WTAWARD2014

Categorie Premio	Accessibilità	Sostenibilità	Qualità della vita

Product Name	Li-Fi (Li-1st)
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Description of innovation social values
- product category
- formal and functional features
- problems solved by innovation
- user
- field of application

Li-1st is the first Li-Fi product enabling Internet access through off-the-shelf light emitting diode (LED) light fixtures. The product consists of a desktop unit to connect to a laptop or a smart phone as well as a ceiling unit which drives an off-the-shelf LED light fixture. The light fixture provides room illumination as well as high speed internet access. The communication link is bi-directional, and the system also works under non-line of sight conditions. Li-Fi uses the visible light spectrum for high speed data communication. The visible light spectrum is license-free and 10,000 times larger than the entire radio frequency spectrum used for commercial and defence wireless systems. Therefore, Li-Fi is a viable solution to the looming radio frequency (RF) spectrum crisis. The latter is a consequence of the huge success of smartphones and tablet computers. The amount of data sent through mobile networks is growing at a compound annual growth rate of about 80%. Li-Fi provides a very fat, free wireless communication pipe. In addition, the frequency spectrum is entirely free from health concerns unlike RF based wireless communication systems. Moreover, light does not propagate through walls. This means that Li-Fi is inherently more secure than RF communications. The field of applications is vast, ranging from high speed indoor wireless networking, indoor navigation, intelligent transport systems, car-to-car communication, underwater communication, wireless communication in intrinsically safe environments, in-cabin communication in an aircraft, communication between 'things' and 'machines' to secure wireless communication in hospitals and banks.

Description of technical features
- operations
- technology

The enabling technologies behind Li-Fi are unique digital modulation techniques which convert a binary data stream consisting of '0's and '1's into subtle changes of the intensity of an LED lamp. The changes are so fast that the human eye cannot recognise them – in fact, the speeds are 10,000 times faster than the refresh rate of a typical computer or laptop screen. At the receiver a photodetector captures the subtle changes of light intensity and converts them into a varying signal which is processed by a microchip. The output is the same binary bit stream that was transmitted from the light bulb. The data transmission speeds can be 4-7 times faster than state-of-the-art Wi-Fi systems. Li-Fi also works under ambient light conditions since ambient light produces a constant light intensity which is filtered out by the receiver. Also lights can be dimmed without greatly affecting the communication performance. Moreover, the handover techniques and multi-user access techniques enable users to roam without noticing any wireless service degradation.

Dimensions

The Li-1st ceiling unit has the following dimension: 120 x 120 x 100 mm and the desktop unit has the following dimensions: 130 x 140 x 100 mm.

Materials

The units have a high quality plastic enclosure.

Certifications

Self-certified under CE

Benefits for environment

Li-Fi does not produce electrosmog, and combining illumination and wireless data communication results in improved energy efficiencies, and hence reduced carbon footprints of communication technologies.

Benefits for human being

There is no increased exposure to electrosmog while enjoying ever growing applications on smart phones and tablet computers. The technology enables high speed communications and a high definition video download that takes 15 minutes with Wi-Fi could in the future be downloaded in less than 5 seconds using Li-Fi.