

# **2022 98th ARFTG Microwave Measurement Conference (ARFTG 2022)**

**Las Vegas, Nevada, USA  
17 – 18 January 2022**



**IEEE Catalog Number: CFP22ARG-POD  
ISBN: 978-1-6654-0663-5**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

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

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

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

IEEE Catalog Number:	CFP22ARG-POD
ISBN (Print-On-Demand):	978-1-6654-0663-5
ISBN (Online):	978-1-6654-0662-8

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## **Session A: Microwave, mm-Wave Measurement for Circuits, Devices and Systems**

### **New Space Meets Old (Invited Talk)...N/A**

Erik Luther  
CesiumAstro

### **Correcting nonlinear distortion of wideband modulated signals using new frequency domain methods...1**

Sam Kusano, Augustine Stav, Tong Li, Jan Verspecht  
Keysight Technologies Inc.

### **Quantifying Noise Floor and Trace Noise in VNA Measurements for the WR-15 Waveguide Band...4**

Aaron Morgan Hagerstrom, Angela Stelson, Jeff Jargon, Christian Long  
National Institute of Standards and Technology

## **Session B: On-Wafer, In-Fixture and Waveguide Environment Calibration Techniques**

### **On the Influence of Metal Chucks in Wideband On-Wafer Measurements...9**

Gia Ngoc Phung, Uwe Arz  
Physikalisch-Technische Bundesanstalt

### **Improving the Reliability of the Multiline TRL Calibration Algorithm...13**

Ziad Hatab, Michael Gadringer, Wolfgnag Bösch  
Graz University of Technology

### **Repeatability of 220 - 330 GHz Variable Waveguide Attenuator and Frequency Extenders for 6G Measurements...18**

Marko E. Leinonen, Juha-Pekka Mäkelä, Klaus Nevala, Nuutti Tervo, Aarno Pärssinen  
University of Oulu

## **Session C: Non-Linear and Broadband Techniques**

### **Contactless in-Situ Probe Tilt Adjustment on Co-Planar Devices...22**

Ryo Sakamaki  
National institute of Advanced Industrial Science and Technology

### **Self-Interference Cancellation in Full-Duplex MIMO System...25**

Shipra Bhadoria, Meenakshi Rawat  
IIT Roorkee

### **Generating Wide Bandwidth Signals by Coherently Combining Vector Signal Generator Outputs...29**

Jan Verspecht, Augustine Stav, Troels Nielsen  
Keysight Technologies, Inc.

### **Probe Measurement System for Surface Mount Devices at Radio Frequencies...33**

Ryoko Kishikawa<sup>1</sup>, Masahiro Horibe<sup>1</sup>, Toshi Ohi<sup>2</sup>, Akito Yamamoto<sup>2</sup>, Noriyoshi Hashimoto<sup>3</sup>, Ryo Takeda<sup>3</sup>  
<sup>1</sup>National Institute of Advanced Industrial Science and Technology, <sup>2</sup>T Plus Co. Ltd., <sup>3</sup>Keysight Technologies, Inc.

## **Mixer Residual Phase Noise Measurements Using Clock-Locked DDS Sources and Receivers...37**

Joel Dunsmore, Junichi Iwai  
Keysight Technologies, Inc.

## **Session D: Other Areas of RF and mm-Wave Measurements**

### **Measurement Method for Beam Steer Execution Time...41**

Thomas Harz, Thomas Kleine-Ostmann  
Physikalisch-Technische Bundesanstalt

### **Complex Permittivity Measurement of Liquids Using Half Mode Corrugated Substrate Integrated Waveguide Structure...45**

Shivakumar Chedurupalli<sup>1</sup>, Vishwam T<sup>2</sup>, James Raju K.C<sup>1</sup>  
<sup>1</sup>University of Hyderabad, <sup>2</sup>GITAM University Hyderabad

### **Experimental Study on Coexistence of a Spiking Neural Network and 77 GHz VCO on a Single Chip...49**

Hendrik M. Lehmann<sup>1,2</sup>, Cyprian Grassmann<sup>1</sup>, Pietro Brenner<sup>1</sup>, Vadim Issakov<sup>1,2</sup>  
<sup>1</sup>Infineon Technologies AG, <sup>2</sup>Technical University Braunschweig

### **Broadband Microwave Materials Characterization (invited)...N/A**

Jim Booth  
National Institute of Standards and Technology