

GIGABIT FIDELITY TECHNOLOGY

¹Sindhu Dilip Sagar, ²Dr. Dinesh V. Rojatar

^{1,2} Electronics and Telecommunication Engineering dept. Government Engineering College, Chandrapur, India

Abstract: Gi-Fi will help to push wireless communications to faster drive. For many years cables ruled the world. Optical fibers played a dominant role for its higher bit rates and faster transmission. But the installation of cables caused a greater difficulty and thus led to wireless access. 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 up to 5 gigabits 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 2watts 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. The breakthrough will mean the networking of office and home equipment without wires will finally become a reality. In this we present a low cost, low power and high broadband chip, which will be vital in enabling the digital economy of the future.

Keywords: Wi-Max, Optical fibers, Gigabit Wireless, high broadband chip.

1. INTRODUCTION

Wi-Fi (IEEE-802.11b) and Wi-Max (IEEE-802.16e) have captured our attention, as there are no recent developments in the above technologies which cannot transfer data and video information at a faster rate and led to the introduction of Gi-Fi technology. It offers some advantages over Wi-Fi, a similar wireless technology, that offers faster information rate in Gbps less power consumption and low cost for short range transmissions. Gi-Fi or Gigabit Wireless is the world's first transceiver integrated on a single chip in which a small antenna used and both transmitter receiver are 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 can be done within seconds. Researchers of Melbourne University has come up with a wireless technology which promises high speed short range data transfers with a speed of up to 5Gbps within a radius of 10 meters. The new wireless technology is named as Gi-Fi and operates on the 60GHZ frequency band, which is currently mostly unused. The Gi-Fi Chip developed by the Australian researcher's measures 5mm square and is manufactured using existing complementary metal-oxide-semiconductor (CMOS) technology, the same system that is currently used to print silicon chips. The best part about this new technology is its cost effectiveness and power consumption, it consumes only 2watts of power for its operation with antenna (1mm) included and the development of Gi-Fi chip costs approximately \$10(Rs 380) to manufacture.

2. NETWORK EVOLUTION

Communication technology can be divided into two types. 1) wired technology and 2) wireless technology. The evolution of wireless technology will lead to the GI-FI technology. The following diagram will give the network evolution.

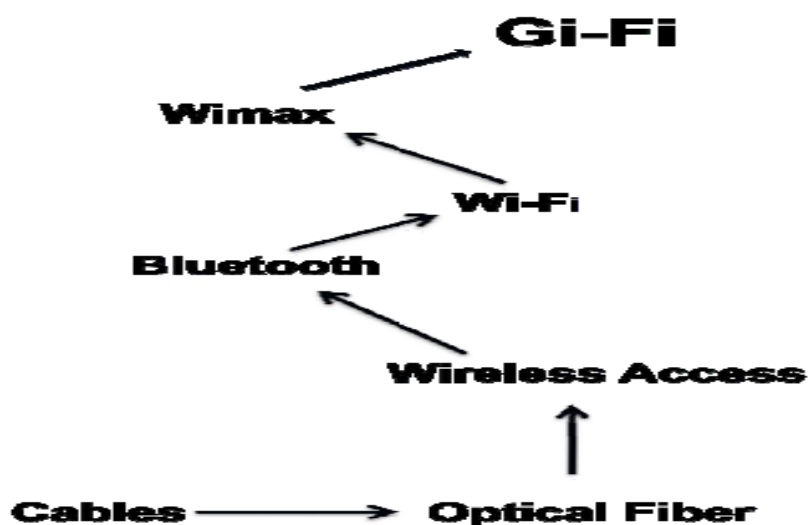


Figure 1: Network Evolution

3. WORKING PRINCIPLE USED IN GI -FI

In this we will use time division duplex for both transmission and receiving. Here data files are up converted from IF range to RF60Ghz range by using 2 mixers and 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 and due to availability of 7 GHz spectrum the total data will be will be transferred within seconds.

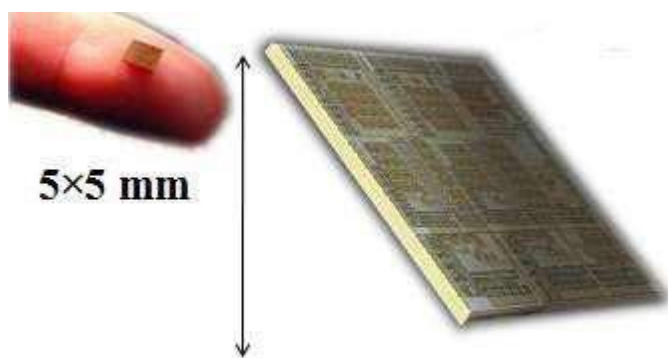


Figure 2: Chip of GI-FI

4. FEATURES OF GI-FI

- 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.
- Multi-gigabit wireless technology that removes the need for cables between consumer electronic devices.
- More than 100 times faster than current short-range wireless technologies.
- Allows wireless streaming of uncompressed high-definition content.
- Operates over a range of 10 meters without interference.
- Entire transmission system can be built on a cost effective single silicon chip.

5. ADVANTAGES OF GI-FI TECHNOLOGY

1. **Removing Cables:** For many years cables ruled the world. Optical fibers played a dominant role for its higher bit rates and faster transmission. But the installation of cables caused a greater difficulty and thus led to wireless access. The foremost of this is Bluetooth which can cover 9-10mts. Wi-Fi followed it having coverage area of 91mts. The standard's original limitations for data exchange rate and range and high cost of the infrastructures have not yet made it possible for Wi-Fi to become a good replace for the cables. Gi-Fi technology Removes need for cables to connect consumer electronics devices and all the devices in the range of 10 meters can be connected in order to transmit the data wirelessly.
2. **Low Cost Chip:** Gi-Fi's chip uses only a tiny one-millimeter-wide antenna and less than 2mili watts of power. Low-cost chip allows technology to be readily incorporated into multiple devices. The chip in Gifi would likely cost about \$10 or less to build.
3. **Simplicity:** One of the problems with wire connections and cables is complexity for connecting, but in the Gigabit wireless technology simplicity is one of the features. Simple connection improves the consumer experience. The new gigabit wireless system provides Multi-gigabit wireless technology that removes the need for cables between consumer electronic devices and is More than 100 times faster than current short-range wireless technologies such as Bluetooth and Wi-Fi. This technology with high level of frequency re-use can satisfy the communication needs of multiple customers within a small geographic region. This Gi-Fi technology allows wireless streaming of uncompressed high-definition content and operates over a range of 10 meters without interference. It is highly portable and can be constructed in everywhere.

6. CONCLUSION

Gi-Fi technology is defined that will allow wireless transfer of audio and video data up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth of the cost, usually within a range of 10 meters that operates at 60GHz on the CMOS process. This technology removes cables that for many years curled the world and provides high speed data transfer rate. Gi-Fi technology has much number of applications and can be used in many places and devices such as smart phones, wireless pan networks, media access control.

ACKNOWLEDGEMENT

It is with great pleasure and effort that I am able to present this seminar report. I have trid all my best to make this report complete in all aspects. I would like to acknowledge Dr. D. V. Rojatar, Head of Electronics and Telecommunication Engineering Department (G.C.O.E. Chandrapur). I express my deepest seanc of attitude to him for supervising my project and also pro- viding me necessary guidance. Last but certainly not least I would like to thank my colleagues and friends for their inspiration and motivation and also those who helped me directly and indirectly for my seminar work.

REFERANCES

- [1] Gast, Matthew, 802.11 Wireless Networks: The Definitive Guide, Second Edition, Sebastopol, CA: O'Reilly & Associates, Inc., 2005.
- [2] Ross, John, The Book of Wireless: A Painless Guide to Wi-Fi and Broadband Wireless, Second Edition, San Francisco, CA: No Starch Press, 2008.
- [3] Sachin Abhyankar, Rishi Toshiwal, Carlos Cordeiro and Dharma Agraqal, —Emerging Technologies: WLANS and WPANS: On the Application of Traffic Engineering over Ad Hoc Networks|, Unpublished, 2003.
- [4] Gowtham S Shetty, GiFi: Next Generation Wireless Technology, Seminar report, Visvesvaraya Technological university Belgaum, 2011.
- [5] F. Ramirez-Mireles, —On Performance of Ultra Wideband Signals in Gaussian Noise and Dense Multipath, IEEE Trans on Vehicular Technology, January 2001, pp. 244-249.