GIFI New Epoch of Wireless Technology

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Abstract-For years cables have dominated ruling the world. Optical fibres were a major part of it because faster communication became possible because of its higher bit rate. The cable deployment was also a difficult task which urged the need to introduce wireless technology. Bluetooth was the first among the wireless transmission covering up to 9-10 meters. The outset of wi-fi wireless network has been an absolute solution to the above problem. But the hunt for better and more powerful technology notwithstanding the advantages of existing technology has led the research platform to move to another level devising a new technology named GI-FI. It stands for Gigabit Wireless Fidelity. Developed on an integrated wireless transceiver chip operating at 60GHz on the CMOS process the transmission in GI-FI is 10 times rapid than the other technologies. Short range gigabits are used for the data transmission. The promised high speed short range data transfer is nearly 5Gbps within the range of 10 meters. With the very high speed of huge file transfers within seconds this development will ensure the making of complete wireless office and home in near future. Need for high data transfer rate, less power utilization and low cost has made the evolution of GI-FI possible playing a crucial role in empowering the digital economy. This paper discusses the evolution of technology in wireless sector and its possibilities in future.

***Index Terms*— GI-FI, Wi-max, Gigabit Wireless;**

I. INTRODUCTION

Wi-Fi and Wi-max has seized the attention for long as there was no advancement in the above technologies for data transmission at a faster rate until GI-FI was introduced. GI-FI has a small antenna along with transmitter-receiver fused on one chip operating at 60Hz on CMOS(complementary metal-oxide semiconductor) process. Audio and video can be transferred at a speed of up to 5 Gigabits per second which is about ten times rapid than the now existing highest wireless data transfer rate.GI-FI technology has many quality traits as it provides easy deployment, small form factor, high speed data transfer, low power utilization etc. This new technology significantly affect the consumer adoption of High-Definition (HD) television with inexpensive chip and additional exciting aspects. It can be envisioned that in near future the expected global market for this technology is huge. Also the technology is considered to bring revolution in the system the household devices communicate with each other.

II. EVOLUTION OF NETWORK TECHNOLOGY

The advancement of wireless technology led the incorporation of GI-FI technology. The diagram mentioned below represents the above statement.

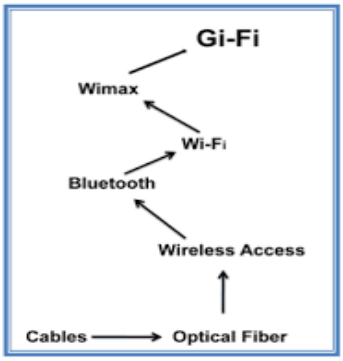


Figure 2.2 Evolution of Gi-Fi

A. Bluetooth

The very first technology introduced to connect devices and transmit data over a short distance without the usage of wires. It was the beginning of upcoming revolutions and new technological discoveries. We have wireless mouse or keyboard which communicate with the computer through Bluetooth. Also security devices can be connected to main security controller with the help of Bluetooth which also helps in synchronizing devices. Two types of network are used in Bluetooth : Pico net and Scatter net . Bluetooth bit rate is 800Kbps with power consumption 5mw. Wi-Fi or Wi-max provide the better statistics and wireless access infrastructure.

B. Wi-Fi

The enhanced version of Bluetooth is Wi-Fi. It is based on IEEE802.11 standard which provides security, reliability and fast wireless connectivity. It comprises of three radio technologies to transmit and receive data at high speed: IEEE802.11a IEEE802.11b and IEEE802.11g. 802.11b standard developed in 1999 which provides the speed of 11Mbps and operates at 2.4GHz radio spectrum.802.11a standard was developed in 2001, which provides the speed of 54Mbps and operates at 5GHz.

C .GI-FI

GI-FI is evolved on a fused transceiver chip. So GI-FI is considered to be a competition to WI-FI.

The new system provides Multi-gigabit wireless technology which eliminates the usage of cables between consumer electronic devices and is 100 times rapid than the present small-range wireless technologies such as Bluetooth and Wi-Fi. With high level re-usage of frequency this new technology can satisfy the needs of multiple consumers communicating within a small area.

III. WORKING

In this new technology Time division duplex (TDD) is used for both transmitting and receiving. The conversion of data files from IF range to RF60Ghz range takes place using 2 mixers. This is then provided to a power amplifier, which feeds millimetre wave antenna.

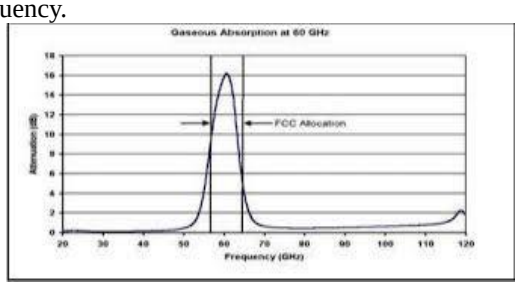
The RF signal coming is first transformed to an IF signal at 5 GHz and is then converted to normal data ranges. To prevent the losses because of unmediated transformation heterodyne construction is made into use and the presence of 7GHz spectrum ensures that the transfer of whole data takes place within seconds.

Time -Division Duplex

Time-Division Duplex separates the outgoing and returning signals. It ensures that the full duplex communication takes place over a half duplex communication channel. When there is an increase in uplink traffic, more channel capacity is dynamically be allotted to it, and when the traffic decreases it can be returned back.

OPERATION AT 60 GHZ

Millimetre wave antenna is used which works at 60 GHz frequency and doesn't have lining band which makes it possible to achieve large signalling rate in the 60 GHz band. Other benefits provided are outstanding resistance to co-channel interference, security and re-usage of frequency.



IV. GIGABIT WIRELESS FEATURES

The Gi-Fi technology permits HD content which is uncompressed and can also operate over an extent of 10 meters without any interference. The flexibility which it provides with its simplicity and no complex connection is a benefit.

It is mobile and can be deployed anywhere. The transmission system is very cost effective as it comprises one silicon chip that works in the unaccredited,57-64 GHz spectrum band.

With the very high speed of huge file transfers within seconds this development will ensure the making of complete wireless office and home in near future.

High Speed Data Transfer

Gigabit wireless technology has a data transfer rate in Gigabits per second. In just few seconds a whole High-Definition (HD) movie could be transferred to a mobile phone ,and then it could be uploaded to a home computer or screen at the same rate.

Interference in Data Transfer

To transfer data, 60GHz millimetre wave spectrum is used which gives it an upper hand over Wi-Fi. The wi-fi section of the spectrum is congested which when shares the waves with gadgets such as cordless phones governs interference and slower speeds.

Power Consumption

Wi- Fi has a power consumption of 5mili watts whereas Bluetooth consumes 10mili watts of power but the chip of Gi-Fi makes use of very small one-millimetre-wide antenna thus consuming less than 2 mili watts of power which is very less when compared to other technologies.

High Security

Gi-Fi technology is based on IEEE 802.15.3C which ensures high security as it offers optional security in the link and service level. Point-to-point wireless systems has been used for many years for high security communications.

V. ADVANTAGES OF GI-FI

A. Removing Cables

For years cables have dominated ruling the world. . Optical fibres were a major part of it because faster communication became possible because of its higher bit rate. The cable deployment was also a difficult task which urged the need to introduce wireless technology. Bluetooth was the first among the wireless transmission covering up to 9-10 meters. Wi-Fi then introduced had a coverage area of 91 meters. But the hunt for better and more powerful technology notwithstanding the advantages of existing technology has led the research

platform to move to another level inventing a new wireless technology named GI-FI.

B. Cost efficient chip

The chip of Gi-Fi makes use of very small one-millimetre-wide antenna thus consuming less than 2 mili watts of power which is very less when compared to other technologies.

As the cost of chip is economical ,it can be assimilated in multiple devices. It takes about 10$ or less to build the chip. The mobiles and other small gadgets incorporates the technology without remarkable increase in price and as further development is done so does the price decreases.

C. Security

The fear of security and lack of performance compared to Ethernet has withholden the rise of enterprises. Even after deploying their WLAN in a secure firewall zone majority of the firms are even today using the primitive WEP protocol, which does not provide the protection to the application layer adequately so superior encryption is the need of the hour. The technology of encryption in Gi-Fi establishes the security and privacy of the content.

D. Flexibility

The complex connection of wires is one of the issue with the wires, but in the Gigabit wireless technology simplicity is the attribute. No wiring at all.

VI. APPLICATIONS OF WI-FI

A. Gi-Fi Access Devices

The Gi-Fi access devices are namely phones, printer, fax, notebook ,LAN_AP consists of termination units, internal radio modules, network interface card, printers, PC's, and all household electronic appliances.

B. Broadcasting Video Signal Transmission System in Sports Stadium

Temporal broadband network can be constructed for information distribution in sports stadium.

C. Office Appliance

As Gi-Fi data transfer rate is very high ,data can be transmitted at very high speed in offices which ensures easy working and also provides high quality of information from the internet.

D. *Video Transfer*

The existing technologies takes hours for transmitting of huge video files whereas with the introduction of this new technology , in just few seconds a whole High-Definition (HD) movie could be transferred to a mobile phone ,and then it could be uploaded to a home computer or screen at the same rate.

VII. FUTURE SCOPE

GI-FI has a small antenna along with transmitter-receiver fused on one chip operating at 60Hz on CMOS(complementary metal-oxide semiconductor) process. It can be envisioned that in near future the expected global market for this technology is huge. With the very high speed of huge file transfers within seconds this development will ensure the making of complete wireless office and home in near future. Also the low cost of chip is forcing companies to make more and more use of the chip.

VIII. CONCLUSION

This paper discusses the evolution of technology in wireless sector and its possibilities in future. Also the technology is considered to bring revolution in the way the household devices communicate with each other. This wireless technology allows the data transfer at a rate of 5 Gbps which is ten times rapid than the existing technology and has overruled the need for wires.

The comparison has also been drawn between the Gi-Fi technology and the other existing technologies proving Gi-Fi to have the upper hand. Low Power Consumption, cost efficient chip , high security and many more benefits have been explained in details in this paper which makes it a potential replacing and powerful technology in years to come.

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