



# IMPLEMENTATION ON ANALYSING THE SCOPE OF 4G CELLULAR WIRELESS GENERATION

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**Abstract 4G** means **fourth generation**. It is fourth generation of mobile telecommunications technology, succeeding 3G. A 4G system must provide capabilities defined by ITU in IMT Advanced. Potential & current applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television, & cloud computing. Two 4G candidate systems are commercially deployed:

Mobile WiMAX standard first used in South Korea in 2007, & first-release Long Term Evolution (LTE) standard. This has however been debated if these first-release versions should be considered to be 4G or not, as discussed in technical definition section below. In United States, Sprint (previously Clearwire) has deployed Mobile WiMAX networks since 2008, while Metro PCS became first operator to offer LTE service in 2010.

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## [1] INTRODUCTION

4G, short for 4<sup>th</sup> generation is fourth generation of mobile telecommunications technology succeeding 3G. A 4th Generation system would be expected to provide support to potential & current applications including mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television & cloud computing.

The first operational cellular communication system was set up in Norway in 1981 & was followed by similar systems in United States & United Kingdom. These first generation systems provided

voice transmissions by using frequencies around 900MHz & analogy modulation.

The second generation (2G) of wireless mobile network was based on low-band digital data signalling. Most popular 2G wireless technology is known as Global Systems for Mobile Communications (GSM). First GSM systems used a 25MHz frequency spectrum in 900MHz band.

## 4G TECHNOLOGY

The following key features could be observed in all suggested 4G technologies:

**Physical layer transmission techniques are as follows**



1. Channel-dependent scheduling: To use time-varying channel
2. Link adaptation: Adaptive modulation & error-correcting codes
3. Mobile IP utilized for mobility
4. IP-based femtocells



**Fig 1** Show various 4G devices

## TECHNICAL UNDERSTANDING

Since first-release versions of Mobile WiMAX & LTE support much less than 1 Gb/s peak bit rate, they are not fully IMT-Advanced compliant, but are often branded 4G by service providers. According to operators, a generation of network refers to deployment of a new non-backward-compatible technology. On December 6, 2010, ITU-R recognized that these two technologies, as well as other beyond-3G technologies that do not fully fill IMT-Advanced requirements, could nevertheless be considered "4G", provided they represent forerunners to IMT-Advanced compliant versions & "a substantial level of improvement in performance & capabilities within respect to initial third generation systems now deployed".

## [2] LITERATURE REVIEW

In their research titled "Role of Cognitive Radio on 4G Communications" Maninder Jeet Kaur, Moin Uddin & Harsh K Verma in 2012 wrote about rapid advancement in wireless communication technology providing network services anywhere & anytime.

According to them 4G communication systems are being developed to solve various problems 3G, 2.5G are facing.

A research paper published by Khaleel Ahmad, Jayant Sekhar & Sunil Kumar in 2012 titled "Network Congestion Control in 4G Technology Through Iterative Server" stated that During last few decades, mobile communication has developed rapidly. Increasing dependency of people on telecommunication resources is pushing even more current technological developments in mobile world. In Real-time multimedia applications, such as Live TV or live movie, video conferencing, VoIP, on-line gaming etc.

Muhammed Mustaqim, Khalid Khan, & Muhammed Usman in 2012 researched on title "LTE-Advanced: Requirements & Technical Challenges for 4G Cellular Network" wrote about the higher peak data rates for mobile user are in demand. Audio/Video streaming, online conferences & social media services are becoming necessity of life. They professed that in order to fulfil sheer amount of data need of users, robust & efficient wireless technology is needed.

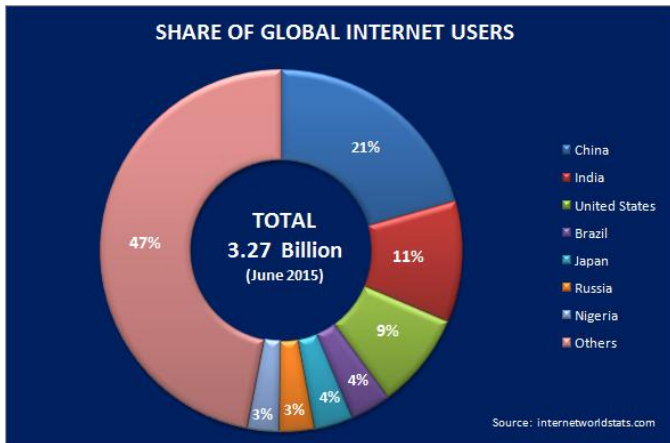
## [3] THEORITICAL DEVELOPMENT

### Features of Fourth Generation Technology



Fourth generation (4G) technology would offer many advancement to wireless market, including downlink data rates well over 100 Mbps, low latency, very efficient spectrum use & low-cost implementations. With impressive network capabilities, 4G enhancement promise to bring wireless experience to an entirely new level within impressive user applications, such as sophisticated graphical user interfaces, high-end gaming, and high-definition video& high-performance imaging.

total number to 3.8 billion, or around half of the world’s expected population by 2020.“Our new findings underline how mobile is now the gateway to the Internet for billions of citizens across the world and will be responsible for connecting millions of currently ‘offline’ global citizens to the Internet in the years to 2020 and beyond,” said Anne Bouverot, Director General of the GSMA

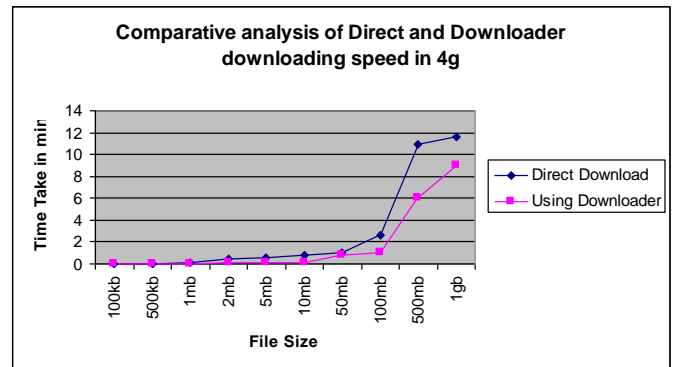


**Fig 2** represents the distribution of the Internet users among countries.

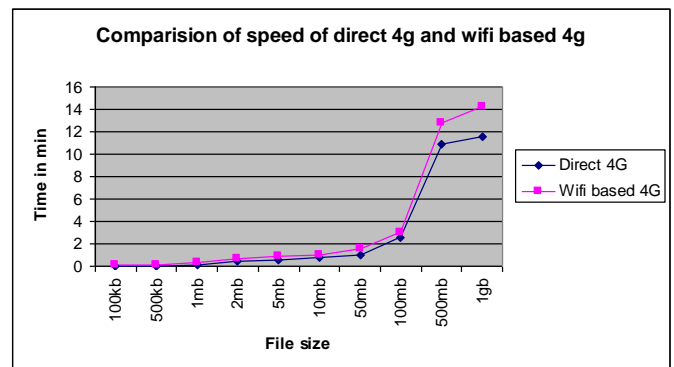
The move to 4G networks will allow service providers to offer the impressive applications that will drive users to upgrade to the new phones. Current downlink data rates are less than 10 megabits per second (Mbps); 4G systems will offer downlink data rates well over 100 Mbps, an improvement of 10 times over 3G. 4G systems will also have low latency, improving.

#### [4] RESULT & DISCUSSION

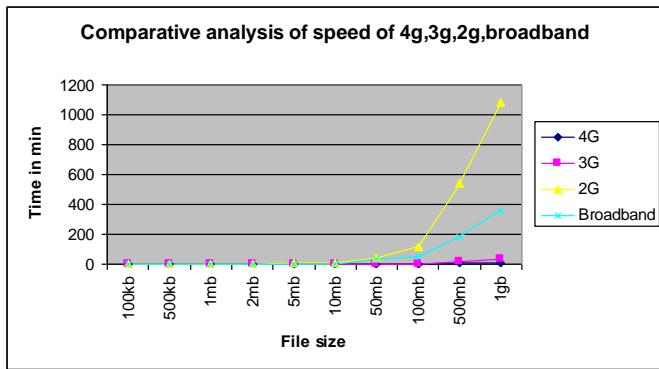
GSMA Intelligence forecasts that an additional 1.6 billion citizens worldwide will become mobile Internet users over the next six years, bringing the



**Fig 3** Comparative analysis of direct downloading speed 4g

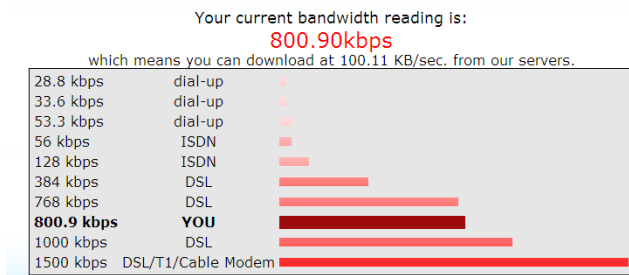


**Fig 2** Comparative of upload speed of direct speed 4g

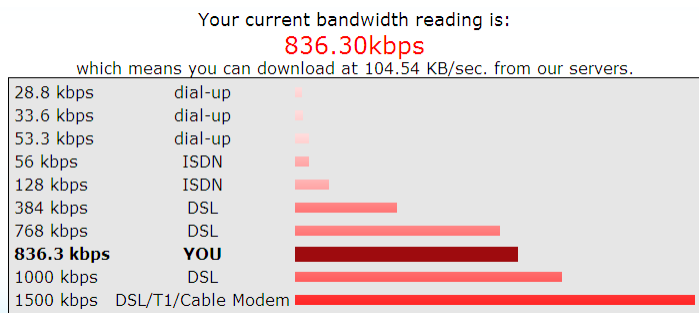


**Fig 4 Comparative analysis of 2g,3g,4g,broadband download & upload speed Speed test on simulator**

**Case 1: reading in case of 4 devices sharing 4g data**

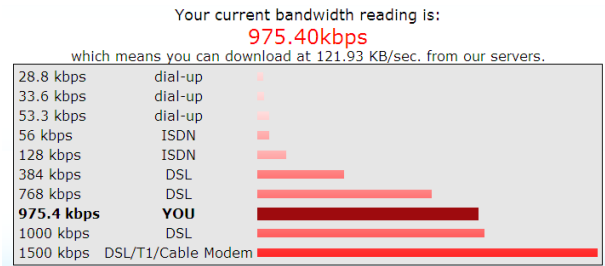


**Fig 5 Reading in case of 4 devices sharing 4g data Case 2: reading in case of 3 devices sharing 4g data**



**Fig 6 Reading in case of 3 devices sharing 4g**

**Case 3: reading in case of 2 devices sharing 4g data**



**Fig 7 Reading in case of 2 devices sharing 4g data**

**Conclusion:** Speed of 4g depends of following factors.

- 1) Whether device is directly or indirectly connected.
- 2) Whether Data is has been shared in multiple devices or not
- 3) Depends on Area.
- 4) Depends of Downloader used.

## [6] CONCLUSION & FUTURE SCOPE

India's 4G and 3G user base will touch 300 million by March 2018, according to a market research undertaken by the investment group, Credit Lyonnais Securities Asia (CLSA). The report adds that the smartphone population in India is expected to reach 350 million by March 2018, 210 million of which will be 4G. The estimate underscores the phenomenal increase in the country's smartphone penetration in recent months, and the expansion witnessed in high-speed internet coverage in the country. At present, mobile services across the second, third and fourth generation platforms are offered in India on 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2300 MHz bands. The government has indicated it will auction super-efficient 4G spectrum in the 700 MHz band but has yet to



finalise a timetable. As affordability for 3G and 4G data increases, fuelling data usage and spends, the addressable market will expand to 300 million subscribers by March 2018.

## REFERENCES

1. Sergio Benedetto & Ezio Biglieri (1999). *Principles of Digital Transmission: With Wireless Applications*. Springer. ISBN 0-306-45753-9.
2. C. T. Bhunia, Information Technology Network & Internet, New Age International, 2006, page 26.
3. Lal Chand Godara, "Handbook of antennas in wireless communications", CRC Press, 2002, ISBN 0849301246, ISBN 9780849301247
4. "Just Ahead: A Wider Wireless World", "Wildstrom, S.", BusinessWeek, December 19, 2007, Retrieved February 9, 2011
5. Mobile & Wireless Communications, "Gow G. & Smith R.", Open University Press, 2006
6. Putting Economics above Ideology, "Hazlett, T", Barrons, July 12, 2010
7. Crampton, Peter (October 1998). "Efficiency of FCC Spectrum Auction" (PDF). *Journal of Law & Economics* **41**: 727–736. doi:10.1086/467410.
8. Salmon, Timothy (2004). *Auctioning Public Assets: Analysis & Alternatives* (PDF). Cambridge University Press. ISBN 0-521-83059-1.
9. "FCC Spectrum Auction Data". *FCC Spectrum Auction Data*. Penn State University. Retrieved April 25, 2011.
10. McMillan, John. "Why Auction Spectrum?" (PDF). *Why Auction Spectrum*. Retrieved April 25, 2011.
11. "Moving Toward a Market for Spectrum". *Moving Toward a Market for Spectrum*. Cato Institute.
12. Malik, Om. "700 MHz Explained in 10 Steps". *700 MHz Explained in 10 Steps*. GIGA.com.
13. "Light Fidelity (Li-Fi): Towards All-Optical Networking", D. Tsonev, S. Videv & H. Haas; Institute for Digital Communications, Li-Fi R&D Centre, University of Edinburgh, EH9 3JL, Edinburgh, UK.
14. Rancy, Francois. "Welcome to ITU-R". *ITU*. Archived from original on May 14, 2011. Retrieved April 27, 2011.
15. Gahran, Amy (March 22, 2011). "FCC warns of looming mobile spectrum crunch". *CNN Tech*. Retrieved April 29, 2011.
16. Zhao, Houlin. "Globalizing Trend of China's Mobile Internet". *ITU*. Retrieved April 20, 2011.
17. Budde, Paul. "Broadband: A Platform For Progress" (PDF). Retrieved May 5, 2011.
18. Onyeije, Uzoma. "SOLVING CAPACITY CRUNCH Options for Enhancing Data Capacity on Wireless Networks Onyeije" (PDF). *Onyeije Consulting LLC*. Archived (PDF) from original on May 21, 2011. Retrieved April 30, 2011.



19. *"Egypt may have turned off Internet one phone call at a time". Los Angeles Times. January 29, 2011.*
20. *Johnson, Bobbie. "How Egypt Switched Off Internet". Archived from original on January 28, 2011. Retrieved January 28, 2011.*
21. *"China Lifts Wikipedia Blockage". Archived from original on November 23, 2006. Retrieved November 17, 2006.*