101st ARFTG Microwave Measurement Conference

Challenges in Complex Measurement Environments

Hilton San Diego Bayfront
San Diego, CA, USA, June 16, 2023

07:55-08:00 **Welcome to the 99th ARFTG Conference – Introduction**
Conference Co-Chairs: Marco Spirito and Jeffrey Jargon
TPC Co-Chairs: Jon Martens and Dennis Lewis

08:00-08:40 **Keynote: Measurement Challenges and Novel Approaches to Modern Antenna Measurements in Complex Environments Using UAVs and Multi-Axis Robots**
Stuart Gregson (Next Phase Measurements)*

Session A: Over-the-air measurement topics
Session Chair: Dennis Lewis, Boeing

A-1 **08:40-09:00** **Practical Verification of Over-the-Air Measurements and Correlation across Measurement Setups**
Thomas Deckert (NI)*; Okay Schierhorn (NI); Harsh Nitharwal (NI); Jan Fromme (NI)

A-2 **09:00-09:20** **Robot-Based Multi-Purpose Measurement Platform for 6G Communications**
Woohyun Chung (Korea Research Institute of Standards and Science)*; Chihyun Cho (KRISS); Jae-Yong Kwon (KRISS)

A-3 **09:20-09:40** **Dynamic Range by Design in OTA EVM measurements**
Paritosh Manurkar (CU Boulder)*; Dan Kuester (NIST); Joshua M Kast (Colorado School of Mines); Rob Horansky (NIST)

09:40-10:40 **Break – Exhibits and Interactive Forum**

Session B: Modulated and spectral analysis
Session Chair: Dominique Schreurs, KU Leuven

B-1 **10:40-11:00** **A Measurement-Referenced Error Vector Magnitude for Counterfeit Cellular Device Detection**
Améya S Ramadurgakar (NIST)*; Kate Remley (NIST); Dylan Williams (NIST); Jacob Rezac (NIST); Melinda Piket-May (University of Colorado Boulder); Rob Horansky (NIST)

B-2 **11:00-11:20** **Spectral Purity Evaluation of VNA Frequency Extenders to Enable Electronic Software-Based Power Control**
Carmine De Martino (Delft University of Technology)*; Juan Bueno Lopez (Delft University of Technology); Marco Spirito (TU Delft)

B-3 **11:20-11:40** **Pulsed Sub-THz Wideband Vector Component Analysis**
Jean-Pierre Teyssier (Keysight Technologies)*; Joel Dunsmore (Keysight Technologies); Johan Ericsson (Keysight Technologies); Sam Kusano (Keysight Technologies, Inc.); Nizar Messaoudi (Keysight Technologies, University of Waterloo)

B-4 **11:40-12:00** **Accurately Applying Wideband Modulated Signals to a DUT Using an Extended VSG-VSA Setup**
Frans Verbeyst (NI)*; Pawel Barmuta (NI); Marc Vanden Bossche (NI); Markus Rullmann (NI)

12:00-13:20 **Awards Luncheon**

Session C: Doug Rytting Memorial session: Advanced Linear Network Analysis
Session Chair: Rusty Myers, Keysight Technologies

C-1
13:20-13:40
Memorial for Doug Rytting
Marc Vanden Boscche, NI

C-2
13:40-14:00
D-Band Characterization of a Commercial High-Resistivity Silicon Calibration Substrate
Gia Ngoc Phung (Physikalische Technische Bundesanstalt)*; Hyunji Koo (KRISS); chihyun cho (KRISS); JAE-YONG KWON (KRISS); Uwe Arz (Physikalisch-Technische Bundesanstalt (PTB))

C-3
14:00-14:20
Dielectric Spectroscopy of Liquids by De-embedding Two-Port Measurements
Seyede Maede Chavoshi (KU Leuven)*; Matko Martinic (KU Leuven); Helene Ponsaerts (KU Leuven); Maya Van Dijck (KU Leuven); Bart Nauwelaers (KU Leuven); Tomislav Markovic (University of Zagreb); Dominique Schreurs (University of Leuven)

C-4
14:20-14:40
Verification of Reference Impedance from Common On-Wafer Calibrations on Commercial Calibration Substrates
Lucas Nyssens (Université catholique de Louvain)*; Martin Rack (Université catholique de Louvain); Romain Tuytaerts (Université catholique de Louvain); Dimitri Lederer (Université catholique de Louvain); Jean-Pierre Raskin (Université catholique de Louvain)

14:40-15:30 **Break – Exhibits and Interactive Forum**

Session D: Non-Linear, Large-Signal VNA Techniques
Session Chair: Patrick Roblin, The Ohio State University

D-1
15:30-15:50
VNA-Based Characterization of Frequency Multipliers Phase-Distortions Under Continuous-Wave and Modulated Signal Excitation
Mahitab Eladwy (University of Waterloo)*; Ahmed Ben Ayed (University of Waterloo); Slim Boumaiza (University of Waterloo,Canada)

D-2
15:50-16:10
Modulated-Input Control and Linearization of a Multi-Port Millimeter-Wave PA by VNA-based Calibrated Wideband Measurements
Mattia Mengozzi (University of Bologna)*; Gian Piero Gibiino (University di Bologna); Alberto Maria Angelotti (University of Bologna); Christoph Schulze (Ferdinand-Braun-Institut); Olof Bengtsson (Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik); Corrado Florian (University of Bologna); Alberto Santarelli (University of Bologna)

D-3
16:10-16:30
A Rigorous Analysis of the Random Noise in Reflection Coefficients Synthesized via Mixed-Signal Active Tuners
Faisal Mubarak (VSL)*; Marco Spirito (TU Delft); Fabio Munoz (VSL)

D-4
16:30-16:50
First Comparison of Active and Passive Load Pull at W-Band
Christopher Clymore (University of California, Santa Barbara)*; Matthew Guidry (UCSB); Emre Akso (UCSB); Henry Collins (UCSB); Wenjian Liu (UCSB); Christian Wurm (UCSB); Nirupam Hatui (UCSB); Umesh Mishra (UCSB)

D-5
16:50-17:10
Mini-Rump Session
High frequency measurement in 2030. What will be discussed?
Moderator: Leonard Hayden (Qorvo)

Interactive Forum
Session Chair: Jeffrey Jargon, NIST

P-1
09:40-15:30
A 3D FW-EM Simulation-Based PSOD Method for Characterizing On-Wafer Devices Compensating for Short Pattern Error
Yunsang Shin (Seoul National University)*; Sangwook Nam (Seoul National University)

P-2
09:40-15:30
Design of Optimal Length for Waveguide Offset Shorts in D-band based on Uncertainty Analysis
Chihyun Cho (KRISS)*; Jae-Yong Kwon (KRISS)

P-3
09:40-15:30
Implementing Direct RF Sampling at Sub-Nyquist Rate for Error Vector Magnitude Measurements
Xifeng Lu (NIST)*; Paritosh Manurkar (NIST); Dazhen Gu (NIST); Dan Kuester (NIST); Rob Horansky (NIST)

P-4
09:40-15:30
Evaluating Correlation Between Measurement Samples in Reverberation Chambers Using Clustering
Carnot L Nogueira (NIST)*; Kate Remley (NIST); Rob Horansky (NIST)

P-5
09:40-15:30
VNA-Based Large-Signal Drain-Modulated Power Amplifier Measurement Setup With Digital Pre-Distortion
Rob Vissers (Chalmers University of Technology)*; Christian Fager (Chalmers University of Technology); Gregor Lasser (Chalmers University of Technology)

P-6
09:40-15:30
Over-the-Air Characterization of mmW Near-Field Channels
Yagmur Ozturk (The Ohio State University)*; Niru Nahar (Ohio State University); Kubilay Sertel (Ohio State University)

P-7
09:40-15:30
NPR assessment without multi-tone phase randomization
Ricardo Figueiredo (University of Aveiro)*; Nuno Borges Carvalho (Instituto de Telecomunicacoes)

P-8
09:40-15:30
Validity of Room-temperature Calibration for On-wafer Measurements up to 220 GHz, 125 °C, and 48 h
Tianze Li (Cornell University)*; Lei Li (Cornell University); James C. M. Hwang (Cornell University)

P-9
09:40-15:30
Characterization of a Compact Wideband Microwave Metasurface Lens for Cryogenic Applications
Ali Al-Moathin (U. Glasgow); Mingyan Zhong (U. Glasgow); Qusay Al-Taai (U. Glasgow); Yunan Jiang (U. Glasgow); Michael Farage (U. Glasgow); Jalil ur Rehman Kazim (U. Glasgow); Muhammad Zulfiqar Ali (Oxford Instr.); Fatemeh Nikbakhtnasrabadi (U. Glasgow); Megan Powell (U. Strathclyde); Prince Khatri (U. Strathclyde); Manoj Stanley (NPL); Alessandro Rossi (U. Strathclyde);(NPL);Hadi Heidari (U. Glasgow); Muhammad Ali Imran (U. Glasgow); Qammer H. Abbasi (U. Glasgow); Nick M. Ridler (NPL); Martin Weides (U. Glasgow); Chong Li (U. Glasgow)*

P-10
09:40-15:30
In-Situ Measurement of Transmitter Antenna Input Current Using a Software-Defined Radio
Austin S Egbert (Baylor University); Adam C Goad (Baylor University); Samuel M Haug (Baylor University); Charles Baylis (Baylor University)*; Benjamin Kirk (Army Research Laboratory); Anthony Martone (Army Research Laboratory); Robert J. Marks II (Baylor University)