

A REVIEW ON VARIOUS GENERATIONS OF MOBILE TECHNOLOGY

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ABSTRACT

This paper deals with the relative study of wireless cellular technologies. First Generation, Second Generation, Third Generation, Fourth Generation and Fifth Generation under wireless cellular technologies. A cellular network or mobile network is a radio network diffuse over earth areas called cells. Each cell is served by at least 1 fixed-location handset and handset is known as a cell site or base station. In a mobile network, each cell uses a different set of frequencies from other neighbouring cells and avoids constrain. The First Generation was referred as cellular and which was later abbreviated to "cell". Cell phone signals were analog in nature. In this paper an attempt has been made to arrange an analysis of expansion of mobile generations by analyze the quality, data rates, capacity, primary utility, objection and displaying provided by each generation and describe how recovery have been made from earlier generation to the next one.

Keywords: - FIRST Generation, SECOND Generation, THIRD Generation, FOURTH Generation and FIFTH Generation.

1.Introduction

The primordial stone-age sounding 1G, or analog cellular, then like 80's rock came 2G, or digital cellular; 3G wireless, 4G, 5G and so on. The last decade subscribers. With all the scientific advances, and the friendly incidence of the 2G, 2.5G, 3G and 4G networks, the bang of services on network efficiency have become even more reproach. And update addition to this group, is the 5G technology, which promises to revolutionaries Internet stood witness to wonderful increasing in the wireless industry, both in terms of mobile technology and its as we know it with make lighter fast speeds. The first generation (1G) mobile wireless statement network was analog used for voice calls only. The second generation (2G) is a digital technology and maintain text messaging. The third generation (3G) mobile expertise provided higher data transmission rate improved capacity and supply multimedia maintain. The fourth generation (4G) combine 3G with fixed internet to maintain wireless mobile internet, which is an increase to mobile technology and it overcome the limitations of 3G. It also increases the radio band and reduces the cost of property. 5G stands for 5th Generation Mobile technology and is going to be a new exchange in mobile market which has changed the means to use cell phones within very high radio band. User never competent ever before such high value technology which includes all type of advance features and 5G technology will be most important and in giant attention in near future.

Evolution:- Generation refers change in nature of service friendly transmission technology and new frequency bands. In 1980 the mobile cellularera had started, and since then mobile communications have substantial significant changes and experienced massive growth.

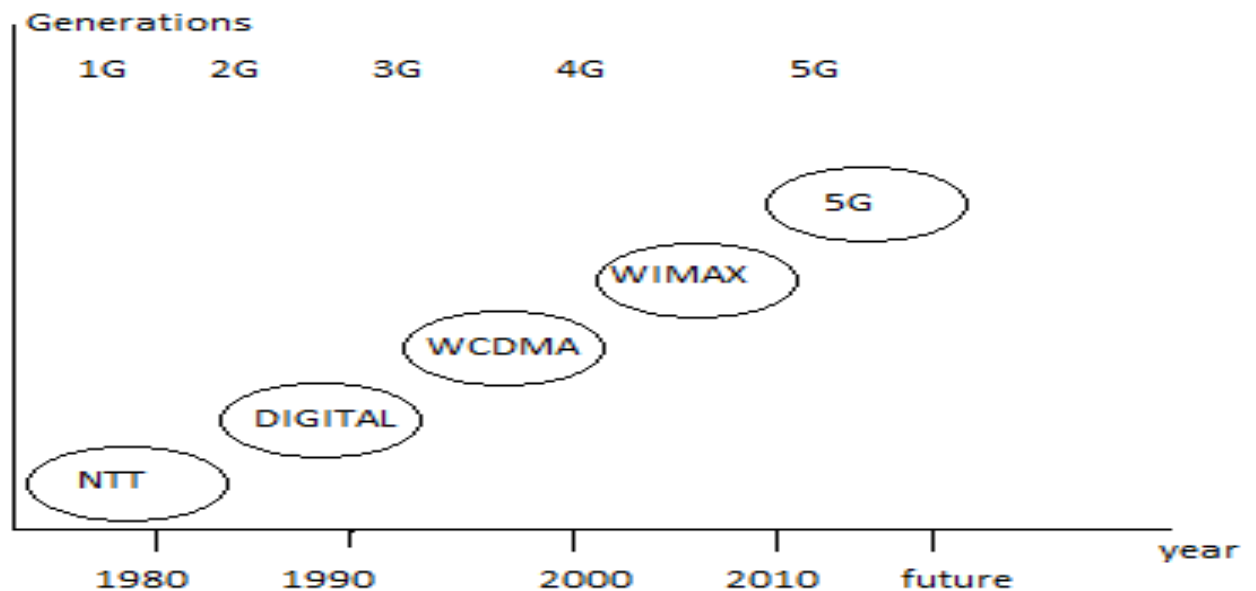


fig1- evolution of cellular network

2. Description

1st Generation:- 1G is the first generation wireless telephone technology, Cell phones. They were analog cell phones and were introduced in 1980. In 1979, the first cellular system in the world became functioning by Nippon Telephone and Telegraph (NTT) in Tokyo, Japan. In Europe two most established analog systems were Nordic Mobile Telephone (NMT) and (TACS) other analog systems were also introduced in 1980's across the Europe. All the systems obtainable handover and travelling potential but the cellular networks were unable to interoperate between countries. This was the main drawback of First Generation mobile networks.

- Speed-2.4 kbps
- Allows voice calls in 1 country
- Use analog signal.
- Poor voice quality
- Poor battery life
- Large phone size
- Limited capacity
- Poorhandoff reliability
- Poor security
- Offered very low level of spectrum efficiency

2nd Generation:- 2G cellular telecom networks were commercially launched on the GSM standard in Finland by Radiolinja in 1991. [1] 2G used digital signals for voice transmission and had a speed up to 64 kbps. It also provided the facility of Short Message Service (From now on, referenced as SMS) and used the bandwidth range of 30 - 200 KHz. 2G comprised of the following Mobile technologies: General Packet Radio Service (GPRS), Code Division Multiple Access (CDMA), Global System for Mobile Communication (GSM) and Enhanced Data Rates for GSM Evolution (EDGE).

- Data speed was up to 64kbps
- Use digital signals

- Enables services such as text messages, picture messages and MMS(Multimedia message)
- Provides better quality and capacity
- Unable to handle complex data such as videos.
- Required strong digital signals to help mobile phones work. If there is no network coverage in any specific area, digital signals would weak.

3rd GENERATION:- 3G is the third generation of mobile phone standards and technology, superseding 2G, and preceding 4G. It is based on the International Telecommunication Union (ITU) relatives of standards under the International Mobile Telecommunications programme, IMT-2000. 3G technologies enable network operators to offer users a wider range of more superior services while achieving larger network capability through better spectral efficiency. Services contain large area wireless voice telephony, video calls, and broadband wireless data, all in a mobile environment.

- Speed 2 Mbps
- Typically called smart phones
- Increased bandwidth and data transfer rates to accommodate web-based applications and audio and video files.
- Provides faster communication
- Send/receive large email messages
- High speed web/more security/video conferencing/3D gaming
- Large capacities and broadband capabilities
- TV streaming/mobile TV/Phone calls
- To download a 3 minute MP3 song only 11 sec-1.5 mins time required.
- Expensive fees for 3G licenses services
- It was challenge to build the infrastructure for 3G
- High bandwidth requirement
- Large cell phones
- Expensive 3G phones

4th GENERATION:- 4G Technology will have a data rate up to 20mbps. A successor of 2G and 3G is 4G which have 100mbps downloading speed. A 4G system must provide capabilities defined by ITU in IMT Advanced. 4G system does not support traditional circuit-switched telephony service, but all-Internet Protocol (IP) based communication such as IP telephony.

- Capable of provide 10Mbps-1Gbps speed
- High quality streaming video
- Combination of WiFi and Wi-Max
- High security
- Provide any kind of service at any time as per user requirements anywhere
- Expanded multimedia services
- Low cost per-bit
- Battery uses is more
- Hard to implement
- Need complicated hardware
- Expensive equipment required to implement next generation network.

5th Generation:- Fifth generation is a impending technology. Some sources suggest that 5G technology will come approximately in 2020. 5G has speeds beyond what the current 4G can offer. The main heart of 5G will be on world-Wireless World Wide Web (WWWW). It is a absolute wireless communication with no boundaries.

The main features of 5G are :

- It is highly supportable to WWWW (wireless World Wide Web)
- High speed, high capacity
- Provides large broadcasting of data in Gbps.
- Multi-media newspapers, watch TV programs with the clarity (HD Clarity)
- Faster data transmission than that of the previous generation
- Large phone memory, dialling speed, clarity in audio/video

Technology	1G	2G	3G	4G	5G
Start/Development	1970/ 1984	1980/ 1999	1990/ 2002	2000/ 2010	2010/ 2015
Multiplexing	FDMA	TDMA, CDMA	CDMA	CDMA	CDMA
Switching	Circuit	Circuit, Packet	Packet	All Packet	All Packet
Data/ Bandwidth	2kbps	14.4- 64kbps	2mbps	2000mbps to 1Gbps for low Mobility	1Gbps and higher
Core Network	PSTN	PSTN	Packet N/W	Internet	Internet
Technology	Analog	Digital	CDMA 2000, UMTS,EDGE	Wi-Max, Wi-Fi, LTE	WWWW
Handoff	Horizontal	Horizontal	Horizontal	Horizontal and vertical	Horizontal and vertical
Key differentiator	Mobility	Secure, Mass adoption	Better Internet experience	Faster Broadband Internet, Lower Latency	Better coverage and no dropped calls, much lower latency, Better performance
Services	Mobile technology (voice)	2G: Digital voice,	Integrated Higher Quality	Dynamic Information Access,	Dynamic Information Access,

		Short Messaging 2.5G: Higher capacity Packetized data	audio, video and data	Wearable devices	Wearable devices with IA capabilities
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Table1. General Comparison between 1G to 5G technologies

3.Conclusion

Mobiles have become very necessary part of our daily life. Their current development is the result of different generations. In this paper, we have seen various generations of mobile wireless technology, their portals, performance, advantages and disadvantages of one generation over other. This field is still full of research opportunities. In conclusion, our analysis reveals that there are following major area of research:

- Real wireless world with no more limitation with access and zone issues.
- Wearable devices with AI capabilities.
- Internet protocol version 6 (IPv6), where a visiting care of mobile IP address is assigned according to location and connected network.

4.Acknowledgement

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5.References:-

- [1]. Friedhelm Hillebrand, ed. (2002): "GSM and UMTS, the Conception of Global Mobile Communications", John Wiley & Sons.
- [2]. Goldsmith, Andrea (2005), "Wireless Communications. Cambridge University".
- [3]. Martin Cooper et al. (Motorola)(2002), "Radio Telephone System (Dyna-Tach)".
- [4]. Michel Mouly, Marie-Bernardette Pautet (June1992): "The GSM System for Mobile Communications". Artech House.
- [5]. Daniel Minoli, Nanotechnology Applications to Telecommunications and Networking, Nanotechnologies for Future Mobile Devices, Tapaniryhanen Nokia Research Center, Cambridge.
- [6]. J. Ibrahim, 4G Features," Bechtel Telecommunications Technical Journal,1(1), 2002, 11-14.
- [7]. Ms. Neha Dumbre, 5G WIRELESS TECHNOLOGIES-Still 4G auction not over, but time to start talking 5G International Journal of Science, Engineering and Technology Research (IJSETR) Volume 2, Issue 2, February 2013.