Radio Access Technology based on Evolution of 5G Technology

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Abstract - In this Paper an attempt has been made to review various existing generations, we identify an attempt has been made to review various existing generations of mobile wireless technology in terms of their portals, performance, advantages and disadvantages. The paper throws light on the evolution and development of various generations of mobile wireless technology along with their significance and advantages of one over the other. In the past few decades, mobile wireless technologies have experience 4 or 5 generations of technology revolution and evolution, namely from 1G to 5G. Current research in mobile wireless technology concentrates on advance implementation of 4G technology and 5G technology. Currently 5G term is not officially used. In 5G research is being made on development of World-Wide Wireless Web (WWWW), Dynamic Adhoc Wireless Networks for cellular and Real Wireless World. In this paper we propose novel network architecture for next generation 5G mobile networks.. In the proposed architecture the mobile terminal has the possibility to change the Radio Access Technology - RAT based on certain user criteria and the user requirement.

Keywords: cellular, Radio Access Technology, network, 5G mobile, ICT, various generations, GSM.

INTRODUCTION

Mobile wireless industry has started its new technology creation and evolution since early 1970s. In the past few year, mobile wireless technologies have experience 4 or 5 generations of latest technology revolution and evolution of technology . [1] The telecommunication service in World had a great leap within last few years. 5 billion people own mobile phones so we are going to analyze the different generations of communication systems as studied in the start of mobile communications from 1st generation to 5th generation. We can analyze that this could be due to grow in the telecom customers day to day. In the present time, there are 4 generations in the cellular industry. These are respectively 1Genration the first generation, 2Genration- the second generation, 3G-the third generation, and then the 4G- the forth generation,5G-the fifth second generation.[1] 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), Wi-Fi (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 system . All wireless and cellular networks implements all-IP principle, that means all data and signaling will be transferred via IP (Internet Protocol) on network layer. Fifth generation technology provide facilities like camera, MP3 recording, video player, large phone memory, audio player and lots of featues. that user very satisfy and for children making fun with wireless technology .

I. EASE OF USE

The fifth generation wireless mobile cellular multimedia internet networks can be completely wireless communication without any limitation, which makes perfect wireless real world – World Wide Wireless Web (WWWW). Fifth generation is based on 4G technologies and some new feature. The 5th wireless mobile internet networks are real wireless world which shall be supported by LAS-CDMA (Large Area Synchronized Code-Division Multiple Access), OFDM (Orthogonal frequency-division multiplexing), MCCDMA (Multi-Carrier Code Division Multiple Access), UWB (Ultra wideband), Network-LMDS (Local Multipoint Distribution Service), and IPv6. Fifth generation technologies offers tremendous data capabilities and unrestricted call volumes and infinite data broadcast together within latest mobile operating system for better performance as compare to past . Fifth generation should make an important difference and add more services and benefits to the world over 4G. Fifth generation should be more intelligent technology that interconnects the entire world without limits. This generation is expected to be

released around 2020. The world of universal, uninterrupted access to information, entertainment and communication will open new dimension to our lives and change our life style significantly. [2] Fig
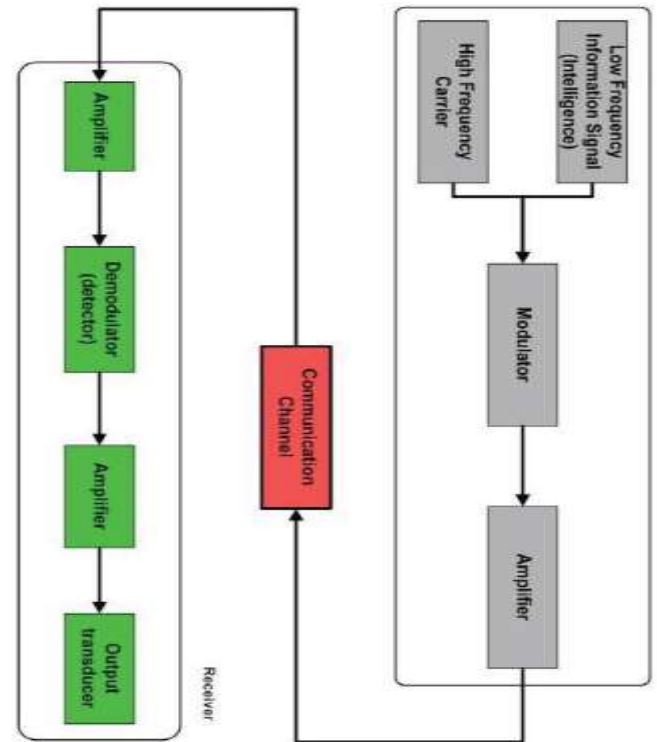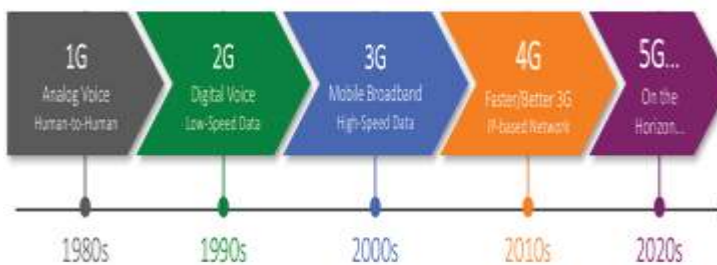

First Generation(1G): 1G emerged in 1980s.It contains analog system and popularly known as cell phones this is also very popular on that time. It introduces mobile technologies such as mobile telephone system (MTS) and Advanced mobile telephone system(AMTS),Improved mobile telephone system(IMTS)and push 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) on that time FDMA is very latest .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 some

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problem happed with this technology[2]. B. 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 more than 144 kbps. E.g. GPRS, CDMA and EDGE [2] C. 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 and making some issues. Along with verbal communication it includes data services, access to television/video, new services like Global Roaming. It operates at a range of 2100 MHz 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[2]. D. Fourth Generation (4G): 4G offers a downloading speed of 100Mbps this is much better than 3G.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 [3]. 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

5G network is very fast, high speed, secure and reliable. The concept of hand held devices is going to be revolutionized with the advent of 5G. Now all the services and applications are going to be accessed by single IP as telephony, gaming and many other multimedia applications. As it is not a new thing in market and there are millions of users

all over the world who have experienced the wireless services wireless technology. It is not easy for them to shrink from using this new 5G network technology because have a lots of challenges. There is only need to make it accessible so that a common man can easily afford the profitable packs offered by the companies so that 5G network could hold the authentic place. There is need to win the customer trust to build fair long term relation to make a reliable position in the cellular telecommunication field. To complete with the preceding wireless technologies in the market 5G network has to tender something reliable something more pioneering. All the features like telephony, camera, mp3 player, are coming in new mobile phone models. 4G is providing all these utility in mobile phone. By seeing the features of 4G one can gets arough idea about what 5G Networks could offer. There is messenger, photo gallery, and multimedia applications that are also going to be the part of 5G. There would be no difference between a PC and a mobile phone rather both would act vice versa [3].3-figure shows the system model that proposes design of network architecture for 5G mobile systems, which is all IP based model for wireless and mobile networks interoperability. The system consists of a user terminal (which has a crucial role in the new architecture) and a number of independent, autonomous radio access technologies. Within each of the terminals, each of the radio access technologies is seen as the IP link to the outside Internet world. However, there should be different radio interface for each Radio Access Technology (RAT) in the mobile terminal. For an example, if we want to have access to four different RATs, we need to have four different access - specific interfaces in the mobile terminal, and to have all of them active at the same time for connection, with aim to have

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CONCLUSION

In this paper, we conclude that 5G network is very fast, high speed and reliable. Fifth generation is based on 4G technologies that is working before time. The 5th wireless mobile internet networks are real wireless world which shall be supported by LAS-CDMA (Large Area Synchronized Code-Division Multiple Access),OFDM (Orthogonal frequency division multiplexing), MCCDMA(Multi-Carrier Code Division Multiple Access), UWB (Ultra-wideband), Network-LMDS(Local Multipoint Distribution Service), and IPv6. Fifth generation technologies offers tremendous data capabilities and unrestricted call volumes and infinite data broadcast together within latest mobile operating system. Fifth generation should make an important difference and add more services and benefits to the world over 4G. Fifth generation should be more intelligent technology that interconnects the entire world without limits in past decades. This generation is expected to be released around 2020. The world of universal, uninterrupted access to information, entertainment and communication will open new dimension to our lives and change our life style significantly.

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