

A

Seminar report

On

Gi-Fi Technology

Submitted in partial fulfillment of the requirement for the award of degree
of Bachelor of Technology in Computer Science

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Acknowledgement

I would like to thank respected Mr..... and Mr.for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

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Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

Preface

I have made this report file on the topic **Gi-Fi Technology**; I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude towho assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

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1. 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.

Gi-Fi which is developed on a integrated wireless transceiver chip. In which a small antenna used and both transmitter- receiver integrated on a single chip which is fabricated using the complementary metal oxide semiconductor (CMOS) process. Because of Gi-Fi transfer of large videos, files will be within seconds.

1.1 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.

1.2 Bluetooth Verses Wi-Fi

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

1.3 Disadvantages of Bluetooth and Wi-Fi:

From the table we can conclude that the bit rate of Bluetooth is 800Kbps and Wi-Fi has 11Mbps. Both are having power consumptions 5mw and 10mw. They have lower frequency of operation 2.4GHz. For transferring large amount of videos, audios, data files take hours of time. So to have higher data transfer rate at lower power consumption we move onto **GiFi Technology**.

2. What is Gi-Fi?

Gi-Fi or gigabit wireless 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 at up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth the cost. NICTA researchers have chosen to develop this technology in the 57-64GHz unlicensed frequency band as the millimeter-wave range of the spectrum makes possible high component on-chip integration as well as allowing for the integration of very small high gain arrays. The available 7GHz of spectrum results in very high data rates, up to 5 gigabits per second to users within an indoor environment, usually within a range of 10 meters. It satisfies the standards of IEEE 802.15.3C

2.1 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.



Fig. 1 - GIGABIT WIRELESS PAN NETWORKS

2.2 Fundamental Technologies in 802.15.3C:

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.

2.3 Working in Gi-Fi:

Here we will be use a time division duplex for both transmission and receiving. The data files are up converted from IF range to RF 60GHz range by using 2 mixers. We will feed this to a 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 transferred within seconds.

2.3.1 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 communication link. Time division duplex has a strong advantage in the case where the asymmetry of the uplink and downlink data speed is variable. As uplink traffic increases, more channel capacity can dynamically be allocated to that, and as it shrinks it can be taken away. For radio systems that aren't moving quickly, another advantage is that the uplink and downlink radio.

2.4 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 choice for covert communications.

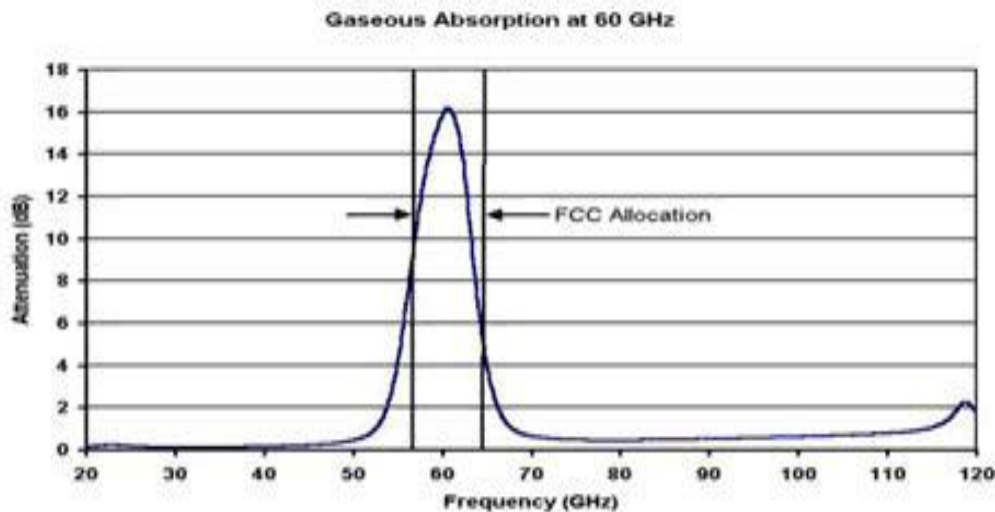


Fig. 2 - Oxygen Attenuation vs. Frequency

2.5 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.

3. FEATURES OF Gi-Fi

The Gi-Fi standard has been developed with many objectives in mind. These are summarized below:

3.1 Advantages

3.1.1 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.

3.1.2 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.

3.1.3 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.

3.1.4 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.

3.1.5 Small Size:

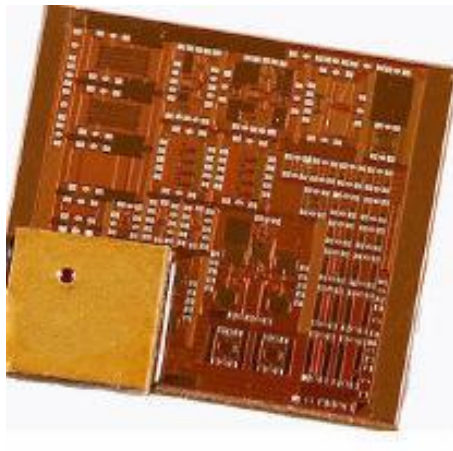


Fig.3- Gigabit wireless: The Gi-Fi integrated wireless transceiver chip developed at the National ICT Research Centre, Australia. —

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

3.1.6 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.

3.2 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.

3.3 Gi-Fi Access Devices:

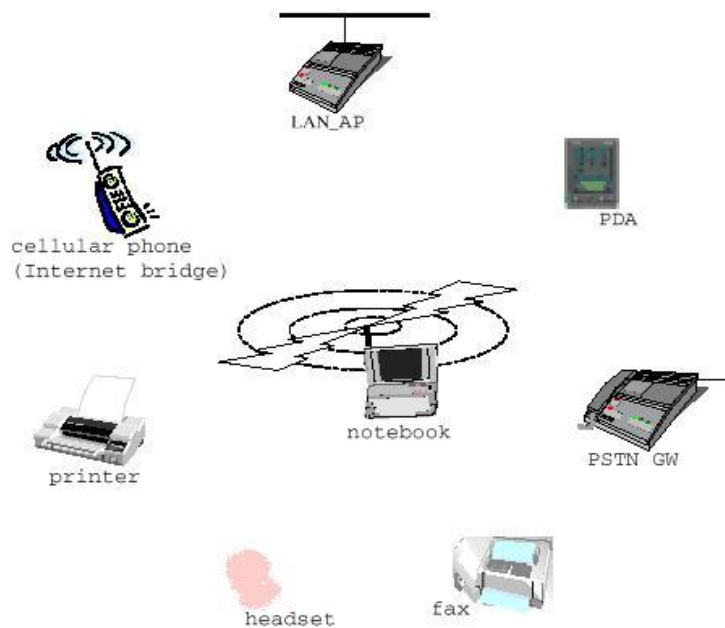


Fig.4 – Access Devices

This figure shows some of the different types of Gi-Fi access devices. This diagram shows that access devices include network termination units, internal radio modules, network interface cards, printers, PC's, all house hold electronic appliances on communication devices.

4. Applications

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

4.1 Different Applications

4.1.1 House Hold Appliances:



Fig.5 – Household Applications

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 theater, etc.), real time streaming and wireless data bus for cable replacement. It makes the WIRELESS HOME AND OFFICE OF THE FUTURE.

4.1.2 Office Appliances:

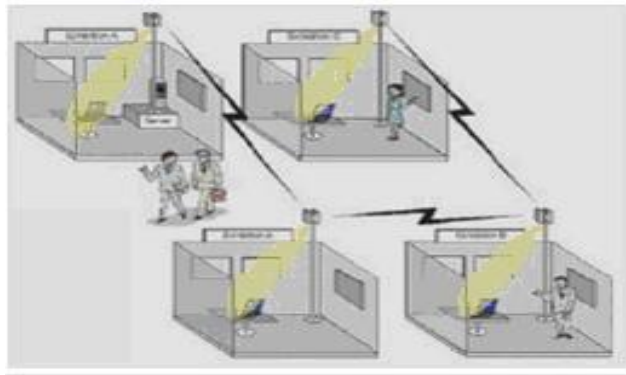


Fig.6 – Office Appliances

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

4.1.3 Video information transfer:

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

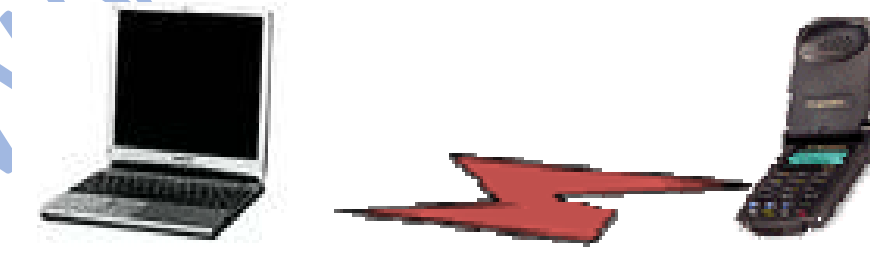


Fig.7 – Information Transfer

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.

4.1.4 Inter-vehicle communication system:

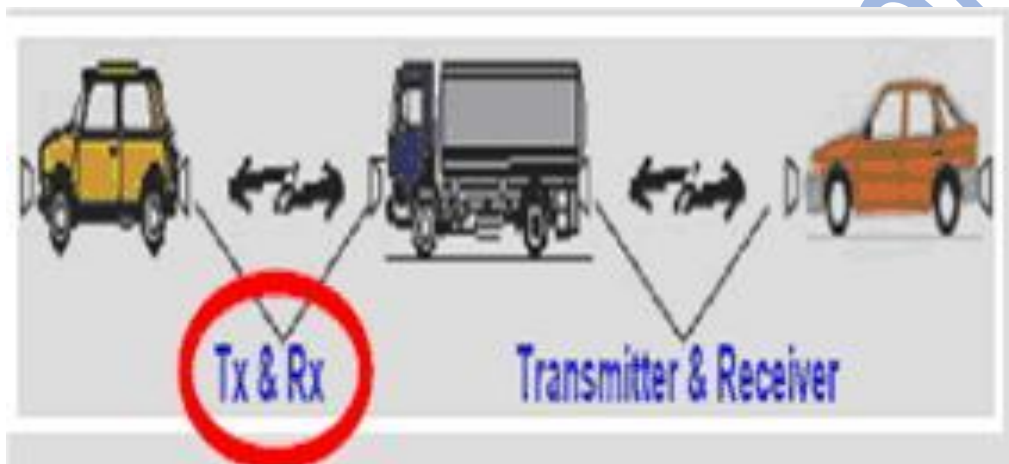


Fig.8 - Inter-vehicle communication system

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

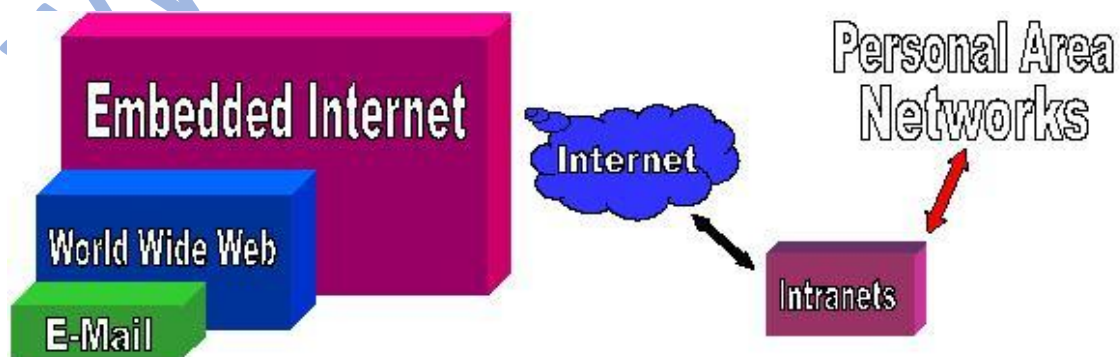


Fig.9 - MAC and imaging and others

4.2 Future Considerations:

As the range is limited to shorter distances only we can expect the broad band with same speed and low power consumption.

4.3 Technology Considerations:

The Gi-Fi integrated transceiver chip is may be launched by starting of next year by NICTA, Australia will be first. Due to less cost of chip so 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, Si-BEAM, Sony and Toshiba to form Wireless HD, an industry-led effort to define a specification for the next generation consumer electronics products. Specifically, Wireless HD has a stated goal of enabling wireless connectivity for streaming high-definition content between source devices and high-definition displays.

5. 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 wireless 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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6. References

- www.wikipedia.com
- www.google.com
- www.studymafia.org

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