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Gi-Fi Technology

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ABSTRACT

Wireless technology improvement has become follower in today's modern life. One of the greatest improvements made on wireless technology field was inventing a new wireless technology (Gi-Fi)or gigabit wireless is the world's first transceiver integrated on a single chip that operates at 60hz on CMOS process.

Gi-Fi is a wireless transmission system which is ten times faster than WI-FI and its Chip delivers short range multi-gigabit data transfer in an indoor environment .it will allow wireless transfer of audio and video data upto 5 gigabits per second, low power consumption ,usually within a range of 10 meters. This technology providing low cost, high broadband access with very high speed large files exchange within seconds. It is required that Gi-Fi to be the preferred next generation wireless technology used in home and offices.

KEYWORDS: WI-FI, GI-FI

INTRODUCTION

WHY Gi-Fi?

The reason for pushing into Gi-Fi technology is because of slow rate, high power consumption, low range of frequency operations of earlier technologies i.e. Bluetooth and Wi-Fi. see the comparisons and features of those two technologies.

CURRENTLY USED TECHNOLOGIES:

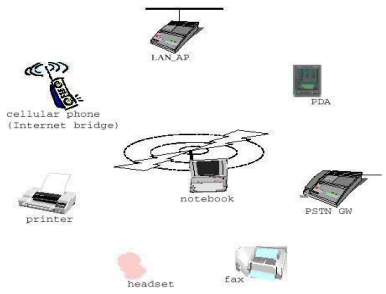
- Bluetooth
- Wi-Fi

From the above table we can see the data transfer rate is 800 kbps for Bluetooth and 11mbps for Wi-Fi. It takes more time to transfer. So we are moving on to Gi-Fi.

GI-FI TECHNOLOGY:

Gi-Fi Definition

Gi-Fi or gigabit wireless refers to the wireless communication at a date rate of more than one billion bits (gigabit) per second .It will allows wireless transfer of video data at up to 5 gigabits per second.



GI-FI ACCESS DEVICE

Characteristic	Bluetooth	Wi-Fi
Frequency	2.4 GHz	2.4 GHz
Range	10 meters	100 meters
Primary application	WPAN: cable replacement	WLAN: Ethernet
Data transfer rate	800 Kbps	11 Mbps
Power consumption	Low	Medium
Primary devices	Mobile phones, PDAs, consumer electronics, office and industrial automation devices	Notebook computers, desktop computers, servers
Primary users	Traveling employees; electronics consumers; office and industrial workers	Corporate campus users
Usage location	Anywhere at least two Bluetooth devices exist — ideal for roaming outside buildings	Within range of WLAN infrastructure, usually inside a building
Development start date	1998	1990
Specifications authority	Bluetooth SIG	IEEE, WECA

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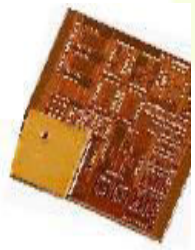
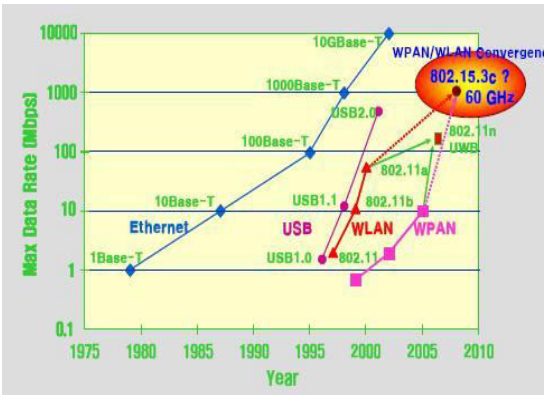
CONSTRUCTION:

The core component of Gi-Fi system is the subscriber station which available to several access points. It supports standard IEEE802.15.3c 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 .



FUNDAMENTAL TECHNOLOGIES IN 802.15.3C:

- It transmits multiple signals simultaneously across the wireless transmission paths within separate frequencies to avoid interference
- It uses ultra wide band.



WORKING of GI-FI:

Here we will use time division duplex for both transmission and receiving. We will data files are up converted from IF range to RF60Ghz range by using 2 mixers. We will feed this to an power amplifier, which feeds millimeter wave antenna.

The incoming RF signal is first down converted to an IF signal centered at 5 GHz .and then to normal data ranges, here we will use heterodyne construction for this process to avoid leakages due to direct conversion. Due to availability of 7 GHz spectrum the total data will be will be transferred within seconds

WHY 60 GHZ..?

Here we will use millimeter wave antenna which will operate at 60 GHz frequency which is unlined band .Because of this band we are achieving high data rates energy propagation in the 60 GHz band has unique characteristics that make possible many other benefits such as excellent immunity to co-channel interference, high security, and frequency re-use.

Point-to-point wireless systems operating at 60 GHz have been used for many years for satellite-to-satellite communications. This is because of high oxygen absorption at 60 GHz (10-15 dB/Km). This absorption attenuates 60 GHz signals over distance, so that signals cannot travel far beyond their intended recipient. For this reason, 60GHz is an excellent

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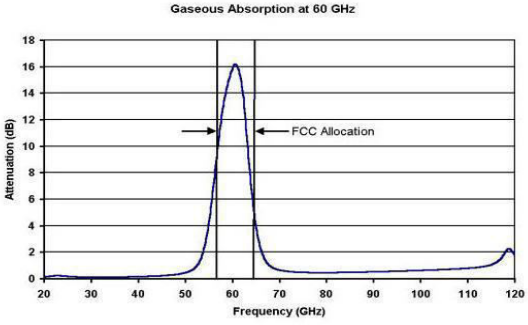
choice for communication.



(**Oxygen Attenuation Vs. Frequency).**

CHARACTERISTICS	WI-FI	GI-FI
DEVELOPMENT YEAR	1990	2004
FREQUENCY	2.4ghz	57-64GHZ
POWER CONSUMPTION	10m	<2mw

ULTRA WIDE BAND FREQUENCY USAGE:

UWB is a technology with **high bit rate, high security** and **faster data transmission.** It is a zero carrier technique with low coverage area. So we have low power consumption. These features are Ultra-Wideband (UWB) is a technology for transmitting information spread over a large bandwidth (>500 MHz) that should, be able to share spectrum with other users. Regulatory settings of FCC are intended to provide an efficient use of scarce radio bandwidth while enabling both high data rate *personal-area network* (PAN) wireless connectivity and longer-range, low data rate applications as well as radar and imaging systems

GI-FI FEATURES

This Gi-Fi technology allows wireless uncompressed high-definition content and operates over a range of 10 meters without interference. Gi-Fi chip has flexible architecture. It is highly portable and can be constructed in everywhere. Entire transmission system can be built on a cost effective single silicon chip that operates in the unlicensed, 57-64 GHz spectrum band. Gi-Fi technology also enables the future of information management, is easy to deployment with the small form factor.

Capacity of High Speed Data Transfer

The data transfer rate of Gigabit wireless technology is in Gigabits per second. Speed of Gi-Fi is 5 Gbps which is 10 times the data transfer rate is the main invention of wireless technology was the Gi-Fi. An entire High-Definition (D) movie could be transmitted to a mobile phone in a few seconds, and the phone could then upload the movie to a home computer or screen at the same speed.

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Interference in Data Transfer

It uses the 60 GHz millimeter wave spectrum to transmit the data, which gives it an advantage over Wi-Fi. Wi-Fi's part of the spectrum is increasingly crowded, sharing the waves with devices such as cordless phones, which leads to interference and slower speeds. But the millimeter wave spectrum (30 to 300

GHz) is almost unoccupied and the new chip is potentially hundreds of times faster than the average home Wi-Fi technology.

Power consumption

Power consumption of the present technologies such as Wi-Fi and Bluetooth are 5 milli watts and 10 milli watts. But chip of Gi-Fi uses a tiny 1 millimeter wide antenna and it has less than 2 milli watts of power consumption that in compare to the current technologies is very less.

Provides high security

Fastest form of Wi-Fi. The sheer density of the signal would allow a chip to send as much as 5 Giga bits per second while the spectrum would limit the device to the same 33 foot range as Bluetooth or UWB. It could theoretically transfer an HD movie to a cell phone in seconds. Mixing and signal filtering used in Gi-Fi technology would keep the signal strong versus the longer- ranged but slower and more drop-prone Wi-Fi option of today .The chip in Gi-Fi would likely cost is less.

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.

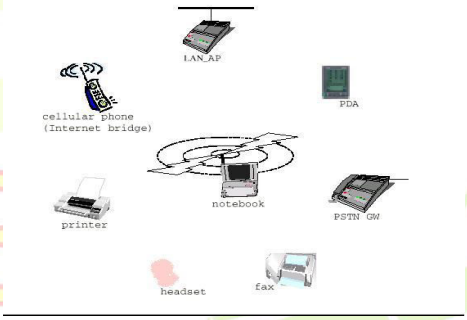
APPLICATIONS:

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

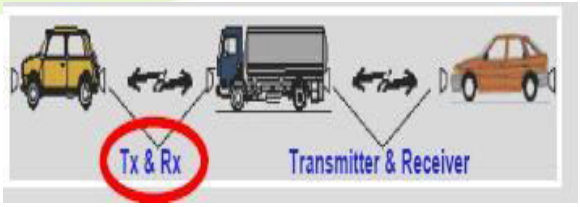
OFFICE APPLIANCES:

As it transfer data at high speed which made work very easy. It also provides high quality of information from internet.

In wireless pan networks:



Inter-vehicle communication system:



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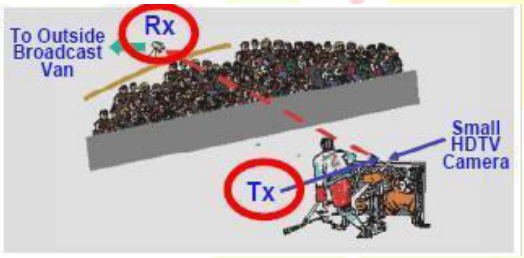
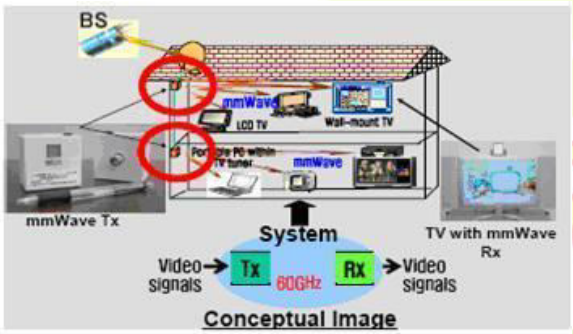
Huge data file transmission:

It will transfer gigabits of information within seconds

Broadcasting video signal transmission system in sports stadium :



Ad-hoc information distribution with Point-to-Point network extension:



Easy and immediate construction of temporal broadband network such as in exhibition-site for…Advertisement information distribution or Contents downloading service.

HOUSEHOLD APPLIANCES

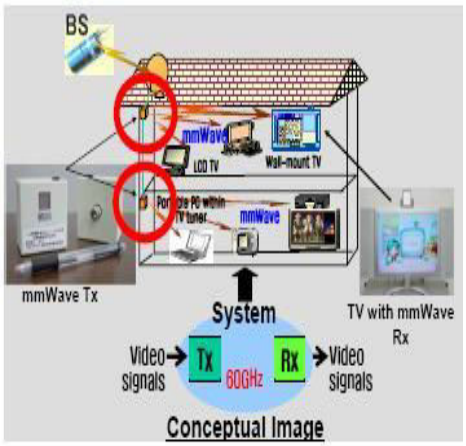
Consumers could typically download a high definition from a kiosk in a matter of seconds to a music player or a smart phone and having got home could play it on a home theatre system or store it on a home server for future viewing, again within a few seconds .High speed internet access, streaming content (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.

Video information transfer:

By using present technologies video swapping takes hours of time, whereas by this we can transfer of Gbps. Data transfer rate is as same for transfer of information from a PC to a cell or cell to PC.

It can enable wireless monitors, the efficient transfer of data from digital camcorders, wireless printing of digital pictures from a camera without a need for an intervening personal computer and the transfer of files among cell phone handset and other handled devices like personal digital audio and video players.

Wave video-signals transmission system



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Media access control (MAC) and imaging and other Future:

As the range is limited to shorter distances

only we can expect the broad band with same speed and low power consumption

Technology Considerations:

The Gi-Fi integrated transceiver chip is may be launched by starting of next year by NICTA, Australia will be the first. Due to the less cost of chip many companies are forward to launch with lower cost. The potential of mw-WPAN for ultra fast data exchange has prompted companies like Intel, LG, Matsushita(Panasonic), NEC, Samsung, SiBEAM, Sony and Toshiba to from Wireless HD, an industry-led effort to define a specification for the next consumer electronic products. Specifically, Wireless HD has an stated goal of enabling wireless connectivity for streaming high-definition connect between source devices and high definition display

CONCLUSION

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 wire less home and office of future.

If the success of Wi-Fi and the imminent wide usage of Wi-MAX is any indication, Gi-Fi potentially can bring wireless broadband to the enterprise in an entirely new way.

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