



94th Session B: On-Wafer and mm-Wave Measurements-Chair

Session Chair: Jeffrey Jargon

B1

Broadband 220 GHz network analysis: structures and performance

3:50 PM 4:10 PM **Jon Martens** (*Anritsu*)*; **Tom Roberts** (*Anritsu*)

As mm-wave applications continue to increase in frequency and, simultaneously, the broadband measurement needs for the underlying device and subsystem development work increase, continuous network analyzer coverage beyond 200 GHz can be helpful. One such system uses an extension of an existing multiplied source multiplexing scheme and a modified shaped-LO converter structure to achieve power leveling over more than a 40 dB range from 70 kHz to 226 GHz, high receiver linearity, a noise floor below -100 dBm across the band, and $\sim < 0.1$ dB thru transmission measurement stability over 24 hours.

B2

Calibration Substrate Design for Accurate mm-Wave Probe-Tip Calibration

4:10 PM 4:30 PM **Andrej Rumiantsev** (*MPI Corporation*)*; **Ralf Doerner** (*Ferdinand-Braun-Institut (FBH)*); **Gia Ngoc Phung** (*Ferdinand-Braun-Institut (FBH)*)

This work presents the design concept, EM-simulation and measurement results of a new calibration substrate developed to address probe-tip calibration challenges and to improve calibration accuracy at mm-wave frequency range.

B3

In-Situ Calibration and De-Embedding Test Structure Design for SiGe HBT On-Wafer Characterization up to 500 GHz

4:30 PM 4:50 PM *Marco Cabbia (University of Bordeaux)*; Marina Deng (IMS Laboratory, University of Bordeaux); Sébastien Fregonese (IMS Laboratory, University of Bordeaux); Magali De Matos (IMS Laboratory, University of Bordeaux); Didier Céli (STMicroelectronics); Thomas Zimmer (IMS Laboratory, University of Bordeaux)*

In this paper, we present an in-situ thru-reflect-line (TRL) calibration and de-embedding kit that sets the reference plane in close proximity to the device under test. This is made possible thanks to the realization of the standards at the metal-3 BEOL level, instead of the common metal-8 solution. This novel calibration kit has been compared to classic TRL, both for parasitics assessment and by direct application on the active device (HBT) measurements.

B4

An interlaboratory study of the reproducibility of on-wafer S parameter measurements from 140 GHz to 220 GHz

4:50 PM 5:10 PM *Roland G Clarke (University of Leeds)*; Xiaobang Shang (National Physical Laboratory); Nick Ridler (National Physical Laboratory); Roger Lozar (Fraunhofer IAF); Thorsten Probst (Physikalisch-Technische Bundesanstalt (PTB)); Uwe Arz (Physikalisch-Technische Bundesanstalt (PTB))*

The development, modelling and characterization of millimeter-wave semiconductor devices calls for accurate and reproducible on-wafer measurements. We report on an interlaboratory study involving on-wafer S-parameter measurements in the 140 GHz to 220 GHz band, conducted by three well-established measurement laboratories. The measurements can be used to form typical reproducibility limits for these measurements when conducted in different laboratories using different equipment and calibration methods.