

A Review: 5G Technology

Varinder Bansal
BGIET Sangrur

Gursimrat Singh
BGIET Sangrur

Vipin Bansal
BGIET Sangrur

ABSTRACT

This review gives you the complete information about what is being used and what new technologies' are being added to the existing technology for future reference and what can further it be implicated in the technology we are reviewing by this paper. The viewer will get all the history information about the generations being used before about their speed standards and bandwidths and the other required conditions for this to be.

Keywords

1G-First Generation, MBPS-Mega Bite Per Second, FDMA- Frequency Divison Multiple Access

1. INTRODUCTION

Mobile and wireless network have developed very much now a day. It was firstly introduced in 1877 and was based on AM schemes. It is limited up to some systems only. But due to increasing needs new systems were developed during World War II and due to development of FM radio communication. At present we are using mainly 2.5G and 3G networks. They have very limited access. We need a fast wireless network to maintain today's needs. 5G Technology that stands for 5th Generation Mobile technology is proposed after the network history of 1G, 2G, 2.5G, 3G and 4G. 5G technology may change all the present network technologies. There is wide range of communication with very high speed and bandwidth. The 5G terminals consist of new security techniques and error control systems. 5G wireless uses OFDM and millimeter wireless that enables data rate of 20 mbps and frequency band of 2-8 GHz. The 5G communication is capable of supporting wireless World Wide Web (www). This review gives the concept of intelligent internet phone where, the mobile can prefer the finest connection.

Historical Prospective

- a) **1G** -This network design began in 1970 in Bell's laboratory and was implemented in 1984. The services under this network are analog voice communication. The band width provided for this network is 1.9kbps. The multiplexing technique is FDMA. The core network is PSTN.
- b) **2G** -The beginning of this network takes place in 1980 and implemented in 1991. The services provided by this are digital voice communication. The bandwidth of this network is 14.4kbps. The multiplexing techniques are TDMA, CDMA. The core network is PSTN.
- c) **2.5G** -This network began in the mid of 1985 and implemented in 1999. The services provided by this network are higher capacity, packetized data. The bandwidth for this is 384kbps. The multiplexing techniques are TDMA, CDMA. The core network is PSTN, Packet Network.
- d) **3G** -The network began in 1990 and implemented in 2002. The services under this network are higher capacity broadband data up to 2mbps. The bandwidth is 2mbps. The multiplexing technique is CDMA. The core network is Packet Network.

- e) **4G** -The beginning of this network takes place in 2000 and implemented in 2010. The services under this network is completely IP based, speed up to hundreds MBs. The bandwidth is 200mbps. The multiplexing technique is CDMA. The core network is Internet.

2. ADVANCEMENT FROM 4G

- a) **Multi Mode User Terminals** -The 4G technology is based on single station single user operated system but 5G is a single station multi operated system. This is the major achievement of this technology.
- b) **Security** -Security level increases in this technology. Reconfigurable and lightweight protection mechanisms are designed.
- c) **Data Encryption** -There is data encryption technique in this technology. Due to this it is difficult to encrypt the data from the transmitter to receiver.
- d) **A Super-Efficient Mobile Network** -It delivers a better performing network for lower investment cost. It addresses the mobile network operates need at unit cost of data transport falling at roughly the same rate as the volume of data demand is rising.
- e) **A Converged Fiber-Wireless Network** -This uses wireless Internet access having bandwidth 20 to 60 GHZ in millimeter so as to allow very wide bandwidth radio channels able to support data access speeds of up to 10 Gbit/s.
- f) **Speed of Delivery** -One of the main benefits of 5G technology over 4G will not be its speed of delivery – which is about between 10Gbps and 100Gbps but it is low. At present, 4G provides speed between 40ms and 60ms, which is very low and not enough to provide real-time response.

3. KEY CONCEPTS OF 5G

- 1) No zone issues in this network technology.
- 2) No limited access the user can access unlimited data.
- 3) Several technologies such as 2G, 2.5G, 3G, and 4G can be connected simultaneously along with the 5G.
- 4) All the technologies can use the same frequency spectrum in very efficient manner. This is also called smart radio.
- 5) New features such as online TV, newspaper and researches with advanced resolution.
- 6) High altitude stratospheric platform station systems.

4. FEATURES OF 5G NETWORKS TECHNOLOGY

- 1) 5G technology has high resolution and high bandwidth.
- 2) 5G's prospective ultra-low-latency could range between 1ms and 10ms. This would allow a spectator in a football stadium to watch a live stream of an alternative camera

- 3) The high quality services of 5G technology based on Policy to avoid error.
- 4) 5G technology has a very large bandwidth in which we can connect up to 65000 of connections.
- 5) The uploading and downloading speed of 5G technology will extremely large

5. VISIONS AND REQUIREMENTS FOR 5G NETWORK

- a) **The Internet of Things** -By the year 2020, it is predicted by analysts that each person in the UK will own and use 27 internet connected devices. There will be 51 billion connected devices worldwide. Such as smart phones, tablets and smart watches, to fridges, cars and even their will be presence of smart clothes. Some of these will require significant data to be shifted at very high speed, while others might just need very small amount data information to be sent and received. The 5G system can automatically switch and provide bandwidth according to requirement of the services.
- b) **Millimeter Wave Communication** -To satisfy requirement of new increased traffic and technology services , additional frequency band width is required which should be greater than 4G network bandwidth . To resolve this the use of millimeter wave frequency bands is must to overcome the problem of rare spectrum.

6. IMPLEMENTATION

As part of a “heterogeneous network”, the points, or cells, will used for LTE-A. Cells will automatically talk to each other to provide the best and most efficient service no matter where the user is. Larger cells will be used in the same way as they are now, with broad coverage, but urban areas will be covered by multiple smaller cells, fitted in lampposts, on the roofs of shops and malls, and in the pillars of building . Each of these will make the signal stabilized.

7. TECHNOLOGIES BEHIND

5G radio access will be built upon both new radio access technologies (RAT) and evolved existing wireless technologies (LTE, HSPA, GSM and Wi-Fi). This comes up with the idea of utilizing millimeter-wave frequencies. This frequency range lies Between 3 to 300MHz, this is greater than today’s network frequency. The main benefit of using this frequency range is that it is securely used by other broadcast technologies. Hence it provides more speed and data for the network usage. Millimeter-wave frequencies don't pass through solid objects easily, and it's difficult to stable the network up to long distance, that’s why we are unable to use this in previous mobile networks. As a result, 5G network will use a lot of little base stations

rather than relatively few large masts. The increase in spectrum means that these smaller base stations will be able to share data between one another as well as with everyone's phones, easily detect how much data a user much required for that time during the work.

8. CONCLUSIONS AND FUTURE SCOPE

Here, in conclusion of 5G mobile communication surveys, the 5G technology is designed as an open platform on different layers from physical to application. Now the present network is in process which offers the best operating system and at very less service charges. There are lots of improve mental changes from generation 1 to generation 5 in the world technology of wireless network. This upcoming technology is very efficient and less expensive, a lot of expectations from this technology. 5G technologies provide high resolution for the use of network to the mobile phone consumers.

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