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PERFORMANCE ASSESSMENT OF VARIOUS GENERATIONS IN WIRELESS NARROWBAND NETWORKING

K. Abinaya*, R. S. Beril Binny*, V. Gayathri*,
S. R. Boselin Prabhu** & Dr. S. Sophia***

* UG Scholar, Department of Electronics and Communication Engineering, SVS College of Engineering, Coimbatore, Tamilnadu
** Assistant Professor, Department of Electronics and Communication Engineering, SVS College of Engineering, Coimbatore, Tamilnadu
*** Professor, Department of Electronics and Communication Engineering, Sri Krishna College Engineering and Technology, Coimbatore, Tamilnadu

Abstract:

In the past few decades, wireless mobile technologies have been experiencing 4 or 5 generations of technology revolution and evolution, namely from 0G to 5G.Mobile wireless technology is developing in drastic speed with advanced techniques. It is an emerging technology in all the fields of mobile communication such as internet access, location based services, video conferencing system, amusement services, mobile banking services, mobile services etc. The users can be able to use these applications at anytime and anywhere via mobile communication. The aim of this survey is to compare the challenges and problems that are deployed in each generation and explain how the improvements have been made successfully made in mobile communication from earlier generation to modern generation still.

Key Words: Wireless Technology, Generations, 1G, 2G, 3G, 4G, 5G, AMPS, GSM, GPRS & OW

1. Introduction:

With the fast advances and development in the field of mobile and telecommunication sector, the evolution of generation bands has demonstrated to be one of the greatest technologies ever seen. It all started with 1G mobile system which transmit only the analog signals, then moved to 2G mobile technologies [1] which transmits discrete signals.1G and 2G mobile technology developed into 3G and 4G technology. Its successor 3G comprised of data transmission at enormous speed compared to 2G.The fourth Generation of mobile technology (4G) was known as Long term Evolution (LTE). The 4G contain many services such as animation, entertainment, multimedia, mobile applications and many more. 5G mobile technology depends upon OWA (Open Wireless Architecture) and Open Transport Protocol (OTP).

2. Zero Generation Mobile Technology (0G):

Wireless telephones have been started with what you might call 0G. OG refers to pre-cell phone mobile technology like telephonic radios that some had implemented in cars before the advent of cell phones. Cellular mobile telephony technology comes after mobile radio telephone systems. Since their arrival was before the First generation of technology, these systems are called Zero generation of mobile technology. Different technologies used include PTT (push to talk), MTS (Mobile telephone system), improved version IMTS (Improved Mobile telephone system), AMTS (Advanced Mobile telephone system), OLT (Norwegian for offending land mobile Telefoni public land mobile Telephony) and MTD (Swedish abbreviation for Mobilelefoni system D). Wireless telephone was started with what you might call 0G if you can remember back that far.

After World War II, the great ancestor is the mobile telephone service that became exists. In those pre-cell days, you had a mobile operator to set up the calls with dialer tones and there were only a handful of channels available by landline connection. Mobile radio telephone systems progressed modern cellular mobile telephony technology

Figure 1: 0G Mobile Phones

3. First Generation Mobile Technology:

The First generation of wireless mobile communication [2] is completely based on analog signal. Analog system was first introduced in North America, which is been known as Analog Mobile Phone System (AMPS), while the complex system was brought in Europe and rest of the world as commonly identified as a variation of Total Access Communication System (TACS).But this type of analog mobile system is Primary based on circuit switched technology and design only for voice, not for data.

The First Generation is Analog Telecommunication standard that were introduced in 1980s and prolonged until being substituted by Second Generation Digital Telecommunication. Its successor, second generation (2G) which made use of discrete signals, 1G wireless networks [3] are used as analog radio signals. Through 1G, a voice call can be arranged at higher frequency about 150 MHZ range and above as it transmitted radio towers.

This is finished by using the multiplexing technique Frequency- Division Multiple Access (FDMA).In terms of overall connection quality 1G, compares unfrock to its successors. It has low capacity, unreliable handoff, poor voice links, poor networks and no security so ,voice call are not supported and played back to radio towers, producing this call are quite easily influenced to unwanted eaves dropping of third persons.

Figure 2: 1G Mobile Phones

4. Second Generation Mobile Technology (2G):

2G (or 2-G) is stands for second-generation wireless telephone technology called GSM. It cannot usually transfer data, such as email (Electronic mail) or software, other than the digital or discrete voice call itself, and other basic ancillary data such as date and time without any loss. Nevertheless, SMS messaging is also available as a form of packet transmission for few standards. Second generation 2G cellular telecom networks were commercially lanced on the GSM standard in Finland by Radiolinja (now part of Elisa Oyj), 1991. GSM service is used by over 2 billion people across more than 212 countries, states and territories. The ubiquity of the GSM standard makes international roaming very common between mobile phone operators, furnishing subscribers, servers to use their phones in many parts of the world. 2G technologies can be splited into Time Division Multiple Access (TDMA) based and Code Division Multiple Access (CDMA) based standards depending on the type of multiplexing technique employed and the number of channels used. 2G uses CODEC (Compression- Decompression Algorithm) to compress and multiplex digital voice data into single signal.

By this technology, a 2G network can pack more calls and messages per amount of throughput as a 1G network. 2G cell phone units were designed smaller than 1G unit, because they send out less radio power. Some benefits of 2G were digital signals annihilate less battery power, so it helps mobile batteries and other battery devices to last long useful for several applications. Digital coding improves the voice clearness and reduces distortion and power consumption in the line. Digital signals are regarded environment friendly. The use of digital data service helps stations, mobile network operators in source to launch short message service which means little content over the cellular phones. Digital encryption has provided secrecy and security to the data and voice calls which will be safe.

The use of 2G technology requires speed digital signals for processing to help mobile phones in earlier days. If there is no network coverage in any of the specific area, digital signals would be weak and cannot work in the area concerned. 2.5G, which means "second and a half generation," is a cellular wireless technology developed in between its predecessor, 2G, and its successor, 3G. The term "second and a half generation" is used to describe 2G-systems mean second generation systems that have implemented a packet switched domain in addition to the circuit switched domain. "2.5G" is a new term or improved version of 2G, invented mainly for marketing purposes, unlike second or third generation which are officially follows defined standards the International Telecommunication (ITU).

Figure 3: 2G Mobile Phones

GPRS could provide data at the rate of 56 k bit/s up to 115 k bit/s. It can be used for wireless services such as Wireless Application Protocol (WAP) access, Multimedia Messaging Service (MMS), and for Internet communication [4] services such as email and World Wide Web access. In the GPRS (General Packet Radio Services) data transfer charge per megabyte of traffic transferred, while data communication with improved technology through traditional circuit switching is billed per minute of connection time, independent of the user. Actually utilizing data capacity is in an idle state. 2.5G networks may help services like WAP, MMS, SMS (Short Message Service) mobile games, and search, video conferencing and directory.

4.1 GSM Architecture:

A) Mobile Station (MS):

The mobile Station known as mobile handset, it contains both the Mobile equipment and the Subscriber Identity Module. It is an interface to other networks and is called gateway.

B) Mobile Equipment (ME):

Mobile handset hardware including RF, GSM modulation etc. has been identified by a unique International Mobile Equipment Identity (IMEI) which is disguised from the phone number.

C) Subscriber Identity Module (SIM):

It contains subscriber-related information which has been identified by a unique International Mobile Subscriber Identity (IMSI) which is disguised from the phone number.

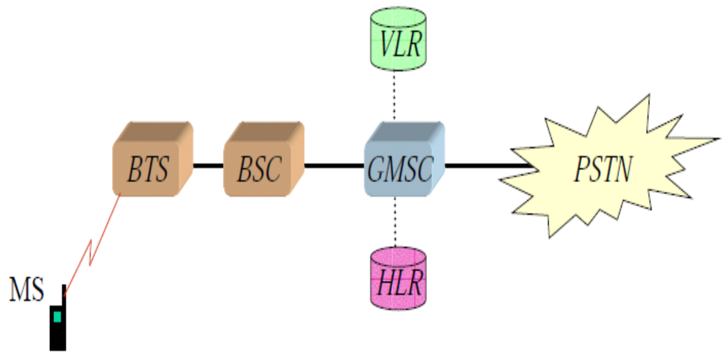

Figure 4: GSM Architecture

D) Base Station Subsystem (BSS):

The BSS consists of three main hardware components: the Base Transceiver Station (BTS), the Base Station Controller (BSC) and the Transcoder (TCU / TRAU). The BSS consists of BTSs and BSCs, where the base transceiver station is creditable for communication with the MS. It is also creditable for radio transmission and reception. It includes antennas omni and directional, modems, signal processing. Base station controller is responsible for radio interface management of Base Transceiver Station and Main Station which are further used for channel management and handovers. It is also creditable for communication [5] with the NSS and it is a single BSC typically manages 10-20 BTSs.

E) Network and Switching Subsystem (NSS):

NSS contains the switching functions of GSM, and also databases for mobility management. NSS contains Mobile Switching Centre (MSC), Gateway MSC (GMSC), Home Location Register (HLR) which is co-located with GMSC, and Visitor Location Register (VLR) which is co-located with MSC/GMSC. Signaling between MSC, GMSC, HLR, VLR through SS7 signaling network, using specifically the Mobile Switching Centre (MSC) coordinates setup of calls to and from GSM users and it controls several BSCs and Gateway MSC (GMSC). The gateway to external network [6] incoming call is routed to

GMSC, which then determines the MS location. GMSC function is often in the same machine as the MSC application part (MAP) of Signaling System No. 7 (SS7). Home Location Register (HLR) contains information about subscribers, e.g. subscriber profiles, also information on their current location IMSI, user phone number and address of current VLR etc. Currently in the GMSC area, Visitor Location Register (VLR) temporarily stores subscription data for subscribers wealth. It has more precise location data than does the HLR and is linked to one or more MSCs.

F) Operation Sub System (OSS):

Its performs network operation and maintenance, Subscriber data management, Call charging, Simultaneous access to Web and Telephone, Mobile equipment [7] management through Equipment Identity Register (EIR).

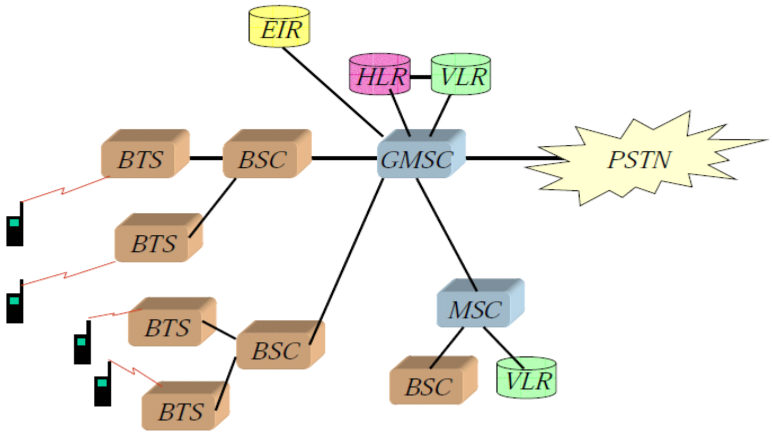

Figure 5: GSM Components

G) GSM Channel Structure:

Channel Requirements are traffic Channels, associates and Signaling Channels. The Call-related signaling is a Common Signaling Channels. There are Cell information channel(s) (downlink), Paging channel (downlink), Access channel(uplink).These channels all need to be efficiently multiplexed into the GSM frame structure .The GSM channel structure contain three types of physical channel ,called traffic channels (TCH): TCH/F Full rate traffic channel provides 13 kbps speech channel, TCH/H Half rate traffic channel which can give 7 kbps speech channel, TCH/8 One-eighth rate traffic channel (used for low-rate signaling channels, data channels, common channels).SACCH (slow associated control channel). It is used for call-associated signaling, particularly measurement data needed for handover decisions. A Traffic channels is being allocated with an associated SACCH. The TCH in combination with SACCH designated TACH. FACCH (fast associated control channel) indicates cal barring service, call establishment progress, dialer tones, authenticates subscribers, synchronization and commands or information handovers, and others makes use of a TCH. A "stealing flag" in the TCH represents if it is being used for signaling, or for call transmission SDCCH (stand alone dedicated control channel). This makes use of TCH/8 channel, and is used only for passing signaling information (e.g. location updating), and not for calls.

G) Common Signaling Channels:

FCCH (frequency correction channel) is used to find a beacon frequency. SCH (synchronization channel) follows each FCCH to obtain synchronization. BCCH (broadcast control channel) is broadcast regularly and received by each mobile station while it is in the useless mode. Broad cast control channel provides brief information about the cell, i.e., which network the cell contained in PAGCH (paging and access grant channel) is used to page called mobile, and to stipulate a channel during call set-up.

There are one-third rate PAGCH/T or full rate PAGCH/F. CBCH (cell broadcast channel) can be widely used for transmit one 80 octet message every 2 seconds. It uses half a TCH/8 channel.

H) Uplink Channels (Mobile Station to Base Station):

This uses high frequencies and one common emanate channel on the uplink, RACH (random-access channel).The MS uses this channel to emanate the network. These may be provided as a full rate RACH/F or a half rate RACH/H.

5. Third Generation Mobile Technology (3G):

Phase 1 of the standardization of GSM900 was fully completed by the European Telecommunications Standards Institute (ETSI) in 1990 and contains all necessary definitions for the GSM network operations. Several bearer services and tele-services defined whose data transmission up to 9.6 kbps, but some supplementary services were offered. As a result, GSM standard were enhanced in Phase 2 to incorporate a large number of supplementary services. In digital fixed network integrated services digital network (ISDN) it is accessed through copper pair. In 1996, ETSI decided to enlarge GSM in annual Phase 2+ hence incorporate 3G capabilities. GSM Phase 2+ releases have introduced specialized 3G features like intelligent network (IN) services with specific application for mobile enhanced logic (CAMEL), enhanced full rate (EFR), enhanced speech (CODEC) code compression/decompression adaptive multi-rate (AMR), high–data rate services which will be most useful and prolonged transmission principles with high-speed circuit-switched data (HSCSD), general packet radio service (GPRS), and enhanced data rates for GSM evolution (EDGE).It can covers distance upto 4 to 5kms. UMTS is a 3G GSM successor standard that is downward-compatible with GSM, using the GSM.

3G wireless networks has a core network and a Radio Access Network (RAN). Packet-switched domain comprised of core network includes 3G Gateway GPRS Support Node(GGSNs)and Serving GPRS Support Node (SGSNs), that provide the same functionality as conceded in a circuit-switched domain, and a GPRS system, which includes 3G MSC for Charging services, switching of voice calls and access via Charging Gateway Function (CGF), which is one part of the core network. Core network and Radio access network (RAN) functionality is disguised to each other. The access network concedes a core network technology independent for mobile terminals. The core network domain can access any appropriate RAN service; e.g. it should be possible to access speech bearer when compared to the packet switched domain.

The Radio Access Network contains network elements such as Node B and Radio Network Controllers (RNCs). Node B is comparable to the Base Transceiver Station in 2G wireless networks. RNC replaces the Base Station Controller. It provides handover control, the radio resource management, and helpful for the connections to circuit-switched and packet switched domains. The network elements get connected in RAN and between core network is over Iub, Iur and Iu interfaces based on ATM as a layer 2 switching technology.

Data services run from the terminal device over Internet Protocol (IP), which further uses ATM as a best transport with Quality of service (QoS). Voice is inserted into ATM from the edge of the network (Node B) and is transported over ATM out of the RNC. The Iu interface is differentiated into 2 parts: packet-switched and circuit switched. The Iu interface is based only on ATM with voice traffic inserted on virtual circuits using and IP-over-ATM and ATM Adaptation Layer 2(AAL2) technology for data traffic using ATM Adaptation Layer 5(AAL5) technology. These common traffic categories are switched accordingly to the 3G MSC for voice or 3G SGSN for information.

The following is a detailed description of each protocol layer in a 3G wireless network architecture: Global Mobility Management (GMM) protocol that consist of attach, security, detach and routing area update functionality. Node B (NBAP) provides procedures for paging distribution, broadcast system information, management of dedicated and logical resources.

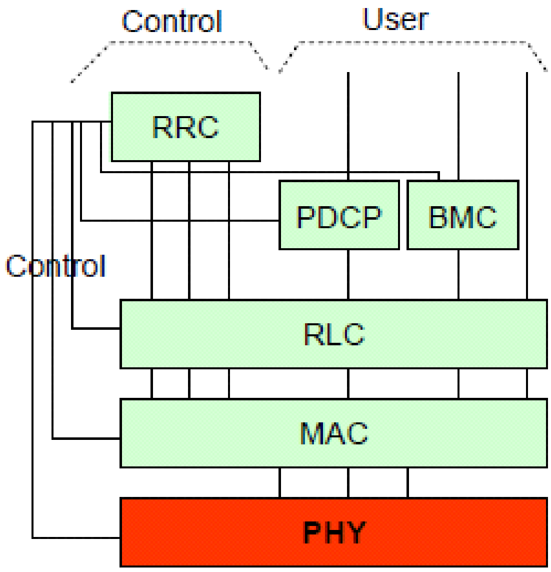

Figure 6: 3G wireless network architecture

Packet Data Convergence Protocol (PDCP) provides protocol transparency for higher layer protocols. It also maps higher level characteristics onto the features of the underlying radio-interface protocols. Radio Link Control (RLC) sets up a logical link control on the radio interface. Procedures for the radio channel are controlled by Medium Access Control (MAC) hence grant access signaling. Radio resource Control (RRC) functions includes connection establishment and release, Radio bearer establishment or reconfiguration and its release, information broadcast system, Radio resource connection mobility procedures, Outer loop power control, constant network access, Paging notification and release. Radio Access Network Application Protocol (RANAP) protocol encapsulated by higher layer signaling. It can regulate GTP connections and the signaling between RNC and 3G-SGSN. It is able to process signaling and circuit-switched connections between 3G MSC and RNC. Radio Network Service Application Part (RNSAP) protocol is used for providing linkage communication between RNCs. GPRS Tunnel Protocol (GTP) operates on top of TCP/UDP over Internet protocol. Through the IP backbone by adding routing information it tunnels the protocol data units. Mobile Application Part (MAP) supports signaling between HLR/AuC/EIR and SGSN/GGSN. AAL2 Signaling (AAL2 CPS and AAL2 SSSAR) protocols are used to transfer voice over ATM backbone using AAL2.

5.1. Architecture Difference Between 2G and 3G:

Second generation GSM networks contain BTS, BSC, HLR/AuC/EIR and MSC/VLR network elements. The interconnection or boundary between BTS, BSC and MSC/VLR elements are circuit-switched PCM. Parallel packet-switched core network are added to GPRS technology. The 2G+ network consists of BSC with packet interfaces to GGSN, SGSN, HLR/AuC/EIR. The interfaces between SGSN network and BSC elements may be Frame Relay or ATM with Quality of Service (QoS) for providing reliable transport. 3G wireless technologies introduce new Radio Access Network (RAN) [8] which has Node B and RNC network elements. The 3G Core Network consists organizations as GPRS and

2G: 3G MSC/VLR, GMSC, HLR/AuC/EIR, 3G-SGSN, and GGSN. ATM technology is used to provide suitable transport with QoS. The BSC can be evolved into an RNC by using the add-on cards or additional hardware which is co-located. The carrier frequency 5 MHz and frequency bands (2.5 to 5GHz) are disguised for 3G wireless technology and 2G/2G+ wireless technology. Evolution of BSC to RNC needs support for innovative protocols such as RRC, RANAP, RNSAP and NBAP.BTS introduction into Node B judged to be tedious on the part of the network operators it represent useful services expenditure. The International Telecommunications Union (ITU) allows anyone using a mobile device marketed to help a specific network to have high speed and connectivity of the device. Mobile networks, like 3G, 4G and 5G are primarily used by cell phones, broadband modems and tablets. Wireless technology is backward-compatible, as 4G devices will use 3G networks to transfer data, if 4G is unavailable.

6. Fourth Generation Mobile Technology (4G):

4G, a range of new services and models will be present. These services and models need to be further examined with the design of 4G systems. Figures a and b show the key elements and the seamless connectivity of the networks.

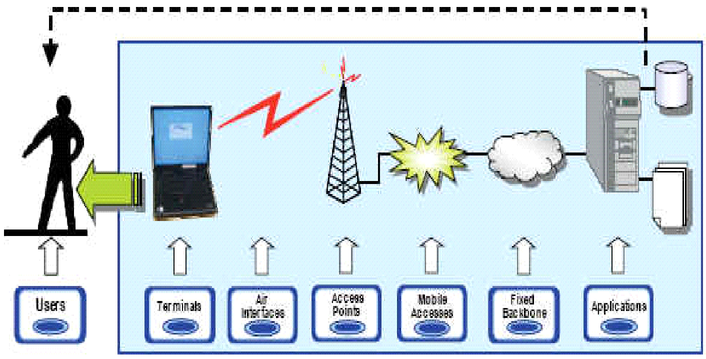

Figure 7: 4G Mobile Communication

6.1. Terminals:

Till date the "terminal" for accessing mobile services has been the mobile phone. With the 3G and also the advanced 4G, we can also obligate to see a broadening of this concept. Tradition changed keyboard, display, mouse and tablet, to new interfaces based on speech, vision, touch, soft buttons which are user interfaces terminals. These will be general-purpose computing and communication devices. There are recognizable mobile phones, but many of these with larger screens to display Internet pages [9] or the face of the person being spoken to. There is smaller mobile phones which will not support video conferencing with restrictions in web browsing and e-mail capabilities. The development of mobile communication technologies to laptop and palmtop computers which will speed up the intersection of communication and computing, and bring about portable and easy computing all the features, functions available on the most powerful desktop computers. There are video conferencing phones, cameras, wrist communicators, palmtop computers, and radio modem cards for portable computers. Innovative new voice based interfaces, easy web access will allow people to regulate their mobile communication services with voice commands.

6.2. Networks:

Worldwide roll-out of 3G networks [10] are defer in some countries by the massive Costs of additional spectrum tariff. In World's major parts, third generation networks do not use the same radio frequencies as second generation networks , in need of mobile operators to build entirely innovative networks and license for entirely new frequencies. Hence various spectrum allocation decisions, spectrum synchronization, spectrum standardization decisions, spectrum availability decisions, technology innovations, component development, Processing of signal and switching developments, data transfer, inter-vendor cooperation have to take place before the vision of 4G will regard as matter.

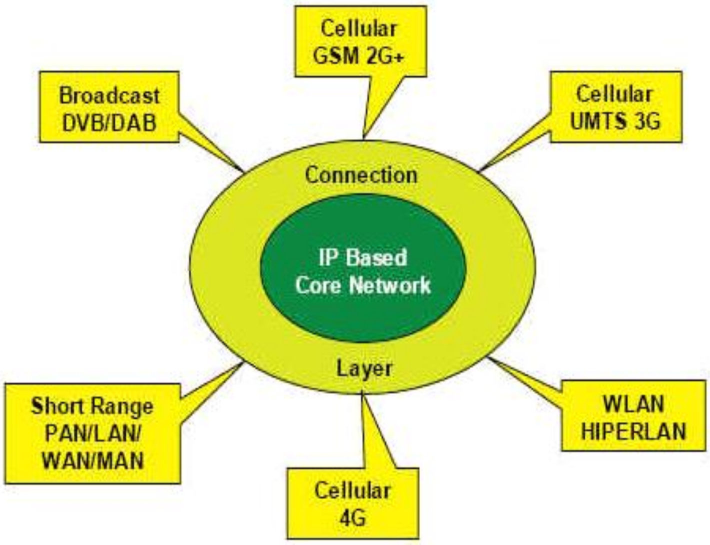

Figure 8: 4G Network Connection

6.3. Applications:

The applications for 3G and 4G wireless systems [11, 16-27] typically require highly Heterogeneous and time varying quality of service from the implicit protocol layers. Promising techniques and practical topics are Mobile application should refer to a user's profile so that it can be maintained in a way most used by the subscriber and server, which includes context-based personalized services. For varying locations and speeds this also brings the applications with utility to terminals that are moving. Techniques such as adaptive multimedia and individual messaging take the nodal features into account and proved that the service can be received on the most suitable form to the node type and run on a terminal. The 4G technology can support responding services like modems, surfing sites, Video Conferencing with more than 2 sites simultaneously, Wireless Internet and all. Wider throughput at 100 MHz and data or packets would be conducted at much higher rates. The data transfer cost would be comparatively very less and mobility of data in global form would be possible. All IP networks will be based on IPv6. Improved access technologies like channel adapting technique (OFDM) Orthogonal Frequency Division Multiplexing and MC-CDMA (Multi Carrier CDMA) will be used. Also the security features will be much better. It's a 3GPP its research item for Release 8. It's also known as 3.9G or "Super 3G" by some researchers. Data rates at highest level of 200 Mbps (DL) and 100 Mbps (UL). The WiMax [12] lobby and the people who are using WiMax technology are working hard to push WiMax as the 4G wireless technology. We don't know their popularity. Over a 50Km radius, WiMax can give data up to 70 Mbps speed. With 4G wireless technology people would like to enhance the speed up to 1Gbps indoors. WiMax does not satisfy the criteria totally. Also WiMax technology 802.16d cannot gather mobility very well at the same time. Mobile WiMax is being standardized to overcome the mobility problem. Thing to remember here is that all the researches for 4G technology is based around Orthogonal Frequency Division Multiplexing. WiMax is based on OFDM. This gives more credits to the researchers who would like to change WiMax as a 4G technology. Since there is no consensus or issues for the time being, we have to wait and see who would be the winner.

6.4 Applications of 4G:

Virtual Presence: This means that 4G provides user services at every time, even if the user is off-site. 4G provides users with virtual navigation via which a user can access a database of the streets, buildings etc of large cities. This demand high speed data transmission. 4G can support remote health supervising of patients. At anytime and anywhere doctor assistance can be obtained by using videoconference assistance and there is no need for an user to go to hospital. Tele-geoprocessing is a combination of GIS (Geographical Information System) and GPS (Global Positioning System) in which a user can get the position by querying. Crisis management includes Natural disasters like flood and other may cause drop in communication systems. In today's world it might also take days or weeks to restore the system. But 4G can restore such crisis issues in a few hours. For people who are interested in lifelong education, 4G [13] provides a good opportunity. People all over the world can continue their education through online in a cost effective manner.

7. Fifth Generation Mobile Technology (5G):

This article represents personal views on 5G network architecture, especially for wireless service providers. Convergence is merging of technologies, domain and discrete IT systems [14]. Basic of convergence lies in digitalization. The digitalization of everything is creating the more natural communications experience. Boundaries separating various technologies, engineering practices, functions etc are melting. Wireless technologies are going to take taking new dimension in our lives. The wireless [15] broadband will soon become more preferable to everybody while, being at home, driving the car, sitting in the park and even on a pleasure boat in the middle of a lake. The world of universal, uninterrupted access to information, entertainment and communication will open new dimension to our lives and change lifestyle significantly.

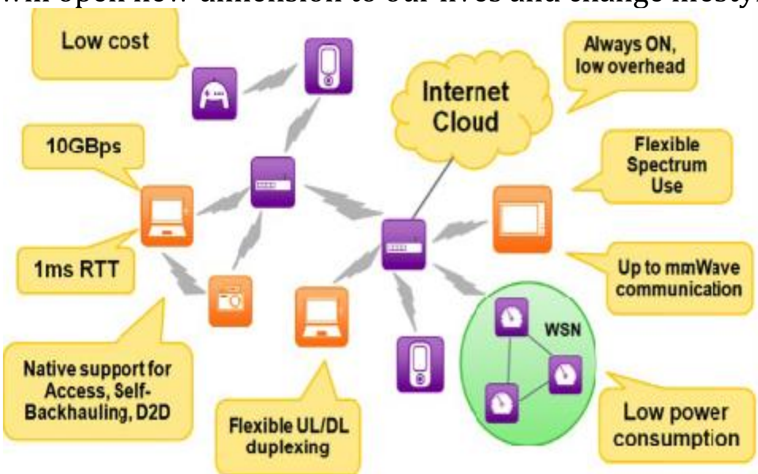

Figure 9: Features of 5G

7.1 Viability of 5G:

To explain this, two challenges been divided as: a) Technological challenges, Common challenges. Technological challenges include Inter-cell interference: This is one of the major technological egress that need to be solved. There is variations in size of traditional macro cells and con-current small cells that will need to interference. b) Efficient medium access control: In a situation where dense deployment of a access points and user nodes are required, the user throughput will be low latency will be high and hotspots will not compensate cellular technology to provide high throughput. c)

Traffic management: Comparing to the traditional phase to phase traffic in cellular networks, a large number of machine to machine (M 2 M) devices in a cell create serious system challenges i.e. Radio access network challenges which will cause overload and accumulation.

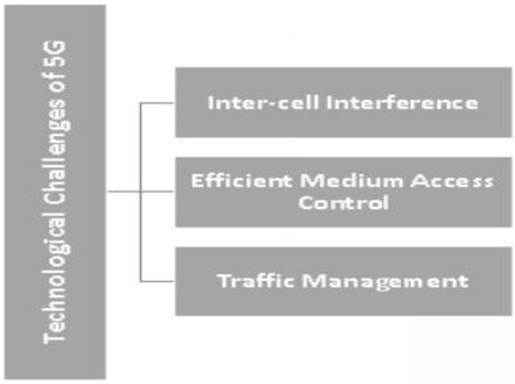

Figure 10: Challenges in 5G

The Common challenges in the 5G are a) Multiple services: Comparing other Radio signal services, 5G would have a huge task to deliver services or process to heterogeneous networks, technologies and devices operating in different geographic regions. To provide dynamic, faster, universal, user centric and data rich wireless services, the challenge is of standardization that would fulfill the high expectation of people. b) Infrastructure: Researchers are diverging technological challenges of standardization and application of 5G services. c) Communication, Navigation and Sensing: the Radio spectrums which transmit signals mostly depend upon the availability of these services. Though 5G technologies has a strong computational power to process the enormous volume of data coming from disguised and distinct sources are in need of larger infrastructure support. d) Security and Privacy: One of the most important challenges to overcome the needs of 5G to assure the security of personal data.5G will have to define the uncertainties or inevitability related to security threats including trust, privacy, cyber security which are growing across the globe. e) Enactment of cyber law: Cyber crime and other fraud may also increase with the high speed and ubiquitous 5G technology. Therefore, legislation of the cyber law is also an imperative issue which largely creates issues.

The main deviation, from a user point of view, between current generations and expected 5G techniques must be something else beyond expectation providing maximum throughput; other requirements include: Lower battery consumption, lower probability; better and wide coverage and high speed data rates available at cell edge. Multiple concurrent or simultaneous data transfer paths are possible. It can give upto 1Gbps data rate in mobility. More secure; better cognitive radio/SDR Security by Encryption and Decryption. Higher system level spectral efficiency. Worldwide wireless web (WWWW), wireless-based web applications that include full multimedia capability beyond 4G speeds can be adopted. More applications combined with artificial intelligent (AI) as human life will be surrounded by artificial sensors which could be communicating with mobile phones. It is not harmful towards human health. Cheaper traffic tariff due to low infrastructure deployment costs.

The advantages includes: High resolution and bi-directional large bandwidth shaping. Recent technology to gather all networks on one platform. It is used more effectively and efficiently .It can be easily maintained or controlled with the previous generations. Possibility to provide uniform, distance independence, uninterrupted, distortion less and consistent connectivity across the world. The disadvantages are technology is still under process and research on its viability is going on. The speed of this technology is claiming seems difficult to achieve because of the incompetent technological support in most part of the world. Developing infrastructure needs high cost. Security and privacy issues yet to be solved.

8. Conclusion:

The evolution of generation bands has demonstrated to be one of the greatest technologies ever seen. It all started with 1G mobile system which transmit only the analog signals, then moved to 2G mobile technologies [1] which transmits discrete signals.1G and 2G mobile technology developed into 3G and 4G technology. Its successor 3G comprised of data transmission at enormous speed compared to 2G.The fourth Generation of mobile technology (4G) was known as Long term Evolution (LTE). The 4G contain many services such as animation, entertainment, multimedia, mobile applications and many more. 5G mobile technology depends upon OWA (Open Wireless Architecture) and Open Transport Protocol (OTP). The aim of this survey is to compare the challenges and problems that are deployed in each generation and explain how the improvements have been made successfully made in mobile communication from earlier generation to modern generation still.

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