

3G And 4G Impacts on Pakistan and Challenge of Ensure Quality

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Abstract: This paper was prepared 4G 3G wireless communication and why it is not good enough for a proper discussion included. Due to the many benefits of 3G to 4G cellular infrastructure is very good for business purpose gradation 4G 3G, which is very expensive for a very large return up the price so expensive are introduced. These days mobility communications network is one of the most important features. Such as wireless communications, high impact has become an inevitable part of our lives. Required in technology and innovation as a result of rapid fuel.

The wireless technology 1G, 2G, 3G, and 4G, which is known as a significant change in the future 5G can recognize. However, a wireless communications network and a technique dominate. Therefore, seamless global network connectivity of wireless and mobile networks is a major challenge faced. This is globally connectivity demand for faster and more rapid innovation. In this paper, the transfer of data and voice communications, 3G and 4G wireless technologies for the implementation of some important changes in wireless networking, with a focus on the technical development of the races. The idea of 5G to date the most powerful medium of communication, which makes the complete wireless communication with almost no limitation process which provides the international research suggests. Pakistan Telecommunication Authority 1947. Industry has come a long way since independence can be early enough period PTCL (Pakistan Telecommunication Company Limited) as a monopoly, the national telecommunications was the sole provider of services. This area by the end of the end of 1990, because of the decade-old monopoly of PTCL wireless communications services in the New World was not until four decades later, Government support and international investment in the region, innovation and improved quality low price opened the doors to healthy competition. Telecommunications infrastructure and the private sector in the service profile for wireless lines. Wireless GSM technology a significant boosts to the economy of Pakistan all stakeholders (customers, regulatory bodies and market) to receive so much support from.

Numerous tangential elements important step in the history of telecommunications in Pakistan had triggered. Traders' global joint projects in East and international business idea became reality intended to test the idea. Pakistan recently launched this technology and the best quality services to ensure regular 3G and 4G technologies in the West, was a big success. Also, analysts, investors, businesses, telecommunications and the Ministry of Finance Pakistan as well as the beginning of a new era, are saying the move. This situation was WINING for everyone involved. With the partial success of 3G in Europe and the United States on 23 April 2014 for the launch of 3G and 4G license auction.

Keywords: 3G and 4G Impacts, PTCL (Pakistan Telecommunication Company Limited), Wireless GSM technology.

1. INTRODUCTION

Mobile communication any time, any place and the terminal is a technique in which the objects. From the viewpoint of communication networks, mobile networks of wired communication networks can be seen as an extension, therefore, the two parts of a mobile network, which consists of wireless and wired. The reliability of wireless voice and data in transit, using limited frequency resources provides access terminals and the wired part is to complete network functions, including switching, subscriber management, roaming authentication etc. [1] Internet and mobile communications on the subject

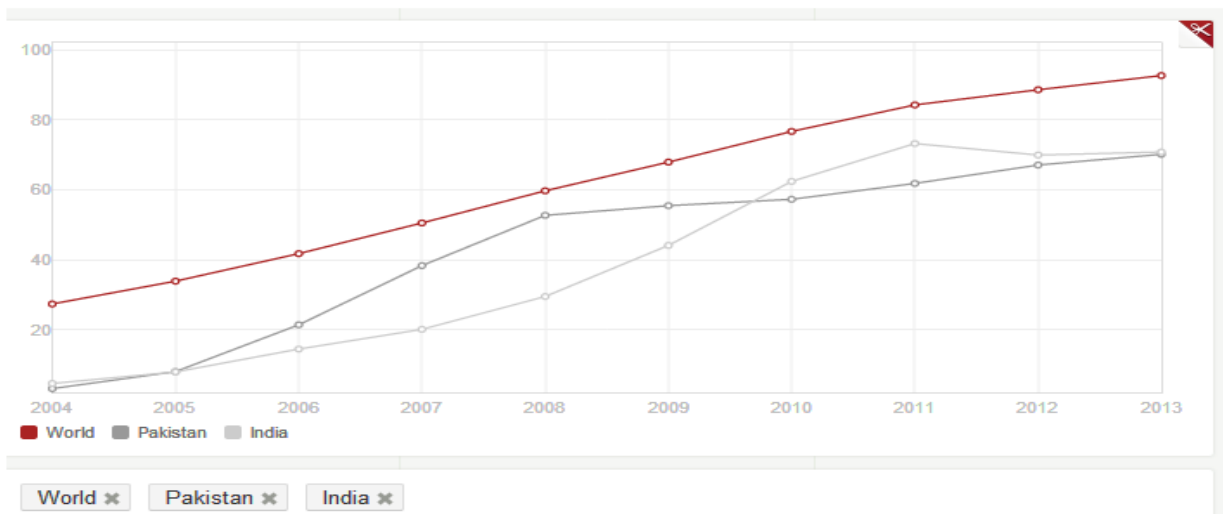
were found through the library, but video conferencing is focused on the research paper about Wi MAX via 3G and 4G, is not about quality assurance. **The goal of the research is to evaluate the usability of 3G and 4G and ensure quality of telecommunication quality of telecommunication quality environment and also in rural areas for purposes all over Pakistan for same services**, Different for the quality of the wireless signal transfer method using. 3G model and its usability for people living far from the city to improve the quality of services that can help.

The Mobile users or subscribers since few years are increased yearly as below chart indicating

Mobile cellular subscriptions (per 100 people)

DATABANK

Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service using cellular technology, which provide access to the public switched telephone network. Post-paid and prepaid subscriptions are included. International Telecommunication Union, World Telecommunication/ICT Development Report and database, and World Bank estimates.



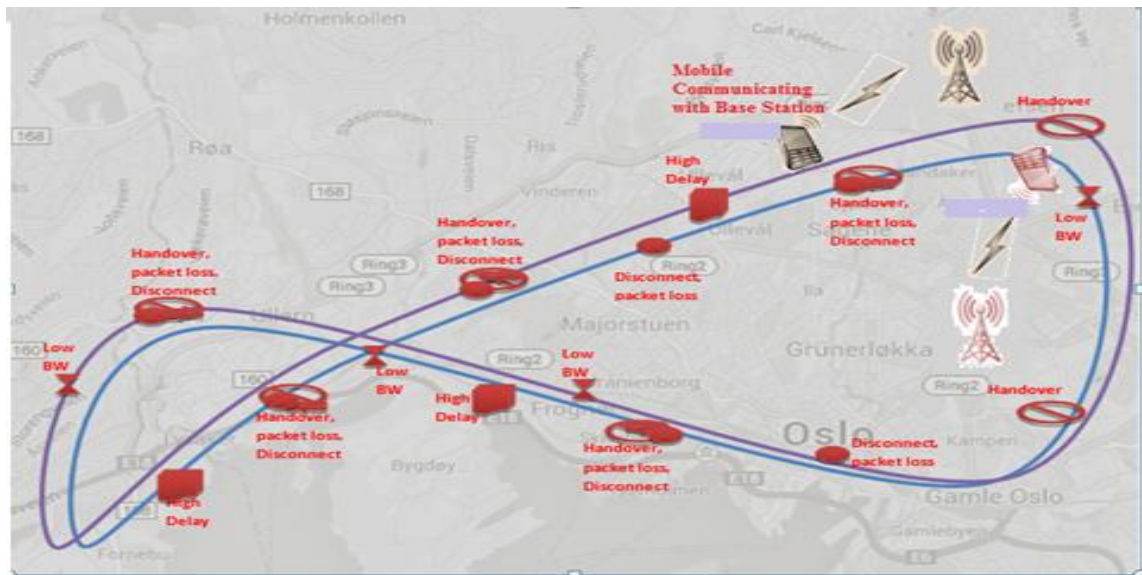
A second goal to Economic Impacts and comprehensive information about the practical reliability and the communication speed in reality.

Main focus is on 3G technology environment and is not widely used in rural areas as 4G and the 5G network beyond the scope of this paper is left. 3G and 4G in rural areas compared with the analysis are much easier to be established. However, usability improvements, and process needs. Most attempts theory, research, and was based on data from 2014 so the 3G technology Zong (CM Pak), Mobilink, Ufone, Warid, Telenor Communications Corporation is hired as empiric. According to practical part as we seen previous reports of PTCL have many complaints in quality access so this Research is also focused.

1.1 Motivation:

Mobile broadband networks from a crucial part of our daily life along with the development of small and multi-purpose mobile devices such as tablets and smart phones and the availability of height capacity 3G and 4G/LTE Internet services. Broadband traffic has grown rapidly and is being estimated to grow by 66% annually until 2017.[2]. Although, Wi-Fi has much higher capacity than 3G, Wi-Fi in mobile nodes is challenging due to coverage area of access points (APs0, and the connection – quality is a function of the speed under mobility [3]. People are browsing us, sending emails, making VOIP calls in mobile devices irrespective of where they are and what they are doing, due to the ubiquities availability of Broadband as a future of the Internet. Data networks should be available where and when one needed. If users are not satisfied with the connectivity and Quality service performance of the Broadband networks they have subscribed to, it is natural that they change the Internet service even if it costs more to new service. Therefore, it is important to provide reliable Broadband services with good performance.

There are still issues related to performance of Broadband especially under mobility. In order provide realistic performance information to many stakeholders and assuming quality of services to the subscribers of broadband networks, detail study is needed about the performance, stability and reliability under mobility. In literature most of the Research activities on the performance and reliability of broadband networks focus on static cases [4].



1.2 Different Wireless Technologies:

Wireless communication is distinguished in two types:

- Cellular Network: setting a mobile communication through voice conversion and various tools issued for private and business use. The standards used this kind of network are GSM, CDMA and TDMA.
- Wireless Local Area Networks: with respect to the computer networks in workplace. The standardization of WLAN is IEEE 802.11

Wireless communication offers and advantageous approach such as simplicity and flexibility. It is much more reliable quicker. Tends to get higher data rates, Better and its reach ability to the user. It is cost effective and always emerging with new technologies in the field. But stills wireless communication comes with a dominant in today's world.

The large scale applications for wireless communication are

- ✓ Wi-Fi connectivity
- ✓ Bluetooth for setting short range connectivity.
- ✓ Infrared-connectivity through electromagnetic waves via remote systems or devices.
- ✓ Wireless communication acts as an essential use in the coming generation of mobile computing. [5]

1.3 Problem statement:

The primary goal of this research Paper is to enable concurrent connectivity across multiple available network interfaces in a seamless and efficient manner on mobile devices and Desktop Broadband.

- **It necessary to ensure the Quality Services of Communication technologies as recently auctioned by PTA.**

The Stack holders as Zong, Mobilink, Telenor, Warid, and Ufone have to regularize on Quality services as in rural area of All over Pakistan, as we see report of Last year PTCL also in mostly complaints [6]

(Received and solved)Summary of Consumers complains. 2012-2013 by PTA

Service Providers	Received Complaints	Resolved Complaints
Cellular Mobile Telecom Operators	17948	17083
PTCL	11327	11168
Internet Service Providers (ISPs)	248	229
Wireless Local Loop (WLL)	124	115
Long Distance International (LDIs)	67	55
Total	29714	28650

Sources PTA.com.pk/annual Report 2013

- Which Impacts arrived in Pakistan’s economy as Analysts Indicators?

1.4 4G Impacts On International countries’ Economic:

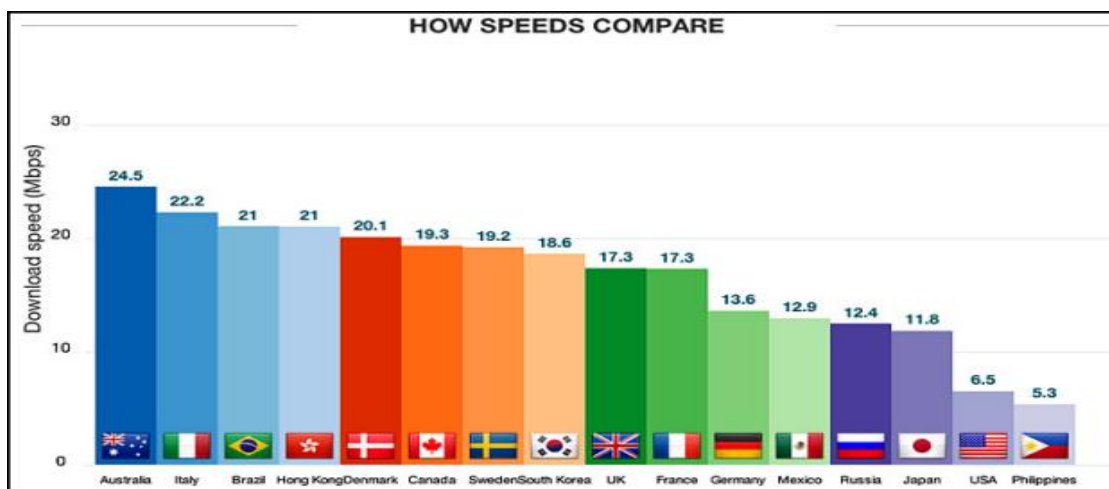
Overview of US Policy:

The key factors in explaining how the United States leads the 3G cited. The federal government's role in making the spectrum available. From 1994-2000, the FCC auctioned spectrum available for commercial mobile services in the amount of triples. [7].

However, spectrum caps limited U.S carries 55 MHz per market, while abroad most European and Asian carries were allowed to own 80 to 90 MHz in 2003, the spectrum caps were removed, which freed American carriers from the constraints on developing broadband networks. Additionally, the fact that the FCC allowed U.S carriers to buy and sell spectrum meant that the available airwave were allocated efficiently by market forces. FCC spectrum auction and the reverberations of the 250% increase in investment and jobs in the mobile market with 300 per cent are collected promptly. [8]

1.5 3G and 4G International Countries Users:

Most of countries are used this technology for economic and social services, as we see in the map of world they increased in the technology and Economic situations by help of technology if we see the map, technology users most fastest are below:



Sources: smh.com.au/austrials-4g-networks

Trail of the fastest 4G network in the world download speeds, but the speed of its coverage of users their experience means 58% of the time, 4G download speeds in the world rankings Australia top spot "LTE 2014 report by British firm comes from the world over 6 million 4G devices installed on users of Android and iPhone applications by means of which data "OpenSignal",.

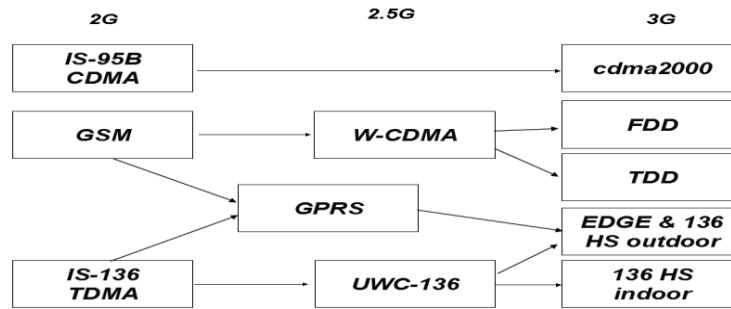
2. BACKGROUND AND LITERATURE REVIEW

2.1 Evolution of mobile Wireless Communication:

“Mobile phones with maritime vessel partially successful, dates back to the 1920s. Because most Largest and most advanced radio technology, lack of equipment; it was not appropriate to particular land Communication. With the further development in 1930s was built the Second World War frequency Modulation (FM) development. Assigned to enable the development of peace in some big cities, limited mobile telephone service in the 1940s. [9].

The first radiotelephone service was introduced in USA at the end of the 1940s and was meant to connect mobile users in cars to the public fixed network. In the 1960s a new system launched by Bell systems called “Improved mobile telephone service” (IMTS), brought many improvements like direct dialing and higher bandwidth. The first analog cellular system were based on IMTS and developed in the late 1960s and early 1970s. The system was “cellular” because areas were split into smaller area or “cell” each of which is served by a low power transmitter and receiver [10].

Evolution to 3G Technologies



2.2 Basic mobile telephone:

Basic concepts in mobile telephone in order to provide ground for building understanding the idea discussed hereafter. Model used in 2G since it provides ground for 3G evolution.

2.3 1G:

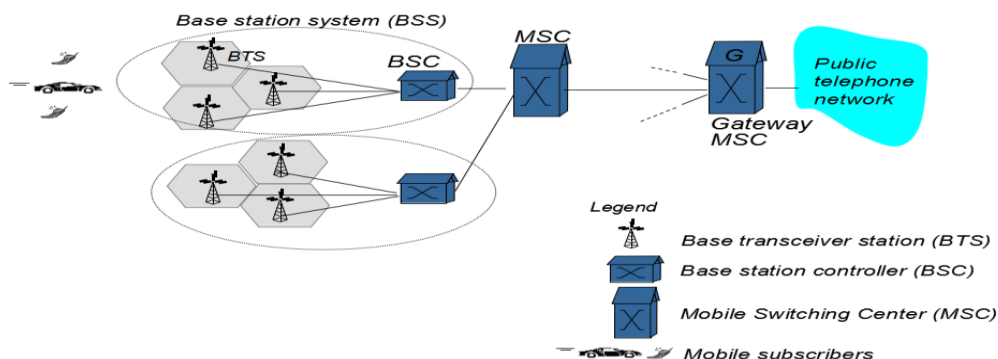
This term refers to the first generation cellular system that was analog telecommunications standards introduced in 1970s. The voice channel typically used frequency modulation and they used FDMA techniques. Some of the standards are NMT (Nordic mobile Telephone). AMPS (Advanced Mobile phone system) TACS (Total Access Communication system) and C-450. The major drawbacks were poor voice quality, poor battery life, large phone size, no security, frequency call drops, limited capacity and poor handoff reliability .[11]

Tchnology	1G	2G	2.5G	3G	4G
Year	1970	1980	1985	1990	2000
Standards	AMPS, NMT, Hicap, CDPD, TACS, ETACS	GSM, i-DEN, D-AMPS	EDGE, GPRS	CDMA 2000, WCDMA	Single Standard LTE-Advanced
Data Bandwidth	1.9 kbps	14.4 kbps	384 kbps	2 Mbps	200 Mbps
Core Network	PSTN	PSTN	PSTN packet network	packet network	INTERNET
Multiplexing	FDMA	CDMA TDMA	TDMA CDMA	CDMA	OFDMA
Service	Analog Voice	Digital Voice	Packetized Data, Higher Capacity	Higher Capacity, Broadband Data	Broadband Data With High Speed

2.4 2G:

This term same refers to the 2nd generation cellular telecom system that was introduced in 1980s. The system were digital and were oriented to voice with low data speed services. System such as GSM and US-TDMA used a mixture of TDMA and FDMA techniques. IS-95/CDMA one were the first system, 2G services are frequently referred as Personal Communications services or PCS in the United States. 2G phones used global system for mobile communication (GSM) standard. The GSM is a circuit switched connection oriented technology, were the end systems are dedicated for the entire call session. This causes inefficiency in usage of bandwidth and resources. The GSM enabled systems do not support high data rates. They are unable to handle complex data such as video.

2G (voice) network architecture



2.5 2.5G:

This term is used to describe 2.5G system that has implemented a packet switched domain in addition to the circuit switched domain. 2.5G is not an officially defined term rather it was invented for marketing purpose. The systems enable high speed data transfer over upgraded existing 2G networks.

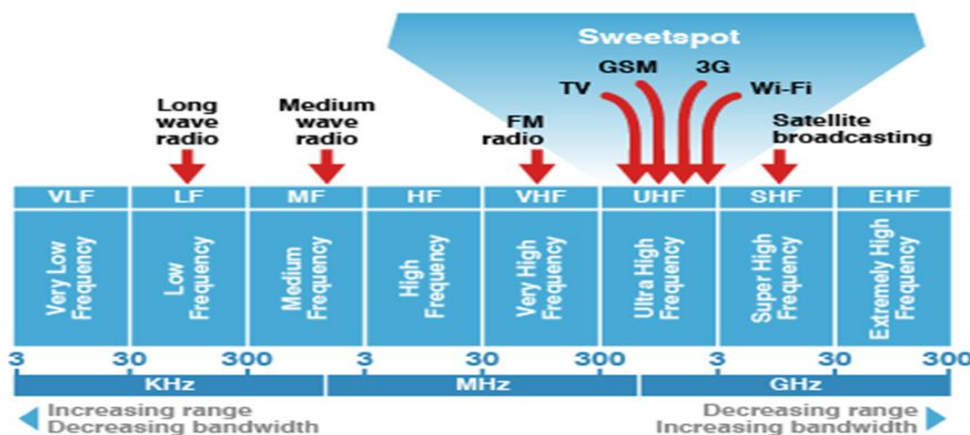
Example: EDGE, GPRS, CDMA2000.

2.6 3G:

This is same refers 3rd generation the designation for system following the 2G systems and they offer high speed data services in addition to the basic voice capability.

Typically they use CDMA techniques and include UMTS (W-CDMA), CDMA2000 1xEV-DV, CDMA2000 1xEV-DO and TD-SCDMA. The 3G technology adds multimedia facilities to 2G phones by allowing video, audio and graphics applications. Over 3G phones you can watch streaming video or have video telephonic. 3G promises increased bandwidth up to 384 kbps when the device holder is walking. 128kbps in a car and 2Mbps in fixed applications. However the short comings of 3G network were high bandwidth requirement, High spectrum licensing fees, huge capital.

Electromagnetic Spectrum Showing Radio Frequency



The frequency bands for IMT-2000 were allocated in two steps: WRC 1992 and WRC 2000. Spectrum auction in late 1990's was primarily for the newly defined high frequency bands. "Many country specific regulations controlled which IMT-2000 family option could be deployed. Result was media focus on the "revolutionary" members of the IMT-2000 family of standards, which led to a belief that this was the only Real 3G. Many industry organizations only consider part of the IMT-2000 family of 3G standards as actual 3G technologies; in particular IMT-SC (EDGE) is excluded from most 3G mobile statistics. This is particularly unfortunate because IMT-Sc is the "evolutionary" option for the vast installed GSM (2G) base and therefore will almost certainly become the dominant 3G component in the near future. IMT-SC is typically excluded because many the industries view CDMA as the only 3G wireless technologies [12].

2.7 WiMAX in the IMT-2000 set of standards:

The backing from the ITU adds to the case for using WiMAX in future wireless developments, said research firm Maravedis. "The price paid **per Hz for WiMAX** Spectrum is as much as 1000 times lower than for 3G spectrum and WiMAX is built specially for IP said Jeff Orr, senior analyst at Maravedis.

The approval of WiMAX version of IEEE standard 802.16 as an IMT-2000 technology increases the changes of global deployment of WiMAX to deliver mobile internet services, especially within the 2.5GHz to 2.69GHz band [13].

2.8 Standards and benefits of 4G:

The section outlines of the details of 4G standards and its various objectives and comparisons with existing 3G technologies. In 4G is the fourth Generation of standards, it is a successor to the families of standards. 4G is described as MAGIC; Mobile multimedia any time anywhere and global mobility support integrated wireless solution and customized

personal service. In 2009 the organization specified the (International mobile telecommunication Advanced). Requirements for 4G standards, setting peak speed requirements for 4G service at 100 for high mobility communication (such as from and cars) and 1 for low mobility communication (such as pedestrians and stationary users). Initially, candidate technologies for 4G wireless standard are (a) HSPA=(High speed Packet Access) (b) UMB (Ultra Mobile Broadband) (c) LTE (d) Mobile WiMAX (e) XGP(Extended Global Platform).

A 4G system is expected to provide a comprehensive Modem Wireless Communication and secure all based solution to laptop computer and other mobile devices. Such as Internet Access, gaming services, and streamed multimedia may be provided to users. 4G technologies such as first release (LTE) have been on the market since 2006, 2008 and 2009 respectively. Advance compliant versions of LTE and WiMAX (first used in South Korea in 2006) and then established after 2008. ITU has decided that LTE Advanced and wireless MAN Advanced should be accorded the official designation of IMT Advanced. On December 6, 2010. ITU recognized that current versions of LTE, WiMAX and other evolved 3G technologies that do not fulfill “ IMT Advanced and a substantial level of improvement in performance and capabilities with respect to the initial 3rd Generation systems now deployed.

Wireless Devices



Wireless Icon



Data card



Semi Parabolic Antenna



Nokia Rooftop :: Wireless Routers



Wireless Router

2.9 Technologies are use:

2.9.1 IPv6

IPv6 supports a large number of wireless enable devices. It removes the need of Network Address translation (NAT) due to increase in number of IP address. It also enables multicast security and route optimization capabilities and for a number of Application [15].

2.9.2 VOIP (Voice over Internet protocol):

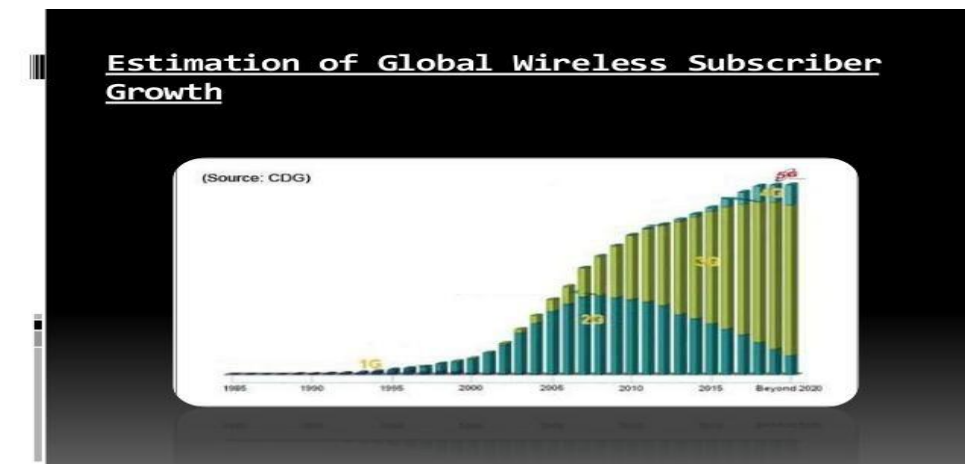
VOIP can only transfer IP packets which eliminate two protocol complexities on a same circuit. It provides lower latency transmission of voice data because it is wrapped up in a packet. Due to greater data compression it increases battery life.

2.9.3 OFDM (Orthogonal frequency division Multiplexing):

The design of the transmitter and the receiver is simplified. Transfer of data is more as compared to other forms of multiplexing. There is no gap in the frequency bandwidth but need to prevent interference. It sends multiples signal from the same antenna to one device at the same, there is no cross talk between the signals.

2.9.4 SDR (Software Defined Radio) Technology:

It is one of the types of open wireless architecture. It is radio communication system in which those components are implemented by the software that is difficult to implement on hardware (e.g. mixers, filters, amplifiers, detectors etc).



2.9.5 UWB (Ultra Wide Band):

It provides higher bandwidth with lower energy bands. This technology is used in both 4G and 5G, also detected as noise in both 4G and 5G. The radio frequency devices which are currently in use frequency spectrum (frequency use 3.1 to 10.66GHz). It transmits pulse instead of continuous signals, therefore it uses less power.

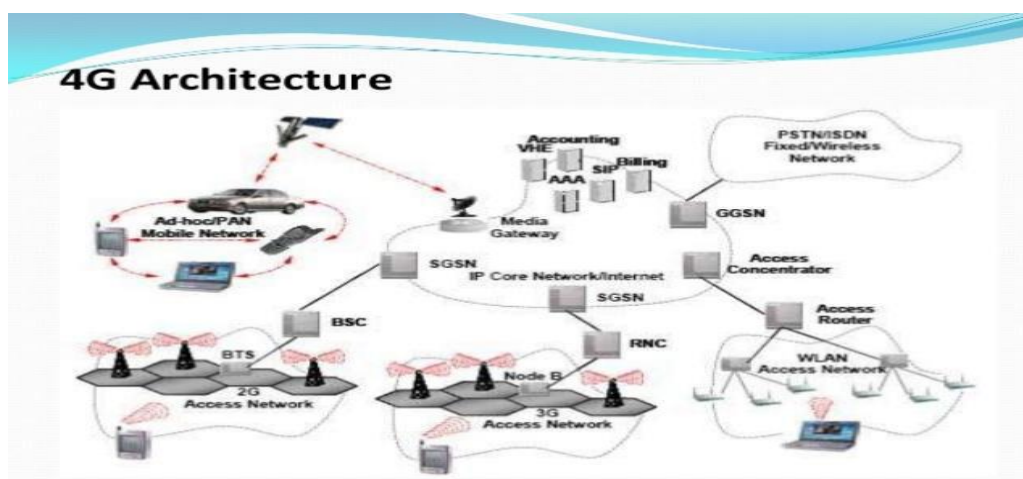
2.10 What is 4G?

In the year 2009 the technology of 4G was proposed to ITU. They basically purpose two ideas:

1. LTE Advanced standardized by the 3GPP.
2. 802.16m standardized by the IEEE(i.e. WiMAX)

(WiMAX: Wireless Mobile Access, the standard designed to provide 30 to 40 mbps with 1Gbits/s update for fixed station).

There are various features of 4G like, Mobile Multimedia; it can be used nay time anywhere, Global mobility support integrated wireless system, Customized Personal service. (MAGIC) It is also a source of entertainment. It has high speed data rate, the download speed is up to 400 mbps and 1GB up to for stationary uses, it can ease to download movies in few minutes. It uses packet switching instead of circuit switching comprehensive IP solutions will be taken from this technology where voice and data and multimedia can be given to a user on “ Any time Anywhere”. It provides high mobile and TV resolution. Its bandwidth is almost about 100 MHz It is a combination of Wi-Fi and WiMAX. Due to substantial growth in number of subscribers 4G is required. Massive demand of new services also leads to evolving of 4G technology. It offers to reduce the number of technologies to single global standard. It fulfills the goal of personal computing and communication. In 4G model with different access technologies combine on a common platform. It increases the position of ADSL and optical fiber access system and office home LANs. It provides network services ALL-IP network, IMT Advance requirement [14].



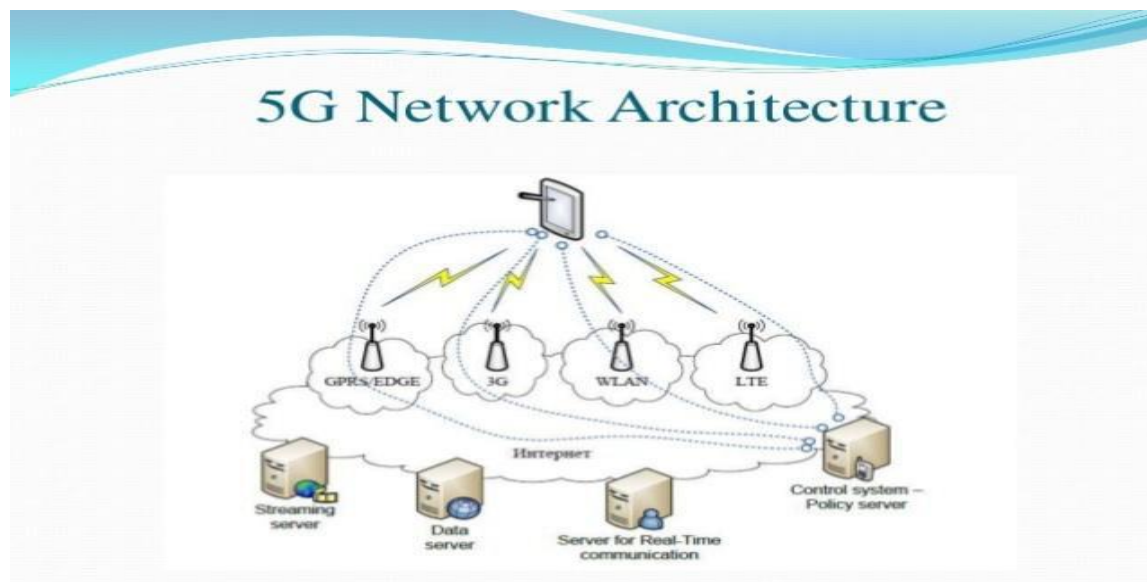
2.11 Merits and Demerits of 4G:

Merits: It has a lot of space then you need, It has higher bandwidth better response time and better coverage. It uses the same tower where the sender and receiver and transmitter for 3G is less time to built the 4G, its uses the same tower and same fiber optic cables as 3G. they just have to upgrade the tower with 4G components. Higher speed in the new mobile applications, with the help of LTE decreases the traffic of communication in terms of sending data. LTE separates frequencies into different channels in order to protect the disturbance of each channel, the solution is called "ORTHOGONAL", and LTE supports more data capacity because it focuses in VoIP (Voice over Internet Protocol). LTE can support voice and SMS (Short Message Service) text messaging using existing network via generic access (VoLGA).

Demerits: up gradation of equipments are high expensive, we have equipments needed to install. Need to use additional antennas at network base use of new network infrastructures. Carriers and providers have to plan carefully to make sure that the expenses are kept realistic. In case of advanced mobile data applications, it's not possible to offer full internet due to limited speed and bandwidth. It has to improve its user interfaces.

2.12 What Is 5G and may come in Future?

Its concept is only theory not real. It is going to be the new revolution in mobile market. It's just the real wireless world with almost no limitation related to access and zone issues. It has wearable devices with AI capabilities. It is the unified global standard it has unparallel consistency transport class gateway. It usually support virtual private network. It provides very high bi-directional bandwidth shipping and very high resolution for cell phone. For fast action it provide subscriber supervision tools. It covers wide coverage with high throughput and uses a packet switched wireless system. Data transfer rate is about 1GBps between two points in the world. Interactive multimedia, voice, streaming video, Internet and other broadband services, more effective and more attractive, bi-directional, accurate traffic static supported by 5G technology. It provides global access, service portability and scalability mobile services. Flexible platform can serve by 5G technology. IT has more capacity that others about 10 times high, it almost provides connectivity speed of 25 MBps. New concept of multi-path data path introduced in this technology. Its vision is to make real wireless world. Integration of networks required in 5G. it usually support CDMA, OFDM, MCCDMA, UWB and IPv6. It has an extraordinary capability to support software and consultancy. It has a great feature called remote diagnostics. It has ubiquitous computing provided by pervasive networks. It is a stratospheric platform station (HAPS) system with high altitude[15].



3. METHODOLOGY AND APPROACH

This Chapter covers approaches involved in overall research from the beginning to end, It helps in eliminating the option of using several hardware components and terminals. To combine various wireless networks and services in a 4G systems, multimode user terminals should be installed in the system because they are able to work hand in hand with various wireless networks by reconfiguring themselves. It makes each particular communication session easy because it choose the appropriate wireless networks for each sessions. This can be achieved by using a software defined radio.

3.1 Quality of Service Issues:

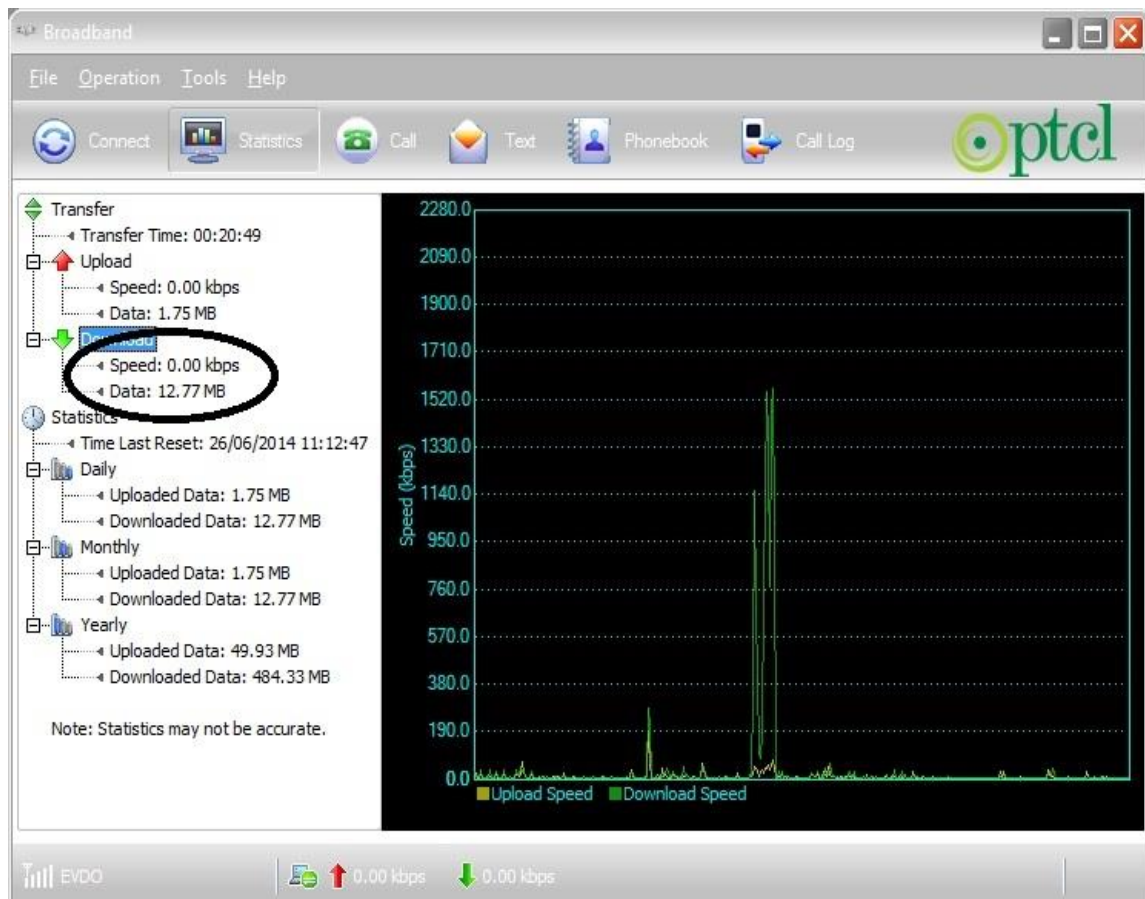
As mentioned in the Problem Statement, performance of Broadband network under mobility was studied in this research paper. The first purpose of this research is to provide data related to performance metrics of Mobile Broadband networks in Pakistan and the second purpose is to deliver knowledge and analysis from the collected data. To fulfill the first purpose, different performance metrics like connectivity, delay (RTT), packet loss, Broadband mode and sub mode, and WLL state, Cell and LAC and RSSI were collected in mobile scenario for operators in Pakistan.

Table 1 QoS Tested Operators	
ZONES	OPERATORS
Karachi	Cyber Net, CubeXs, Multinet, NTC, Satcom, FiberLink, FariyaNet, Connect Communication, Ebone Tech, WorldCall, Wateen, Mobilink Infinity, Qubee & Wi-Tribe
Lahore	Wateen, NTC, WorldCall, Wi-Tribe, Qubee, Cyber Net & Nexlinx
Islamabad/Rawalpindi	Cyber Net, Micro Net, NayaTel, Qubee, PTCL, Wateen & Wi-Tribe
Peshawar	COMSATS, Cyber Net, GOL, Wateen, WorldCall, NTC & PTCL
Quetta	Wateen, Cyber Net, PTCL, Link Dot Net & Geo Net
Muzaffarabad	SCO & SkyTel

Source: Pakistan telecommunication Authority Annual report 2013, Current Issues

3.2 Assumption of 3.1 EVO service:

Many times we see signal drops and speed not so good as defined 3.1 MB but in differentiate of 3G Evo3.1 MB against DSL Broadband so good quality against this service.



The second statistical analysis models follow by investigating information in connection with problem statement for desired knowledge.

3.3 Using Towers and Tenancy or Sharing Infrastructure:

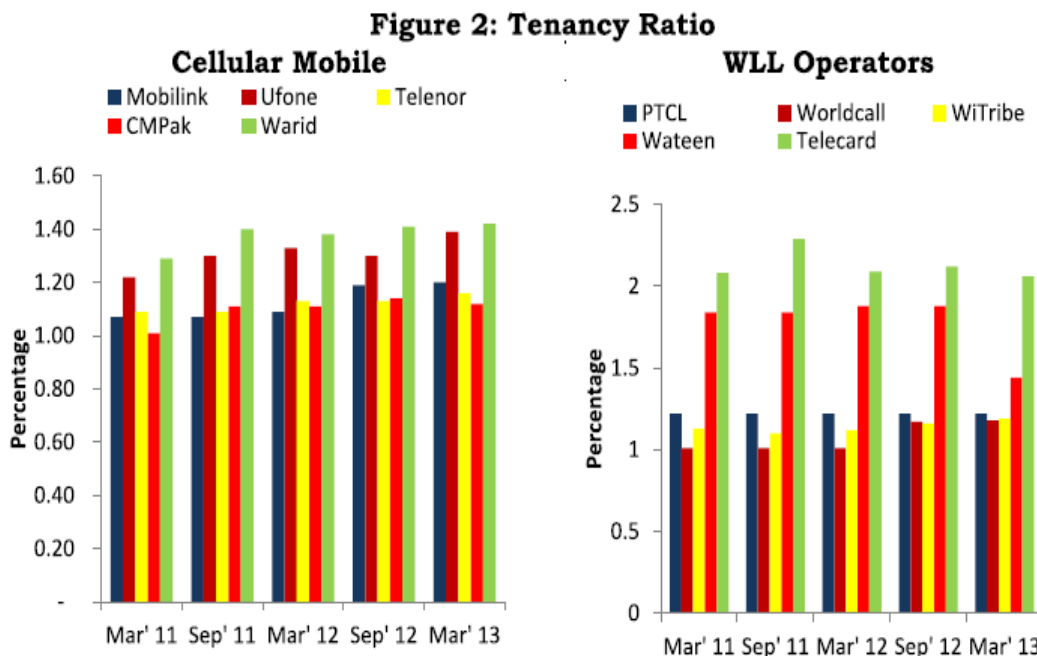
The study purpose is primarily Impacts arisen else economic or broadband speed spectrums after launched 3G and 4G, where performance metrics were compared in static versus mobile scenario. Performances were also compared between different operators in Pakistan under mobility in different speeds. Later, behaviors of Broadband networks such as handover, loss patterns as well as coverage in different geographic locations were investigated. So the study performance on this research is ensuring this technology benefits all over Pakistan also in rural areas. As we see in table some shared tower Ratio.

	Total Towers	Shared Towers	Tenancy Ratio
Overall	34168	8213	1.24
Mobile	31405	7519	1.24
WLL	2763	694	1.30

Source PTA Pakistan

Among the mobile operators (telecom Companies) Around Mobilink, Telenor and CMPak behind with their ratio below 1.3 are still 1.3 Ufone tenancy ratio of 1.44 is the highest.

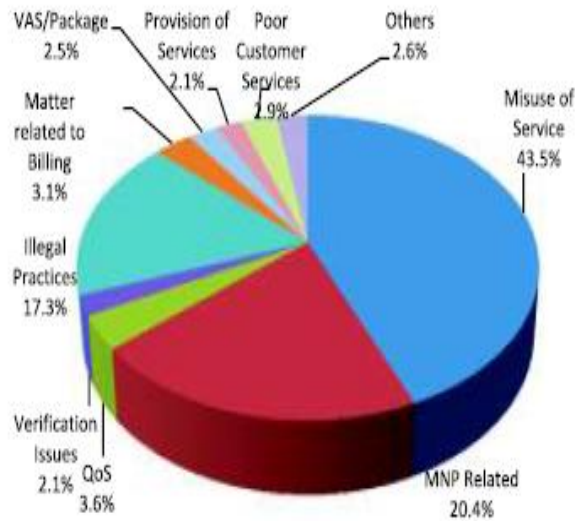
Smaller than the WLL operators, PTCL, Witribe and World Call tenancy ratio of major players still need to improve.



In this figures clearly stated about position of networked towers and cellular, WLL Operators statistics.

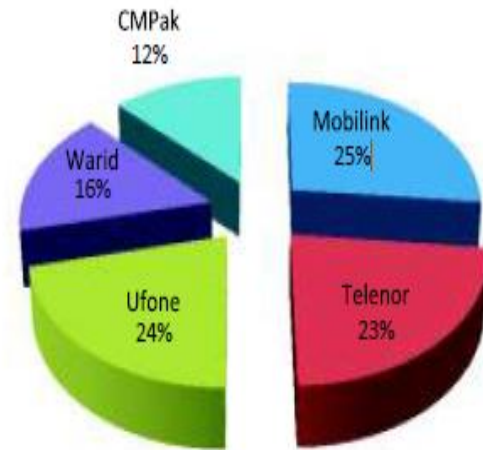
A deeper analysis of complaints cellular mobile services and mobile number portability 43.5% of the 9930 complaints received from the mobile number portability (20.4%) received by the PTA cellular mobile service after complaints were related to the abuse of obviously.

Figure 32: Share of Complaints by Category (CMTOs & MNP) FY 2013



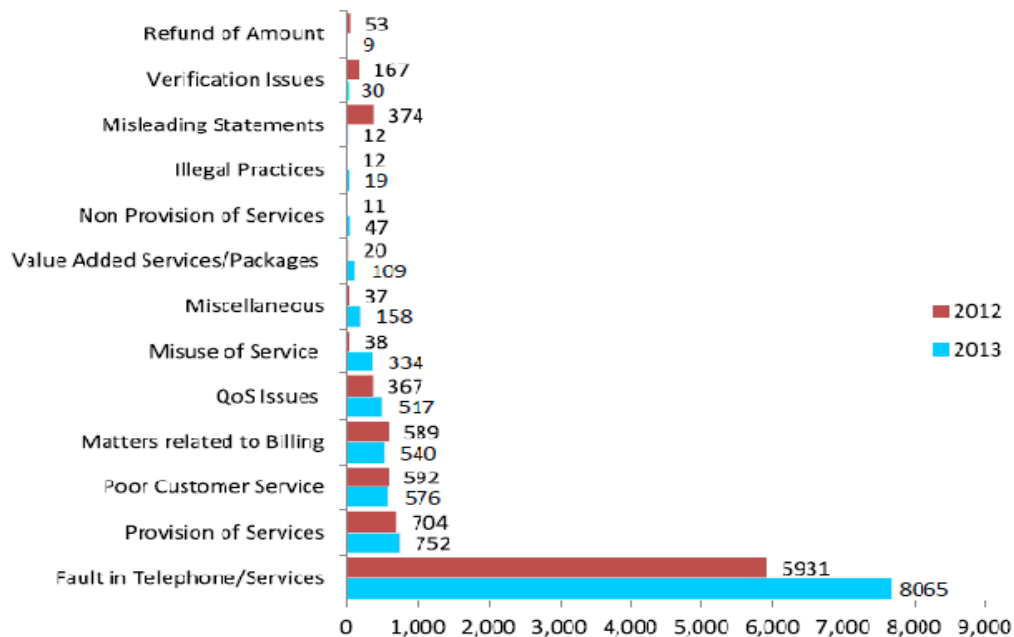
Note: Others includes Miscellaneous Issues, Refund of Amount, Non Provision of services, Misleading Statements

Figure 34: Mobile Operators Complaints Share FY2012-13



Authority in various categories 11168 complaints received against PTCL. However, sin / break in service form the bulk of the complaints. A complaint of existing infrastructure to prevent this important position needs immediate attention. Service provision, service quality, billing problems and other complaints make up the rest of the complaints.

Figure 35: Analysis of Consumer Complaints (PTCL 2012 and 2013)



Consumer Complaints

As these complaints are arisen so we have to determined and find out speed delay time by different procedures
 This Analysis report displaying a comparatives yearly report of services complaints
 Systematic measurement can be performed with several possible approached involving different parties:

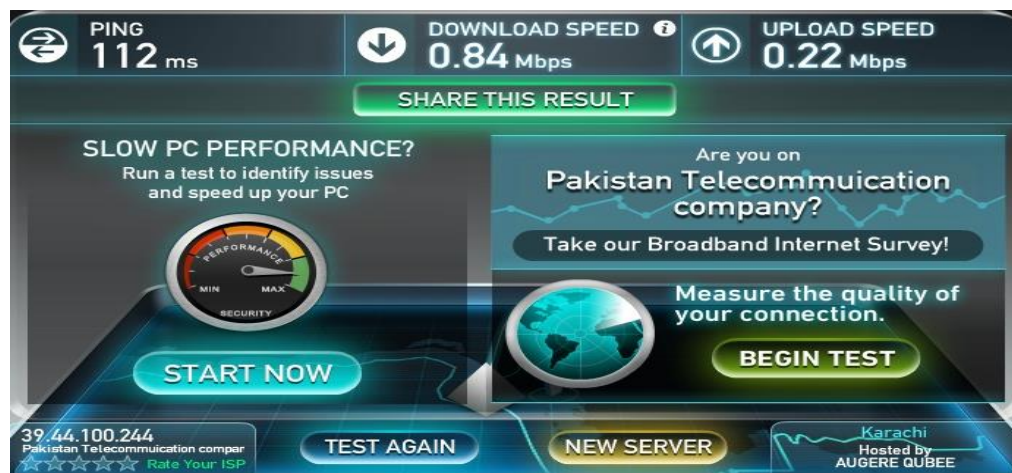
- Drive tests by the operators to find performance as well as coverage
- Performance tests by end users
- Independent tests on dedicated test bed or measurement infrastructure

Enhancing commercial interactions

The way the entrepreneurial innovation ecosystem affects the economy can be described enhancing commercial interactions among people, organizations and machines.

3.4 Measuring Procedure:

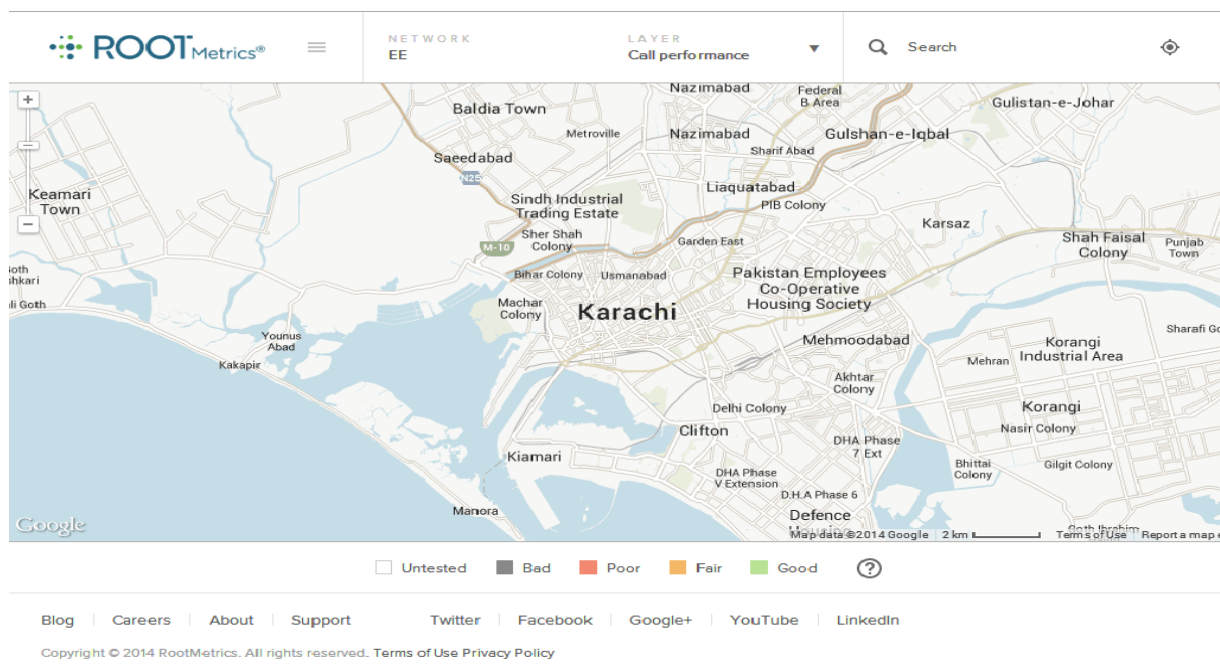
Procedure 1. Measurement of this technology as speed and bandwidth with delay time, The One MB Connection status get this report signals and data download.



Source: Speedtest.net

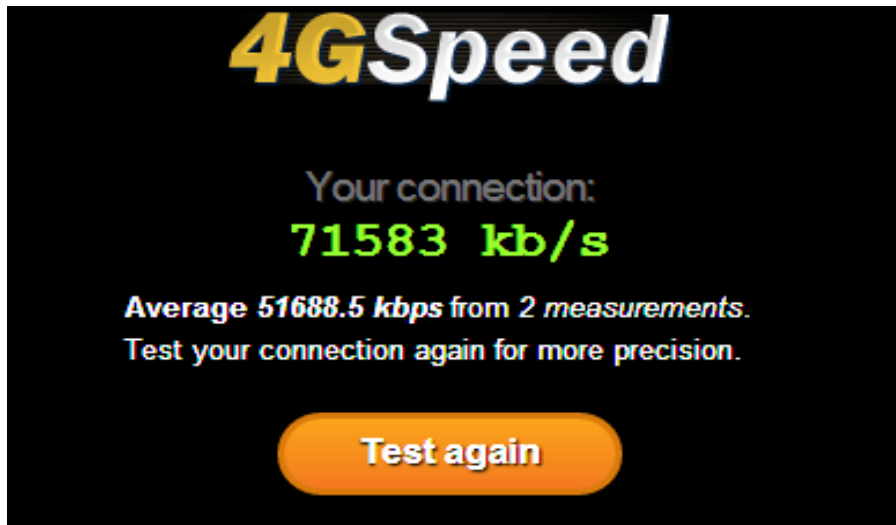
Testing Quality service:

Procedure 2; as all International Countries are used the Root metrics Services by different locations so we also used this service to determined root metrics of City



Sources: www.rootmetrics.com

Procedure 3; now we test the speed for 4G service as this picture clearly showing the status of this test,



Source: 3gspeed.info

3.5 Analysis International Models:

➤ Global Developments and Implements:

EE brings 4G mobile broadband to 2600 rural communities in UK

Mobile network providers EE has completed a major project to bring 4G broadband to almost 2600 rural towns and villages across the UK, doubling the footprint of its double-speed network and bringing service quality comparable to that obtained in major cities to three million more people.

The project covered 2588 communities with population below 10,000 the smallest being Silverburn in Scotland, with just over 60 residents.

EE claims in some of these communities, businesses and residents are now able to obtain download speeds that were faster than those reached under the auspices of the controversial BDUK Programme, raising the possibility of 4G broadband becoming a viable replacement for fixed line services in some cases. [16]

3.6 4G Deployment:

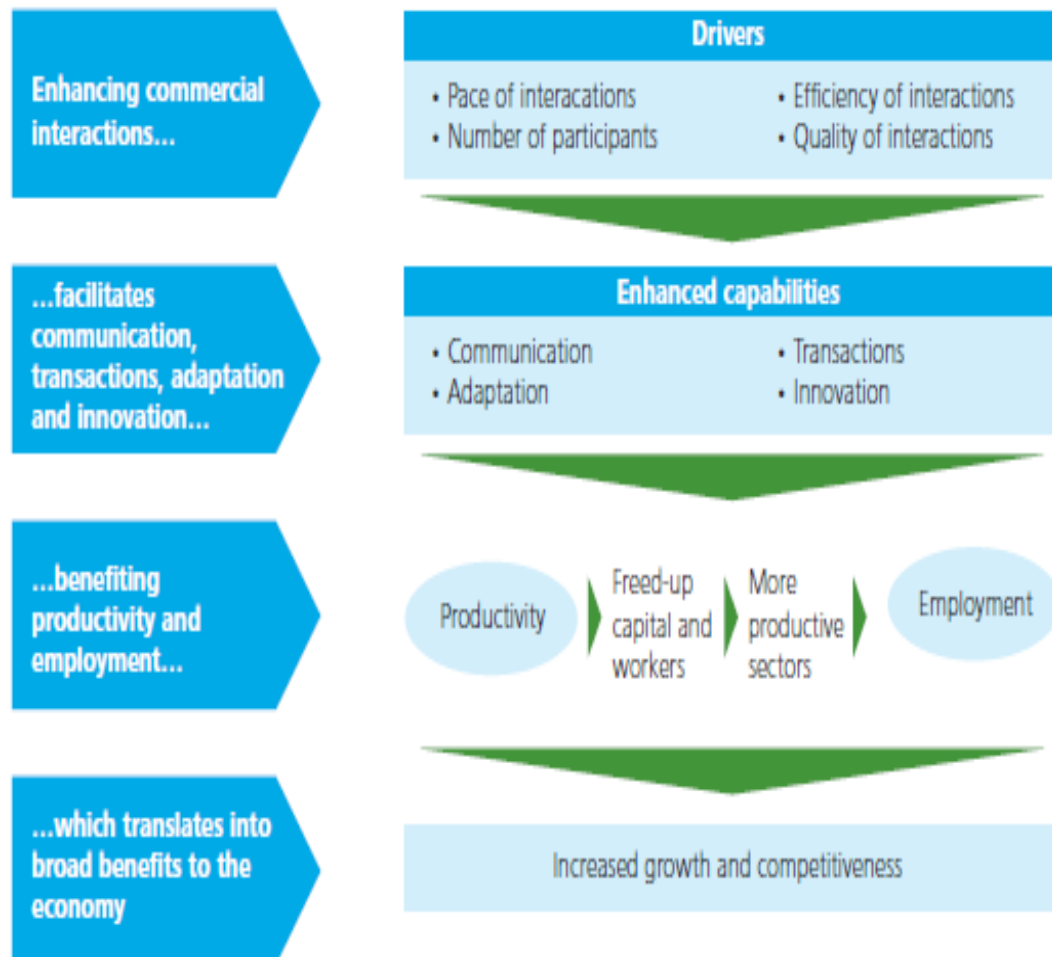
4G deployment as income, it can be more effective, and/or whether that information is included in the higher price in the term of affluence that can allow more such discussions.

- Increasing efficiency entails producing the same outputs with reduced inputs or producing the more outputs with the same inputs. For example, mobile communications increase efficiency by making it possible to conduct transactions, meet exchange information or carry out other interactions on an anywhere anytime basis. The greater throughput of 4G networks allows more mobile interactions to be conducted more efficiently – for example, transactions and payments information and data transmission, and interactive collaborations or enhanced communications such as video calls and social media.
- Increase quality relates to the level of performance or value of goods services, such as the extent to which the richness of the communication associated with interactions is appropriate to the needs of the parties or the security with which information integral to the interaction is exchanged and documented. For example; for virtual business meetings remote education or personal conversations, value is enhanced to the extent the experience resembles being there in person. The visual and auditory information inherent in the type of high quality video available via a 4G network created the opportunity for an anywhere anytime, high quality interaction that can augment the capabilities of wire line broadband.

Improving efficiency and quality increases the ability to communicate, transact, adapt and or innovate contributor to growth in GDP. The impact when new infrastructure enhances commercial interactions is shown by examples such as the

increase in productivity in the United States following expansion of the interstate highway system and the increase in global consumption resulting from electronic payments. [17]

Exhibit 5. How enhancing commercial interactions produces economic benefits⁵²



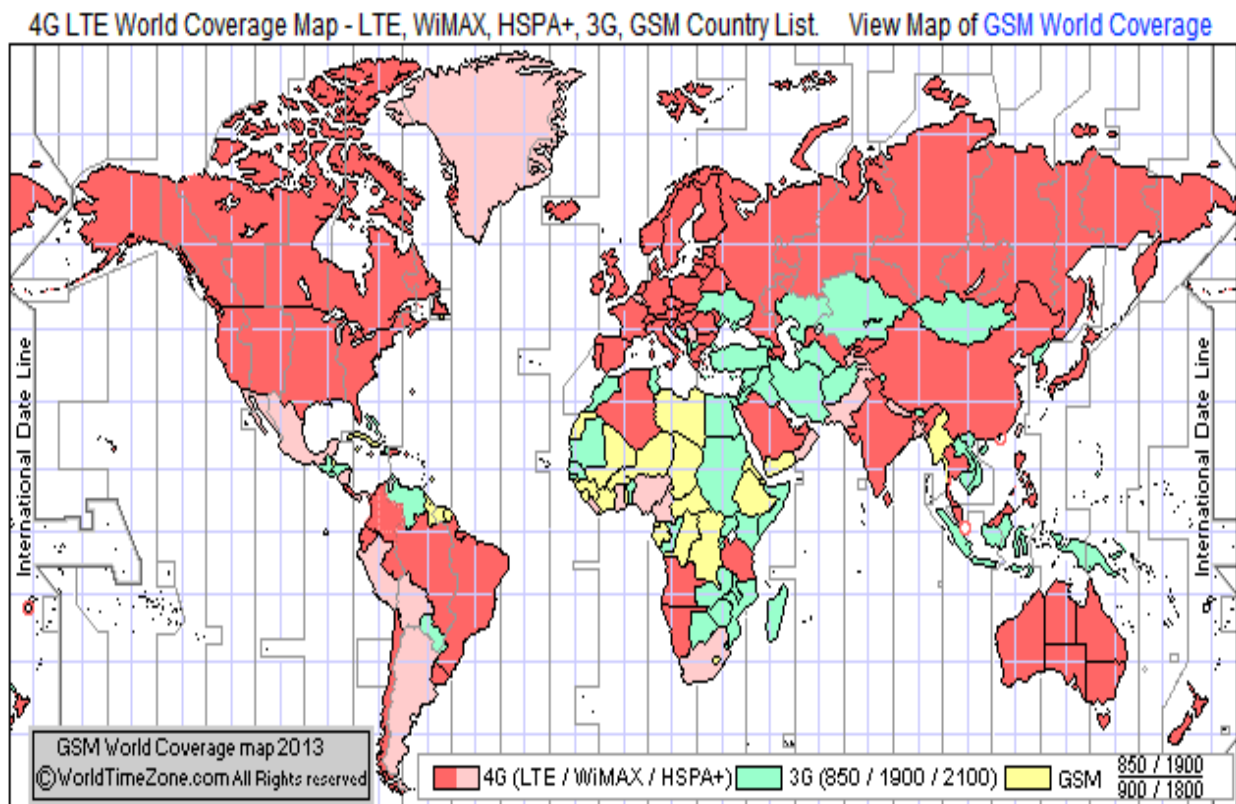
3.7 Wireless System Selection:

4 G user with the help of terminals for each individual’s particular communication session can select available wireless networks. because each network is the prominent features, particularly for a proper network service by using system performance and usage is optimized. Moreover, I understand the network selection is required by each session can ensure quality of service. On the other hand, the availability of the network is different because every now and then in every communication, it is difficult to choose a suitable network for the session. In addition to the appropriate facts are needed for each network before a selection is made. It contains. The exact knowledge of the types of support service, system data rates, quality of service requirements, communications costs and user preferences are.

3.8 Network Infrastructure and Quality service support:

Wireless environment can be categorized into two parts: an IP based system (mostly for voice delivery such as GSM Services) and IP-based system (data such as 802.11 WLAN services are usually optimized for). A 4 G wireless, in an atmosphere of these two systems, the problem becomes apparent. In order to deal with because they are especially when time is considered to be sensitive or multimedia applications are not easy and the quality of the services by the end of the end of guarantee for services such as research, need to be the case with challenges. The current quality of service with a specific design in mind, usually are made up of wireless system. 4 g will be in the systems because are different, each

system includes design for quality of service to provide only certain wireless system to end services cannot guarantee. The Internet is the most common quality of service architecture to solve these challenges in working with 3GPP studied.



Pakistan Launch 3G and 4G technologies in few cities

4G marketing period (all 4G networks are created equal) Major 4G Standard:

- LTE (Long Term Evolution) network, the fastest 4G;
- HSPA + (evolved high speed packet access) LTE, however slow, faster than 3G;
- WiMAX (Worldwide Interoperability for Microwave Access) - HSPA + speeds almost the same as
- LTE FDD and TDD spectrum associated operations to accommodate the unpaired spectrum is described.
- Many countries, LTE, WiMAX, HSPA +, 3G UMTS, the GSM network co-exist).

3.9 Fault Tolerance and Survivability:

The wired and high speed data networks (e.g. Public telephone switched network and asynchronous transfer mode network) has an extensively designed fault tolerance which gives the networks improved reliability, availability and survivability. In contrast to wireless network, they are configured as a tree topology that has quite a few levels; any damage to one level will affect that level and the levels below it. If this can happen to one wireless network then it will be worse in 4G network system, working together, where the network topology is the tree. The fault-tolerant design should consider the power consumption. Many different wireless networks, user mobility, quality management, safety, system capacity and link error rate.

3.9.1 Disadvantages:

- Cost is a constraint for 4G system because the tools needed to carry out the vision of 4G is very costly.
- Operating areas: In 2G systems, it can operate in various areas but the problem it has that has been unable to supply network in most rural areas and in metropolitan areas with many tall buildings. If this problem is not stored out it will be integrated into the 4G system.

- The relationship gap amongst the major players in mobile networks i.e. telecommunication vendors, operators and service providers and the internet providers may cause a staggeringly difficult 4G billing issue.

3.9.2 Advantages:

- High Speed data transmission.
- It will support interactive service link video conferencing (with more than 2 sites simultaneously).
- It will support wireless internet.
- The bandwidth will be much wider (100 MHz).
- The cost of data transfer would be comparatively very less.
- Global mobility would be possible.
- The network security would be much tighter.
- The Quality of Service will improve.
- Efficient algorithm at the physical layer will reduce the inter-channel interference and co-channel interference.

3.10 Certain Governments are own shares; in domestic telecom and high-tech companies by International countries. Some treat the success of their telecom and high-tech sectors as a matter of national industrial policy and offer assistance through means such as tax incentives, R & D funding and end user subsidies in addition to directly supporting particular entities through their ownership position.[18]

Exhibit 9. Efforts by selected governments to promote 4G deployment⁷⁴

Country	Government actions
China	<ul style="list-style-type: none"> • Providing R&D for a Chinese version of 4G wireless infrastructure • Coordinated large-scale LTE trials • Financing the export of China's wireless technology through state-owned banks
South Korea	<ul style="list-style-type: none"> • Actively field testing what has been rated the world's fastest LTE network • Providing funds to build a "mobile cluster" industrial zone to support LTE product development • Provided undisclosed support for Ericsson to set up a 4G R&D facility in the country
Japan	<ul style="list-style-type: none"> • Identified 400 MHz of spectrum to reallocate for mobile broadband purposes • Supported NTT DoCoMo, the leading wireless carrier, with LTE field tests
France	<ul style="list-style-type: none"> • Made available 30 MHz of spectrum in the 800 MHz band and 70 MHz of spectrum in the 2.6 GHz band for 4G service • Mandated that 90 percent of the population will be covered by 4G by 2025, creating a large market for 4G services
Sweden	<ul style="list-style-type: none"> • Deregulated market three years before the United States • Made the 2.6 GHz band available to carriers in April 2008 • Provided Ericsson, a leading 4G network equipment vendor based in Sweden, an undisclosed level of financial support

Source; www.ZTE.com

As the deployment of 4G networks proceeds, the extension of advanced mobile communications could cause an increase in the number of businesses retained, relocated, and started rural communities. Allowing rural markets to participate in the

enhancement of commercial interactions that 4G networks enable could help stimulate economic growth and new job creation that would not have happened without the new infrastructure.

As in inner city neighborhoods, 4G networks serving rural communities could augment the contributions of desktop or laptop computers connected to fixed networks and create new opportunities to learn and work. The affordability, familiarity and capabilities of 4G mobile Broadband devices could help rural residents who would not be viable candidates for employments in fixed broadband world gain entry to the online realm and obtain the information and skills required to begin to climb up to the workforce who were previously on the sidelines' would help increase the rate of growth in America's GDP employment and Competiveness.[19]

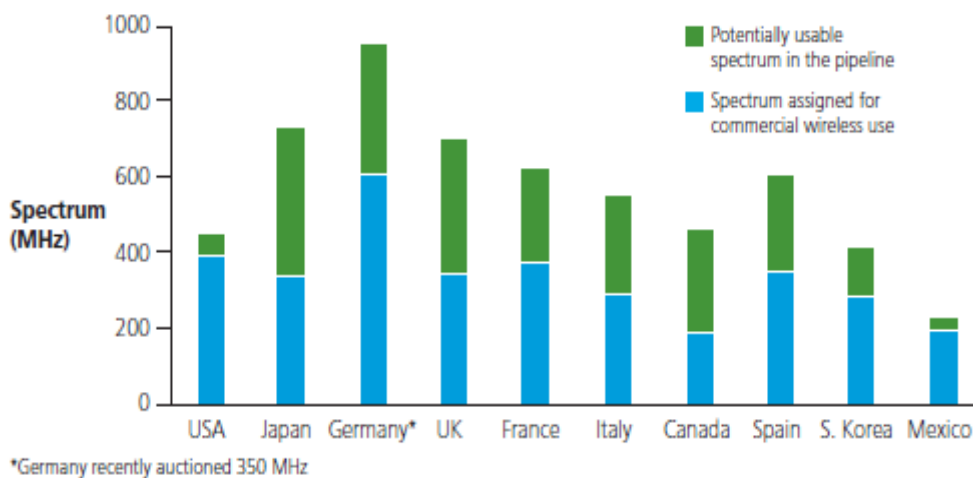
3.11 Ensuring sufficient spectrum:

As the first section also pointed out, however, there are indications the spectrum currently and potentially available for U.S. Commercial wireless service will be insufficient Telecommunications increasingly shift from voice to data applications. Further, as the chart illustrates, the amount of spectrum available from commercial wireless services in the United States could be exceeded by the supply in other countries. [20]

The federal Governments committed making new spectrum available for flexible use, including spectrum for mobile broadband services, and proposals are pending to permit incentive auctions that will encourage current spectrum owners to allow some of their holdings to be real located.

Auctions made spectrum available for 3G mobile broadband and thus could be effective in the case of 4G as well. Additionally, stipulating that spectrum is spectrum is to be used, which can be more efficient that sources.[21]

Exhibit 10. Comparison of spectrum assigned and in the pipeline⁷⁸



Source: CTIA, "The Wireless Industry Overview", May 12, 2010. [22]

3.12 Application of 4G and 5G Technology:

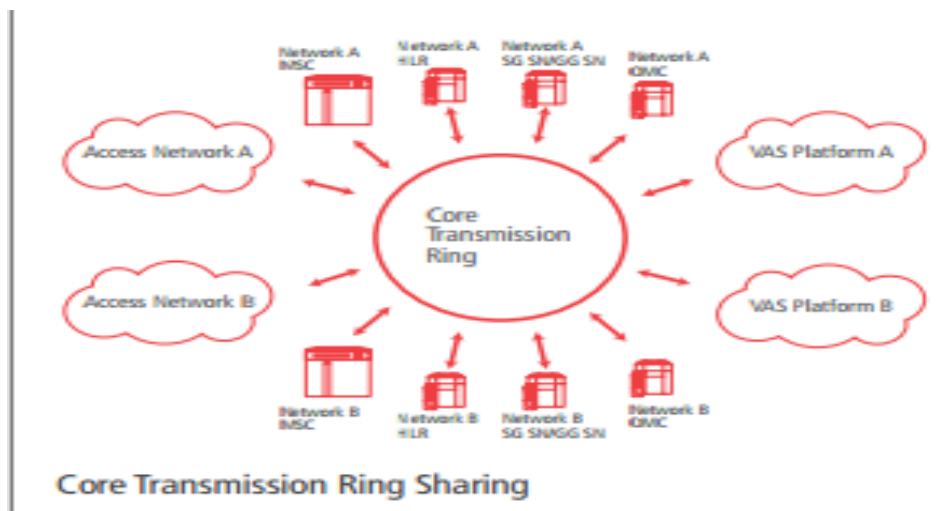
1. E-Commerce:- helps E-Commerce engine, online payment and courier system integrated in one site
2. Business/Work: - extend your office works to your phone, your car or to your belt.
3. Private Life: - Movies download, various search engines.
4. Vehicle: - 8.2 4G public policy safety, Intelligence transportation system (ITS) helps technologies information process, control and electronics, will mitigate future collaborations.
5. **Public Policy:** Providing guide lines to certain places, showroom nearby, provide anywhere anytime police security connection through 4G.
6. **Education and Entertainment:** Smart classes-learning, online gaming.
7. **Ringing your mobile according** to your mood, as well as hold you are mobile as you desire.

8. Visualize planets and universe live.
9. Get alert from your mobile when someone is trying to open your intelligent car illegally.
10. It is media independent handover, manages radio resources.

4. RESULTS AND ANALYSIS

4.1 Strategic Solution for Quality services:

Top Charts towers share a report showing, but successful and expensive towers infer better performance and quality of the towers of the load bearing capacity of the leaves should be increased by the private operators are concerned Sites, antenna and antenna tilt and getting the height of the negative impact on the quality of service and within the space, quality goods employed by the dealer. Therefore, sharing sites, mast sharing and roaming networks because of their relative simplicity infrastructure for technical and commercial partnerships are the most common types. Built-in 3G and 4G network operators start out by sharing infrastructure to reduce capital and operational costs are taking a chance. The products and services in many cities over the 3G network is trying to use the 2G network operators to join the current technical and more attractive.



4.2 Positive outcomes include:

- Optimization of scarce resources and positive environmental impacts.
- Decrease in duplication of investment, reducing capital and operational expenditure.
- Reduce Energy Consumption
- Positive incentives to roll out into underserved areas.
- Improved Quality of Service, particularly in congested areas.
- Product and technological innovation as operators compete on service differentiation.
- Reductions in wholesale and retail prices for mobile service.
- Faster Service roll-out
- Affordable tariffs for consumers
- Reduced cost of infrastructure

4.3 Competition Impact:

Regulatory dominant firms face competition to meet the non-dominant firms, where working conditions so as to harm competition., Work on the basis of national competition rules and usually (1) efficiency gains outweigh any competitive whether access to the difficult task of accurately distinguishing the case, and (2) the same level of performance that can be achieved in the least harmful way, whether it is to distinguish between the following types of partnerships is relevant to a regulatory point of view :

Site and mast sharing (passive sharing)

- RAN sharing
- Core network sharing
- National roaming

4.4 Environmental Impacts:

The main environmental impact of networks relate to:

- Proliferation of masts.
- Power Consumption
- Handsets.

In this session we look at the impact that infrastructure sharing can have on these environmental issues.[23]

4.5 New Implements as Latest Fastest New Technology:

Alcatel-Lucent's Bell Labs division announced a 10 Gbps broadband over copper speed record with its new XG-Fast technology. This new technology could be a breakthrough for broadband providers to gain fiber speeds using existing copper infrastructure. Meanwhile a report from Tele-Geography shows more content providers and Internet service providers are choosing peering agreements over IP transit services. [24]

4.6 3G/4G Technology Impacts on Economic:

The Pakistani government on 23 April 2014 auctioned 3G and 4G spectrum, 3G / 4G broadband will spread in Pakistan starts. This Service at the country's national income and interest, 380 to 1180 till 2020 for the country's national treasures, its video calling service from mobile service users, live video streaming, e-education, e-banking, e-driven data like text or voice-based services will migrate to the health, therapeutic and social media ecommerce applications. 3G / 4G service through smart phones will provide Internet access to consumers everywhere. [25]

Internet users should be in Pakistan now waits to see any telecom operators get much hyped about the licensed service. While everyone agrees that the addition of 3G and 4G technology will be a good development for Pakistan, there is still a lot of people are confused regarding the specific benefits of the new technology.

- **Increase in Internet speeds:**

This is the benefit everyone knows. Increased Internet speeds will not make Internet browsing a pleasure for everyday users, but also increase work opportunities for those in the technical sector. Streaming music and video while on the go will become much easier. The increase in Internet usage will result in more opportunities for online businesses.

- **Increase in Employment:**

Studies have shown that an increase in broadband penetration and, so as not to GDP growth. The increased economic activity in the country leads to an increase in job opportunities, especially in the technical sector. It is estimated that about one million jobs will be created in Pakistan with the launch of 3G and 4G.

- **Availability of Internet Across the country:**

We want here to become easier to provide the best Internet services across the country rather than just in the main cities. With the increasing use of the Internet, so you will know the technology, how to ordinary Pakistanis. Once people in the villages to get connected to the Internet, they will be able to keep up with the latest technology and updates.

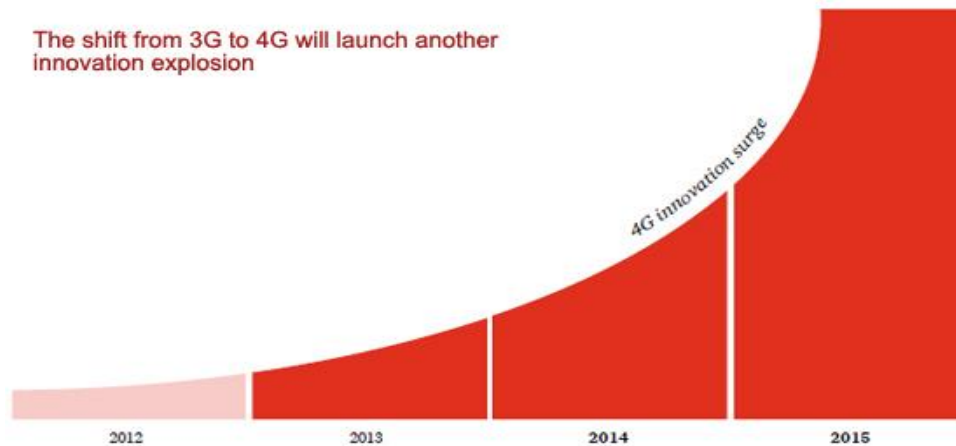
- **Increase in Foreign Direct Investment:**

One of the licenses is to be issues off the local operator, which is done in the hope of increasing foreign direct investment in Pakistan.

4.7 Technological Impacts:

We expect this 4G innovation to include new business models based on capacity improvements, and new use cases based on better video streaming and other technologies. We also expect three factors associated with the transition to 4G technology (a) share of infrastructure investment, (b) share of devices (c) share of subscribers.

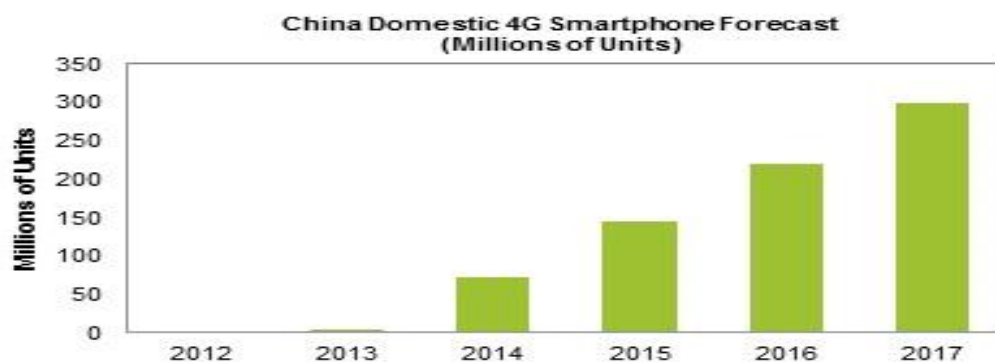
To reach levels that could trigger a robust period of 4G innovation. On base this expectation on the pattern we saw in the same three factors in the 2G to 3G transition, as this pattern repeats with 4G if creates the potential for a surge of 4G innovation starting no later than 2015. As expected chart.



The actual speed for the user cannot be precisely predicted. At any point in time, the wireless infrastructure is a mix of technology generations. Carriers for good business reasons, don't normally make available to end users the maximum speed the underlying technology is capable of supporting. For the user the mobile experience is only as fast the slowest point on the network at the movement.

The speed at which bits are streamed to individual devices by wireless infrastructure is determined by several variables. Among these are the limits placed on the network by the operators themselves for technical, service quality or business reasons, other variable include geography the generation of technology used by the cell tower, the number of other devices sharing the total capacity of the tower the type of data the devices are accessing (text or video, for example) and the signal's generation strength and exposure to interference. The goal of tracking the relative changes in speed from one year to the next makes this task a bit easier.

As new investment increased Timex's Ironman cellular smart watch China's domestic market for 4G Smartphone's is poised for a massive liftoff this year as shipment grow sixteen fold from 2013 levels, shipments in 2014 of 4G Smartphone within china are forecast reach 72.4 million units nearly 1500 percent from just 4.6 million last year, the next few years the 4G smart phones market in China see unstoppable growth, doubling in shipment next few years. [26]



Source: IHS, January 2014

4.8 Future Work:

Due to the time constraint, this research paper could not cover some research possibilities on 3G and 4G Quality Service under network speed and infrastructure, and they are proposed for future works with latest Environment due to short time and recently started this technology no found well reports from sources. We measured Quality of service and Impacts on Pakistan which just performance in normal traffic condition and signals, so we could measure Quality considered and it's generally impacts on economic hub. Since we measured Quality using and measured as Bandwidth, stability, reliability

and disconnectivity, else Impacts on economical or technological, and faster technological period of globally innovative. the rise of 4G networks presents insight into the next generation of mobile and desktop networks, as early 4G deployments were being considered, carriers (Phone companies) so some speculations around 5G networks has carriers embracing the role of dumb, especially as consumer demand for data growth, and also we discovered all economical Impacts till minimum one year reports observed. So must also beneficially discovered impacted technologies and also favor of this country as

Telemedicine rapidly development new application in clinical medicines in which we may transfers prescriptions, remote medicine procedure and other networks for consulting purpose, or remote medical examination. To make it easy to understand we give an example like two Doctors discussing a case through satellite communication, these new techniques have helped the modern Telecommunication. Pervasive networks have wireless sensor networks and ubiquitous computers because of this user can connect to any of these networks and move according to computers because of this the user can connect to any of these networks and move according to requirements among them, also added multi homing applications. Massive dense networks/Massive Distributed MIMO. Use of millimeter wave frequency has also been used for wireless backhaul and access. Cognitive radio technology also known as smart radio allows same

Spectrum to be used by different radios technologies. Here radio resource management has been used in distributed form which in result software defined radio. (Wireless Regional Area networks).

South Korean Ministry of Science Education and Technology (MEST) has declared to spend millions for 5G network to develop which would be faster than 4G LTE. Trials of service would be developed through 2017 and commercially this generation of Network would be available till 2020.

One of the known companies Samsung performed the 5G test on May in 2013, when it said it had 1 GB ps signals.

5. CONCLUSION

The number of generations developed one by one and some of the features enhanced in them eventually, in every next Generation which has lead to the growth and development of the society. Coming back to 4G it provides usual voice and transfer of other services in 3G and then it included internet Broadband service along with every other service as a development in 4G. Then 5G totally is by its own a future scope technology and does not define the number of services it would provide in future. "The Combination of GSM/EDGE and WCDMA under a seamlessly integrated UMTS multi-radio network should yield the best possible radio performance both for speech and data services." Provided multiple teams availability, GSM / EDGE can play effective technology in the ranges of the cellular network already deployed (800 900, 1800 and 1900) and WCDMA 2100 new band (IMT-2000) or other bands coming on the male 2GHz (as is likely the case in the United States). For licensed operators situation with the deployment of multiple devices UMTS ". Because of regulatory conditions and the current market, UMTS900 comes in the picture as 3G enabled before buying new spectrum. Become a role include indications of support for the delivery of steel for UMTS GSM Oakes versa. This is an important requirement, since the start of the application on a large scale to cover the UMTS will take time to complete and if there are holes in the coverage of UMTS, it is recommended that the joint UMTS should receive service of GSM coverage most everywhere. PTA function endless empowerment of the business environment is the biggest challenge for regulators.

The consumer market is the merit of the final success or failure for 3 G in Pakistan. That the trends observed in the next few years to identify areas in response "to it. Challenges in this regard are the largest of the technology or regulation. Region holds high potential for applications that can achieve high revenue for the 3G masses but also provides applications and devices relative. Structure existing infrastructure does possess deep roots, when supported by the organization, and technology, operators can make this task easier. The 3G is more than the Internet or mobile phone. It's a revolutionary step towards the world of wireless broadband. it opens doors to possibilities that can be translated into many services, applications and tools needs of the region.

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