

# A Survey of Unlicensed spectrum use and future of communication is Li Fi Technology

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## Abstract

Smart Phones are used as a mandatory product nowadays. It is used for its wireless nature, of mobility. All the activities with access to Internet is got through with the use of Smart Phones. The Internet access is completed not in particular place but in travelling like train, car, bus, aero plane, two wheelers, etc and at all places like railway station, hotels, public places like bus stops, malls, etc. It is also prepared while moving from one place to another through road. So access of Internet in wireless mode becomes increased. In this paper the access to Internet done through Li Fi Light Fidelity is discussed. As Li Fi is the future of Communication Technology which uses Light as the source of transmission. Even though the Wi Fi promises to increase the efficient use, it will be coupled with the Li Fi. So in future as the promising either Li Fi fully or inherited with Wi Fi it is going to rule the world of wireless Communication.

## Keywords :

Li Fi, Wi Fi, Visible light Rays, X-rays

## Introduction

The Internet was started by the US Government and used for the government Communication and Research activities. Later in 1995, National Science Foundation stopped controlling and the Internet was publicized.

The Mobile communication technology uses Wi Fi as the medium of communication. Wi Fi uses the radio waves for its transmission. Before knowing the Radio waves we need to know about the Spectrum Frequencies.

In Spectrum, even though there are many frequency bands like Radio Waves, Micro waves, Infra Red rays, Visible light rays, Ultra violet rays, X –rays and Gamma Rays. In the above said rays, Gama Rays is so dangerous and it is not used. X- Rays & Ultraviolet Rays are used only in medical fields and there are also dangerous and Infrared Rays are not good for eyes and is used in low power.

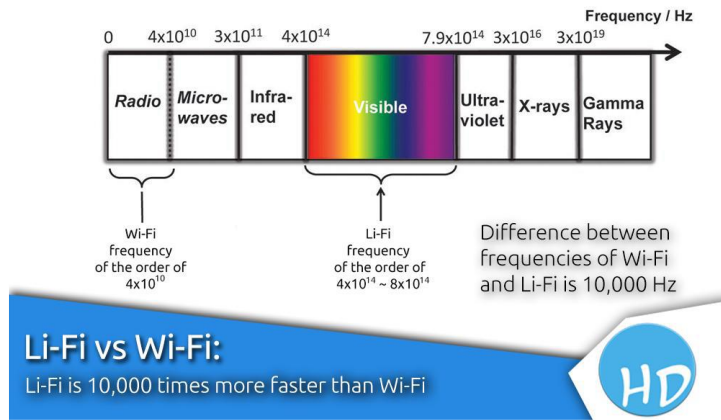


Fig 1. The Spectrum and band Frequencies

The Frequencies used from 30Hertz to 300 GHz of the electromagnetic spectrum is called Radio Spectrum and the electromagnetic waves in the above frequency range are called as the Radio Waves. In all of the above Frequency bands, the wireless Communication uses Radio Frequencies. Wireless Fidelity uses the Radio Frequency for Communication. It is the licensed band. Right the starch we are using the Radio Frequencies for the communication. Radio waves are very low and are not be able to use when the amount of data is large enough. Apart from that these Radio waves need Radio Base Stations to propagate the Radio Waves from one place to another. The problems we face in are Base stations is it needs to consume more energy, security as it can penetrate into the walls and it can affect airlines signals.

## Wi Fi

Wireless fidelity (Wi-Fi) is the standard wireless LAN i.e. Wireless Local Area Network means the wireless Ethernet 802.11b standard where radio frequency transmission is done wirelessly connecting to the host computer. Wi-Fi enables to communicate computer within the range of base stations either in indoor and outdoor environment.

The three elements needed for Wi-Fi network are Radio signals, antenna and routers. The radio waves are the key element where the Wi Fi network is possible. The radio waves are transmitted from the source from the transmitter and it is propagated from one place to another through the routers. After reaching the destination as the computers or the smart phones are ready with the Wi Fi card , the the radio waves signals are within the range of 100-150 feet for router it connect the device immediately.

## Reason for not expand - Wi Fi

The use of the broadband spectrum is increased every year and it is expecting to grow more by 2021. As the Radio frequency Spectrum is limited and congested the RF frequency band cannot be used further.

## Starting Journey of Li Fi

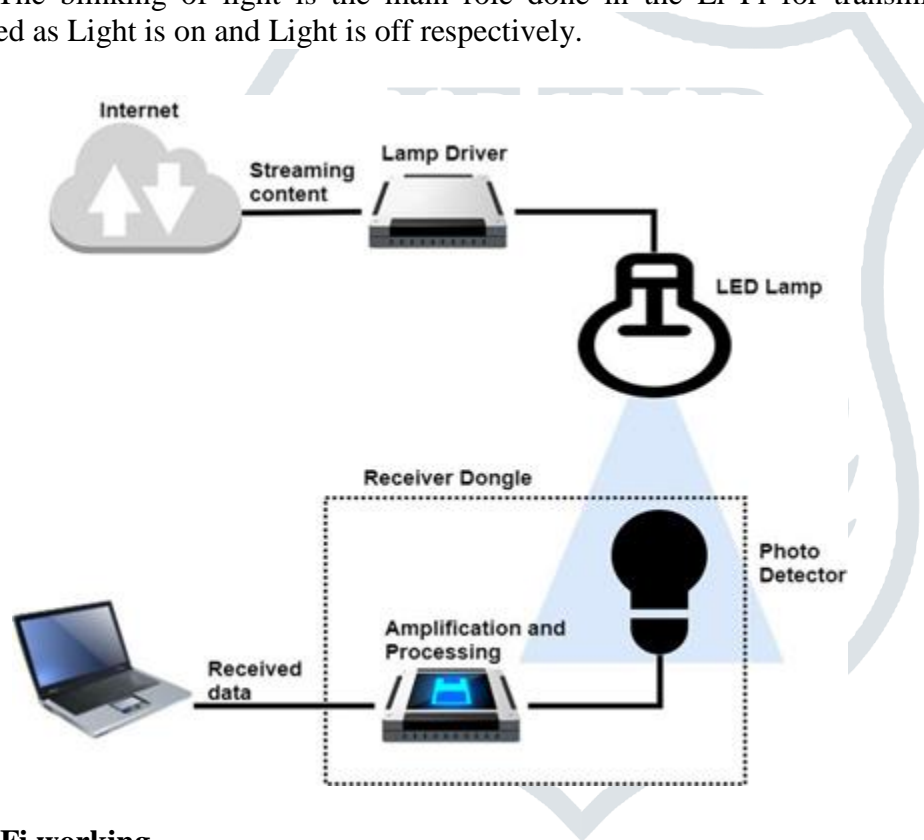
During the year 2011 on a TEDGlobal talk in Edinburgh, Harald Haas first introduced and coined the world Li Fi. Li Fi is the Light Fidelity where the communication is done through the LED lamps. He demonstrated that LED lights can be used as the transmission medium for communication. It uses the visible light wave's frequency for communication. As it can transmit large amount of data it can be used instead of Wi Fi.

## Li Fi Technology

As the internet users are increased tremendously, it is not possible to use Wi Fi because it cannot use large amount of data for transmission. Instead Li Fi the new technology can be used as it is fully networked, it is bidirectional and it can be used for the high speed networks. Li Fi can be used to gain better speed, efficiency, and bandwidth. As the light's strength changes i.e. blinking of light is quicker and it is not seen to the human eye, the data transmission is done through light which is 100 times faster than Wi-Fi.

### Li-Fi working

The two components that are needed for the Li Fi transmission are Transceiver and Light as a media transmission. The Transceiver has the light for transmission and photodiode to receive the light. Amplifier is used for the strengthening the light rays and the modem is used for modulation and demodulation of the data. The signal received from the light is analog and is converted to digital by the modem. The blinking of light is the main role done in the Li Fi for transmission, as ON and OFF is represented as Light is on and Light is off respectively.



**Fig 2. Li Fi working.**

### Advantages of Li Fi

1. Main Advantage of the Li Fi Technology is the speed. As Harald Haas coined it is mainly used for the speed.
2. The next most useful and users needed in an organization is the Security. As light waves cannot penetrate into the walls, it is protected.
3. The third main reason for using the Li Fi is the Light rays are not harmful to human.
4. The final Advantage is consistent, the data transfer is also protected.
5. As light rays can pass through the water, it can send through water also.
6. It can be used for military purposes.

## Conclusion

Eventhough the Wi Fi promises the future of wireless communication will be released like Wi Fi 6, Wi Fi Certified WiGig, Wi Fi Certified Vantage, Wi Fi Certified WPA3, Wi Fi HaLow , the future of the Wireless Communication will be the Li Fi. As in Foreign countries is is increased in the large way. It can be also be used along with the Wi Fi as the inhert manner. As the conclusion the Li Fi is going to rule the coming years as future.

## Refernces

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