



# SNS COLLEGE OF ENGINEERING

(Autonomous)  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



## 19EC601 – Wireless Communication

### Unit -1 Fundamentals of Wireless Communication





# Evolution of cellular systems



- 1G (FIRST GENERATION MOBILE SYSTEM)
- 2G (SECOND GENERATION MOBILE SYSTEM)
- 3G (THIRD GENERATION MOBILE SYSTEM)
- 4G (FOURTH GENERATION MOBILE SYSTEM)
- 5G (FIFTH GENERATION MOBILE SYSTEM)





## 1G (FIRST GENERATION MOBILE SYSTEM)

- 1G was introduced in 1980 and completed in 1990.
- The first generation of wireless telephony technology was referred to as 1G.
- The speed of 1G was 2.4 kbps telecommunications.
- It allowed the voice call in one country.
- Analog Signal and AMPS was used.
- It was first launched in USA in 1G mobile system.





## Features of 1G

- In voice call and text messages is available by use of analog narrow bandwidth. Drawbacks in 1G
- Analog cellular phones are not very protected.
- It has a limited capacity, poor battery life, poor large phone size, poor handoff reliability, poor voice quality, and no security at all since voice call can be hacked by radio towers.

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## 2G (SECOND GENERATION MOBILE SYSTEM)

- 2G refers as the 2nd generation which is based on the GSM.

In 1991, 2G was first launched in Finland

- Digital modulation signal was used in 2G.
- Its data speed is 14kbps to 64kbps.

### Features Include in 2G

- It includes Digital Text messages, picture messages and MMS.
- It provides better quality and capacity and consumes less battery power, improves the voice clarity, reduces noise in the line, and gives security and safety to the data and voice calls.





- Digital error checking allowed by digital voice encoding to increase sound quality and lowers the noise level.

## Drawbacks in 2G

- 2G needs strong digital signals. If there is a refusal of network coverage in any specific area, digital signals would weak.
- Complex data such as Videos are unable to handle.
- It has a Jagged Decay curve such as Abrupt dropped calls and Analog –gradual sound reduction. It has a low transmission
- Quality, and Spotty Coverage





## 3G (THIRD GENERATION MOBILE SYSTEM)

- 3G system goal is to increase the data rates.
- In 2000s 3g technology was introduced.
- The speed of data transmission is 384kbps- 2Mbps.
- To provide accommodation web-based applications and audio and video files

Smart Phones and its characteristics increased its bandwidth and data transfer rates.

- It consists of large capacity and broadband capabilities.
- It increases the spectrum efficiency of 5MHz.
- It works under Multiplexing and Access technologies





## Features Include in 3G

- Faster Communication is provided in 3G.
- To Send/Receive the large Email messages faster and have a High Speed Web / More Security.
- It consists of Video Conferencing / 3D Gaming, Mobile, TV, Phone Calls, Large Capacities and Broadband
- Capabilities moreover 11 sec – 1.5 min and time to download a 3 min Mp3 song.

## Drawbacks in 3G

- It has overpriced fees for 3G Licenses Services. To build the infrastructure for 3G was challenged and need a Large Cell Phones.
- High Bandwidth Requirement and also works in Expensive 3G Phones.







## 4G (FOURTH GENERATION MOBILE SYSTEM):

- It was started as late 2000.
- An IP-based incorporated system which has a capacity to afford 100 Mbps for high mobility and 1Gbps for low mobility with end toned Quality of service and gives an authentication process and it offers the various services as user requirements, anywhere that extends to which system and devices can exchange and interpret the data.
- A compilation of technologies to generate fully packet-switched networks optimized for data is 4G





## Features Include in 4G

- 4G has a wireless broadband access, video chat, Digital Video Broadcasting (DVB), least services like voice and data, mobile TV, Multimedia Messaging Service (MMS) HDTV content, and other services that make use of bandwidth.
- It also consists of High Speed, High Capacity and Low-Cost Per-bit etc. It is Capable to provide speed 100Mbps-1Gbps.
- It contains High QOS and High Security.
- As per the user requirements, any kind of service can be provided





## Drawbacks in 4G

- 4G is very hard to implement. It does need complicated hardware.
- The Battery uses of 4G are more and Expensive equipment required to implement next generation network

## 5G (FIFTH GENERATION MOBILE SYSTEM):

- The initiation year of 5G is late 2010's.
- The new mobile revolution is happen in mobile market is 5G.
- It is wireless and does not have any limitations.
- WWW (Wireless World Wide Web) is highly supportable.





## Features Include in 5G

- The real time performance has Fast response, Low Jitter, latency & delay.
- It provides large broadcasting of data in Gbps and high quality coverage.
- The Virtualized Infrastructure has Software defined network, scalable and low cost system.
- It supports IoT & M2M and also enormous amount of connected devices,  
Deep Indoor Coverage & Signaling efficiency.

## Drawbacks in 5G

- To develop an infrastructure is very expensive.
- There are some issues occur in privacy and Security





Thank  
you

