

GI-FI (A New Wireless Technology)

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Abstract- Gi-Fi stands for Gigabit Wireless. Gi-Fi is a wireless transmission system which is ten times faster than other technology and its chip delivers short-range multigigabit data transfer in a local environment. Gi-Fi is a wireless technology which promises high speed short range data transfers with speeds of up to 5 Gbps within a range of 10 meters. The Gi-Fi operates on the 60GHz frequency band. This frequency band is currently mostly unused. It is manufactured using (CMOS) technology. This wireless technology named as Gi-Fi. The benefits and features of this new technology can be helpful for use in development of the next generation of devices and places. In this paper, the comparison is performed between Gi-Fi and some of existing technologies with very high speed large files transfers within seconds it is expected that Gi-Fi to be the preferred wireless technology used in home and office of future.

Keywords: Semiconductors, Nano materials, Solar Cells, Light Emitting Nano Devices

Keywords: Gi-fi, Wi-fi, CMOS, 802.15.3C.

I. INTRODUCTION

Wi-Fi (IEEE-802.11b) and Wi-Max (IEEE-802.16e) have captured our attention. As there is no recent developments which transfer data at faster rate, as video information transfer taking lot of time. This leads to introduction of Gi-Fi technology. It offers some advantages over Wi-Fi, a similar wireless technology. In that it offers faster information rate in Gbps, less power consumption and low cost for short range transmissions.

Gigabit Wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS (complementary metal-oxide-semiconductor) process. It will allow wireless transfer of audio and video data upto 5 gigabits per second, ten times the current Maximum wireless transfer rate, at one-tenth of the cost, usually within a range of 10 meters. In fact, Gi-Fi is a wireless transmission system which is ten times faster than Wi-Fi and it is expected revolution networking in offices and homes by implementing high-speed wireless environments. It utilizes a 5mm square chip and a 1mm wide antenna burning less than 2milli watts of power to transmit data wirelessly over short distances, much like Bluetooth. Gi-Fi technology provides many features such as ease of deployment, small form factor, enabling the future of information management, high speed of data transfer, low power consumption etc. With growing consumer adoption of High-Definition (HD) television, low cost chip and other interesting features and benefits of this new technology it can be predicted that the anticipated worldwide market for this

technology is vast. The new technology is predicted to revolutionize the way household gadgets talk to each other.



Figure 1: High speed data transmission



Professor Stan Skafidis of Melbourne University.

Figure 2: Man Behind Gi-Fi.

II. ARCHITECTURE OF GI-FI:

The core components of a Gi-Fi system is the subscriber station which available to several access points. It supports standard of IEEE 802.15.3C supports millimeter-wave wireless pan network used for communication among computer devices (including telephones and personal digital assistants) close to one person. An 802.15.3C based system often uses small antenna at the subscriber station. The antenna is mounted on the roof. It supports line of sight operation.



Figure 3 : GIGA Bits Wireless PAN Network

What is 802.15.3C Technologies?

This millimeter-Wave WPAN will operate in the new and clear band including 57-64 GHz unlicensed band defined by FCC 47 CFR 15.255. The millimeter-wave WPAN will allow high coexistence (close physical spacing) with all other microwave systems in the 802.15 family of WPANs. It transmits multiple signals simultaneously across the wireless transmission paths within separate frequencies to avoid interference.

III. EVOLUTION OF GI-FI

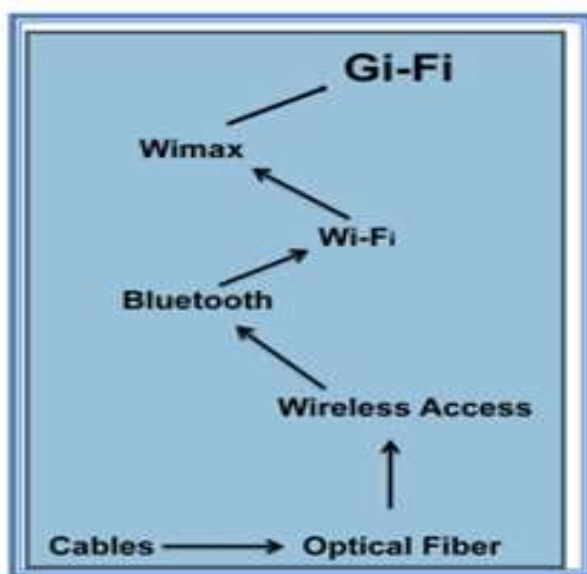


Figure 4: Evolution of Gi-Fi.

3.1 : Comparison between Gi-Fi, Wi-Fi & Bluetooth:

Characteristics	Gi-Fi	Wi-Fi	Bluetooth
Development Start	2004	1990	1998
Specification Authority	NICTA	IEEE, WECA	Bluetooth SIG
Frequency	57-64GHz	2.4 GHz	2.4 GHz
Data Transfer Rate	5 Gbps	11 Mbps	800 Kbps
Range	10 Meters	100 Meters	10 Meters
Power Consumption	< 2 MW	10 MW	5mW
Primary Devices	Mobile phones, Home Devices, Electronics etc.	Notebooks, Computers, Desktop Computers, Servers etc.	Mobile phones, Home Devices, Electronics etc.

Table 1 : Comparison between Gi-Fi, Wi-Fi, and Bluetooth.

4. FEATURES OF Gi-Fi:

4.1: High speed of data transfer:

The main invention of Gi-Fi is to provide higher bit rate .As the name itself indicates data transfer rate is in Giga bits per second. Speed of Gi-Fi is **5 Gbps**, which is 10 times the present data transfer. Because of this high speed data transfer, we can swap large video, audio, data files within seconds. Because of wider availability of continuous 7 GHz spectrum results in high data rates.

4.2 : Low Power Consumption:

As the large amount of information transfer it utilizes milli-watts of power only. It consumes only 2mwatt power for data transfer of gigabits of information, where as in present technologies it takes 10mwatt power, which is very high.

4.3 : High Security:

As the IEEE 802.15.3C provides more security, it provides link level and service level security, where these features are optional.

Point-to-point wireless systems operating at 60 GHz have been used for many years by the intelligence community for high security communications and by the military for satellite-to-satellite communications. The combined effects of O2 absorption and narrow beam spread result in high security and low interference.

4.4: Cost-effective:

Gi-Fi is based on an open, international standard. Mass adoption of the standard, and the use of low-cost, mass-produced chipsets, will drive costs down dramatically, and the resultant integrated wireless transceiver chip which transfers data at high speed low power at low price \$10 only. which is very less As compare to present systems .As go on development the price will be decreased.

4.5 : Small Size:

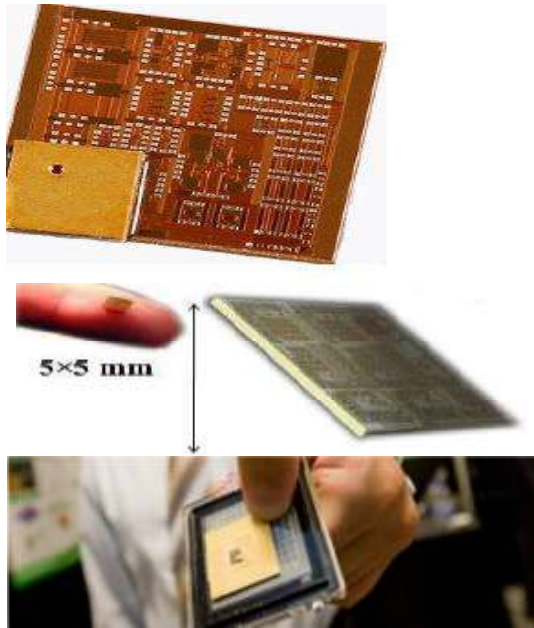


Figure 5: Gigabit wireless: The Gi-Fi integrated wireless transceiver chip developed at the National ICT Research Centre, Australia.

The chip, just 5mm per side, has a tiny 1mm antenna and uses the 60GHz 'millimeter-wave' spectrum.

4.6 : Quick Deployment:

Compared with the deployment of wired solutions, Wi-MAX requires little or no external plant construction. For example, excavation to support the trenching of cables is not required. Operators that have obtained licenses to use one of the licensed bands, or that plan to use one of the unlicensed bands; do not need to submit further applications to the Government. Once the antenna and equipment are installed and powered, Gi-Fi is ready for service. In most cases, deployment of Gi-Fi can be completed in a matter of minutes, compared with hours for other solutions.

4.7 : Other features:

- High level of frequency re-use enabled – communication needs of multiple customers within a small geographic region can be satisfied.
- It is also highly portable-we can construct where ever we want.
- It deploys line of sight operation having only shorter coverage area, it has more flexible architecture.

IV. APPLICATIONS:

There are many usage scenarios that can be addressed by Gi-Fi. The following are some mobility usage applications of Gi-Fi.

5.1: House Hold Appliances:

Consumers could typically download a high definition movie from a kiosk in a matter of seconds to music player or smart phone and having got home could play it on a home theatre system or store it on a home server for future viewing, again within a few seconds, high speed internet access, streaming content download (video on demand, HDTV, home theatre, etc.), real time streaming and wireless data bus for cable replacement. It makes the wireless home and office of the future.



Figure 6: House Hold Appliances.

5.2 Office

Appliances:

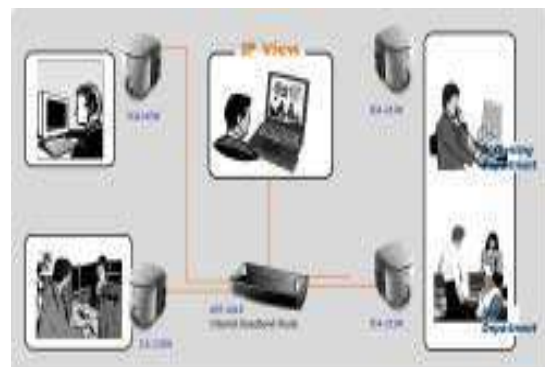
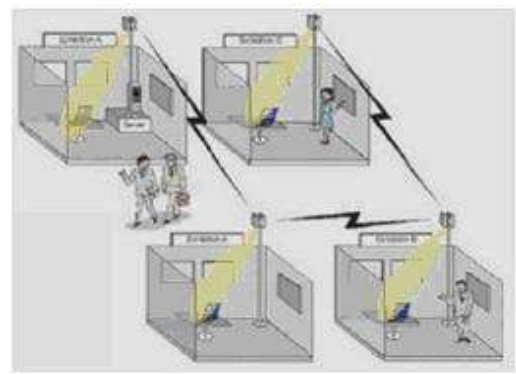


Figure 7 : Office Appliances.

As it transfers data at high speeds which made work very easy, it also provides high quality of information from internet.

5.3 : Video information transfer:

By using present technologies video swapping takes hours of time, whereas by this we can transfer at a speed of Gbps.



Figure 8 : Video information transfer

Data transfer rate is same for transfer of information from a PC to a cell or a cell to a PC. It can enable wireless monitors, the efficient transfer of data from digital camcorders, wireless printing of digital pictures from a camera without the need for an intervening personal computer and the transfer of files among cell phone handsets and other handheld devices like personal digital audio and video players.

5.4 : Inter-vehicle communication system:

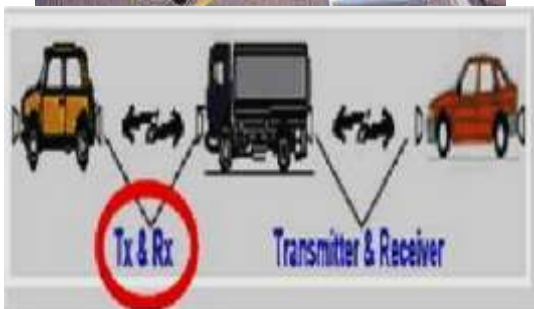
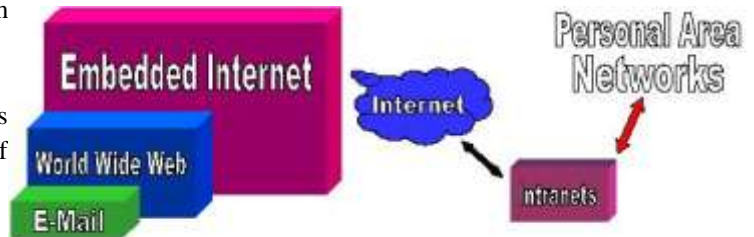


Figure 9 : Inter-vehicle communication system.

Gi-Fi technology uses a wide number of applications in inter-vehicle communication systems as it enables the vehicles to stay connected and go and it also offers better speed of vehicles in advent of communication system. The data exchange between vehicles is made possible by ad-hoc networks.

5.5 : Media access control (MAC) and imaging and others:



V. CONCLUSION

Gi-Fi has given and it is conspicuous that more research should be done in the field of this new wireless technology and its applications. The Bluetooth which covers 9-10mts range and wi-fi followed 91mts no doubt introduction of wi-fi wireless network has proved a revolutionary solution to bluetooth problem the standard original limitations for data exchange rate and range, number of chances, high cost of infrastructure have not yet possible for wi-fi to become a power network, then towards this problem the better technology despite the advantages of rate present technologies led to the introduction of new ,more up to date for data exchange that is GI-FI. The comparison is performed between Gi-Fi and existing wireless technologies in this paper shows that these features along with some other benefits that make it suitable to replace the existing wireless technologies. It removes cables that for many years ruled over the world and provides high speed data transfer rate. Gi-Fi technology has much number of applications and can be used in many places and devices such as smart phones, wireless pan networks, media access control and mm-Wave video-signals transmission systems.

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