



Future of 5G Wireless Network System

Dileep Kumar Yadav¹, Satendra Kumar², Dr. Harsh Lohiya³

(P.G Scholar) CSE Department, SSSUTMS Bhopal-Indore Road, Sehore (M.P), Pin - 466001¹

(P.G Scholar) CSE Departments, SSSUTMS Bhopal-Indore Road, Sehore (M.P), Pin - 466001²

(Professor) CSE Departments, SSSUTMS Bhopal-Indore Road, Sehore (M.P), Pin - 466001³

Abstract: Future 5G wireless networks will aspect new contests, as well as growing claim on network capacity to support a huge number of devices running application necessitating high data rates and always-on connectivity; hugely and supportive the emerging business models in the wireless network market demanding networks to be more open. New challenges initiative new resolutions and involve changed plans in the network positioning, management, and operation of future 5G wireless networks equated to those of current wireless networks. One of the key purposes of future 5G wireless networks is to compliantly provide service customized networks to a wide variety of services using integrated cloud reserve and wireless/wired network possessions, which may be presented by several infrastructure providers and/or operators.

Keywords: Future, 5G, Wireless, Capacity.

1. Introduction

5G Technology stands for 5th generation mobile technology. 5G represent the next major phase of mobile telecommunication ethics beyond the upcoming 4G standards. 5G technology is contribution the service in Product Manufacturing, Documentation, supporting electronic communications, etc. As the purchaser become more and more aware of the mobile phone technology, he or she will look for a decent package all together including all the advanced features a cellular phone can have. Hence the search for new technology always the main motivation of the top cell phone colossuses to out innovate their competitors. The aim of a 5G based telecommunication network would perfectly answer the challenges that a 4G rototypical would present once it has entered ubiquitous use. No one company or person owns 5G, but there are numerous companies in the mobile ecosystem that are causative to bringing 5G to life. Qualcomm has played a major role in originating the many introductory technologies that drive the industry forward and make up 5G, the next wireless standard.

Huawei Technology Co. owns the utmost copyrights on the next-generation of 5G technology, confirming the Chinese company will get paid despite Trump administration exertions to erase it from the supply chain, according to a new study. Wireless systems using Orthogonal Frequency Division Multiplexing (OFDM) with extensive area coverage, high amount at millimetre

waves (10 mm to 1 mm) covering a frequency range of 30 GHz to 300 GHz, and permitting a 20 Mbps data rate to distances up to 2 km. The millimeter wave band is the most active solution to the current surge in wireless Internet usage. These provisions are capable of providing wireless world wide web (WWW) applications.

What is 5G?

The NEXT GENERATION MOBILE NETWORK

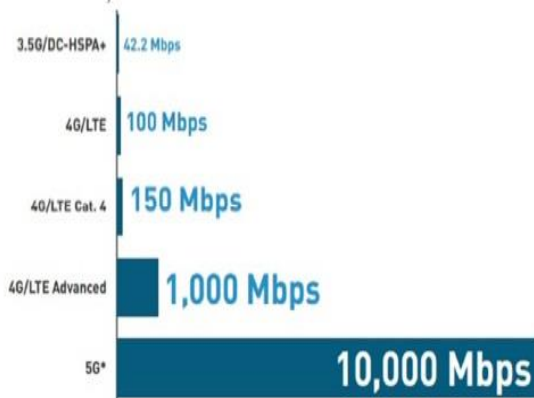
ALLIANCES defines the following pre-requisite for 5G networks:

- Increased Data rates
- 1 Gb per second simultaneously to many workers
- on the same office floor
- SPECTRAL efficiency more enhanced as
- compared to 4G
- Coverage speed
- Signaling efficiency enhanced
- Legacy reduced significantly compared to LTE

5G technology is a breakthrough. The next-generation of telecom networks (fifth generation or 5G) has started beating the market end of 2018 and will continue to increase worldwide. Elsewhere the speed of development, the technology is predictable to unleash a massive 5G IoT (Internet of Things) ecosystem where networks can assist communication wants for billions of connected devices, with the right trade between speed, latency, and cost.



- Up to 10Gbps data rate -10 to 100x speed development over 4G and 4.5G networks
- 1-millisecond latency
- 1000x bandwidth per unit area
- Up to 100x number of coupled devices per unit area (compared with 4G LTE)



How fast is 5G?

5G speed max out at 10 gigabits per second (Gbps).

According to the February 2020 matter of Prosperity Magazine, average 5G speed travels done in Q3/Q4 2019 range from: 220 megabytes per second (Mbps) in Las Vegas,

350 in New York, 380 in Los Angeles,

450 in Dallas, to 550 Chicago, and over 950 in Minneapolis and Providence Approximately.

Will 5G technology be secure?

4G networks use the USIM tender to achieve strong mutual authentication between the user and the connected devices and the networks. The entity introducing the USIM application can be a removable SIM card or an embedded UICC chip. This strong mutual authentication is decisive to enable trusted services. Today, security solutions are already a mix of security at the device and security at the network. Profuse security frameworks may co-exist in the future, and 5G is likely to re-use remaining solutions.

2. 5G Cellular Network Architecture

There are several obstacles in way for 5G designers. One of the most vital challenges is the physical paucity of radio frequency (RF) spectra owed for cellular communications. Moreover these frequency spectra have been profoundly used, and there is no more auxiliary in the existing cellular bands. Further challenge is the operation of advanced wireless technologies comes at the tag of high energy consumption. Toting up to environmental concerns, it has been seen and reported by cellular operators that the energy which is consumed by the base stations contributes to over 70% of their electricity bill. To study 5G network

in the market now, it is clear that the multiple access techniques in the network are almost at a halt and requires sudden upgrading. Current technologies like OFDMA are reported to work at least for next 50 years. Furthermore, there is no need of change in the technology. The wireless setup had come about from 1G to 4G. Alternatively, the addition of an application or we can say amelioration done at the elementary network for pleasing the user requirements is provoking the package providers to drift for a 5G network as soon as 4G is commercially set up. However, there was a widely agreement on the fact that as compared to the 4G network, the 5G network should achieve the below benefits over it:

1. 1000 times the system capacity
2. 10 times the spectral efficiency
3. energy efficiency
4. Data rate.

5. 25 times the average cell throughput. Drastic changes in the policy of designing the 5G wireless cellular architecture is needed to meet the difficulty of the user and to triumph over the challenges that have been put forward in the 5G system. In attendance wireless cellular architecture, for a mobile user to get connected or to communicate whether inside or outside, an outside base station is always present in the middle of a cell which helps in communication. The signals have to travel through the walls of the indoors, in providing communication between inside and outside base station which will result in very high penetration loss, along with the correspondingly costs with reduced spectral effectivity, data rate, and energy competency of wireless communications. To tackle this obstacle, a new idea for designing the 5G cellular architecture has come into existence i.e. to distinct the outside and inside setups. With the help of this designing technique, the loss due to the penetration through the walls of the building will be to some extent reduced. This scheme or we can say that this plan will be supported with the help of massive MIMO technology, in which the dispersed array of antenna's are deployed geographically, which consists of many small units or it is made up of tens or hundreds of antenna units. Since at present MIMO systems are using either two or four antennas, but the idea of massive MIMO systems which has been introduced mainly lays emphasis on the utilizing the advantages of large array antenna elements in terms of huge aptitude gains.

Advantages of 5G Technology

- High determination and bi-directional large bandwidth shaping.
- Technology to wrinkle all networks on one platform.
- More active and effective.
- Technology to simplify subscriber administration tools for the quick action.



- Most likely, will provide a vast broadcasting data (in Gigabit), which will support more than 60,000 connections.
- Easily manageable with the previous generations.
- Technological sound to support heterogeneous service area (including private network).
- Possible to afford uniform, uninterrupted, and unflinching connectivity across the world.

Disadvantages of 5G Technology

However, 5G technology is examined and abstracted to solve all radio signal problems and hardship of mobile world, but because of some security reason and lack of technological development in most of the geographic sections, it has following limitations

- Technology is silent under process and research on its possibility is going on.
- The speed, this technology is pleasing seems tough to achieve (in future, it might be) because of the useless technological support in most parts
- of the world.
- Many of the old devices would not be able to 5G, hence, all of them need to be swapped with a new one expensive deal.
- Developing infrastructure needs high cost.
- Security and privacy problems yet to be solved.

3. Future scope

In the upcoming, 5G will offer higher qualities of services, lower latency, and higher bandwidth, which will help improve user experiences both in the consumer and business space, from cloud gaming, to telehealth use cases. By Sergey Seletskyi, IoT Practice Leader and Senior Solution Architect at Intellias. 5G networks will reform the Internet of Things (IoT). But it will take some years for the technology to cover most of the planet. For most people, 5G will handle the wide area wireless connection, and Wi-Fi will handle the local wireless connection. Ultimately, however, there could certainly come a time when only one of them will be essential. It may seem irrational to think that Wi-Fi could go away, especially given how pervasive it is today. Improved Spectrum – greater capacity, more users and faster speed. In many countries the original frequency bands for 5G are below 6 GHz and similar frequencies to remaining mobile and Wi-Fi networks.

4. Conclusion

5G Technology stands for 5th Generation Mobile technology. 5G mobile technology has altered the means to use cell phones within very high bandwidth. Users never experienced continually before such a high value

technology. Nowadays mobile users have much awareness of the cell phones (mobile) technology. The 5G technologies include all the types of innovative structures which makes 5G mobile technology most powerful and in a huge demand in near future. A user can also catch their 5G technology cell phone with their Laptop to get broadband internet access. 5G technology with camera, MP3, video play-actor, large phone memory, audio player and much more you never imagine. For children astounding fun Bluetooth technology and Piconets has become in market.

References

- [1] <https://www.ijsr.net>
- [2] <https://www.networkworld.com/article/2159706/lan-wan-25-of-today-s...>
- [3] https://www.papermasters.com/networking_engineer.html
- [4] <http://www.slideshare.net/upadhyayniki/5g-wireless-technology-14669479>
- [5] 5G – <https://en.wikipedia.org/wiki/5G>
- [6] <http://recode.net/2015/03/13/what-is-5g-and-what-does-it-mean-for-consumers/>
- [7] Dhiraj Gandla Research paper on “study of recent developments in 5g wireless technology”
- [8] Akhil Gupta “ A survey of 5G network”
- [9] Wikipedia
- [10] Sites related to 5G.