

Lab and field test produces top speed for mobile network of up to 360 megabits per second

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At the "Mobile Internet 2010" forum held by the German Ministry of Education and Research on September 14 and 15, Siemens presented the latest results from its mobile communication [research](#) for the first time to the general public. On a test system, videos and music as well as a Microsoft NetMeeting conference were **transmitted in wireless mode at data rates of up to 360 megabits per second (Mbps)**. This speed is around **one hundred times faster than the fastest DSL connection** available today. To also achieve these peak data rates for larger coverage areas, Siemens is the first company in the world to test a combination of orthogonal frequency division multiplexing (OFDM) and the so-called multi-hop technology, a new infrastructure concept. The system was already tested successfully in a field trial in the center of Munich.

“As is the case in information technology, the transmission speed in radio technology will also increase exponentially. We expect mobile systems with transmission speeds of more than 100 megabits per second to be the standard in about ten years”, said Christoph Caselitz, President of Networks within Siemens mobile. “A look back at the history of mobile communication shows what long time cycles are required for developing and standardizing new systems, for identifying new frequency spectrums, and for regulatory processes like licensing. The first talks about UMTS started in the late 1980s. It took almost 15 years for the system to become operational. It's therefore understandable that the first research efforts for developing mobile communication beyond

3G already began in the late 1990s.”

To transmit data rates in the hundred-megabit range, the frequency bands which transport the data as signals through the air need to become increasingly wider, with carrier frequencies entering into the gigahertz range. Starting at about three gigahertz, the waves are severely obstructed by buildings and natural obstacles. The multi-hop concept can increase the signal coverage area considerably. Wireless but fixed multi-hop stations — a combination of base station, repeater and router — forward the signal from cell to cell, also around obstacles, down to the terminal device when the direct link between base station and mobile terminal is interrupted.

To make the high-frequency signals more resistant to interference, Siemens deploys orthogonal frequency division multiplexing (OFDM). Multiplexing procedures specify how a transmission medium can be used several fold, for example by multiple users at the same time. Orthogonal frequency multiplexing is a special form of frequency multiplexing with which signals are split over different, closely adjacent carrier frequencies. These bundles of so-called sub carriers are supplemented by a timed protection interval so that the generated signal sequence is largely protected against interference from echoes and multipathing. OFDM represents a very elegant solution to the problems usually associated with broadband wireless transmission.

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