Comprehensive Study Analysis of 5G Comunication Technology

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Abstract— 5G stands for fifth generation wireless technology. It is the latest iteration of cellular technology that has three main features: greater speed, lower latency, and the ability to connect a lot more devices simultaneously. A commercial 5G wireless network is expected to be deployed by 2020. This paper provides a brief introduction to 5G wireless technology.

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I. INTRODUCTION

Wireless communication has started in early 1970s. In next four decades, a mobile wireless technology has evolved from 1G to 5G generations. Fifth generation technology offer very high bandwidth that user never experienced before. The Fifth generation technologies offer various new advanced features which makes it most powerful and in huge demand in the future. Now days different wireless and mobile technologies are present such as third generation mobile networks (UMTS- Universal Mobile Telecommunication System, cdma2000), LTE (Long Term Evolution), WiFi (IEEE 802.11 wireless networks), WiMAX (IEEE 802.16 wireless and mobile networks), as well as sensor networks, or personal area networks (e.g. Bluetooth, ZigBee). Mobile terminals include variety of interfaces like GSM which are based on circuit switching. All wireless and mobile networks implements all- IP principle, that means all data and signaling will be transferred via IP (Internet Protocol) on network layer. Wireless communication technology has grown and advanced significantly over the years through research and innovation. The time has come when we can connect various wireless technologies, networks, and applications simultaneously. This latest technology is called 5G. The fifth generation wireless system (or 5G for short) is now the next generation of wireless communication systems. It is the next major phase of mobile telecommunications standards beyond the current 4G. 5G moves us beyond networks design for mobile devices alone toward systems that connect different types of devices operating at high speeds.

- 5G stands for fifth generation wireless technology. It is the latest iteration of cellular technology that has three main features: greater speed, lower latency, and the ability to connect a lot more devices simultaneously. A commercial 5G wireless network is expected to be deployed by 2020. This paper provides a brief introduction to 5G wireless technology

achieve equivalent binary information. The schematic of

. Hence, designing highspeed comparators with low supply voltages many techniques are there such boosting [6] methods, techniques employing body driven comparator circuit works in reset phase. CMOS technology

II. RELATED WORKS

PREVIOUS GENERATIONS:- The world of telecommunication has witnessed drastic changes starting from 1G to 2.5G and from 3G to 5G. A new generation is named (often retroactively) when it denotes a significant forward leap in wireless mobile technologies. Previous generations like 3G were a breakthrough in communications. 1G was analog telecommunications standard introduced in the 1970s for voice communications with a data rate up to 2.4 kps. It used FM and FDMA and a bandwidth of 30 kHz. The major problems with 1G are poor voice quality, poor battery quality, and large phone size. 2G was digital standard, circuit switched technology introduced in 1980s. It used CDMA, GSM, and TDMA technologies. It could only transmit digital voice at 64 kbps, and not data such as email. Next comes 3G wireless systems, which used Code Division Multiple Access Technique (CDMA). It introduced high- speed Internet access. It used technologies such as WCDMA and HSPA

(high speed packet access). It provided IP connectivity for real-time and non-real-time services. The development of 3G was mainly driven by demand for data services over the Internet. 4G works the same as 3G and may be regarded as the extension of 3G but with a faster Internet connection , more bandwidth, and a lower latency. 4G technologies, such as WiMAX and LTE (Long-Term Evolution), claim to be about five times faster than 3G services. It used technologies like Coded Orthogonal Frequency Division Multiplexing.

III. BACKGROUND OF STUDY

Mobile communication has become more popular in last few years due to fast revolution in mobile technology. This revolution is due to very high increase in telecoms customers. This revolution is from 1G- the first generation, 2G- the second generation, 3G- the third generation, and then the 4G- the forth generation,5G-the fifth second generation. FIRST GENERATION(1G) :- 1G emerged in 1980s. It contains Analog System and popularly known as cell phones. It introduces mobile technologies such as Mobile Telephone System (MTS), Advanced Mobile Telephone System (AMTS), Improved Mobile Telephone Service (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 has 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. SECOND GENERATION(2G) :- 2G emerged in late 1980s. It uses digital signals for voice transmission and has speed of 64 kbps. It provides facility of SMS(Short Message Service) and use the bandwidth of 30 to 200 KHz. 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 THIRD GENERATION(3G) :- It uses Wide Brand Wireless Network with which clarity is increased. The data are sent through the technology called 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. It operates at a range of 2100MHz and has a bandwidth of 15-20MHz used for High-speed internet service, video chatting.3G uses Wide Band Voice Channel that is by this 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 even send messages too. FOURTH GENERATION(4G) :- 4G 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 . 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,

Multimedia Messaging Service (MMS), video chat, mobile TV, HDTV content, Digital Video Broadcasting (DVB), minimal services like voice and data, and other services that utilize bandwidth.

IV. METHODOLOGY

Technology Features	1G	2G	3G	4G	5G
Start/ Deployment	1970 – 1980	1990 - 2004	2004-2010	Now	Soon (probably 2020)
Data Bandwidth	2kbps	64kbps	2Mbps	1 Gbps	Higher than 1Gbp
Technology	Analog Cellular Technology	Digital Cellular Technology	CDMA 2000 (1xRTT, EVDO) UMTS, EDGE	WiMax LTE Wi-Fi	WWWW(coming soon)
Service	Mobile Telephony (Voice)	Digital voice, SMS, Higher capacity packetized data	Integrated high quality audio, video and data	Dynamic Information access, Wearable devices	Dynamic Information access, Wearable devices with AI Capabilities
Multiplexing	FDMA	TDMA, CDMA	CDMA	CDMA	CDMA
Switching	Circuit	Circuit, Packet	Packet	All Packet	All Packet
Core Network	PSTN	PSTN	Packet N/W	Internet	Internet

V. RESULTS AND DISCUSSIONS

5G wireless technology is projected to bring three main benefits : • Faster speed: Data transfer speeds with 5G are projected to be about 10 times higher with 4G. That means significantly faster transmission of images and videos. • Shorter delays: 5G should reduce latency (the time between cause and effect). This will make it possible, for example, to watch high-speed virtual reality video with no delays. • Increased connectivity: 5G technology would will bring faster, more reliable connections for users than 4G/LTE. That means more people and devices will be able to communicate at the sometime. Besides these benefits, 5G has excellent capability to support both software and consultancy. It has high data rate at the edge of the cell and better coverage area. It has low battery consumption. It is beneficial for the government, as it can make governance easier, and for the citizen, as it can provide Internet connectivity anytime anywhere.

VI. CONCLUSION

The 5G wireless technology is a multipurpose wireless network for mobile, fixed and enterprise wireless applications. It incorporates all type of advanced features that makes it powerful and in huge demand in near future Many tests and trials need to be conducted before implementing 5G. 5G technology is still in development stage. It has a bright future and will be a revolution in the mobile market..

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