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A REVIEW OF WIRELESS EVOLUTION IN CONTEXT OF 5G

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Abstract— **The better the technology, the more users friendly it becomes. This is what 4G brings to us after 3G. 4G provides us 3 times faster speed than 3G technology.4G is the short name of fourth generation of wireless /mobile communication That will enable things like IP –based voice, data, & high quality streamed multimedia on portable devices with cable modem like transmission speed. Where 4G is really good for business purpose. After that the idea of 5G was proposed which provides complete wireless communication with almost no limitation which makes it the most powerful source of communication till the date.**

Keywords— **SDR Technology, VOIP, IPv6, MIMO, OFDM, UWB, GSM**

I. INTRODUCTION

This paper discusses the challenge of evolving the core network of today's 2G and 3G networks to enable the unprecedented growth in voice and data expected with the migration to 4G wireless networks and gives the basic idea of 5G and which technology will be used to make such. The introduction of packet core infrastructure into digital wireless networks offers both challenges and opportunities for wireless service providers and its users.

Here as we know 4G is a successor of 3G, i.e. 4G provides internet broadband in computer devices and other mobile devices .Some of the other features you use these days are parts of it like High definition Mobile TV, Video conferencing, video calling, accessing mobile internet, IP Telephony (Voice Over Internet Protocol [VIOP] it is the group of technologies which is used to deliver the voice communication through the internet protocol). 4G can be categorized in two types –LTE (Long Term Evolution [first used in Norway, Oslo in 2009]), Mobile WiMAX (firstly used in South Korea in 2006) .WiMAX was establishes after 2008.

- **What Is Wireless Communication?**

Wireless communication basically means a linkage between two destinations by the means of radio waves. Wireless communications has always been a major benefit because it permits long range communication with ease. It works in an unguided medium, which means absence of wires and other physical conductors.

Wireless communication is distinguished in two types:

- **Cellular networks:** The Setting of a mobile communication through voice conversations and various tools issued for private and business use. The standards used in 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 communications offers an advantageous approach such as simplicity and flexibility. It is much more reliable quicker, tends to get in higher data rates, better speed and its reach ability to the user. It is cost effective and always emerging with new technologies in the field.

- **Wireless Evolution**:

A. 1G (First Generation)

The preliminary 1G phones technology was released during the 1980's in US. They were based on the analog radio signals, basically larger in size with a broad rigid structure. Their properties were Basic voice services and providing a speed of just 7 KBPS. E.g. AMPS (Advanced Mobile Phone System)

B. 2G (second generation)

The second generation (2G) of the wireless mobile network was based on low-band digital data signaling. The most popular 2G wireless technology is known as Global Systems for Mobile Communications (GSM). GSM systems, first

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implemented in 1991, are now operating in about 140 countries and territories around the world. An estimated 248 plus million users now operate over GSM systems. GSM technology is a combination of Frequency Division Multiple Access (FDMA) and Time Division Multiple Access (TDMA). The first GSM systems used a 25MHz frequency spectrum in the 900MHz band. FDMA is used to divide the available 25MHz of bandwidth into 124 carrier frequencies of 200kHz each. Each frequency is then divided using a TDMA scheme into eight timeslots. The use of separate timeslots for transmission and reception simplifies the electronics in the mobile units. Today, GSM systems operate in the 900MHz and 1.8 GHz bands throughout the world with the exception of the Americas where they operate in the 1.9 GHz band

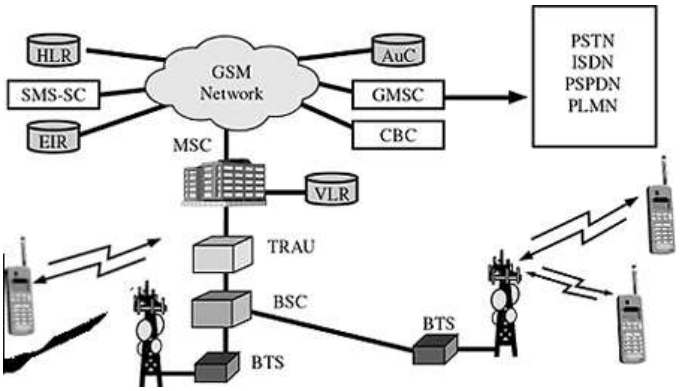


Figure:1
2G Architecture Model.

C. 2.5G(Second generation)

These 2G+ systems are based on the following technologies: High Speed Circuit-Switched Data (HSCSD), General Packet Radio Service (GPRS) and Enhanced Data Rates for Global Evolution (EDGE) technologies. HSCSD is one step towards 3G wideband mobile data networks. This circuit-switched technology improves the data rates up to 57.6kbps by introducing 14.4 kbps data coding and by aggregating 4 radio channels timeslots of 14.4 kbps. To meet the needs of today's subscribers, wireless service providers are in the process of upgrading their 2G networks to 2.5G networks. These 2.5G networks continue to use the 2G architecture to deliver voice and circuit-switched data applications while adding a packet data overlay to support additional packet data services. Upgrading a 2G wireless infrastructure to support 2.5G enables subscribers on this network to attain data rates up to 170 kbps, a substantial increase over 2G data rates. Choosing a multi-service core network solution that efficiently handles multiple traffic types (e.g. packet data, voice, etc.) not only gives the operator the capability of providing new services with increased data rates, but also saves on TDM voice expenditures .

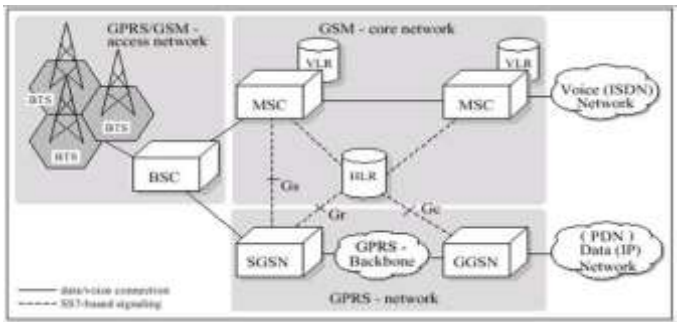


Figure:2
2.5G Architecture Model

D. 3G (third generation)

3G wireless technology represents the convergence of various 2G wireless telecommunications systems into a single global system that includes both terrestrial and satellite components. One of the most important aspects of 3G wireless technologies is its ability to unify existing cellular standards, such as CDMA, GSM, and TDMA, under one umbrella. The following three air interface modes accomplish this result: wideband CDMA, CDMA2000 and the Universal Wireless Communication (UWC-136) interfaces. Wideband CDMA (W-CDMA) is compatible with the current 2G GSM networks prevalent in Europe and parts of Asia. W-CDMA will require bandwidth of between 5 MHz and 10 MHz, making it a suitable platform for higher capacity applications. It can be overlaid onto existing GSM, TDMA (IS-36) and IS95 networks. Subscribers are likely to access 3G wireless services initially via dual band terminal devices. W-CDMA networks will be used for high-capacity applications and 2G digital wireless systems will be used for voice calls. The second radio interface is CDMA 2000, which is backward compatible with the second generation CDMA IS-95 standard predominantly used in US. The third radio interface, Universal Wireless Communications – UWC-136, also called IS-136HS, was proposed by the TIA and designed to comply with ANSI-136, the North American TDMA standard. 3G wireless networks consist of a Radio Access Network (RAN) and a core network. The core network consists of a packet-switched domain, which includes 3G SGSNs and GGSNs, which provide the same functionality that they provide in a GPRS system, and a circuit-switched domain, which includes 3G MSC for switching of voice calls. Charging for services and access is done through the Charging Gateway Function (CGF), which is also part of the core network. RAN functionality is independent from the core network functionality. The access network provides a core network technology independent access for mobile terminals to different types of core networks and network services. Either core network domain can access

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any appropriate RAN service; e.g. it should be possible to access a "speech" radio access bearer from the packet-switched domain.

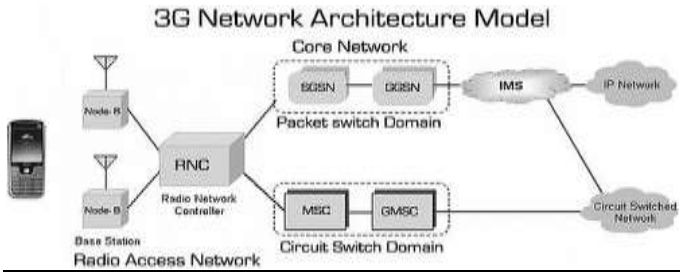


Figure:3
3G architecture model

E. 4G (Fourth Generation)

To achieve a 4G standard, a new approach is needed to avoid the divisiveness we've seen in the 3G realms. One promising underlying technology to accomplish this is multi carrier modulation (MCM), a derivative of frequency-division multiplexing. MCM is not a new technology; forms of multi carrier systems are currently used in DSL modems, and digital audio/video broadcast (DAB/DVB). MCM is a base band process that uses parallel equal bandwidth sub-channels to transmit information. Normally implemented with Fast Fourier transform (FFT) techniques, MCM's advantages include better performance in the inter symbol interference (ISI) environment, and avoidance of single-frequency interferers. However, MCM increases the peak-to-average ratio (PAVR) of the signal, and to overcome ISI a cyclic extension or guard band must be added to the data.

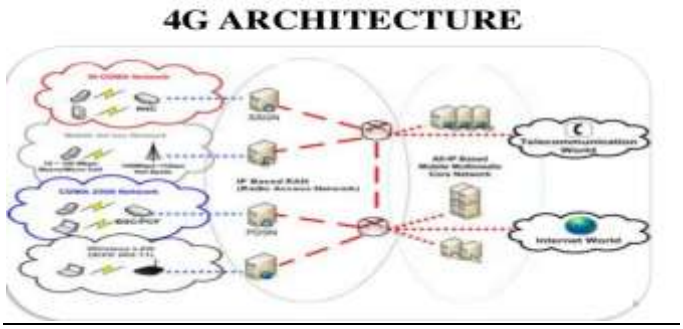


Figure:4
4G Architecture Model

F. 5G (Fifth Generation)

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 & zone issues. It has wearable devices with AI capabilities. It is the unified global standard it has unparallel consistency transporter class gateway. It usually support virtual private network. It provides very high bi-directional bandwidth shaping and very high resolution for cell phone. For fast action it provide subscriber supervision tools. It covers wide coverage with high throughput & uses a packet switched wireless system. Data transfer rate is about 1gbps between two points in the world. Interactive multimedia, voice, streaming video, internet, &other broadband services, more effective & more attractive, bi-directional, accurate traffic statics supported by 5G technology. It provides global access, service portability & scalable mobile services. Flexible platform can serve by 5G technology. IT has more capacity than others about 10 times high. It almost provides connectivity speed of 25 mbps. New concept of multi-path data path introduced in this technology. It' s vision is to make real wireless world .integration of networks required in5G.It usually support CDMA, OFDM, MCCDMA, UWB & IPv6.It has an extraordinary capability to support software & 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.

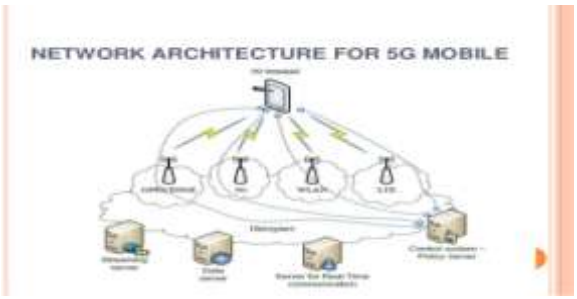


Figure:5
5G Architecture Model

II. FUTURE WORK

5th generation technology is designed to provide incredible and remarkable data capabilities, unhindered call volumes, and immeasurable data broadcast within the latest mobile operating system. Likewise, our world would have universal and uninterrupted access to information, communication, and entertainment that will open a new dimension to our lives and will change our life style meaningfully. Moreover, governments and regulators can use this technology as an opportunity for the good governance and, which will definitely encourage continuing investment in 5G, the next generation technology.



III. CONCLUSION

The lack of standards, piece meal offerings and a confusing marketplace are critical barriers to mobile Internet growth that need to be overcome. Over the next five years, mobile Internet services will move beyond a novelty, and become a core solution for consumers and businesses. Corporations will invest in technologies that allow their remote users and field offices to tap into the corporate databases and information sources, and to take part in daily operations from anywhere, any time. For consumers, the ability to communicate, get information and ultimately conduct transactions over cell phones and mobile devices will fuel a new industry of solutions targeted at the mobile user.

IV. REFERENCE

1. Massive MIMO in the UL/DL of cellular Networks: By Hoy dis.J .Bell Labs, Alcatel –Lucent, Stuttgart, Germany; Ten Brink, S.Debbah.m.
2. 2G-5G Networks: Evolution of Technologies, standard s, and Development, By Shakil Akhtar [Professor, Information Technology Department Clayton States University].
3. Mudit bhalla. & Anand bhalla. "Genaration of mobile wireless technology": A survey,' IEEE Trans.(0975-8887) vol. 5- No.4, August 2010.
4. Mauri Rao. "4G wireless Technology", NCNTE-2012AT C.R. I. T., Vashi, Navi Mumbai, feb.24-25,2012\
5. Ms. Reshma S. Sapakal, Ms. Sonali S. Kadam, "5G Mobile Technology" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, Issue 2, February 2013
6. Suvarna Patil, Vipin Patil, .Pallavi Bhatt, "A Review on 5G Technology" International Journal of Engineering and Innovative Technology (IJEIT) Volume 1, Issue 1,January 2012
7. A. Stamoulis et al.,\Time-varying fair queueing scheduling for multicode CDMA based on dynamic programming," IEEE Trans.Wireless Com.,vol.3,no.2, pp.512-523,2004.
8. G. Song, \Utility-based resource allocation and scheduling in OFDM-based wireless broadband networks," IEEE Commun. Magazine, pp. 127-134,2005.
9. A. Jalali et al., \Data throughput of CDMA-HDR a high e±ciency-high data rate personal communication wireless system," IEEE VTC'00, vol. 3, pp.1854-1858, May.
10. A. Kam et al., \Supporting Rate Guarantee and Fair Access for Bursty Data Tra±c in W-CDMA," IEEE JSAC, vol. 19, no. 11, pp. 2121-2130, 2001.

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