EVOLUTION OF MOBILE COMMUNICATIONS

1G

0G

CONTENTS

- INTRODUCTION
- 0G TECGNOLOGY
- 1G TECHNOLOGY
- 2G TECHNOLOGY
- MODELS OF 1G & 2G
- 3G TECHNOLOGY
- 4G TECHNOLOGY
- COMPARISON BETWEEN 3G VS 4G
- 5G TECHNOLOGY
- COMPARISON BETWEEN 4G VS 5G
- EVOLUTION FROM 1G TO 5G TECHNOLOGY
- GENERATION OF MOBILE COMMUNICATION
- CONCLUSION

INTRODUCTION

WHAT IS WIRELESS ?

The word wireless is dictionary defined “having no wires ” .

In networking terminology , wireless is the term used to describe any computer network where there is no physical wired connection between sender and receiver, but rather the network is connected by radio waves and or microwaves to maintain communications.

Wireless networking utilizes specific equipment such as NICs and Routers in place of wires (copper or optical fibre).

0G TECHNOLOGY(0G – 0.5G)

- Mobile radio telephone systems preceded modern cellular mobile telephony technology. Since they were the predecessors of the first generation of cellular telephones, these systems are sometimes referred to as 0G (zero generation) systems.
- It operate on 160 MHz VHF band using frequency modulation on 160 -162 MHz for the mobile unit and 168-170MHz for base stations.
- 0.5G is a group of technologies with improved feature than the basic 0G technologies
- The raw signaling rate is 19.2 kbps, and with Reed-Solomon coding the effective data arte is 14.4 kbps full duplex before control overhead.

1G TECHNOLOGY

- 1G refers to the first generation of wireless telephone technology, mobile telecommunications which was first introduced in 1980s and completed in early 1990s.
- It's Speed was upto 2.4kbps.
- It allows the voice calls in 1 country.
- 1G network use Analog Signal.
- AMPS was first launched in USA in 1G mobile systems.

FEATURES OF 1G

Generations	1G
Starts from	1970-84
Frequency	800-900 MHZ
Data capacity	2KBPS
Technology	Analog wireless
Standard	AMPS
Multiplexing	FDMA
switching	Circuit
Service	Voice only
Main network	PSTN
Hand off	Horizontal

2G TECHNOLOGY

2G :

❖2G technology refers to the 2nd generation which is based on GSM.

- ❖ It was launched in Finland in the year 1991.
- ❖ 2G network use digital signals.
- ❖ It's data speed was upto 64kbps.

2.5G :

- ❖ 2.5G, which stands for "second and a half generation".
- ❖ The move into the 2.5G world began with General Packet Radio Service (GPRS).
- ❖ 2.5G networks may support services such as WAP, MMS, SMS mobile games, and search an directory.

2G TECHNOLOGY

2.75G :

- EDGE (Enhanced Data rates for GSM Evolution or Enhanced GPRS) is a digital mobile phone technology which acts as a bolt-on enhancement to 2G and 2.5G General Packet Radio Service (GPRS) networks.
- EDGE is radio technology and is a part of third generation technologies.
- EDGE technology is an extended version of GSM. It allows the clear and fast transmission of data and information.

FEATURES OF 2G

Generations	2G	2.5	2.75
Starts from	1990	2000	2003
Frequency	850-1900MHz(GSM)	850-1900 MHz	850-1900 MHz
	825-849MHz(CDMA)		
Data capacity	10KBPS	200 KBPS	473 KBPS
Technology	Digital wireless	GPRS	EDGE
Standard	CDMA TDMA	Supported	GSM CDMA
	GSM	TDMA/GSM	
Multiplexing	TDMA CDMA	TDMA CDMA	TDMA CDMA
switching	Circuit Packet	Packet	Packet
Service	Voice data	MMS, internet	
Main network	PSTN	GSM, TDMA	WCDMA
Hand off	Horizontal		

WIRELESS MODELS OF 1G & 2G

1G WIRELESS SYSTEMS

2G WIRELESS SYSTEMS

3G TECHNOLOGY

3G :

- 3G technology refer to third generation which was introduced in year 2000s.

- Data Transmission speed increased from 144kbps- 2Mbps.

- Typically called Smart Phones and features increased its bandwidth and data transfer rates to accommodate web-based applications and audio and video files.

3G TECHNOLOGY

3.5G :

- High- Speed Downlink Packet Access(HSDPA) is a packet-based data service in W-CDMA downlink with data transmission up to 8-10 Mbit/s over a 5MHz bandwidth in WCDMA downlink.
- Its implementations includes Adaptive Modulation and Coding (AMC)
- Multiple-Input Multiple-Output (MIMO), Hybrid Automatic Request (HARQ), fast cell search, and advanced receiver design.

3G TECHNOLOGY

3.75G :

- High Speed Uplink Packet Access (HSUPA) is a UMTS / WCDMA uplink evolution technology, directly related to HSDPA and the two are complimentary to one another.

- HSUPA will enhance advanced person-to -person data applications with higher and symmetric data rates.

- It will initially boost the UMTS / WCDMA uplink up to 1.4Mbps and in later releases up to 5.8Mbps.

FEATURES OF 3G TECHNOLOGY

Generations	3G	3.5	3.75
Starts from	2001	2003	2003
Frequency	1.6-2.5GHz	1.6-2.5GHz	1.6-2.5GHz
Data capacity	384Kbps	2Mbps	30Mbps
Technology	Broad band /IP technology	GSM/3GPP	
	FDD		
	TDD		
Standard	CDMA/WCDMA/UMTS/	HSDPA/HSUPA	1xEVDO
	CDMA2000		
Multiplexing	CDMA	CDMA	CDMA
switching	Circuit ,packet	packet	packet
Service	High speed	High speed	High speed
	voice/data/video	voice/data/video	internet/multimedia
Main network	Packet network	GSM TDMA	
Hand off	Horizontal	Horizontal	Horizontal

4G TECHNOLOGY (Anytime ,Anywhere)

- 4G technology refer to or short name of fourth Generation which was started from late 2000s.
- Capable of providing 100Mbps – 1Gbps speed.
- One of the basic term used to describe 4G is MAGIC.
- MAGIC:
  - Mobile Multimedia
  - Anytime Anywhere
  - Global Mobility Support
  - Integrated Wireless Solution
  - Customized Personal Services
  - Also known as Mobile Broadband Everywhere.

4G (Anytime, Anywhere)

- The next generations of wireless technology that promises higher data rates and expanded multimedia services.
- Capable to provide speed 100Mbps-1Gbps.
- High QOS and High Security
- Provide any kind of service at any time as per user requirements, anywhere.

FEATURES OF 4G

Generations	4G
Starts from	2010
Frequency	2-8GHz
Data capacity	200Mbps-to- 1Gbps
Technology	LTE, Wi MAX
Standard	IP-broadband LAN/WAN/PAN
Multiplexing	MC-CDMA, OFAM
switching	Packet
Main network	Internet
Hand off	Horizontal &Vertical

COMPARISON BETWEEN 3G Vs 4G

The basic difference between 3G and 4G is in data transfer and signal quality.

Technology	3G	4G
Data Transfer Rate	3.1 MB/sec	100 MB/sec
Internet Services	Broadband	Ultra Broadband
Mobile - TV Resolution	Low	High
Bandwidth	5-20 MHz	100MHz
Frequency	1.6-2 GHz	2-8 GHz
Download and upload	5.8 Mbps	14 Mbps

5G TECHNOLOGY

- 5G technology refer to short name of fifth Generation which was started from late 2010s.

- Complete wireless communication
- with almost no limitations.

- It is highly supportable to WWWW
- (Wireless World Wide Web).

BENEFITS OF 5G TECHNOLOGY

- High Speed, High Capacity
- 5G technology providing large broadcasting of data in Gbps .
- Multi - Media Newspapers, watch T.V programs with the clarity
- as to that of an HD Quality.
- Faster data transmission that of the
- previous generations.
- Large Phone Memory, Dialing Speed,
- clarity in Audio/Video.
- Support interactive multimedia , voice,
- streaming video, Internet and other
- 5G is More Effective and More Attractive.

FEATURES OF 5G TECHNOLOGY

Generations	5G
Starts from	2015
Data capacity	Higher then 1Gbps
Technology	IP v6
Standard	IP-broadband
	LAN/WAN/PAN&WWW
Multiplexing	CDMA
switching	All packet
Service	Dynamic Information access,
	wearable devices with AI
	capabilities
Main network	Internet
Hand off	Horizontal & Vertical

COMPARISON BETWEEN 4G Vs 5G

The following basic differences between 4G and 5G are:

Technology	4G(2000-10)	5G(2010-20)
Switching	Circuit/Packet	Circuit/Packet
Data Rate	Upto 20Mbps	Upto 1 Gbps
Technology	Combination of broadband LAN/WAN/PAN	Combination of broadband LAN/WAN/PAN

EVOLUTION OF 1G TO 5G TECHNOLOGY

Generation of Mobile Communication and its Year

The Time of year	Mobile Generation
1980	1G
1990	2G
2000	3G
2010	4G
2020	5G

CONCLUSION

In this paper reviewed the generation mobile communication and latest technology of networks. By addition to that the future generation of 6G, 7G and 7.5G. The main aim of this generation to create fastest and reliability mobile network which will access all the users with high speed of peak upload and download methodologies.

THANK YOU