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ОСВІТА, НАУКА ТА ВИРОБНИЦТВО: РОЗВИТОК ТА ПЕРСПЕКТИВИ

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LIGHTING ANTENNA OF LI-FI TECHNOLOGY

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Optical wireless system Li-Fi (Light Fidelity) of a new type developed by students of the Institute of Photon Integration at the Eindhoven University of Technology allows to achieve a data transfer speed that is 100 times faster than the most advanced Wi-Fi networks.

The term "Li-Fi" was first proposed by Harald Haas, professor at Edinburgh University, in 2011. If the Wi-Fi system uses radio waves to transmit data, then the visible light rays are used in the Li-Fi system.

In the first Li-Fi systems, an LED (LED) lamp was used, which transmitted data in all directions in the room. However, this type of system is capable of processing only a limited bandwidth, and is also sensitive to overloads that occur when several devices in the room are trying to connect to the Internet. Also, the problem is the need to constantly keep the bulbs on and make sure that nothing blocks the spread of light rays.

In other experimental systems, Li-Fi uses mobile powerful mirrors that emit infrared light rays, but each of these mirrors can transmit only one beam in a certain period of time.

After the system appeared, proposed by Joan Oh, uses "light antennas" that do not contain moving parts and do not require power and maintenance. Such antennas are mounted on the ceiling, from where they emit light rays obtained from optical fiber lines. Antennas include a pair of gratings that emit light rays with different wavelengths and at different angles. A wave of each length refers to a certain device, so the devices do not conflict with each other when using a bandwidth. If the device moves out of the antenna's coverage area, it can connect to another antenna. The work uses infrared rays of a safe spectrum, which are considered harmless to the human eye.

"Modern Wi-Fi networks use radio waves in the 2.5 or 5 GHz band. A system developed at the Eindhoven University of Technology uses infrared rays with a wavelength of 1500 nanometers or more; such beams have a frequency that is thousands of times higher, at a level of about 200 terats, which significantly increases the capacity of the light transmission system.

Li-Fi systems managed to achieve a speed of 42.8 Gb / s when transmitting the signal for a distance of up to 2.5 meters. The average connection speed in the Netherlands is 17.6 Mbps, which is two thousand times less, and the fastest existing Wi-Fi network can provide a speed of 300 Mbps, which is more than a hundred times slower than the Li-Fi system , developed in Eindhoven.

References

1. Bulashenko AV, Sokolov K.A. The use of visible light for the transfer of information on the example of technology LI-FI // XI scientific and technical conference of students, postgraduates and teachers of the Radio Engineering Faculty of NTUU "Igor Sikorsky Kyiv polytechnic institute" RADIOELECTRONICS IN XXI CENTURY. Kyiv, May 16-18, 2017 - Kyiv, 2017. - p. 128 - 129.
2. A. Shetty. Comparative study and analysis on Li-Fi and Wi-Fi. // International Journal of Computer Applications.– 2016.– Vol.150, №6.- pp 454-460.