Mobile with 360 Mbit/s

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Using a combination of two radio technologies, Siemens researchers have now entered **a new dimension of data transfer for** mobile **communications**. The new system is able to transfer data at a rate of up to **360 megabits per second (Mbit/s) - around 100 times faster than the most powerful DSL connection**. The researchers have also substantially increased the range of the radio cell. This was achieved on the basis of OFDM technology and the multi-hop process, which works in conjunction with special base stations. These tests are a step toward the introduction of high data-transfer rates, which experts believe will **become standard in around ten years**.

The new system was used to transfer videos, audio files and a Microsoft NetMeeting conference, which demands especially high-quality data transfer. The base frequency selected was five gigahertz, a range in which future commercial transmission channels are likely to operate. The bandwidth of 100 megahertz (MHz) was divided up into 256 closely adjacent carrier frequencies that do not interfere with one another. This so-called Orthogonal Frequency Division Multiplexing (OFDM) protects the signal as far as possible against interference such as echoes, which are caused by reflections from buildings. This well-known process is new to mobile communications, although it is already used for wireless LANs as well as digital TV (DVB) and radio (DAB).
New, too, is the combination with the multi-hop technology, which enables signals to be relayed when a direct transmission between a base station and a mobile phone is impossible. Given that wave propagation at a frequency of five gigahertz is subject to stronger interference from buildings or mobile obstructions than is the case with the transmission

frequencies for GSM or UMTS, the level of radio coverage has to be increased. This is achieved with the use of multi-hop stations, which are a combination of base station, amplifier and router. If necessary, they relay signals from one cell to another.

In a field test held in downtown Munich, researchers used a base station with a four-meter-high antenna. The signal was then routed via a multi-hop station into a busy shopping street at a bandwidth of 20 MHz. They were able to achieve a maximum transfer rate of 72 Mbit/s. Despite the low transmitting power of 200 milliwatts, it was still possible to transfer at 3 Mbit/s to a terminal 500 meters away. At present, the research team is working on a system featuring multiple antennas in the transmitter and receiver to further boost data-transfer rates. In addition, they want to increase the still limited mobility of the terminal.

The mobile terminal used in the field tests has little in common with today's cell phones. For a start, it weighs several dozen kilograms and is enclosed in a large box. The experimental system was built for the "Coverage" project and will now be used in the "3GET" project, around half of the funding for which comes from the Federal Ministry of Research. The project, which is scheduled to run until 2007, involves not only Siemens but also other leading mobile phone manufacturers such as Nokia and Ericsson.