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# Analysis of 5G Wireless Technology Over 4G

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**ABSTRACT:** The 5G wireless era is based upon modified 4G, which at gift is going through many troubles to meet its performance desires. The evaluation among 4G and 5G wireless era when it comes to its speed, frequency band, switching design basis and forward mistakes correction is studied. Security has become the number one concern in lots of telecommunications industries nowadays as dangers can have high results. Especially, as the middle and allow technology will be associated with 5G community, the exclusive statistics will flow in any respect layers in future wireless structures. Several incidents discovered that the threat encountered by way of an inflamed wi-fi community, now not simplest affects the security and privateness worries, but also impedes the complex dynamics of the communications ecosystem. Consequently, the complexity and power of protection attacks have multiplied in the recent past making the detection or prevention of sabotage a worldwide task**.**

**KEYWORDS***:* 5G,4G.

## I. INTRODUCTION

The "G" in 5G means "age." and 5 is the headway signified through a number. Remote telephone innovation in fact entered with 1G, and in the mid1990s it moved up to 2G when organizations empowered individuals to send instant messages between two cell gadgets which intrigued the world. Ultimately the world proceeded onward to3G, which conferred the freedom of settling on telephone decisions, send instant messages, and peruse the web at amazing speed.4G improved large numbers of the capacities that were made conceivable just with the third era of remote. Individuals could peruse the web at lights speed, send instant messages, and can settle on telephone decisions and they could even download and transfer huge video records with no issues and without long pausing. At that point organizations added LTE, abbr. for "long haul development," to 4G availability. LTE turned into the quickest and steadiest assortment of 4G and it began rivaling the advancements like Wi-Max on the lookout. The two advances brought about comparable results, yet it was essential to make a norm for everybody to utilize. LTE did precisely that, by making 4G innovation considerably quicker and this established the framework of 5G. 5G will make it simpler for individuals to download and transfer Ultra HD and 3D video. So we can say that there is progression in the speed of living. It is interesting to envision redesigning your information association from a terrace hose to a blazes hose. The distinction will be perceptible and worth obvious.

Coalitions characterizes the accompanying pre-imperative for 5G networks:

- Increased Datarates
- 1 Gb each second all the while to numerous laborers
- on a similar officefloor
- Spectral effectiveness more upgraded as contrasted with4G
- Coverage speed
- Signaling effectiveness upgraded
- Legacy decreased fundamentally contrasted with LTE

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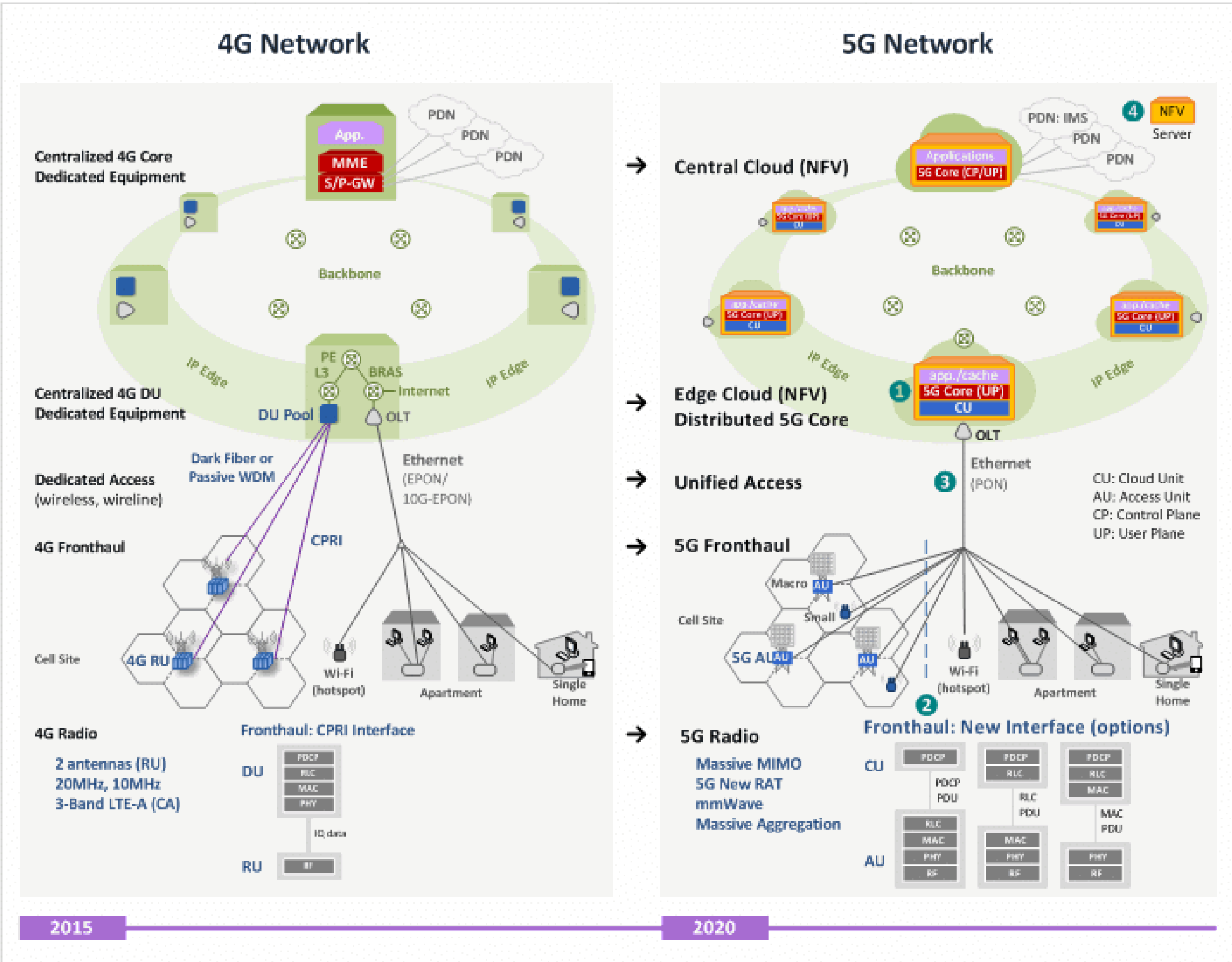


Fig 1. Shows 5G efficiency over 4G Technology

## II. EVOLUTION

### 1. First Generation(1G)

1G was developed in the 1980's. It contains analog system which supported the 1st generation of analog cell phones with speed up to 2.4kbps.It introduces mobile technologies such as mobile telephone system (MTS), Advanced mobile telephone system (AMTS), Improved mobile telephone system (IMTS) and push to talk (PTT).It uses analog radio signal which have frequency 150 MHz. Voice call modulation is done using a technique called frequency division multiple access (FDMA). It allows users to make voice calls in 1 country. But it had low capacity, unreliable handoff, poor voice links and no security at all since voice calls were played back in radio towers making these calls susceptible to unwanted eavesdropping by third parties[3].

### 2. Second Generation(2G)

2Gemerged in late 1990s. Commercially launched on the GSM standard in Finland (1991). It uses digital signals for voice transmission and has speed of 64 kbps. 2G network allows for much greater penetration intensity and provides services such as text messages, picture messages and Multimedia Messaging Service (MMS) which uses the bandwidth of 30 to 200 KHz. Text messages are digitally encrypted. Next to 2G, 2.5G system uses packet switched and circuit switched domain and provide data rate up to 144 kbps. E.g. GPRS, CDMA and EDGE [2].

### 3. Third Generation(3G)

It uses Wideband Wireless Network with which clarity is increased. The data are sent through the technology called

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Packet Switching. Voice calls are interpreted through Circuit Switching. Along with verbal communication it includes data services, access to television/video, new services like Global Roaming. Data Transmission speed ranges from 125kbpsto2Mbps. It operates at a range of 2100 MHz and has a bandwidth of 15-20 MHz used for High-speed internet service, video chatting.3G uses Wide Band Voice Channel due to which the world has been contracted to a little village because a person can contact with other person located in any part of the world and can send messages too[4]

### 4. Fourth Generation(4G)

4G offers both cellular and broadband multimedia services everywhere. It offers a downloading speed of 100Mbps.4G provides same feature as 3G and additional services like Multi- Media Newspapers, to watch T.V programs with more clarity and send Data much faster than previous generations [4]. LTE (Long Term Evolution) is considered as 4G technology. 4G is being developed to accommodate the QoS and rate requirements set by forthcoming applications like wireless broadband access, MMS, video chat, mobile TV, HDTV content, Digital Video Broadcasting (DVB), minimal services like voice and data, and other services that utilize bandwidth[5].

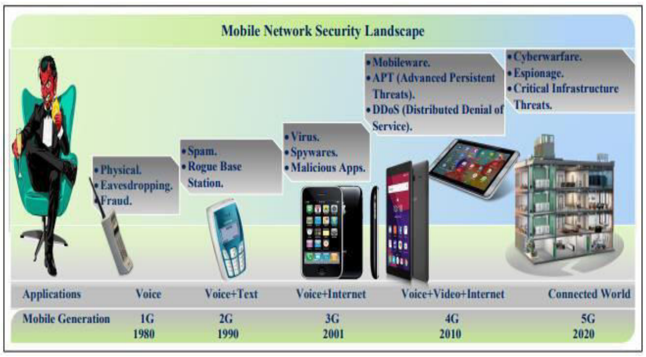


Fig. 2. Evolution of Mobile Network Security Landscape with offered technologies and respective security threats

## III. COMPARISON OF TECHNOLOGIES

**Table 1.1**. Comparison of 4G and 5G Technologies

| Specifications | 4G | 5G |
|---|---|---|
| Full form Fourth Generation Fifth Generation | Full form Fourth Generation Fifth Generation | Full form Fourth Generation Fifth Generation |
| Data Bandwidth | 2Mbps to 1Gbps | 1Gbps and higher as per need |
| Frequency Band | 2 to 8 GHz | 3 to 300 GHz |
| Standards | Al access convergence including OFDMA,MC-CDMA,network-LMPS | CDMA and BDMA |
| Technologies | Unified IP, seamless integration of broadband LAN/WAN/PAN and WLAN | Unified IP, seamless integration of broadband LAN/WAN/PAN/WLAN and advanced technologies based on OFDM modulationused |

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| | | |
|---|---|---|
| | | in 5G |
| Service | Dynamic information access, wearable devices, HD streaming, global roaming | Dynamic information access, werable devices, HD streaming, any demand of users |
| Multiple Access | CDMA | CDMA,BDMA |
| Core network | All IP network | Flatter IP network, 5G network interfacing(5G-NI) |
| Handoff | Horizontal and vertical | Horizontal and vertical |

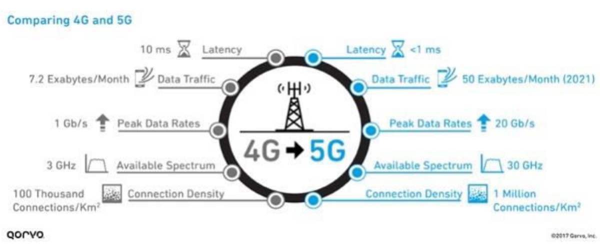


Fig3. Comparison between 4G and 5G

## IV. FEATURES OF 5G

- The technology 5G presents the high resolution for sharp, passionate cell phone every day and give consumers well shape and fast Internetaccess.
- The 5G technology provides billing limits in advance that the more beautiful and successful of the modernera.
- The 5G technology also allows users of mobile phones,cell phone records for printing operations.
- The 5G technology for large volume data distribution in Gigabit, which also maintains close ties to almost 65,000.
- The information from the data transfer technology5G organize a more accurate and reliable results.
- Using remote control technology to get the consumer can also get a 5G comfort and relax by having a better speed and clarity in less timealone.
- The 5G technology also support virtual privatenetwork.
- The uploading and downloading speed of 5Gtechnology touching the peak.
- The 5G technology network offering enhanced andavailable connectivity just about the world

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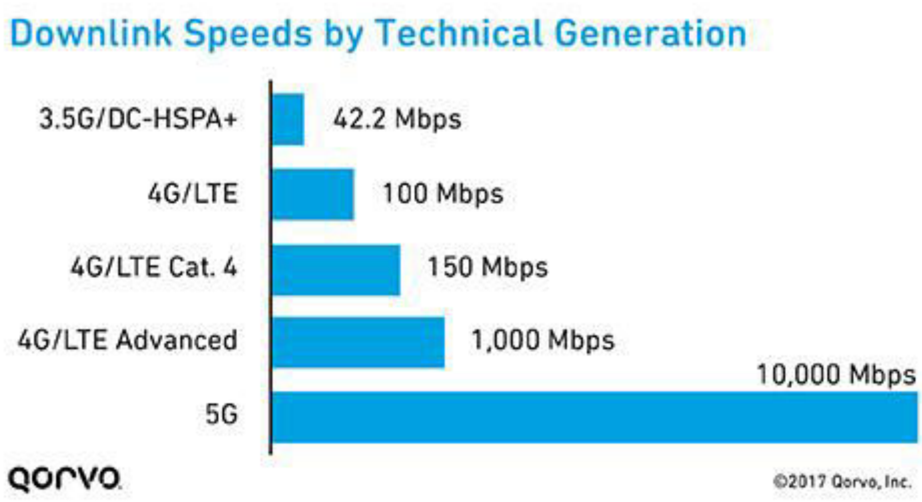


Fig4. Speed of 5G Technology

## V. CONCLUSION

To address 5G applications, there are many developments to be considered above the introductory model. In order to handle higher data rates, the operating frequency has to be increased to a millimeter range from which we can achieve a wider bandwidth. This will result in higher path. 5G is going to have a much tougher process behind its development level. The 5G network is very fast and reliable. Fifth generation is based on 4G technologies. With the use of IP version 6, 5G will have higher security. The development of the mobile and wireless networks is going towards higher data rates and all-IP principle. Mobile terminals are obtaining each year more processing power, more memory on board, and longer battery life for the same applications. 5G include latest technologies such as cognitive radio, Software Defined Radio (SDR), nanotechnology, cloud computing and based on All IP Platform. In this paper we have compared 1G to 5G networks along with theirfeatures.

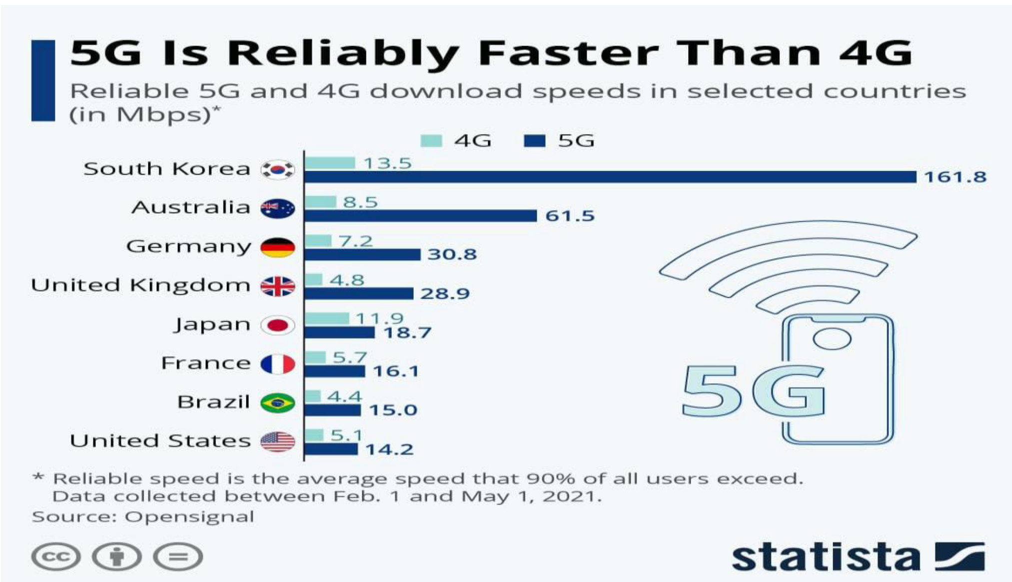


Fig4. Overall Uses of 5g network over world

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