GIGABIT WIRELESS - AN EMERGING TECHNOLOGY

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ABSTRACT

Since ages we have been intertwined in the network of cables. But with increasing technology and the need for various devices by people for various uses, cables proved to be a major hindrance. And hence wireless devices came into being. Many such devices have been developed to curb the problem of cables and have proved to be an asset. But man's quest for even better, lead to the introduction of Gi-Fi i.e. Gigabit Wireless.

The development of Gi-Fi proved to be a boon as it is the first transceiver to be integrated on a single chip operating at 60GHz on the CMOS process. Both the transmitter and receiver are integrated on a single chip and this device enables a short range multi-gigabit rate transfer at the rate of 5Gbps. Low cost, less than 2mW of power consumption and ten times faster rate of transmission as compared to other wireless devices will make Gi-Fi an effective mode of wireless communication.

I INTRODUCTION

The research team of NICTA, Melbourne University Researchers have introduced a technology called Gi-Fi i.e. Gigabit Wireless. Large data or video files can be exchanged within seconds i.e. at a rate of 5Gbps using this technology. The Gi-Fi is ten times faster than the other existing wireless technologies and is the first transceiver to be integrated on a single chip. It operates at the frequency of 60GHz on the CMOS process and covers a range of about 10meters.

A 5mm chip is used on an antenna as small as 1mm for the existence of this resourceful technology and the power consumption is less than 2mW. Therefore Gi-Fi will bring about a revolution in the wireless technology and soon all the offices and homes will become free from the trap of cables and wires. The small size and very low cost i.e. one – tenth the existing devices will help Gi-Fi to carve a niche among other devices. Another important feature of this technology is that it can be enabled in cell phones very easily and effectively without increasing the cost of the device.

Gi-Fi being a wireless technology allows swapping of large files within seconds but only within the range of 10 metres. It is a highly efficient technology and can replace High Definition Multimedia Interface (HDMI) cables in the near future. The complete implementation of this wireless system will prove to be very beneficial for the people whose work involves the continuous use of such wireless devices and hence we will very soon be able to experience wireless homes and offices.

II PRINCIPLE OF WORKING

Gifi works on the principle of Time Division Duplex (TDD). TDD uses time division multiplexing for the separation of outgoing and returning signals.

At the transmitter end the IF range data files are converted to Rf range (60GHz) with the help of the two mixers. The range thus obtained is fed on the power amplifier.This further goes to the millimetre wave antenna.

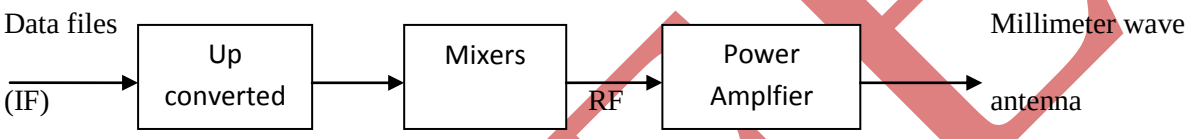

Fig.1 At Transmitter

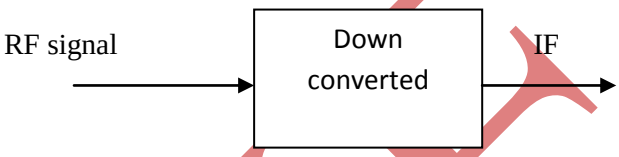

Fig.2 At Receiver

At the receiver end heterodyne construction is used. The leakage due to direct conversion is avoided by using this construction and converted easily to normal data range. The total data can be transferred within seconds because of the availability of of 7GHz spectrum.The signal is strong as compared to Wi-Fi due to mixing and filtering.

TDD : It is basic principle of Gi-Fi. It has duplex communication link as uplink and downlink. The uplink and downlink is separated by time slots allocated in same frequency band. It has various advantages like variable speed for uplink and downlink and uplink and downlink radio.

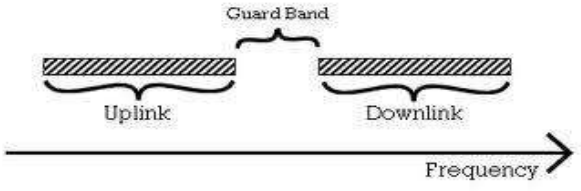

Fig.3 TDD

III WHY GI-FI?

The Gi-Fi is a multi-gigabit wireless technology which will effectively remove the trap of intertwined cables and wires around us by making our homes and offices wireless. The high level of frequency re-use in this technology will be able to satisfy the communication needs of multiple customers in a small geographical region. The Gi-Fi has a flexible architecture and it is about 100 times faster than the existing technologies.

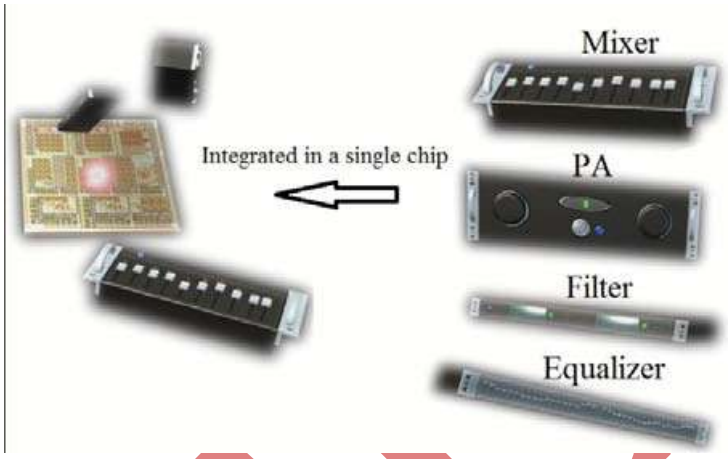

Fig.4- Gi-Fi Chip in Mobile Phones

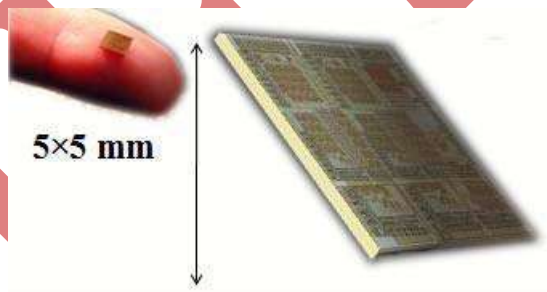

Fig.4 Gi-Fi Chip

Some features of Gi-Fi include:

1) **High speed data transfer** at a rate of 5Gbps and because of this an entire HD movie can be transferred to any mobile phone within seconds.
2) **Low power consumption** i.e. less than 2mW and it is one of the prominent features of Gi-Fi as other wireless technologies consume as much as 10mW of power.
3) **Minimum or no interference** because Gi-Fi uses a 60mm wave spectrum for transmission. This spectrum is mostly unoccupied and the new chip is 100 times faster and hence there is no interference of any type.
4) **High security** is due to the secure encryption technology in Gi-Fi which ensures privacy and security of the content due to the combined effects of oxygen absorption and narrow beam spread.

5) **Fast data synchronisation** enables transfer of videos and other information at exceptionally fast speed.

The answer as to how Gi-Fi is better than the existing technologies is due to the following advantages that this technology has over the others:

1) Removes cables and will very soon make our offices and homes completely wireless.
2) The low cost of the chip i.e. only about $10.
3) It will bring about an enhancement to the next generation gaming technology.
4) The simplicity of the technology also separates it from the crowd and hence makes it user-friendly.
5) Better privacy policies.

IV APPLICATIONS

The Gi-Fi technology being very efficient and advantageous has a large number of applications and can be used for various purposes. The major applications of Gi-Fi include Media Access Control (MAC), imaging, broadcasting video signals and wireless PAN networks.

Gi-Fi can be used for Ad-hoc information distribution with point-to-point network extension and can also connect personal computers and notebooks wirelessly. Inter vehicular communication systems and the transmission systems installed in the sports' stadiums also use this technology. With the use of this technology, inter – vehicular communication system can also be established. Gi-Fi therefore will prove to an asset and will help make our offices, homes and all our surroundings wireless.

V FUTURE OF GIGABIT WIRELESS

The Gi-Fi has a vast market worldwide because of the growing need of High Definition (HD), Televisions, and Smart phones etc. It has a good future because of the low cost of the chip, high broadband access and the very appreciative speed with which large files can be swapped within seconds.

This technology will very successfully make the dream of wireless homes and offices a reality.

VI CONCLUSION

Gi-Fi technology is going to remove the cables for communication. A high speed data transfer rate can be encountered by all the communication system having low power consumption and high security. The flexibility of Gi-Fi can help various field to improve their working and their applications.

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