

Mobile Communication of the Future: Adaptive MIMO-OFDM Transmission

Mobile communication systems for the time after UMTS (introduced in 2002-2005) must support much higher data rates in a limited spectrum, to enable broadband multimedia services for multiple mobile users at reasonable costs. Internationally accepted numbers indicate that therefore one must realize data rates up to 1 Gbit/s for hot spot applications and 100 Mbit/s for highly mobile users in each mobile radio cell (100 m...1 km radius). A combination of orthogonal frequency-division multiplexing (OFDM) and multi-antenna techniques (MIMO, for multiple-input multiple-output) can realize these requirements with reasonable effort.

Fraunhofer HHI jointly presents with SIEMENS and IAF a real-time experimental system at CeBIT 2005 which is intended to demonstrate the benefit of new algorithms for practical application. About 3 months ago, we have set a world record in mobile communications with the presented system: For the first time, data were transmitted with 1 Gbit/s over the air, which is 10 times higher than the throughput of present wireless LANs.

Here, we show the next system component in real-time for the first time: A smart transmitter. Over a comparably narrow-band feed-back channel, the transmitter is informed about the channel quality. The data transmission can so be adapted already in advance to the channel state. A so-called bit-loading is implemented selectively over all antennas and OFDM sub-carriers adapting the data throughput to the channel capacity. In this way, transmission errors can be avoided in advance and the mean throughput is substantially increased.

Hall 9, Booth B40 (BMBF)

further information → Flyer, Gigabit press release

