AWR DESIGN FORUM

ADF 2018 ITALY

Learn. Network. Collaborate.

Date/Location	
Nov 6, 2018	**Nov 8, 2018**
Polytechnic University of Milan Sala Alpha, Edificio 24, piano terra Piazza Leonardo da Vinci, 32 20133 Milan	**University of Rome Tor Vergata** Sala Leonardo Via Cracovia n.50 00133 Rome

Register at: awrcorp.com/adf2018-italy

Agenda	
08:30 – 09:30	**Welcome, Registration, and Coffee**
09:30 – 10:15	**Future Faster: Realizing the NI AWR Software Vision with Version 14 or Beyond** *Andrea Sani, AWR Group, NI*
10:15 – 10:45	**Advances in Recent PCB Design Verification Flows** *Malcolm Edwards, AWR Group, NI*
10:45 – 11:15	**Milan:** **NI AWR Software For Practical Design of Microwave Filters and Multiplexers** *Giuseppe Macchiarella, Polytechnic University of Milan*
	Rome: **Simulating RF Devices, RF Impairments and Measuring System Performance** *Andrea Sani, AWR Group, NI*
11:15 – 11:30	**Coffee**
11:30 – 12:00	**Utilizing Network Synthesis to Accelerate Matching Circuit Design** *Malcolm Edwards, AWR Group, NI*
12:00 – 12:30	**Why You Need New Dielectric Materials to Succeed in the 5G Race?** *Dr. Jan Järveläinen, Premix*
12:30 – 13:00	**Analysis and Simulation of Phased Arrays for 5G and AESA Radars** *Malcolm Edwards, AWR Group, NI*
13:00 – 14:00	**Lunch**

Media Partner:

Microwave Journal
Frequency Matters.

Event Partner:

PREMIX

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Presentation Abstracts

Future Faster: Realizing the NI AWR Software Vision with Version 14 or Beyond

Andrea Sani, AWR Group, NI

RF/microwave designs must meet the many stringent component/system requirements called for in next-generation communications and radar systems serving a diverse range of applications such as 5G, IoT, aerospace/defense networks, wireless biomedical devices, and ADAS-enabled vehicles. This ADF 2018 keynote will discuss how the NI AWR software long-term vision has supported and grown alongside an evolving wireless landscape and will introduce attendees to the new and enhanced capabilities being offered in NI AWR Design Environment V14, including powerful network synthesis for multi-band impedance matching circuits, advanced layout editing for PCB/module EM verification, design flows for phased-array antenna development, and enhanced analysis, automation, and report/measurement management for greater productivity and design success.

Advances in Recent PCB Design Verification Flows

Malcolm Edwards, AWR Group, NI

To support ever-increasing functionality, printed circuit boards (PCBs) are employing more complex board structures designed for specific applications. For PCBs in mobile devices, the interconnect and board dimensions are rapidly shrinking as designs rely on a reduced number of highly-integrated modules, each with high pin counts. At the same time, boards for networking and computer applications are getting larger, with more interconnect and plane layers. This presentation looks at changing board technology for RF/wireless applications and recent capabilities in simulation software that allows designers to isolate and characterize critical traces through complex multi-layer configurations.

NI AWR Software For Practical Design of Microwave Filters and Multiplexers

Giuseppe Macchiarella, Polytechnic University of Milan

Microwave filters and multiplexers are typically composed of several cavities coupled to each other. The physical dimensioning of the device structures is based on the preliminary evaluation of universal parameters (coupling coefficients, resonating frequencies) from synthesized electrical (equivalent) networks, which are then translated to the physical structures. An iterative procedure is typically set up, which consists of extracting the parameters from the dimensioned structure, comparing them with the required ones, correcting the physical dimensions, and continuing until the extracted parameters are sufficiently close to the synthesized ones. This presentation illustrates how to use NI AWR Design Environment platform, specifically Microwave Office circuit design software, together with a full wave electromagnetic simulator to implement this flow. Improving the response obtained after the procedure using NI AWR software for a smart implementation of "space mapping" will also be demonstrated.

Simulating RF Devices, RF Impairments and Measuring System Performance

Malcolm Edwards, AWR Group, NI

This presentation will cover different RF components that can be simulated in Visual System Simulator™ (VSS). A work bench to understand what impacts overall noise figure of a mixer will be simulated. Methods of accommodating device frequency and temperature dependency will be illustrated. Measuring and simulating phase noise will be shown, and we will monitor its impact on Error Vector Magnitude (EVM). Other topics will include measuring Signal to Noise Ratio in time domain, 3rd order intermodulation to carrier ratio, and Carrier to Noise + Interference ratio.

Utilizing Network Synthesis to Accelerate Matching Circuit Design

Malcolm Edwards, AWR Group, NI

Addressing the initial stages of design through synthesis is an area of considerable interest to designers of impedance matching circuits, which are critical to the performance of PAs and other RF components found in communication system front ends, especially those required to operate over greater bandwidths to support LTE-A and 5G data capacities. This paper looks at advances in simulation optimization and network synthesis that have been developed specifically to support the design of impedance-matching circuits. Complementing other developments in design automation and aids such as load-pull analysis, network synthesis accelerates design starts and allows designers to more fully explore design options through the creation of optimized two-port matching networks with discrete and distributed components based on user-defined performance goals.

Why You Need New Dielectric Materials to Succeed in the 5G Race?

Dr. Jan Järveläinen, Premix

To achieve the envisioned 1000-fold capacity increase of next-generation 5G wireless networks, many new frequency bands and smaller cells, as well as denser frequency reuse, is needed. These requirements put new demands on the materials used in base stations and mobile devices. In addition, requency reuse necessitates improved MIMO antenna systems, which in turn need materials with stable and tightly controlled dielectric properties, consistent performance in all use conditions, and good moldability. To achieve this, accurate processes are required in quality control and in characterization of dielectric properties. In this presentation, the effects of material losses are shown in very concrete ways via industrial examples.

Analysis and Simulation of Phased Arrays for 5G and AESA Radars

Malcolm Edwards, AWR Group, NI

An in-depth overview of Visual System Simulator™ (VSS) phased array simulation and analysis capabilities will be presented. The demonstration will start with a black box approach to examine an array gain patterns inclusive of failure and yield analysis. Next, the VSS array model that accommodates characterization of each patch and individual links of the array will be shown. The impact of coupling effects and active impedance on an array gain pattern will be simulated. The subjects of MIMO and beamforming will be discussed. Throughout the presentation pertinent examples will be shown to emphasize the unique phased-array analysis capabilities of VSS. Lastly, an overview of the VSS phased-array design wizard will be presented using simulations displaying 3D radiation patterns.