terminal to be an ultra-low-power -consumption device.

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3. ABSTRACT

This invention develops a 3-in-1 indoor optical wireless communication system which is suitable for private networks or consumer communication networks which require high speed data transmission and it occupies no registered radio frequency spectrum. In addition, light waves are obstructed only by physical obstacles, hence it nearly does not suffer from radio and electromagnetic interference. As a result, light illumination is a promising channel for indoor data communication.

In accordance with the first concept of the invention, multiple white LEDs are used as indoor illumination device.

In accordance with the second concept of the invention, an indoor optical wireless communication channel is established for data transferring. White LEDs radiate visible light with its intensity modulated with the data to be transmitted. Hence, these white LEDs play a similar role as antennas. The intensity variation should be human eyes imperceptible. For such an optical wireless system, the data rate to be achieved is in the range of several hundred of Mbps to several Gbps. Comparing to the present average data rate transmission in wireless communication link, the high data rate transmission makes this optical wireless communication system more attractive.

In accordance with the third concept of the invention, the power of illumination light is extracted to supply the data receiving device, which means the mobile and wireless terminal can be battery-less. In the initial state of development of the present system, data transmitted by white LEDs may be only voice data and mobile and/or wireless terminals are simple receivers which makes battery-less possible. However, in the mature state of the presented system, the mobile and/or wireless terminal may be a laptop which intends to make use of power of illumination light to do data processing and so on. In general, the battery-less concept is hard to achieve. In order to realize such a battery-less terminal, the development of ultra-low-power device and improvement of solar cell efficiency are essential.