# MiPlaza Device Characterization and Simulation Workshop

*Learn More About the Latest Trend on Device Characterization and Simulation*

MiPlaza

Dear customer,

It's our pleasure to invite you to Agilent's complimentary workshop: **"Device Characterization and Simulations"**. This full day event takes place on **October 17** at the High Tech Campus in Eindhoven, The Netherlands.

Who should attend?

Engineers and scientists who are working in the field of semiconductor device characterization.

What to expect?

With topics ranging from probing techniques, new algorithm simulation and large signal network analyzer technologies for active components, our application experts will present the new trends and technologies in component characterization. The workshop will make use of the MiPlaza Electronic Measurement Laboratory demonstrating today's capabilities and looking at the future challenges.
Please find enclosed detailed abstracts of the papers that will be presented. Registration information is below. Refreshments and lunch will be provided.

We look forward to welcoming you to this workshop.

With best regards,

Frans Groot
Marcom Benelux
Agilent Technologies Nederland B.V.

**Register NOW!**

Seating is limited for this Complimentary seminar and early enrollment is advised.

You will receive an email confirming your enrollment with directions to the seminar location

**You can register via:**
**Telephone** **+31 20 547 2111**
**Fax** **+31 20 547 2390**
**Email** contactcenter_benelux@agilent.com
**Web** www.agilent.nl/find/devicechar

☐ **Yes, I will attend this workshop on 17 October 2007 in Eindhoven**

☐ **I am unable to attend but please send me the handout material**

| | **Agenda** |
|---|---|
| 09.00 | Welcome |
| 09.15 | Presentation: **"The Poly-Harmonic Distortion (PHD) Model for Nonlinear RF and Microwave Circuits"** - Jan Verspecht (Agilent Technologies) |
| 10.45 | Coffee Break |
| 11.00 | Presentation: **"On wafer semiconductor capacitance basic"** - Tetsuo Watanabe ( Agilent Technologies) |
| 12.00 | Presentation: **"RF design for low-power radios at 17GHz"** - Mihai Sanduleanu (Philips Research) |
| 12.45 | **MiPlaza overview** - Nick Campbell (MiPlaza) |
| 13.00 | Lunch |
| 14.00 | Presentation and demo: **"On wafer devices characterization challenges"** - Franz Sischka / Gavin Fisher (Agilent Technologies / Cascade Microtech ) |
| 15.30 | Coffee Break |
| 15.45 | Presentation: **"Large signal network analyzer technologies for active components"**- Marc Vanden Bossche (NMDG Engineering) |
| 17:00 | Close |

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|---|---|
| ***The Poly-Harmonic Distortion (PHD) Model: Measurement-based Black-Box Behavioral Modeling of Nonlinear RF and Microwave Circuits*** | S-parameter measurements and theory are complete only for linear systems. More advanced nonlinear measurements, theory, and models are required to fully describe components such as power amplifiers, mixers, and other RF functional blocks under large-signal stimulus conditions. This is especially true for designing RF systems from such components considering mismatch effects. This paper reviews an advanced, theoretically sound, frequency-domain measurement and modeling framework - the PHD model - for accurate nonlinear component characterization and simulation. The PHD model is valid for small and large amplitude drive signals, correctly predicts distortion through cascaded chains of nonlinear functional blocks, can simulate load-pull behavior, and predicts ACPR and other figures of merit with excellent accuracy. |
| ***On Wafer Semiconductor Capacitance Measurement basics*** | During this presentation we will be analyze the challenges and the techniques to perform on Wafer semiconductor capacitance measurement in a accurate way.<br>Topics covered:<br>• Theory and practice of capacitance measurement<br>• Low-frequency (up to 5 MHz) and high-frequency (up to 110 MHz) measurement<br>• Importance of good structure design and proper compensation techniques<br>• Pros and cons of different contact methods (4TP versus 3T versus Advanced IV)<br>• CV-IV switching challenges and solutions |
| ***Creating large signal network analyzer technologies for active components*** | The growing feature set of the PNA Network analyzer is bringing them closer and closer to the characterization and analysis of active components. This presentation demonstrates how with a PNA in combination with some additional hardware accurate and complete incident and reflected waveforms can be measured in time and frequency domain. Amongst others the accuracy and completeness is important for model verification and tuning. It will be shown how these types of measurements can be used in Agilent ADS for this purpose. Basic waveform measurements are not enough for active component characterization. Active components require often non-50 Ohm environments and require realistic stimuli. Power levels can go up to 100s of Watts and require adapted test-sets and calibration techniques. By combining the PNA and Maury tuner technology with a proper software tool it is shown how active components can be characterized and analyzed from small – signal to large – signal with one approach. |
| ***RF design for low-power radios at 17GHz*** | A 17GHz low power radio front-end is presented. Low-power operation is based on minimization of energy/bit, the design metric for low-power radios. Increasing the data rate, while reducing the receiver turn-on time, is proposed as a method of improving energy efficiency. Circuit design of prototype receiver and transmitter front-ends for a 17GHz ultra low-power radio are presented and discussed. The power gain of the LNA is 12dB with a minimum noise figure of 3.25dB. Conversion gain of the RF chain is 30dB at DC. The measured IIP3 of the Rx chain is –26.3dBm whereas the maximum saturated output power of the PA is about 5dBm. The total measured power consumption is 17.5mW (@2.5V supply) in the received mode and 16mW (@ 2.5V supply) in the transmit mode. |
| ***On wafer devices characterization challenges*** | This session will review the new tools and techniques necessary to characterize modern semiconductor devices. The advancements in device technology now required measurement to be made to frequencies as high as 220GHz or in a differential environment. These measurements require new probes and calibration techniques in order to make accurate and repeatable measurement that can be trusted. The session will look at probes, calibration standards, and software which allow measurements to be made with confidence. Using the Miplaza setup we will demonstrate the measurement possibility and the use of simulation engines to correlate results and modeling. |