ORIGINAL RESEARCH PAPER

Computer Science

5th GENERATION WIRELESS CELLULAR NETWORKS SCENARIO IN INDIA

KEY WORDS: 5G, Bandwidth, WWW, CDMS, GSM, Gbps

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ABSTRACT

In this paper I, studied and observed that the 5th generation wireless cellular network is really fastest network with better bandwidth than existing network using in India. The remarkable growth of wireless cellular communication networks in India over the radio signal strength is strong. In this paper mentioned the wireless networks increasing of subscriber base and limited radio resource, providing quality telecom services became difficult but using existing network over the 5th generation technology. Radio technologies have evidenced a rapid and multidirectional evolution with the launch of the analogue cellular systems in 1980s but at present it will be highest bandwidth network for every field's telecom communication.

1. INTRODUCTION

5th generation represent the next major phase of mobile telecommunication ethics beyond the upcoming 4th generation standards. 5th generation 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 5th generation based telecommunication network would perfectly answer the challenges that a 4th generation prototypical would present once it has entered ubiquitous use.

No one company or person owns 5th generation, but there are numerous companies in the mobile ecosystem that are causative to bringing 5th generation to life. Qualcomm has played a major role in originating the many introductory technologies that drive the industry forward and make up 5th generation, the next wireless standard.

India is the country which arrayed the lead as far as penetration of the technology goes, by 2026, nearly 50 percent of mobile contributions in India are anticipated to be for 5th generation networks. Few companies owns the utmost copyrights on the next-generation of 5th generation technology in India for upcoming network solutions, confirming the other countries company will get paid despite trump administration exertions to erase it from the supply chain, according to a new study.

Wireless networks system using Orthogonal Frequency Division Multiplexing (OFDM) with extensive area coverage, high amount at millimeter waves (10 mm to 1 mm) covering a frequency range of 30 GHz to 300 GHz, and permitting a 20 and above 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.

After every 10 to 12 years, new mobile generation has come since the first 1st generation system which came in 1980 to 1092. After 10 to 12 years, the next generation which was introduced is 2nd generation and in 1990 to 1992 and the first 3rd generation system introduced in 2000 to 2001. 4th generation system was introduced in 201-12. The development of Global System for Mobile that is 2nd generation and Collision Detection Multiple Access i.e. 3rd generation wireless network system were officially done about 10 to 12 year after all the Research & Development projects where done by the government.

In this paper I have observed appreciate able growth of wireless cellular communication in India over the radio. With the wireless networks increasing of subscriber base and limited radio resource, providing quality telecom services became difficult. These issues led mobile service providers to research into technologies and improve the quality of service and be able to support more users in their systems. Wireless communication networks have become much more pervasive than anyone could have imagined when the cellular concept was first deployed in 1960's and 1970's. Mobile cellular subscribers are increasing by more than 40 to 45% per year. Therefore Cellular communication has been continuously evolving into newer forms. Radio technologies have evidenced a rapid and multidirectional evolution with the launch of the analogue cellular systems in 1980s.

2. Historical Journey of Cellular Network Generations

- **1G:** 1G is the 1st generation. It is simply used to make phone calls; this is all it was able to do.
- **2G:** The second generation provided customers with the facility of voice calling and text messaging. 2G networks are digital.
- **3G:** This technology sets the standard for most of the wireless networks. Third generation allowed the use of internet on the mobile phone, while also enabling picture-sharing and Bluetooth Connectivity.
- **4th Generation:** It offers first true internet broadband data transmission rates. Its data transmission rates are 10 times faster than 3G technology.
- **5th Generation:** 5th Generation will be the network for millions of devices and not just for the smart phone. It promises to enable fast (and secure) connectivity between devices other than smart phones, such as sensors, vehicles, robots, and drones. It will have data speed up to 1 to 10 Gbps.

5th Generation Specifications

Table 1: 5th Generation Cellular wireless performances

PARAMETER	SUGGESTED PERFORMANCE
1. Network capacity	10,000 times capacity of current network.
2. Peak data rate	10Gbps
3. Cell edge data rate	100 Mbps
4. latency	<1 ms

1.5th Generation Cellular Networks

5th Generation technology is a breakthrough. The next-generation of telecom networks has started beating the market end of 2018-19 and will continue to increase worldwide with following features-

- Up to 10Gbps data rate -10 to 100x speed development over 4th Generation and 4.5th Generation networks
- 1-millisecond latency

- 1000x bandwidth per unit area
- Up to 100x number of coupled devices per unit area (compared with 4th Generation LTE)
- 99.9 % availability
- 100% coverage
- 90+% reduction in network energy usage

4. Bandwidth of 5th Generation Cellular Networks

5th Generation cellular networks bandwidth max out at 10 gigabits per second (Gbps).

5. Advantages of 5th Generation 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 unfailing connectivity across the world.

6. Disadvantages of 5th Generation Technology

However, 5th Generation 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 5th generation, 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.

7. Comparison of 5th Generation with existing technology.

In 4th Generation, we can connect 10000 people per square kilometer but 5th Generation will be able to connect more than 2 million people in one square kilometer.5th Generation can be responsible to make intelligence hardware which can be used in healthcare, robotics, defense etc. Most important feature that 5th Generation can give is remote medical surgery which can be predominantly used in rural area and India has such issue from long time. Second reason other counties i.e. china gives full data privacy to India if India will make 5th Generation BRI with China and so on.

8. India and their own take on 5th Generation?

The government of India has taken one step forward in 5th Generation development by own self without taking further help from other companies, the project is named as ''Indigenous 5th Generation bed test''. The some reputed organizations are taking part into this program. These organizations are IIT DELHI, IIT MUMBAI, IIT Chennai, IIT Kanpur, IISC Bengaluru, CEWIT (Centre of Excellence in Wireless Technology) and SAMEER (Society Of Applied Microwave Electronics Engineering and Research). Jio is the only company giving proposal to government of India to implement 5th Generation technology at mid of this year. Till now there is no 5th Generation test done by Huwaei in India.

9. Limitations and Future Scope

In the upcoming, 5th Generation 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. 5th Generation networks will reform the Internet of Things (IoT). But it will take some years for the technology to cover most of the planet.

10. CONCLUSION

5th Generation will provide the elementary infrastructure for building smart cities, which will enhance the mobile network performance and capabilities to their maxima. Lot of improvements is done from 1G to 5th Generation. 5th Generation is expected to be released by the end of 2022. The government had initially stated that India could implement initial 5th Generation roll outs by the end of 2021 and is expected to hold auctions for airwaves to facilitate the next generation technology by the end of fiscal year through March 2021. One of the most famous quotes said about 5th Generation is: 5th Generation is an emerging technology that hasn't really been defined yet.

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