Baracco ² , ¹ Microwave Vision Italy, ² MARDEL SARL | N/A |
| 0746_1123_000084: Design of a Multiprobe Planar Near-Field Scanner for Ku-Band , Juha Ala-Laurinaho ¹ , Sabin Karki ¹ , Ville Viikari ¹ , Ari Alanne ² , Risto Lehto ² , Paul Moseley ³ , Massimiliano Simeoni ³ , ¹ Aalto University, ² DA Design Oy, ³ ESA | 313 |
| 0746_1123_000050: Electrical Alignment Technique for Offset-Mounted and Arbitrarily Oriented AUTs in a Robot-Based mm-Wave Antenna Test System , Henrik Jansen ¹ , Roland Moch ¹ , Dirk Heberling ¹² , ¹ Institute of High Frequency Technology, RWTH Aachen University, ² Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR | 319 |
| 0746_1123_000100: An Alternative Formulation for Plane-Polar Data Transformation , Scott McBride, AMETEK / NSI-MI Technologies | 325 |

| | |
|--|-----|
| Session 12: Poster Session II <i>Chair: Manuel Sierra-Castañer, Polytechnical University of Madrid</i> | |
| 0746_1123_000089: On the Uncertainty Evaluation of Absorber Reflectivity Measurements , Marc Dirix ¹² , Amin Enayati ³ , ¹ Marc Dirix / RF, ² Antenna Systems Solutions, ³ E&C Anechoic Chambers | 333 |

| | |
|---|-----|
| 0746_1123_000093: Validation of OTA Measurement Setup At 28GHz Using A Plan Wave Generator , Shoaib Anwar ¹ , Francesco Scattone ² , Evgueni Kaverine ¹ , Andrea Giacomini ² , Francesco Saccardi ² , Nicolas Gross ¹ , Per Iversen ³ , Lars Foged ² , ¹ MVG Industries, ² MVG, ³ Orbit Advanced Technologies, Inc. (MVG) | 337 |
| 0746_1123_000097: Experimental Validation of Linear Multiprobe Arrays for Fast and Accurate PNF Antenna Characterizations , Francesco Saccardi ¹ , Andrea Giacomini ¹ , Lars Foged ¹ , Nicolas Gross ² , Thierry Blin ² , Per Iversen ³ , Kim Hassett ³ , Roni Braun ⁴ , Lior Shmidov ⁴ , Meng He ⁵ , Chen Chen ⁵ , Xavier Bland ⁵ , ¹ Microwave Vision Italy, ² MVG Industries, ³ Orbit/FR, ⁴ ORBIT/FR Engineering Ltd. MVG, ⁵ MVG Hong-Kong | 340 |
| 0746_1123_000072: Compact Antenna Test Range using Offset Gregorian Antenna for Over 100 GHz Antennas and Metamaterial Reflector , Michitaka Ameya, Yuto Kato, AIST | 345 |
| 0746_1123_000104: A Simple Algebraic Approach for Finding Minimal but Most Representative Measurement Points of Antenna Patterns , Robert Geise, HTWK University of Applied Science | 349 |
| 0746_1123_000116: Miniaturized In-case Antennas for Wireless Audio Transmitter Application , Ali Attaran ¹ , John Locke ² , Luis Rivera ¹ , Daniel Alois ² , ¹ Ford Motor Company, ² Oakland University | 355 |
| 0746_1123_000118: Free-Space Material Measurement for a Small Dielectric Plate at W-Band , Jin-Seob Kang, Korea Research Institute of Standards and Science (KRISS) | 359 |
| 0746_1123_000121: Exploring the Effect of Varying Infill Densities and Patterns on Effective Relative Permittivity in 3D Printed Dielectric Substrates , Bibek Kattel, Winn Hutchcraft, Richard Gordon, University of Mississippi | 362 |
| 0746_1123_000082: An Approach to Compensate 3-D Probe Positioning Errors Affecting the Non-Redundant Cylindrical Near-Field Measurements , Florindo Bevilacqua, Francesco D'Agostino, Flaminio Ferrara, Claudio Gennarelli, Rocco Guerriero, Massimo Migliozi, University of Salerno | 367 |

| | |
|--|-----|
| 0746_1123_000137: The Impact of Rotating Linearly-Polarized Feeds on Circularly-Polarized Gain Uncertainty , Adam Mehrabani ¹ , Rob Mercer ² , Jeff Fordham ² , ¹ SAIC, ² AMETEK / NSI-MI Technologies | 373 |
|--|-----|

| | |
|--|-----|
| Session 13: RF Material Design and Characterization <i>Chair: Adam Mehrabani, SAIC</i> | |
| 0746_1123_000011: Design and Validation of Material Properties of Additively Manufactured Latticed Material , Anna Stumme, Alexander Golding, Mark Dorsey, Scott Rudolph, US Naval Research Laboratory | 379 |
| 0746_1123_000044: An In-Situ Probe for Continuous Dielectric Permittivity Monitoring , John Schultz, Compass Technology Group | 385 |
| 0746_1123_000106: Design of a Tunable Frequency-Selective Surface for Microwave Material Measurement Applications , Christopher Howard ¹ , Kenneth Allen ¹ , Bill Hunt ² , ¹ Georgia Tech Research Institute, ² Georgia Institute of Technology | 391 |
| 0746_1123_000134: New Methods for Extraction of VHF Electrical Properties of Conductive Coatings , Ren Geryak, John Schultz, Compass Technology Group | 397 |
| Session 14: Range Design, Instrumentation, and Characterization <i>Chair: Lydell Frasch, The Boeing Company (Retired)</i> | |
| 0746_1123_000025: A Unique Spherical Near-Field Test System for Commercial Aircraft Radar Radome Testing , Kefeng Liu, Anbang Liu ¹ , Denis Lewis ² , ¹ ETS-Lindgren, Inc., ² Boeing | N/A |
| 0746_1123_000099: Accurate Antenna Characterisation at UHF/VHF Frequencies with Plane Wave Generator Systems , Lars Foged ¹ , Francesco Saccardi ¹ , Vincenzo Schirosi ¹ , Andrea Giacomini ¹ , Francesco Scattone ¹ , Lucia Scialacqua ¹ , Arianna Diamanti ¹ , Enrico Tartaglino ¹ , Nicolas Gross ² , Shoaib Anwar ² , Evgeni Kaverine ² , Per Iversen ³ , Edward Szpindor ³ , ¹ MVG Italy, ² MVG Industries, ³ MVG - Orbit Advanced Technologies Inc. | 411 |
| 0746_1123_000004: Recommendations for RF Absorber Treatment of Ranges Having a Movable Gantry or Multiple Probes , Vince Rodriguez, Mark Ingerson, AMETEK / NSI-MI Technologies | 417 |

| | |
|--|-----|
| 0746_1123_000064: Introducing LORENTZ: A novel Low-temperature Near-field Terahertz Chamber for instrument characterization , Paul Moseley ¹ , Luis Rolo ¹ , Andrey Baryshev ²³ , Tobias Vos ⁴ , Alena Belitskaya ³ , Daniele Ronso da Costa Lima ² , Peter de Maagt ¹ , Paul Hartogh ⁵ , ¹ European Space Agency, ESTEC, ² Kapteyn Astronomical Institute, ³ Dutch Terahertz, ⁴ SRON, ⁵ MPS | N/A |
| 0746_1123_000126: Measurement Uncertainties in Outdoor Far-field Antenna Ranges , Edwin Barry, Pieter Betjes, Eric Kim, AMETEK / NSI-MI Technologies | 422 |
| Session 15: RCS Measurements <i>Chair: Justin Dobbins, Raytheon Technologies</i> | |
| 0746_1123_000038: Background and clutter removal algorithm for RCS extraction in semi-anechoic chamber , Papa Ousmane Leye, Adamo Banelli, Shaikha Aldhaheri, Chaouki Kasmi, Felix Vega, Islem Yahi, Technology Innovation Institute | 431 |
| 0746_1123_000056: The Small Resonant Sphere for Validating Radar Cross Section Measurement Accuracy , Donald Hilliard, Michael Emire, Long To, Advanced Research and Technology Corporation | 436 |
| 0746_1123_000080: Compact RCS Test Range Feed Carousel and Baffle House Design , Gil Yemini ¹ , Stefano Sensani ¹ , Andrea Giacomini ² , Lars Foged ² , Marcel Boumans ³ , Matan Kahanov ⁴ , Maria Baskin ⁴ , Ilan Kaplon ⁴ , ¹ ORBIT/FR Engineering Ltd. MVG, ² Microwave Vision Italy, ³ Antenna Measurement Experts GmbH, ⁴ Center of Technology, Rafael | 442 |
| 0746_1123_000095: Compact Bistatic Radar Cross Section Measurement System Using a New Plane-Wave Synthesis , Masanobu Hirose ¹ , Satoru Kurokawa ¹² , ¹⁷ G aa Co., Ltd., ² AIST | 446 |
| 0746_1123_000085: Reproducible Measurements of “Fan Blades in a Pipe” CEM Benchmark , Jon Kelley, Kurt Norris, Brian Mackie-Mason, Brody Barton, David Chamulak, Scott Schaeffer, Mark Martin, Kendall Crouch, Clifton Courtney, Ali Yilmaz, Lockheed Martin Aeronautics Company | 451 |

| | |
|--|--|
| Session 16: Antennas and Measurements for 5G and Future Communication Systems | |
|--|--|

Chair: Domenic Belgiovane, Microwave Vision Group

| | |
|--|-----|
| 0746_1123_000028: Enhanced Simulation-Augmented OTA Technique Applied to Absorbed Power Density Evaluation, Benoit Derat ¹ , Thorsten Liebig ² , David Schaefer ² , Winfried Simon ² , ¹ Rohde and Schwarz GmbH & Co. KG, ² IMST GmbH | 459 |
| 0746_1123_000119: Performance Evaluation of RU and RIS Based on OTA Mode Near Field and Bistatic Measurement Systems, Chang-Lun Liao ¹² , You-Hua Lin ²³ , Ike Lin ³ , Chang-Fa Yang ² , ¹ Telecommunication Laboratories Chunghwa Telecom Co., Ltd., ² National Taiwan University of Science and Technology, ³ WaveFidelity Inc. | 465 |

Additional Paper:

Demonstration and Validation of a 3D Wave Field Synthesis Setup for Multiple GNSS Satellite Emulation via Over-the-Air Testing, Renato Zea Vintimilla, Mario Lorenz, Nitin Muchhal, Markus Landmann, Giovanni Del Galdo

471