



## IMPLEMENTATION AND ANALYSIS OF WI-FI STANDARDS AND ITS SCOPE

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ABSTRACT: Wi-Fi allows to connect to the internet from virtually anywhere at speeds of up to 54Mbps. The computers and handsets enabled with this technology use radio technologies based on the IEEE 802.11 standard to send and receive data anywhere within the range of a base station. To understand the wireless technology



let us consider a pair of Walkie-Talkies. These are small radios that can transmit and receive radio signals. When we talk into a Walkie-Talkie, our voice is picked up by a microphone, encoded onto a radio frequency and transmitted with the antenna. Another Walkie-Talkie can receive the transmission with its antenna, decode our voice from the radio signal and drive a speaker. Simple Walkie-Talkies like this transmit at a signal strength of about 0.25 watts, and they can transmit about 500 to 1,000 feet.

### [1] Introduction

Wi-Fi is a term that most of us hear almost every day and is a service most would consider an integral part of our lives. From our smart phones to our game consoles and computers, most devices on the market today are equipped to use Wi-Fi. While WiFi has become critical to routines of many, a large portion of us don't know anything more than the basics.

Wireless Fidelity is the wireless way to handle networking. It is also known as 802.11 networking and wireless networking. Using this technology we can connect computers anywhere in a home or office without the need of any wires. The computers connect to the network using radio signals, and they can be up to 100 feet or so apart.

Wi-Fi allows to connect to the internet from virtually anywhere at speeds of up to 54Mbps. The computers and handsets enabled with this technology use radio technologies based on the IEEE 802.11 standard to send and receive data anywhere within the range of a base station.

### How was Wi-Fi invented?

Wi-Fi was born in 1985 after the United States FCC opened up the wireless frequencies 900Mhz, 2.4Ghz, and 5.8Ghz to

be used without a license. These radio bands were used by household appliances such as microwaves, and were assumed to have no practical application in communications due to interference from the aforementioned appliances. To make these frequencies useable for communication, the FCC mandated usage of spread spectrum technology over these bands.

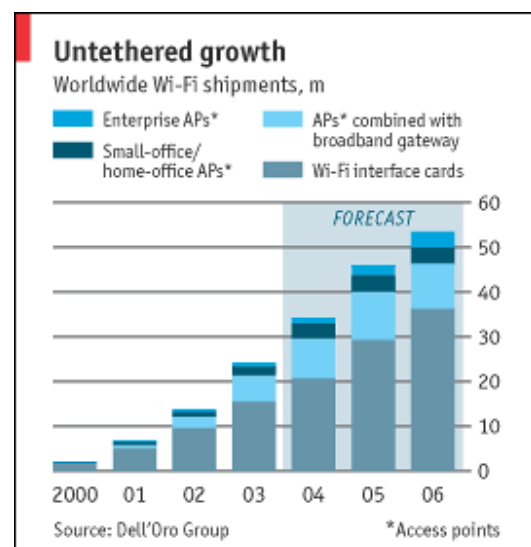


Fig 1 untethered growth

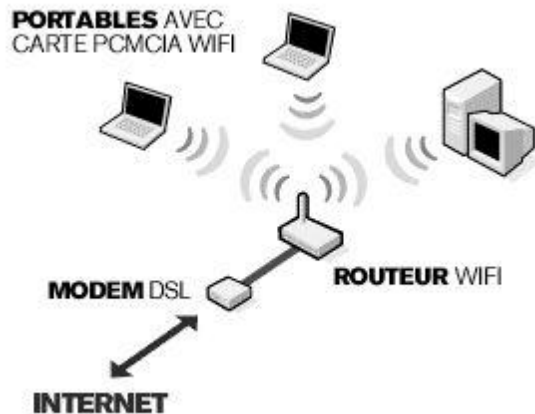


Fig 2 hotspot

### HOTSPOT:

It is a small box that is hardwired into the Internet. The box contains an 802.11 radio that can simultaneously talk to up to 100 or so 802.11 cards. There are many Wi-Fi hotspots now available in public places like restaurants, hotels, libraries and airports. We can create our own hotspot in our home

### [2] Literature Review

In July 2015 research was published under title “WIRELESS TECHNOLOGY IN NETWORKS” authored by Surabhi Surendra Tambe, in which she presents overview regarding emerging technology of Wireless Brodband networks. It focuses on history, tools, standards and implementation of Wi-Fi networks. However main purpose of that research paper had been to understand various problems associated with implementation of these WLANs and propose recommendation and measures to solve these problems and mitigate potential risk factors.

According to her telecommunication has become integral part of their daily lives and has been contributing widely to advancement in various fields. One of emerging mode had been Wireless broadband technology which transmits multiplexed information on wide band of frequencies.

deployment of Wireless broadband services had been done by weighing geographical population density against bandwidth limitation. Wireless technologies are designed to reduce time and different types of obstacles created by cables and more convenient than wired networking. In 1997, Wireless fidelity-popularly known as Wi-Fi technology was developed by IEEE 802.11 standards which provided users liberty to connect to internet from any place. But that service was pretty expensive till 2002, however new 802.11g standards in 2003 has lead to creation of Wifi enabled devices to masses as result today Wi-Fi router has become household commodity in most modern homes in India

She further adds that since its inception, Wi-Fi technology has come long way in providing quicker wireless access to Internet applications data across radio network thereby making access process faster than conventional modem. Radio bands such as 2.4GHz and 5GHz depend on wireless hardware such as Ethernet protocol and CSMA for Wi-Fi Technology to work .

### [3] TOOLS AND TECHNOLOGY

WiFi has brought new aspect in ground of networking. broadcast of data is completed via radio waves & cost of cables for network lying down. Wi-Fi enable user to get access to internet anywhere in given location. Now you could make network in Hotels, Libraries, colleges, universities, campus, private institutes, & coffee shops & even on public place to make your business more profitable & connect with their client any time. WiFi makes waves for business with their highly effective cable less media.

#### Unmatched mobility & elasticity

Wi-Fi, is allowing new intensity of connectivity without giving up functions. Wi-Fi introduced various types of



utilities such music streamers that transmit your music to speakers without any wire you could also play music from remote computer or any other attached to network. most important now you could play online radio. Wifi technology system is rather remarkable, you could download songs, send email & transfer files expediently at sky-scraping speed & you could move your computer easily because your WiFi network has no cable to disrupt your work so we could say that it is quite easy, helpful & most of all expedient.

### Fortress Technology

WiFi providing secure wireless solutions support growth & release of prototype mobile ad hoc wireless network for use in wireless strategic skirmish.

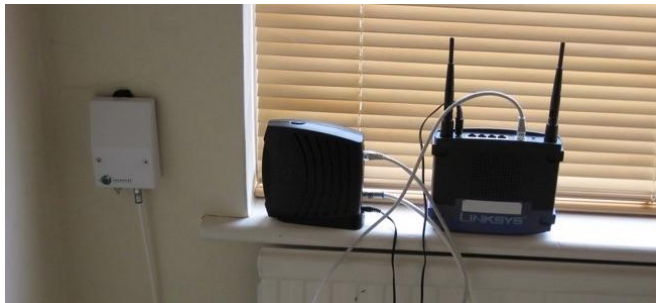


Fig 3. Modem & Router

### [4] PROPOSED WORK

First up, let's deal with that weird looking 802 number. This naming system would be actually used by number of networking standards that you would probably be familiar. Ethernet networks begin with 802.3, Bluetooth had 802.15 prefix, & Wi Fi would be tagged with 802.11. All different Wi Fi varieties would begin with this 802.11 number, followed by letter or two which, from consumer point of

view, would be useful for identifying other properties, such as maximum speed & range of particular device.

To help ensure compatibility with different pieces of hardware & networks, you'll often find that products support multiple, if not all of standards at same time. You might have seen listing such as Wi-Fi 802.11 a/b/g/n/ac on spec sheet for many smart phones, which covers all of oldest & most common modern standards.

### Throughput Comparisons

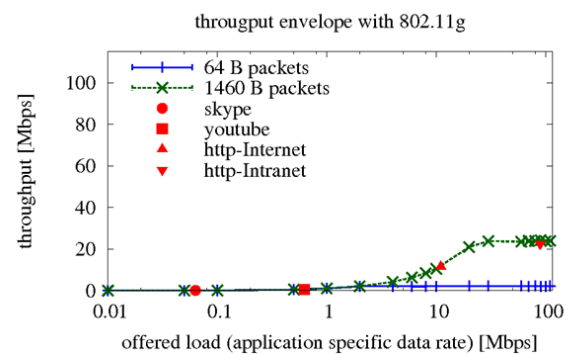


Fig 4. Graphical representation of Wi-Fi application specific (UDP) performance envelope 2.4 GHz band, with 802.11g

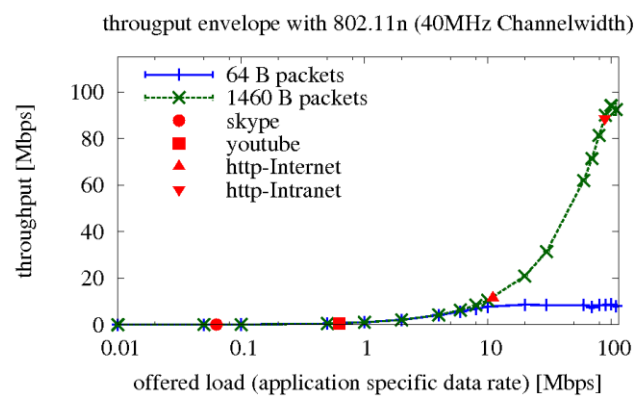


Fig 5 Graphical representation of Wi-Fi application specific (UDP) performance envelope 2.4 GHz band, with 802.11n with 40MHz



[5] PERFORMANCE ANALYSIS

Performance Comparison Analysis between IEEE

802.11a/b/g/n Standards

Now days, in practical application scenario, with increasing demand of wireless LANs, higher data rates are required. Wireless Local Area Network (WLAN) would be based on IEEE 802.11 standard and would be also popular by name as Wireless Fidelity (Wi-Fi). task groups within 802.11 working group introduced few extensions to original specifications. well known extensions of 802.11 specifications are 802.11b, 802.11a, 802.11g and 802.11n. that paper provides major differences between various IEEE 802.11 standards, their operation, interoperability and deployment constraints. In that paper, performances of IEEE 802.11a/b/g/n standards are explained. The IEEE standard defines data rate of 1 Mbps to 2 Mbps for three different physical layers that would be direct sequence spread spectrum (DSSS), frequency hopping spread spectrum (FHSS) and infrared (IR) techniques. From these three physical layers, DSSS would be one of most widely used technique to provide higher data rates. For multicarrier transmission, IEEE 802.11a defines Orthogonal Frequency Division Multiplexing (OFDM) technique to provide data rates from 6Mbps to 54 Mbps at 5 GHz band.

Figure6 : BER Curves for QPSK in AWGN & Rayleigh Channel

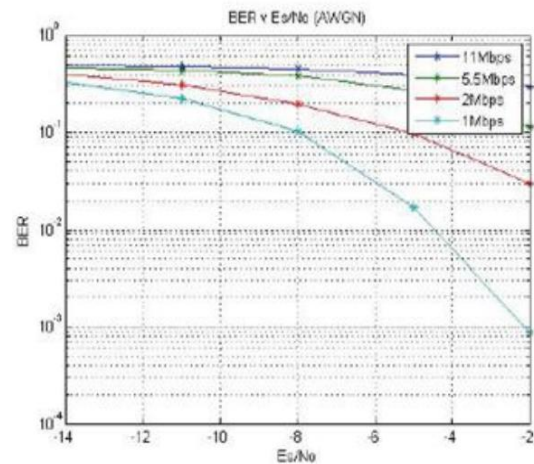


Figure 7 :BER Rate on Different Data Rates for 802.11b using AWGN Channel

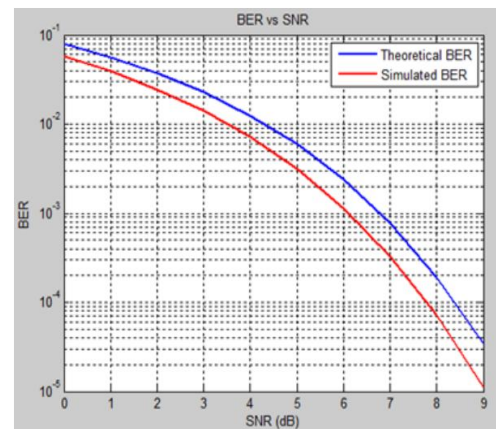
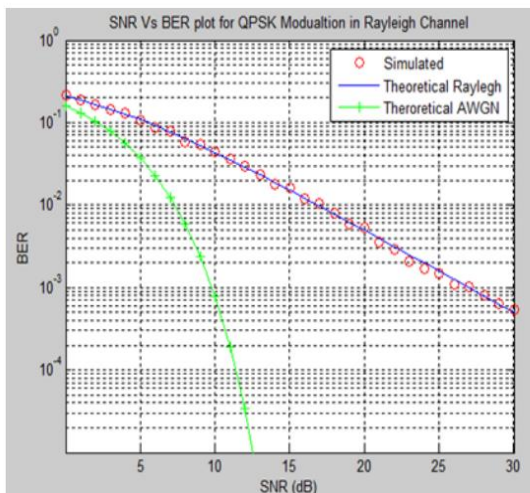


Figure 8 BER Rate for IEEE 802.11g



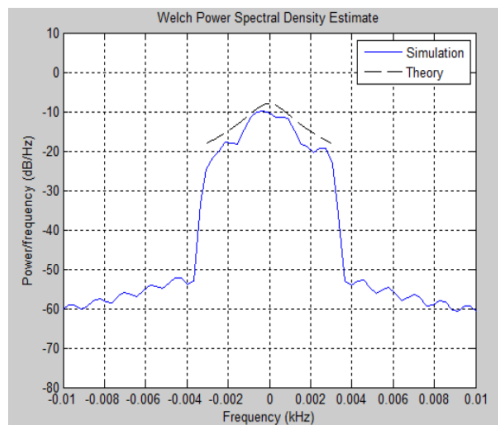


Figure 9 Welch Power Spectral Density Estimate for Antenna 2 in IEEE 802.11n

## [6] Conclusion

WiFi has brought new aspect in ground of networking. broadcast of data is completed via radio waves & cost of cables for network lying down. Wi-Fi enable user to get access to internet anywhere in given location. Now you could make network in Hotels, Libraries, colleges, universities, campus, private institutes, & coffee shops & even on public place to make your business more profitable & connect with their client any time. WiFi makes waves for business with their highly effective cable less media.

WiFi technology has several advantages it support-entire age bracket & create connection between components on same network & have ability to transfer data between devices & enable different kind of devices such as game, MP3 player, PDA's

With WiFi you could get high speed of internet because it is very fast than DSL & Cable connection you could establish Wifi network in small space now you don't need any professional installation just connect to power outlet with-Ethernet cord, & start browsing. WiFi security system for Threats makes it more renewable & its tool protect your VPN & secure web page.

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