New Standards are Challenging T&M Manufacturers

By Josef Wolf, Rhode & Schwarz

An ever-increasing demand for communications and mobility has led to the need for higher data rates and volumes. As a manufacturer of T&M solutions, Rohde & Schwarz sees this as a challenge to smooth the path to new technologies for its customers. That goal is possible only with solutions that are typically a step ahead of development in the area of mobile communications.

As an example, network operators in Europe, Asia, and the USA are currently upgrading their networks with high speed downlink packet access (HSDPA). Starting in 2007, high speed uplink packet access (HSUPA) should improve the performance of data transmissions from the mobile phone to the base station. In order to make HSPA – which is the joint operation of HSDPA and HSUPA – a commercial success, the technology in networks and user equipment must be technically mature and function without flaws. That is why in 2006 Rohde & Schwarz has added HSUPA solutions to its HSDPA T&M product portfolio presented in early 2005.

With UMTS long term evolution (LTE), the next step is already in sight: Even while Rohde & Schwarz is supporting the definition of the standard, it is already offering solutions for initial developments and research projects. LTE – anticipated to launch in 2009 &#151 is intended to ensure the long-term competitiveness of UMTS. The goal is to achieve data rates of up to 100 Mbit/s in the downlink and up to 50 Mbit/s in the uplink. Moreover, LTE is expected to bring significant improvements in access times, data throughput, and spectral efficiency. The uplink is based on the single carrier frequency division multiple access (SC-FDMA) transmission method. Orthogonal frequency division multiple access (OFDMA) is used during the data transmission from the base station to the mobile phone &#151 similar to WiMAX.

WiMAX is another standard that is gaining in popularity. Originally designed to replace broadband cable networks such as DSL, the IEEE 802.16e-2005 standard is paving the way for mobile applications. Accordingly, development of the standard’s physical layer has noticeably advanced, which in turn places new requirements on the T&M equipment used to measure RF characteristics. Where the OFDM multicarrier method was primarily used for stationary applications, mobile applications are now converting completely to OFDMA. While OFDM handles each subscriber sequentially, OFMDA serves multiple subscribers concurrently. Every user is assigned a defined number of subchannels depending on the bandwidth required. Which channel is assigned to which user for how long is defined in the downlink/uplink map. Physical carriers are assigned to the subchannels using permutation algorithms that can change over time and that also define various zones.

With all of these advancements being made, signal generators and analyzers must be capable of generating and demodulating signals appropriately. Rohde & Schwarz is active in the various WiMAX committees so that it can integrate the very latest functionality into its equipment as early as possible. Firmware upgrades make enhancements uncomplicated and offer a high degree of investment safety. Our broad product portfolio is designed to meet the needs of the market. With our combination of signal generators and spectrum analyzers, we offer complete T&M solutions for the physical characteristics of stationary and mobile WiMAX applications, both in development and production. These, in turn, form the basis for system solutions developed specifically for WiMAX, such as our radio conformance test systems.

Because wireless communications are advancing so rapidly, mobile radio manufacturers and network operators cannot purchase new measurement devices or systems for every new technology that is developed. Companies want their investments in T&M solution to be viable now and for some time to come. Manufacturers of these T&M solutions are thus faced with a double challenge: Not only must they make applications available so that their customers can develop and manufacture their own products in accordance with the very latest standards, but they must also offer their customers the assurance that their existing and future investments will be protected. With its platform concept, Rohde & Schwarz meets these demands, offering its customers short innovation cycles with a high degree of future-proofness.

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