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GI-FI TECHNOLOGY

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ABSTRACT

GI-FI stands for Gigabit Wireless. GI-FI is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS process. It will allow wireless transfer of audio and video data up to 5gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth of the cost, usually within a range of 10 meters. It utilizes a 5mm square chip and a 1mm wide antenna burning less than 2 watts of power to transmit data wirelessly over short distances, much like Bluetooth. The development will enable the truly wireless office and home of the future. As the integrated transceiver is extremely small, it can be embedded into devices. GI-FI technology provides many features such as small form factor, high speed data transfer, low power consumption etc.

KEYWORDS: Cable, Optical fiber, GI-FI, WI-FI, WI-max, Bluetooth.

INTRODUCTION

Gigabit Wireless is the world's first handset incorporated on a solitary chip that works at 60GHz on the CMOS (reciprocal metal-oxide-semiconductor) process. GI-FI is ten times speedier than Wi-Fi and permits the remote exchange of sound and video information up to 5 gigabits for each second at low power utilization inside scope of 10 meter. It use a 5mm square chip and a 1mm wide radio wire consuming under 2milli watts of energy to transmit information remotely finished short separations, much like Bluetooth. Inside five years, we anticipate that GI-FI will be the overwhelming innovation for remote systems administration. GI-FI innovation gives numerous highlights, for example, simplicity of arrangement, little frame factor, empowering the eventual fate of data administration, rapid of information exchange, low power utilization and so on.

The Nitro chipset in GI-FI innovation by offering diminished size and power utilization, can be utilized to send and get a lot of information in an assortment of uses, it can exchange gigabits of information inside seconds. The new gigabit remote framework gives Multi-gigabit remote innovation that expels the requirement for links between shopper electronic gadgets and is More than 100 times speedier than current short-go remote advancements, for example, Bluetooth and Wi-Fi. It is require that GI-FI to be favored cutting edge remote innovation utilized as a part of home and workplaces.

EVOLUTION OF GI-FI

For many years cables governed the world. After that optical fiber played a dominant role because of its higher bit rates and faster transmission but its installation caused a great difficulty thus we led to wireless access the foremost of this is Bluetooth which covers 9-10meteres. Next, Wi-Fihaving coverage area of 91 meters. The evolution of wireless networks is shown in figure.

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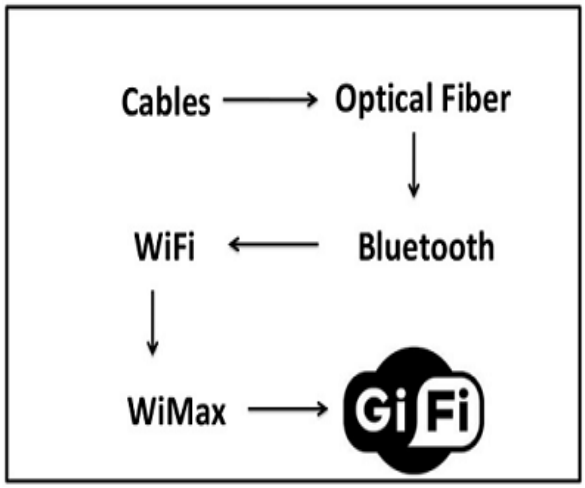

Figure1.Evolution of GI-FI

CABLES

In wireless technologies many computer network utilizes cables as a physical medium for communication and data transfer between the devices. This cable which is commonly used with LANs (Land Area Network). Therefore there are several different types of cable

- Coaxial Cables
- Twisted Pair Cables
- Optical Fiber
- USB Cables

OPTICAL FIBER

Optical fiber is made up of glass or plastic and transmits signals in the form of light. The cost of fiber optic cabling is comparable to copper cabling; however, it is more difficult to install and modify. The center core of fiber cables is made from glass or plastic fibers. The outer insulating jacket made of Teflon or PVC. The glass fiber requires more protection within an outer cable than copper.

BLUETOOTH

Bluetooth is the first wireless technology. It is based on IEEE802.15 standard. This technology is useful when transferring information between two or more devices. This technology has many applications such as communication of wireless mouse or keyboard with computer. Frequency of Bluetooth is 2.4 Ghz, low power consumption with range 10 meter.

WI-FI

Wi-Fi is an acronym for “Wireless Fidelity”, is a set of product compatibility standards for Wireless Local Area Network (WLAN). Wireless Fidelity is the wireless way to handle networking, Wireless networking is also known as Wi-Fi or 802.11 networking as it covers the IEEE 802.11 technologies. The major advantage of Wi-Fi is that it is compatible with almost every operating system, game device, and advanced printer.

Like mobile phones, a Wi-Fi organizes makes utilization of radio waves to transmit data over a system. The PC ought to incorporate a remote connector that will make an interpretation of information sent into a radio flag will be transmitted, by means of a receiving wire, to a decoder known as the switch .As the remote system fills in as a two-way movement, the information got from the web will likewise go through the switch to be coded into a radio flag that will be gotten by the PC's remote.

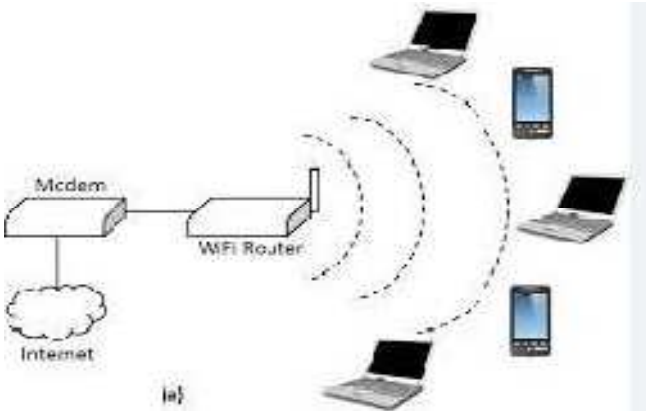

Figure2.WI-FI

WI-MAX

WI-max is a enhance version of WI-FI technology. WI-max (Worldwide Interoperability for Microwave Access (WI-MAX) is a based on standard IEEE802.16 technology, and can provide broadband wireless access up to 30 miles. WI-max used fixed and mobile station to provide user with access to high speed voice, data and internet connectivity. 802.16 standards have the better performance with bandwidth of 100 Mbps and low latency of 25-40ms than 802.11. It has maximum coverage area with 50kms than Wi-Fi supports only100m. Flexibility is one of the main advantages of WI-MAX technology.

Figure3.WI-max

GI-FI

The world's first GI-FI wireless network chip developed at Australia's peak federal technology incubator has entered its commercialization phase it has both transmitter and receiver, integrated on a single chip that operates at 60GHz on the CMOS Process.GI-FI is ten times faster than Wi-Fi and allows the wireless transfer of audio and video data up to 5 gigabits per second at low power consumption within range of 10 meters.The NICTA (National ICT Australia Limited) GI-FI research team has succeeded in taking complex 60GHz transmission technology and shrinking it to the point where it can be built on a single silicon chip. It uses a 5mm square chip and a 1mm wide antenna burning less than 2milli watts of power to transmit data wirelessly over short distances, similar to Bluetooth. GI-FI can be considered as a challenger to Bluetooth rather than Wi-Fi and could find applications ranging from new mobile phones to consumer

electronics. GI-FI allows a full-length high definition movie to be transferred between two devices in seconds to the higher megapixel count on our cameras the increased bit rate on our music files the higher resolution of our video files. Within five years, we expect GI-FI to be the dominant technology for wireless networking. By that time it will be fully mobile, as well as providing low-cost, high broadband access, with very high speed large files swapped within seconds which will develop wireless home and office of future. The GI-FI chip is good news for personal area networkingbecause there is nohave a span of 10 meters.GI-FI technology provides many features suchas ease of deployment, small form factor, enabling the future of information management, high speed of data transfer, low power consumption etc.

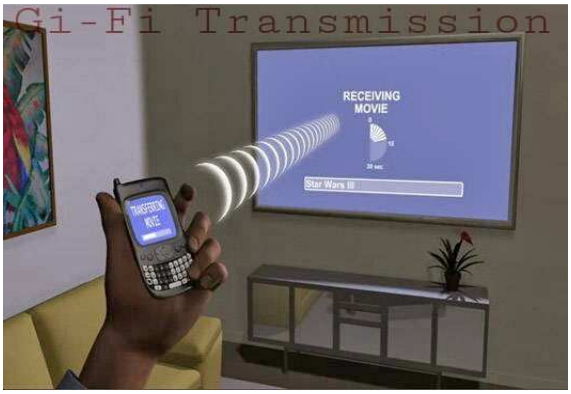

Figure4.High speed data transmission through GI-FI

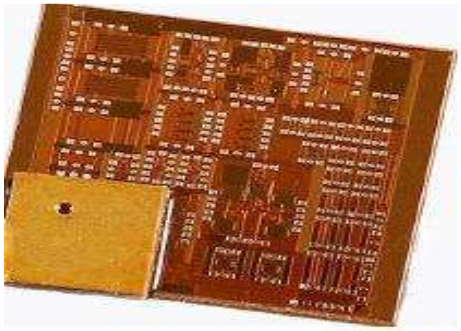

Figure5.GI-FI Chip

WORKING OF GI-FI

GI-FI technology Time division duplex (TDD) is used for transmitting and receiving. Data files are converted from IF range to RF60GHz range with the help of 2 mixers; rom IF range to RF60GHz range with the help of 2 mixers; the output is fed into a power amplifier, which feeds millimeter wave antenna. The incoming RF signal is first converted to an IF signal at 5GHz and then to normal data ranges. To avoid leakage due to direct conversion, heterodyne construction is used for this process. The total data is transfer within few second due to availability of 7GHz spectrum.

TIME-DIVISION DUPLEX

Time-Division Duplex (TDD) is the application of time-division multiplexing to separate outward and return signals. It emulates full duplex communication over a half-duplex communi cation link. Time division duplex (TDD) refers to duplex communication links where uplink is separated from downlink by the allocation of different time slots in the same frequency band. It is a transmission scheme that allows asymmetric flow for uplink and downlink data transmission. Users are allocated time slots for uplink and downlink transmission.

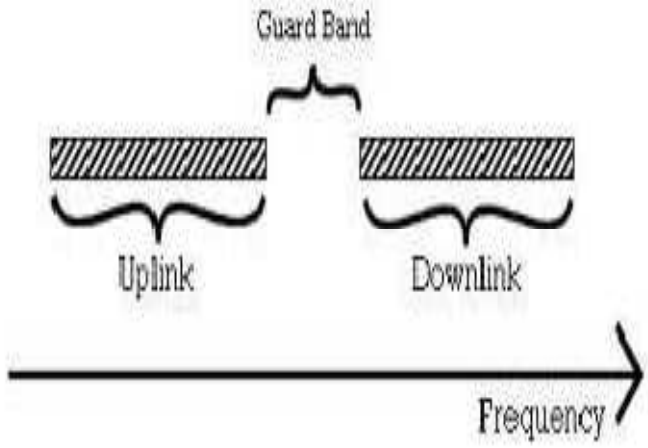

Figure6.Time-Division duplex

Here we will utilize millimeter wave reception apparatus which will work at 60 GHz recurrence which is unlined and in light of this band we are accomplishing high information rates vitality engendering in the 60 GHz band ,which has exceptional qualities, Ultra Band Frequency (UWB) use an innovation with high piece rate, high security and speedier information transmission.

COMPARISON

Characteristics	GI-FI	WI-FI	WI-Max
Full form	Gigabit wireless fidelity	Wireless fidelity	Worldwide interoperability for microwave access
Range	10 m	100 m	50 km
Data transfer rate	5Gbps	11Mbps	1Gbps
Development start date	2004	1990	2001
Power consumption	<2 mw	10 mw	~5 mw
Frequency	57-64 Ghz	2.4 Ghz	2.3-3.5 Ghz
Primary device	Mobile phone HomeDevice	Notebook computer Desktop computer	Desktop computer, PDAs
IEEE standard	IEEE802.15.3C	IEEE802.11	IEEE802.16

APPLICATION OF GI-FI

If all the computers in your house are connected to a GI-FI network, you can easily connect your smart phone to the same network and control them.

HOUSE HOLD APPLICATION

Customers could regularly download a top quality motion picture from a stand in a matter of seconds to music player or advanced cell and having returned home could play it on a home theater framework or store it on a home server for future survey, again inside a couple of moments, fast web get to.

OFFICE APPLICATION

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

VIDEO TRANSFER APPLICATION

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 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 devices like personal digital audio and video players, by using this technologies video and audio transfer at a speed of Gbps.

ADVANTAGES

Valuable advantage of GI-FI technology can be abbreviated as follow:

FASTER DATA TRANSMISSION

The primary creation of GI-FI is to give higher piece rate Because of this fast information exchange; we can exchange extensive video, sound, information records inside seconds. As the name itself demonstrates information move rate is in Giga bits every second i.e., 5 Gbps. A whole High-Definition (HD) motion picture could be transmitted to a cell phone shortly, and the telephone could then transfer the motion picture to a home PC or screen at a similar speed.

LOW POWER CONSUMPTION

This is the best element in light of the fact that in spite of the fact that the extensive measure of data is exchanged, as the vast measure of data move uses in milli watts of energy as it were. It devours just 2 process watt control for information exchange of gigabits of data while in show innovations it takes 10 m watt powers which are high.

LITTLE SIZE

The chip, only 5 mm for each side, has a modest 1 mm radio wire and uses the 60GHz 'millimeter wave' range, this chip can set in various gadgets, for example, cell phone.

PRODUCTIVE CHIP

GI-FI depends on an open, worldwide standard because of which the utilization of ease, mass-delivered chipsets, this likewise brings about coordinated remote handset chip which exchanges information at rapid and low power at low cost as time will pass and improvement builds, the cost of GI-FI will be diminished.

HIGH SECURITY

GI-FI innovation takes after IEEE 802.15.3C standard. This standard gives discretionary security in the connection level and administration level, it gives greater security.

EVACUATING CABLES

For a long time links controlled the world. Optical fiber assumed an overwhelming part for its higher piece rates and quicker transmission. Be that as it may, the establishment of links made a more noteworthy trouble and hence drove remote access. The preeminent of this is Bluetooth which can cover 9-10mts. Wi-Fi tailed it having scope territory of 91mts. The standard's unique confinements for information swapping scale and range and high cost of the frameworks have not yet made it feasible for Wi-Fi to wind up a decent substitute for the links. GI-FI innovation Removes requirement for links to associate buyer hardware gadgets and every one of the gadgets in the scope of 10 meters can be associated keeping in mind the end goal to transmit the information remotely.

EFFORTLESSNESS

One of the issues with wire associations and links is many-sided quality for interfacing, however in the Gigabit remote innovation effortlessness is one of the highlights. Straightforward association enhances the purchaser encounter. The new gigabit remote framework gives Multi-gigabit remote innovation that expels the requirement for links between shopper electronic gadgets and

is in excess of 100 times speedier than current short-go remote advancements, for example, Bluetooth and Wi-Fi. This GI-FI innovation permits remote spilling of uncompressed superior quality substance and works over a scope of 10 meters without impedance.

DISADVANTAGES

- The main disadvantages of the GI-FI arethe it is working in short distance only and it is not work in long distance.
- They were having power consumption of maximum 2mW.

FUTURE SCOPE

GI-FI innovation shows the world's first completely incorporated fascinating highlights of this new innovation it can be anticipated that handset on CMOS innovation working at 60 GHz and gives new method to coordinating radio wires on CMOS. Exhibitions of GI-FI innovation can be organized demonstrating the immense potential it needs to change the way buyers utilize their in home electronic gadgets.

Inside next couple of years, we anticipate that GI-FI will be the prevailing innovation for remote systems administration. By giving minimal effort, high broadband access, with fast substantial records swapped inside seconds it could create remote home and office of future. As the range is restricted to shorter separations no one but we can expect can expect the wide band with same speed and low power utilization & effortlessly installed into gadget, remote office, home gear and remote HD.

CONCLUSION

GI-FI technology is defined as one of thegreatest improvements made on wireless technology. GI-FI is the world's first transceiver integrated on a singlechip that operates at 60 GHz on the CMOS process. The comparison that is performed between GI-FI and existing wireless technologies show that these features along with some other benefits 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 offers highspeed of data transfer, Low power consumption, High security, Cost effective, quick deployment, Small size, highly portable, high mobility etc. GI-FI canbe used in many devices such as media access control, Smart phone, wireless PAN network. 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. In this paper GI-FI technology is defined as one of the greatest improvements made on wireless technology.

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