



AUTOMATIC RF TECHNIQUES GROUP

NEWSLETTER

WINTER 2010

NUMBER 44

Fall 2010 ARFTG Microwave Measurement Symposium: “Millimeter-wave Measurement and Modeling”

OVERVIEW



The Marriott Suites at Clearwater Beach, near Tampa, Florida, venue for the Fall 2010 ARFTG Symposium

The Fall 2010 ARFTG Microwave Measurement Symposium took place at the Marriott Suites, Clearwater Beach, Florida, over four days from Tuesday, November 30th, to Friday, December 3rd. The symposium consisted of a conference, two workshops, a training course and a users' forum. The theme of this year's symposium was "Millimeter-wave Measurement and Modeling". The symposium 'main event' was the 76th ARFTG Microwave Measurement Conference, which took place on Thursday and on Friday morning. However, this was accompanied by four other not-to-be-missed events: the NIST/ARFTG Microwave Measurement Short Course (held on Tuesday, and Wednesday morning), a Millimeter-wave and THz measurements workshop and the NVNA Users' Forum (both held on Wednesday afternoon); an awards

banquet, and a Nonlinear memory effects workshop (on Friday afternoon). Taken together, this amounted to four days packed with exciting activities for RF, microwave, and millimeter-wave engineers and technologists.

This newsletter gives reviews of these activities. There are also brief accounts of other events of interest to the ARFTG community. To obtain more information on ARFTG and its activities, including details of conferences past, present and future, visit the ARFTG website at www.arftg.org.

SHORT COURSE

The Fall 2010 ARFTG Microwave Measurement Symposium began with the 16th annual NIST/ARFTG Microwave Measurement Short Course. This highly successful event provides training, given by acknowledged experts in the field, in most areas of interest to today's RF and microwave measurement community.

Day one of this one-and-a-half day course covered the fundamentals of microwave measurement, including measurement of: connectorized and on-wafer S-parameters; VNA uncertainties and verification, and noise. All of these topics were covered with a bent towards millimeter-wave applications. Day two contained topics on power, large signal and high-speed oscilloscope measurements; and a special lecture on challenges of sub-millimeter wave measurement. A panel session was also held as part of the short course

and was entitled 'Bring your problem'. The session, with all instructors present, was devoted to trying to answer attendee measurement issues. This year, over 20 people attended the course. For information on ARFTG courses, contact Dominique Schreurs (dominique.schreurs@ieee.org), the ARFTG Education Chair and Short Course Organizer.

MILLIMETER-WAVE MEASUREMENT WORKSHOP

A workshop on millimeter-wave and THz measurements was organized by Zoya Popovic of the University of Colorado, and was held immediately after the NIST/ARFTG Short Course. The workshop contained talks on the following topics: Quasi-optical measurement systems, Scattering parameter measurements in rectangular waveguide at (nearly) THz frequencies, Integrated Schottky diode and micromachined-based components for submillimeter-wave metrology, 0.1 -1 THz power metrology: current status, and Microfabrication of rectangular coax for millimeter-wave frequencies.

The workshop was attended by over 30 people and was a great success. Thanks are due to all those that were involved in the workshop – especially Zoya Popovic, who organized an excellent program. Suggestions for future workshop topics should be sent to the ARFTG Workshops Chair, Jean-Pierre Teyssier (teyssier@brive.unilim.fr).



Workshop organizer Zoya Popovic is shown here introducing the millimeter-wave workshop.

NVNA USERS' FORUM - US

The ARFTG NVNA (Nonlinear Vector Network Analyzer) Users' Forum held a meeting on Wednesday afternoon, immediately after the millimeter-wave and THz measurements workshop. On this occasion, approximately 20 people attended this informal meeting that comprised brief technical presentations and an open

discussion. Kate Remley of NIST, was the moderator for the discussion topic on time domain analysis for wideband modulated signals. The Forum organizers were Jean-Pierre Teyssier (teyssier@brive.unilim.fr), Dominique Schreurs, and Patrick Roblin.

CONFERENCE TECHNICAL SESSIONS

The 76th ARFTG Microwave Measurement Conference began with introductions by ARFTG President Ron Ginley and Dave Blackham, the Conference Chair. Dave thanked Jon Martens, Technical Program Chair, and Larry Dunleavy, Conference Host, for their help in organizing the conference. The conference received sponsorship from several organizations: the 'gold' sponsor was Anritsu, while the 'silver' sponsors were Agilent Technologies and Maury Microwave. For future sponsorship opportunities, contact the Sponsorship Chair, Rusty Myers (sponsorship@arftg.org).

The conference consisted of seven sessions of which one was an interactive session featuring papers given as poster presentations. The other sessions consisted of papers given as oral presentations. All papers have been published in the conference digest CD (copies of which can be ordered from www.arftg.org). On this occasion, over 55 people attended the conference.

The best oral paper presentation, as voted on by conference attendees, was "Rectangular-waveguide vector-network-analyzer calibrations with imperfect test ports" by Dylan Williams (NIST, Boulder, US). The best interactive forum paper presentation was "Measurement of micromachined submillimeter waveguide circuits", by X. Shang, M. J. Lancaster, M. Ke, and Y. Wang (University of Birmingham, Birmingham, UK). The best exhibitor was voted as Anritsu.

CONFERENCE EXHIBITS

The exhibits area gave conference attendees an excellent opportunity to see the latest range of products available from some of the leading suppliers in the RF and microwave test and measurement industry. The exhibits were co-located with the interactive forum to enable more contact and discussion.



With the interactive forum and exhibits in the same room, further discussions were possible.

The following companies chose to exhibit at this conference:

- Agilent Technologies
- Anritsu
- Constant Wave
- Maury Microwave
- Rohde & Schwarz
- Tektronix.

To exhibit at future conferences, please contact the ARFTG Exhibits Chair, Brett Grossman, at exhibits@arftg.org.



Extended breaks allowed for further interactions between attendees and exhibitors.

ANNUAL BUSINESS MEETING

The annual ARFTG Business Meeting was held on December 2nd, 2010, during the 76th conference. A significant part of this meeting consisted of electing five members to the ARFTG Executive Committee (ExCom). Biographies for the candidates were distributed prior to voting. The outcome of the voting

was the re-election of four existing members of ExCom, Dave Blackham, Leonard Hayden, Mohamed Sayed, and Jean-Pierre Teyssier; and the election of one new member: Joe Gering. ARFTG thanks John Wood for his valuable contributions to ARFTG while a member of ExCom.

CONFERENCE AWARDS

ARFTG President, Ron Ginley, presided over the conference awards ceremony, which took place during the awards banquet on Thursday evening. Certificates of appreciation were presented to the organizers of the conference, namely: Dave Blackham, Conference Chair; Larry Dunleavy, Conference Host; Jon Martens, Technical Program Chair; and, the Session Chairs – Jon Martens, Nick Ridler, Leonard Hayden, Kate Remley, Uwe Arz, and Mitch Wallis.

Awards were also given for best papers and exhibitor from the previous (75th) conference held in Anaheim, California. The best oral paper presentation was a tie between “A VNA based broadband loadpull for non-parametric 2-port best linear approximation modeling”, by Y. Rolain, J. Schoukens, R. Pintelon, L. Delocht, and G. Vandersteen (Vrije Universiteit Brussel, Belgium) and “A simplified extension of X-parameters to describe memory effects for wideband modulated signals”, by J. Verspecht¹, D. E. Root², and J. Horn² (¹ Jan Verspecht B.V.B.A, Belgium; ²Agilent Technologies, United States). The award for best interactive forum paper presentation went to “Uncertainties in coplanar waveguide and microstrip line standards for on-wafer thru-reflect-line calibrations”, by U. Arz and K. Kuhlmann (PTB, Germany). The best exhibitor award went to Agilent Technologies.

On a special note, Leonard Hayden received the ARFTG Distinguished Service Award for his significant and long-term contributions to the organization.

NONLINEAR MEASUREMENTS WORKSHOP

The Fall 2010 ARFTG Symposium concluded with a workshop on Friday afternoon on nonlinear measurements to investigate memory effects of RF transistors and active devices and was organized by Loren Betts of Agilent Technologies. The workshop contained talks on the following topics: Non-linear measurement techniques for the low- and high-frequency characterization of microwave active device, Pulsed measurements from I(V) to time domain load-pull to control memory effects, Broadband multisine measurements for identification of memory effects, and

Extension of X-parameters to include long-term dynamic memory effects.

The workshop was attended by over 20 people. Thanks are due to all those that were involved, especially Loren Betts who did an excellent job as workshop organizer.

OTHER RECENT EVENTS: NVNA USERS' FORUM - EUROPE

The NVNA Users' Forum – Europe meeting took place during European Microwave Week 2010 and drew over 30 attendees. A talk was presented about the Open Wave Forum initiative and there was an extended discussion about file formats. NPL reported on some of their work with harmonic phase standards and NTNU presented a research update. The open discussion section led to a lively debate on the topic of time domain measurements of wideband modulated signals.

FUTURE EVENTS

Summer 2011 ARFTG activities

Microwave Measurement Conference

The 77th ARFTG Microwave Measurement Conference will be held on June 10th, 2011, in Baltimore, Maryland, as part of Microwave Week 2011 (June 5th-10th), which also includes the IEEE MTT-S International Microwave Symposium (www.ims2011.org) and the Radio Frequency Integrated Circuits symposium (www.rfic2011.org). The theme for the ARFTG conference is "Design and measurement of microwave systems". For more information, contact the Conference Chair, Mohamed Sayed, (mmsayed@sbcglobal.net), or the Technical Program Chair, Jon Martens, (jmartens@anritsu.com) or visit www.arftg.org. ARFTG will also be co-sponsoring three workshops (Practical IMD, P1dB, load pull and behavioral modeling measurements, The design flow of microwave power amplifiers: challenges and future trends, and Laboratory class: wafer-level S-parameter calibration techniques) during Microwave Week.

NVNA Users' Forum

The ARFTG NVNA Users' Forum will also hold a meeting during Microwave Week 2011. For more information, please contact the Forum organizers: Jean-Pierre Teyssier (teyssier@brive.unilim.fr), Dominique Schreurs, Patrick Roblin, Joe Gering, or Kristoffer Andersson.



The Hilton Baltimore, venue for the 77th ARFTG Microwave Measurement Conference

NVNA Users' Forum - Europe

It is planned to hold a meeting of the ARFTG NVNA Users' Forum during European Microwave Week 2011, which takes place from October 9th-14th, in Manchester, UK. More information on European Microwave Week 2011 can be found at www.eumweek.com.

Fall 2011 ARFTG Symposium

The Fall 2011 ARFTG Microwave Measurement Symposium will be held in Tempe, Arizona, from Tuesday, November 29th, to Friday, December 2nd. It is planned to hold the 78th ARFTG Microwave Measurement Conference, a workshop and the ARFTG NVNA Users' Forum during this symposium. For more information, contact the Conference Co-chairs, Mohamed Sayed (mmsayed@sbcglobal.net) or John Wood (R68588@freescale.com), or the Technical Program Chair, Peter Aaen (R40889@freescale.com). Alternatively, information will also be available, in due course, at www.arftg.org.

ARFTG AND SOCIAL MEDIA

The ARFTG group on LinkedIn now has over 250 members. This is a good place to get reminders of upcoming meetings and is an opportunity for discussion with others interested in ARFTG. To join: become a LinkedIn member, search for ARFTG in the groups list, and submit a membership request.

ADDENDUM

Every effort has been made to publish correct information in this newsletter. Significant errors should be reported to the ARFTG Executive Committee Secretary, Jon Martens (jmartens@anritsu.com), so that corrections can be reported in the next issue.