

On Monday January 15<sup>th</sup>, the SDR Forum will host a workshop on the use of test and measurement equipment in the development of SDR based systems and networks. Key players in the test and measurement industry, including Agilent, Anritsu, Electrobit, and Tektronix will be presenting at this workshop detailing how their technologies can be used to support the development and deployment of SDR based systems and networks in the commercial, public safety, and defense markets. The program for this workshop is as follows:

**8:00 to 9:00 Breakfast and Registration**

**9:00 to 9:15 INTRODUCTIONS**  
**Presented by Lee Pucker, CTO of the SDR Forum**

**9:15 to 10:15 TESTING SOFTWARE DEFINED RADIOS**  
**Presented by Darren McCarthy of Tektronix**

Software Defined Radios (SDRs) are driving the integration of digital signal processing (DSP) and radio frequency (RF) capabilities. This integration allows software to dynamically control communications parameters such as the frequency band used, filtering, modulation type, data rates and frequency hopping schemes. SDR technology is widely used in wireless devices for consumer products, commercial networks, military systems and specialized government applications.

Compared to traditional RF technologies and implementations, SDR enables the development of highly flexible and adaptable devices, allowing efficient device reconfiguration in response to changing requirements.

SDRs are used in several different markets, including:

- Cellular, such as WCDMA, HSxPA, GSM, and CDMA2000
- Military Tactical Radios, such as Joint Tactical Radio Service in the US
- Land Mobile Radios, such as Project 25 in the US and other areas
- “Regenerative” Satellite transceivers

Software Radios, however, introduce a host of new problems not present in traditional wireless analog designs. This presentation expands on the basic principles described in the Tektronix Application Note, *Software Defined Radio: An Integrated Test Method for Designing Software Communications Architecture (SCA) Compliant Radios*. Specific examples of common transmitter design issues and how to easily identify and diagnose them using a Real-Time Spectrum Analyzer (RTSA) will be presented.

**10:15 to 10:30 BREAK**

**10:30 to 11:30 TESTING THE SOFTWARE DEFINED RADIO**  
**Presented by John Barfuss of Agilent**

Software Defined Radios (SDRs) are becoming a reality. In the quest to achieve complete SDR design freedom many traditionally analog functions are being

implemented with Digital Signal Processing (DSP). Changing the form of the signal from analog to more flexible digital implementations creates a variety of new performance concerns and diagnostic test challenges. Agilent's approach to testing SDRs builds on understood test methodologies by expanding the capabilities of common instrumentation including the addition of digital interfaces to traditionally analog test tools. Come see Agilent's complete set of tools that enable insight up and down the modem chain and from design simulation to end product.

### **11:30 to 1:00 LUNCH AND DEMONSTRATION**

During lunch, our presenters will be providing one-on-one demonstrations of their test and measurement solutions.

### **1:00 to 2:15 SDR MEASUREMENT DIFFICULTIES AND SOLUTIONS Presented by Eric Hakanson of Anritsu**

While Software Defined Radio as a concept is very powerful, there is a key issue which has yet to be resolved—how to verify the analog performance of an SDR, especially with waveforms that don't exist. This presentation will discuss alternative philosophies for SDR analog performance, along with tradeoffs in measurement speed and comprehensiveness of test. A flexible test solution that addresses each of the philosophies will also be presented.

### **2:15 to 3:15 RADIO CHANNEL EMULATION FOR SDR DEVELOPMENT Presented by Juha Auer of Elektrobit**

### **3:15 to 3:30 BREAK**

### **3:30 to 4:15 CHALLENGES IN TESTING SOFTWARE DEFINED RADIOS Presented by Albert Winter of Rohde & Schwarz**

Together with the introduction of Software Defined Radios the amount of tactical communication will increase dramatically. In order to avoid interference, SDR's will have to undergo thorough testing in development, production and service. As a manufacturer of tactical radios, secure communication products and test and measurement equipment, Rohde & Schwarz combines the knowledge to provide suitable solutions to ensure the RF performance of Software Defined Radios. The flexibility in using different waveforms and new modulation schemes like OFDM must have its counterpart in adequate high performance test equipment. Some examples illustrate the requirements for test and measurement.

### **4:15 to 5:00 PANEL SESSION**

**Proposed topic – what are some of the new test challenges that will be faced in the coming years, and how will the test and measurement industry evolve to meet those challenges**