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New Technologies in High-Speed Wireless Information Transfer

Nowadays, the problem of high-speed wireless communication is topical as the use of such systems extends coverage in rural areas and big cities what is more economically sound.

In the framework of the European program Millenilk there was made an experiment by German researches from KIT (Karlsruhe Institute of Technology) resulting in a record speed of information transmission (about 100 Gb per second) on the pilot plant located within the walls of their laboratory.

The installation worked at the carrier frequency of 237.5 Ghz, and the distance between the transmitter and the receiver maintaining the communication, was only 20 meters. The latest photonic and electronic technologies were used.

Radio signals are generated with the help of optical method including supposition of two laser signals of different frequencies. As a result, the electric signal has the frequency that equals 237.5 Ghz - two optical signals frequency difference. In a new equipment the photonic method of transmitter control and reading the received data was applied. Radio signals are transmitted using ultra-wide band (or photonic) mixer made by Japanese company Nit-Nel.

The electric signal of a millimetric range is emitted via the antenna, while the semiconductor chip coping with advanced modulation formats, transmits the signal. As a result, the radio channel can be integrated in modern fiber-optical networks in a bit transparent way.

It should be noted that the achieved information transfer speed used only 1 data stream occupying a certain strip of carrier frequency. Using multiplexing of multiple streams of data separated by different carrier frequencies will increase the total bandwidth and, as a consequence, raise the rate of information transmission several times.