DATE/LOCATION

Wednesday, December 4
Rohde & Schwarz Headquarters
Muehldorfstrasse 15
Technology Center (Ampfingstrasse 7)
81671 Munich

AGENDA

09:30 - 10:00	Welcome, Registration, and Coffee
10:00 - 10:30	**Opening and Welcome Words** *Heikki Rekonen and Malcolm Edwards, AWR Group, NI*
10:30 - 11:30	**Python Scripting Tutorial for NI AWR Software** *Dr. Edgar Schmidhammer, Qualcomm*
11:30 - 12:00	Break
12:00 - 12:30	**Design of mmWave MIMO Radar System** *Tero Kiuru, VTT*
12:30 - 13:15	**Doherty PA Design Based on the (EPHD) Model** *David Vye, AWR Group, NI*
13:15 - 14:15	Lunch
14:15 - 14:45	**L-, S- and C-Band High Power Amplifier Designs** *Dr. N'Gongo Simplice, Aelius Semiconductors*
14:45 - 15:30	**Ten Best Practices for Efficient and Effective EM Simulation in NI AWR Software** *Dr. John Dunn, AWR Group, NI*
15:30 - 16:00	**Complete Downconverter Module Design and Simulation** *Malcolm Edwards, AWR Group, NI*
16:00 - 16:30	**AXIEM and Virtuoso RF** *Dr. John Dunn, AWR Group, NI*
16:30 - 17:00	Q&A and Lucky Draw

NATIONAL INSTRUMENTS | AWR

ABSTRACTS

Python Scripting Tutorial for NI AWR Software
Dr. Edgar Schmidhammer, Qualcomm

The NI AWR Design Environment platforms API interface provides the ability to externally control the software using Python programming language. For some filter applications it is useful to combine the math power of Python with the easy-to-use Microwave Office circuit design software interface and powerful network simulation tools like optimization and yield-analysis. This tutorial demonstrates through basic Microwave Office design examples how to formulate a simple Python function for each design task such as placing elements, changing parameters and properties of elements, defining optimization goals and more, that can later be combined into a more complex project.

Design of mmWave MIMO Radar System
Tero Kiuru, VTT

This presentation covers the design of a FMCW MIMO radar system with NI AWR Design Environment software. The purpose of the system is for short-range high-resolution localization of nearby moving objects. Four-channel transmitter and receiver chips are designed using a 130 nm SiGe process. The total number of TX and RX channels can be scaled by the number of chips in the system while still maintaining phase coherence between the channels. Measurements are made with a 4 TX channel and 8 RX channel system and simulation vs measurement results are also presented.

Doherty PA Design Based on the (EPHD) Model
David Vye, AWR Group, NI

The Doherty configuration offers a cost-effective solution for achieving a low distortion yet efficient amplifier. To properly design a Doherty PA, engineers need suitable RF circuit simulation technology, including harmonic balance, circuit envelope, load-pull analysis, as well as design automation and accurate device models. This talk presents basic Doherty PA theory and design methodology featuring specific simulation and design automation capabilities within Microwave Office circuit design software. The design example is based on an enhanced polyharmonic distortion (EPHD) GaN model provided by AMCAD Engineering.

L-, S- and C-Band High Power Amplifier Designs
Dr. N'Gongo Simplice, Aelius Semiconductors

Aelius Semiconductors develops III-V MMICs using robust and highly reliable processes available at commercial foundries such as WIN Semiconductors (Taiwan) and UMS (France). This presentation discusses the Aelius Semiconductors development program for L, S, and C-band high power amplifiers (HPAs) using NI AWR Design Environment software. The design of L, S, and C-band 25 W, 30 W, and 100 W GaN HPAs using the AlGaN/GaN 0.25 µm GaN HEMT process from UMS and the AlGaN/GaN 0.45 µm GaN HEMT process from WIN Semiconductors will be showcased and the comparison between simulated and measured results will be also shown.

Ten Best Practices for Efficient and Effective EM Simulation in NI AWR Software
Dr. John Dunn, AWR Group, NI

Designers of today's complex, multi-featured communications products require accurate and fast electromagnetic (EM) simulation to deliver cost-effective, high performance products to market in ever-shrinking windows of opportunity. The AXIEM 3D planar method-of-moments (MoM) EM analysis simulator within the NI AWR software portfolio delivers the accuracy, capacity, and speed designers need to characterize and optimize passive components on RF printed-circuit boards (PCBs), modules, low-temperature co-fired ceramics (LTCCs), monolithic microwave integrated circuits (MMICs), RFICs, and antennas. This presentation presents ten best practices for using the AXIEM simulator that will help designers effectively and efficiently use the software to overcome the most commonly encountered issues when running EM simulations. The best practices address four main design areas: ports, EM environment, meshing, and simulation.

Complete Downconverter Module Design and Simulation
Malcolm Edwards, AWR Group, NI

This presentation helps designers understand Ka, Ku, and X-band frequency downconverter module design challenges and how to overcome them. A design of a complete integrated downconverter module, from system-level specifications to circuit-level implementation, will be presented using N AWR Design Environment software as a single integrated tool. The first part of the presentation will focus on the system-level design by selecting components, optimizing parameters for the downconverter building blocks, and performing various system-level simulations to achieve performance specifications. The second part of the presentation will provide the actual circuit-level implementation and layout design, as well as simulating the final layout using the AXIEM planar EM simulator. Finally, 3D EM analysis of the mechanical housing package will be presented, along with the module co-simulation using the Analyst™ 3D FEM EM solver.

AXIEM and Virtuoso RF
Dr. John Dunn, AWR Group, NI

This talk presents a new flow in which the Cadence interface has been extended to integrate the AXIEM 3D planar method-of-moments (MoM) EM simulator within the Cadence Virtuoso RF Solution design environment. The AXIEM fast solver technology readily addresses passive structures, transmission lines, large planar antenna, and patch array problems with more than 100,000 unknowns, providing the accuracy, capacity, and speed engineers need to ensure first-pass design success. The new flow in Virtuoso, dubbed the Golden Schematic Flow, will be demonstrated and the usefulness of the AXIEM simulator for silicon designs will be discussed.