71st ARFTG Microwave Measurement Conference: “Network Analysis – 50 Years On”

OVERVIEW

The Omni Hotel at CNN Center, venue for the 71st ARFTG Microwave Measurement Conference

More than 120 attendees participated in the 71st ARFTG Microwave Measurement Conference that took place at the Omni Hotel at CNN Center, Atlanta, Georgia, on June 20th, 2008. As is usual for Spring ARFTG conferences, this conference formed part of Microwave Week 2008, which also included the International Microwave Symposium (IMS), the Radio Frequency Integrated Circuits (RFIC) symposium, and many workshops, tutorials and other meetings. Most of these other events took place at the Georgia World Congress Center, right next door to the Omni Hotel. As well as its conference, ARFTG also sponsored a meeting of the NVNA Users’ Forum and two joint ARFTG/IMS Workshops. Taken together, these activities ran from Monday, June 16th, through to Friday, June 20th. This ARFTG conference received sponsorship from Agilent Technologies, Cascade Microtech and Tektronix.

A CD containing the 71st ARFTG conference digest, as well as the IMS digest, is available from the IEEE Online Catalog & Store at www.ieee.org.

For more information on ARFTG and its activities, including details of conferences past, present and future, visit the ARFTG website at www.arftg.org.

CONFERENCE TECHNICAL SESSIONS

The 71st ARFTG conference began with a welcome and introduction from Nick Ridler, Conference Chair. The overall conference theme was “Network Analysis – 50 years on”, and featured a Keynote Speech, four technical sessions and an interactive forum. The Keynote Speech, titled “ARFTG 50 Year Network Analyzer History”, was given by Doug Rytting, of Rytting Consulting, Santa Rosa, United States. The technical sessions consisted of papers given as oral presentations. These technical sessions were titled “50 Years of VNAs”, “VNA Calibration”, “Passive Components” and “Active Devices”. The interactive forum featured a total of 10 papers presented as posters during the breaks from the technical sessions.
Selected by the conference attendees as best oral paper presentation from the technical sessions was “Monte Carlo Analysis of Measurement Uncertainties for On-Wafer Thru-Reflect-Line Calibrations” presented by U. Arz (PTB, Braunschweig, Germany), co-authored by J. Leinhos (Leibniz University Hannover, Hannover, Germany). Selected as the best interactive forum paper presentation was “Verification of Wafer-level Calibration Accuracy at High Temperatures” presented by A. Rumiantsev (SUSS MicroTec Test Systems GmbH), co-authored by R. Doerner (Ferdinand-Braun-Institut fuer Hochstfrequenztechnik (FBH), Berlin, Germany). Selected as best exhibitor at the conference was Tektronix.

As on previous occasions, the ARFTG conference also included an exhibits area and an awards luncheon, both of which are described below.

**CONFERENCE EXHIBITS**

A total of twelve companies chose to exhibit their latest equipment at this conference. These companies were: Agilent Technologies (www.agilent.com), Cascade Microtech (www.cmicro.com), Focus Microwaves Inc (www.focus-microwaves.com), Flann Microwave Ltd (www.flann.com), Maury Microwave Corporation (www.maurymw.com), Verspecht-Teyssier-DeGroote SAS (www.vtd-rf.com), LA Techniques Ltd (www.latechniques.com), Rohde & Schwarz (www.rohde-schwarz.com), Sonnet Software Inc (www.sonnetusa.com), Southwest Microwave Inc (www.southwestmicrowave.com), SUSS MicroTec Inc (www.suss.com) and Tektronix (www.tek.com). To exhibit at future conferences, please contact the ARFTG Exhibits Chair, Joe Tauritz (jltauritz@ieee.org).

**AWARDS LUNCHEON**

ARFTG President, Leonard Hayden, presided over the awards luncheon. This began with Certificates of Appreciation being presented to the organizers of the 71st conference: Conference Chair, Nick Ridler; Conference Host, Chris Ward; Technical Program Chair, Roger Pollard; Exhibits Chair, Joe Tauritz; and the Session Chairs, Mohamed Sayed, Dave Blackham, Andrea Ferrero, Dave Walker and Chris Ward. This was followed by awards being presented for the previous (70th) conference, held in Tempe, Arizona. The award for best oral paper presentation was given to Martin Randus (co-author Karel Hoffmann) for the paper, “A Simple Method for Extreme Impedances Measurement”. The award for best interactive forum paper presentation was given to J E Zúñiga-Juárez (co-authors Andrés Zárate-de Landa, J A Reynoso-Hernández, M C Maya-Sánchez, Juan Luis del Valle-Padilla and José Raúl Loo-Yau), for the paper “An Investigation on the Modified Cold-FET Method for Determining Gate Resistance and Inductance of the Packaged GaN and SiC Transistors”. And finally the best exhibitor award was presented to Agilent Technologies.

**NVNA USERS’ FORUM - INTERNATIONAL**

The ‘international’ meeting of the NVNA Users’ Forum was held on Thursday afternoon, June 19th, at the Omni Hotel at CNN Center, Atlanta.
Approximately 30 people from industry, government and academia attended the meeting. The meeting featured a discussion topic and a research update. The discussion topic concerned “Choice of Bias Tee for Minimizing Memory Effects in Weakly Nonlinear Distortion Measurements and for use in Pulsed Measurements” and was moderated by Kate Remley and John Wood. The research update was given by Daniel Gunyan, of Agilent Technologies, and concerned “Measurement Applications for the Mixer-Based NVNA”, which highlighted measurements such as bit streams, narrow RF pulses and multi-tone signals. A summary of this meeting will be available shortly at www.arftg.org.

JOINT ARFTG/IMS WORKSHOPS
Two joint ARFTG/IMS workshops were held during Microwave Week 2008. Both workshops took place on Monday, June 16th, at the Georgia World Congress Center, Georgia. The first workshop, titled “High Speed Signal Integrity Workshop with Emphasis on Jitter”, was organized by Thomas Ruttan (Intel Corp) and Mike Resso (Agilent Technologies). The second workshop, titled “Applications and Misapplications of Measurement Uncertainty”, was organized by Nick Ridler (National Physical Laboratory (NPL)), Daniel Pasquet (ENSEA) and Andrej Rumiantsev (SUSS MicroTec Test Systems GmbH).

FUTURE EVENTS

NVNA Users’ Forum – Europe
This meeting will be held during European Microwave Week 2008, which takes place from October 27th to 31st, 2008, in Amsterdam, The Netherlands. (Information on European Microwave Week is available at www.eumweek.com.) The NVNA Users’ meeting will be on Thursday, October 30th, from 08:30am to 09:50am. The agenda for the meeting has already been fixed and forms one of the Technical Sessions of the 38th European Microwave Conference (session EuMC39, see page 57 of the European Microwave Week Program Book, available at www.eumweek.com).

Fall 2008 ARFTG Symposium
This year’s fall ARFTG Symposium will comprise the 72nd Microwave Measurement Conference, the NIST/ARFTG Short Course, a Nonlinear Measurement Workshop, a Multiport/Differential Measurement for Signal Integrity Workshop and the NVNA Users’ Forum. All these events will be held at the Red Lion Jantzen Beach Hotel on the Columbia River, from December 9th to 12th, 2008. The timetable for these events is given below.

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<th>Fall 2008 ARFTG Symposium - schedule of events</th>
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Microwave Measurement Conference
The theme for the 72nd ARFTG Microwave Measurement Conference is “Time Domain and Frequency Domain Measurement”. The deadline for submitting a paper for consideration by the conference Technical Program Committee is September 8th, 2008.
As on previous occasions, the conference will offer ample opportunity for participants to interact with leading professionals in fields such as RF communications and other microwave technologies. For more information, visit www.arftg.org or contact the Conference Chair, Tom Ruttan (Thomas.g.ruttan@intel.com), or the Technical Program Chair, Leonard Hayden (Leonard.Hayden@ieee.org).

NIST / ARFTG Short Course
This one-and-a-half day short course will include topics specific to the conference theme (i.e. “Time Domain and Frequency Domain Measurement”). Additional topics include: connectorised and on-wafer S-parameters, power, thermal noise, phase noise and nonlinear measurements, and uncertainty analysis.

For more information, visit www.arftg.org or contact the short course organizer, Dominique Schreurs (dominique.schreurs@esat.kuleuven.be).

Measurement Workshops
For more information about ARFTG’s highly successful measurement workshops, visit www.arftg.org or contact the workshop organizer, Jean-Pierre Teyssier (teyssier@brive.unilim.fr). The fall 2008 ARFTG symposium will feature two such workshops:

1. Nonlinear Measurement Workshop: “Time-Domain Approaches: Issues, Solutions and Evaluations”. This Workshop proposes a tour of up-to-date approaches for time-domain waveform measurements at nonlinear device terminals, especially high power transistors. The planned topics include: passive and active loadpull waveform engineering, large signal network analysis, time domain measurement of very high power and strongly mismatched devices.

2. Multiport/Differential Measurement for Signal Integrity Workshop. Signal integrity is now a ‘hot’ topic, linking microwave engineers and high-speed digital system designers. As many fast digital systems are making use of differential signals, this workshop will focus on RF multiport and differential measurement techniques that are useful for signal integrity measurements and design improvements.

NVNA Users’ Forum – US
This meeting will also take place during the fall 2008 ARFTG symposium. The program should be available at www.arftg.org approximately one month prior to the meeting. Those with potential agenda items for this meeting should contact the Forum organizers: John Wood (john.wood@freescale.com), Jean-Pierre Teyssier (teyssier@brive.unilim.fr) and Dominique Schreurs (dominique.schreurs@esat.kuleuven.be).

Spring 2009 ARFTG activities
The 73rd ARFTG Microwave Measurement Conference will be held on June 12th, 2009, in Boston, Massachusetts, as part of Microwave Week 2009, in conjunction with IMS (www.ims2009.org) and the RFIC symposium (www.rfic2009.org). The ARFTG conference theme is “Practical Applications of Non-Linear Measurements”. For more information, visit www.arftg.org or contact the Conference Chair, Charles Wilker (wilker@ieee.org) or the Technical Program Chair, Dave Blackham (dave.blackham@agilent.com).

It is also planned to hold a meeting of the NVNA Users’ Forum – International, as part of the spring 2009 ARFTG activities, and to co-sponsor appropriate workshops and/or tutorials that will be taking place during Microwave Week 2009.

UPDATED ARFTG CD
The highly successful ARFTG digests compilation CD that contains the digests from the ARFTG conferences that took place during the years 1982 to 2001 has now been supplemented with an additional CD that brings this collection up to date with digests from conferences from 2002 to 2007. The cost of the combined CDs is currently $105 for members or $140 for non-members. In future, it is planned to merge these two CDs into one that will contain all ARFTG conference digests from 1982 to date. In addition, a CD containing the Nonlinear Measurement Workshop compendium of six workshops presentation material, 2001 through to 2006, is also available for purchase. The cost is currently $70 for members or $105 for non-members.

Additional information on purchasing either or both of the above CDs can be obtained by contacting Jim Taylor (jtaylor114@kc.rr.com), the ARFTG Executive Secretary.

CORRECTIONS
Every effort has been made to publish correct information in this newsletter. Significant errors should be reported to the ARFTG Executive Committee Secretary, Nick Ridler (nick.ridler@ieee.org), so that corrections can be reported in the next issue.