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ABSTRACT

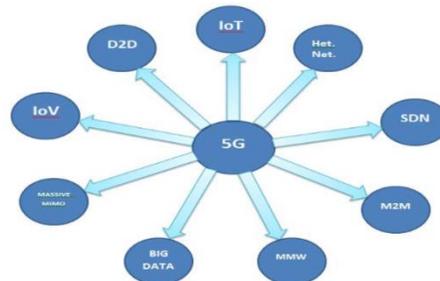
Nowadays due to the large demand of the Cellular subscribers to arrive the billions of connected in the near future as expected in year 2020. So the large numbers of connections are heterogeneous in nature. There are many reasons for the development from first generation to the fifth generation and we are expected for meeting the degrading capacity of the cellular network. Radio technologies have evidenced a rapid and multi directional evolution with the launch of the analogue cellular systems in 1980s. After that, digital wireless communication systems are consistently on a mission to fulfill the demand of human beings (1G .4G, or now 5G). The next major phase of mobile telecommunications standards beyond the current 4G/IMT Advanced standards is the mission of 5G (5th generation mobile networks). Speeds of 5G are faster further what the present 4G can provide. The world of telecommunication has seen a number of advancement along with improved performance with every passing day from 1G to 2.5G and from 3G to 5G.

Keywords: 5G, Heterogeneous, Radio Technology speed, performance.

I. INTRODUCTION

According to Trai, timely deployment of 5G “is essential for achieving the objectives” envisaged in the new telecom policy — National Digital Communications Policy 2018 that was approved by the Cabinet last September.[1]

The world has seen plenty of changes in communication. Today we no more use landlines. Everyone has a mobile phone that works 24X7.our handset not keeps us connected but also a big source of entertainment. If we look back, we will find that every next decade, next generation is ruling the world. As we took example from First Generation (1G) in 1980s, Second Generation (2G) in 1990s, Third Generation (3G) in 2000s, Fourth Generation (4G) in 2010s, and now Fifth Generation (5G), we are moving towards more and more advanced and smarter technology.



What is 5G Technology?

The 5G Technology is an advanced scope of network that will have high frequency bands along with the wider spectral bandwidth per frequency channel. As of now, the earlier generations mobile technologies have proved substantial increase in peak bitrate. Then — how is 5G differs from the previous generations (especially from 4G)?

The answer is — it is not only that increase in bitrate made 5G distinct from the 4G, but due to mentioned properties also 5G is advanced than 4G

It has high increased peak rate and data connectivity of almost 25mbps.
Larger data volume per unit area (i.e., high system spectral efficiency).
Low battery consumption

II. EVOLUTION FROM 1G TO 5G

First generation (1G)

First generation wireless technology is the original analogue (Analogue signal is a continuous signal in which time varying variable is measured by other representative of time quantity), voice-only cellular telephone standard, and developed in the 1980s.



The prominent ones among 1G system were advanced mobile phone system (AMPS), Nordic mobile telephone (NMT), and total access communication system (TACS).

Second generation (2G)

2G is short form for second-generation wireless telephone technology. 2G was commercially launched on GSM basis in Finland in 1991. 2G network allows more penetration intensity than 1G. 2G technology provides various facilities as text message, picture message, MMS.



These are basically Time division multiple access (TDMA) or Code division multiple access (CDMA). TDMA allows division of signal into time slots. For communication over a multiplex physical channel CDMA allocates each user a special code. Some of TDMA technologies are GSM, PDC, iDEN, IS-136. Examples of CDMA technology is IS-95. The most admired standard of all the mobile technologies is GSM (Global system for mobile communication).

Third generation (3G)

IMT—2000 (International Mobile Telecommunications-2000), better known as 3G or 3rd Generation, is a generation of development for mobile phones and mobile telecommunications services fulfilling demands by the International Telecommunication Union. The 3G technology is also able to transmit packet switch data efficiently at better and increased bandwidth.



3G mobile technologies offers more advanced services to mobile users. The spectral efficiency of 3G technology is higher & better than 2G technologies. The measurement of rate of information transfer over any communication system is Spectral efficiency.

Fourth generation (4G)

4G means the fourth generation of mobile technology. It is an advanced version of 3G and 2G families of Networks. A conceptualized framework of network and a discussion point to address future needs of a high speed wireless network was main aim for the development of 4G , that can also transmit multimedia and data to and interface with wire-line backbone network perfectly just raised in 2002[2]. Theoretically promised speeds of 4G can up to 1Gbps. Some of the applications of 4G are:

- Mobile TV –A TV channel can be easily played on mobile
- Video on demand – e.g, Voot, Hotstar etc.



Fifth generation (5G)

5G Technology stands for 5th Generation Mobile technology. 5G technology completely change the meaning of cell with its high bandwidth. Such a high value technology is never experienced ever before by user. Due to all the features that 5G has will make him special and high demandable in near future. It gigantic array of innovative technology.



Technologies that are existing command phone providing a lot of power and options than a minimum of one thousand satellite modules.

To get broadband internet access , user can also hook their 5G technology cell phone with their Laptop.

III. 5G ARCHITECTURE

5G Architecture is highly advanced. A new situation can be easily affordable due to up gradation of , its network elements and various terminals. To adopt the value-added services easily service providers can implement this advance technology.

However, Cognitive radio technology that includes various significant features such as ability of devices to identify their geographical location as well as weather, temperature, etc is due to upgradeability..As shown in the image, Model of 5G is like IP based model and it designed for the wireless and mobile networks.

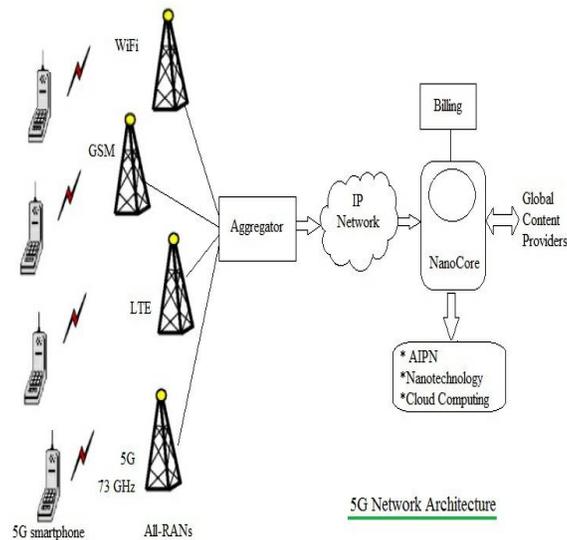


Fig. 5G Architecture [3]

The system consists of a main user terminal and a number of independent and autonomous radio access technologies. Each of the radio technologies is considered as the IP link for the outside internet world. To ensure sufficient control data for appropriate routing of IP packets related to a certain application connections i.e. sessions between shopper applications and servers somewhere on the net. The IP technology is designed exclusively. For accessing , routing of packets should be fixed in accordance with the given policies of the user.

IV. 5G CHALLENGES

Technological challenges

Interference of Inter-cell – One of the major technological issues that need to be solved. Due to variations in size of traditional macro cells and concurrent small cells will lead to interference.

Efficient Medium Access Control -The user throughput will be low, at a condition, where dense deployment of access points and user terminals are required, latency will be high, and to provide high throughput hotspots will not be competent to cellular technology. To optimize the technology there must be proper research.

Management of Traffic -Traditionally human to human traffic in cellular networks, a great number of Machine to Machine (M2M) devices in a cell may cause serious system challenges[4], which will cause overload and congestion i.e. radio access network (RAN) challenges.

Common challenges

Multiple Services – 5G would have a huge task to offer services to heterogeneous networks unlike other radio signal services, technologies, and devices operating in different geographic regions. For dynamic, universal, user-centric, and data-rich wireless services to fulfil the high expectation of people the challenge is of standardization.

Privacy & Security – This is one of the most important challenges that 5G needs to ensure the protection of personal data. The uncertainties associated with security threats as well as trust, privacy, cyber security, which are growing across the globe.

Cyber law Legislation – Cybercrime and other fraud may also increase with the high speed and ubiquitous 5G technology. Therefore, legislation of the Cyber law is additionally an important issue which largely is governmental and political (national as well as international issue) in nature.

V. CONCLUSION

In this paper we have proposed 5G mobile phone concept, which is the main contribution of the paper. A new **revolution of 5G technology** is about to begin because a tough completion to normal computer and laptops will be given by this technology whose marketplace value will be effected. Lots of improvements from 1G, 2G, 3G, and 4G to 5G in the telecommunications world . The upcoming technology is available in the market in affordable rates, high peak future and much reliability than its preceding technologies.

VI. FUTURE SCOPE

Technologists, researchers, academicians, vendors, operators, and governments discuss on this technology and Several kinds of researches are going on across the world among about the innovations, implementation, viability, and security concerns of 5G.As proposed, loaded with multiple advance features starting from the super high speed internet service to smooth ubiquitous service[5].

The purpose of 5G technology is to provide very high speed and extraordinary data capabilities, unstoppable call volumes, and mean worthy data broadcast within the latest mobile operating system. That's why, it is more intelligent technology, which will interconnect the entire world without

Limits. Like, our world would have universal and uninterrupted access to information, communication, and entertainment that will open a new dimension to our lives and will change our life style drastically. However Government can take this technology as a chance for the power tool development and might produce healthier environments, which is able to undoubtedly encourage continued investment in 5G, subsequent generation technology.

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