Global System for Mobile Communication (GSM)

A wireless Mobile Telecommunication Standard

Engr. Abdul Rehman Chishti

1

GSM HISTORY

* In 1876 telephone was introduced to the public in Philadelphia USA, Alexander Graham Bell was able to transmit speech electrically in one direction only on copper wire. This was later perfected to two way communication.
* In the end of 19th century a German Scientist named Heinrich Rudolph Hertz discovered that from an electric spark there seems to emanate invisible waves of force which could be captured at a distant location by a suitable constructed receiving device.

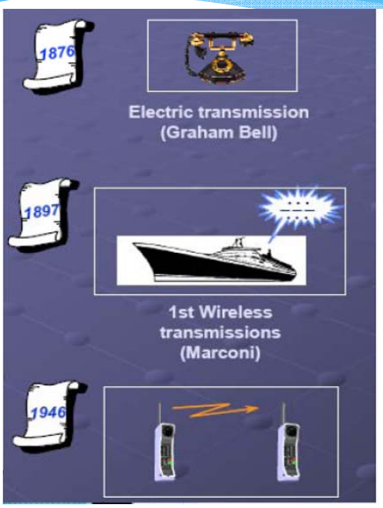
2

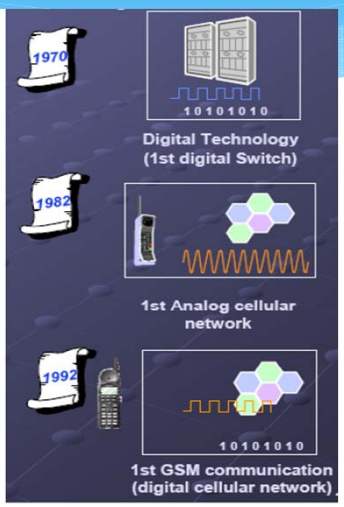
Cont'd

* In 1897 Guglielmo Marconi made first wireless transmission over 15km in Bristol and in 1901 he transmitted these waves overseas and began to call it RADIO.
* In 1982 first commercial Analog Cellular System was turned on in Chicago
* In 1992, GSM the first fully Digital Cellular System was introduced on in Germany and France

3

Brief History Telecommunication





First Generation Wireless Networks (1G)

* The first generation cellular systems using analog voice transmission came into operation in 1983 and were referred to as an analog technology.
* 1G cellular system use FM (Frequency Modulation)
* Examples: AMPS(Advanced Mobile Phone Services)
* 1G wireless systems provide analog speech and inefficient low-data rate transmission between base station and the mobile user.
* 1G cellular radio network includes:
  * Mobile Terminals
  * The Base Stations
  * MSC

5

Different 1G standards

* TACS : Total Access Communication System
  * UK, South Africa, Germany
* AMPS: Advanced Mobile Phone System
  * North America, Australia
* NMT : Nordic Mobile Telephone
  * Switzerland, Europe/ Russia
* Radio.com2000: in Frace
* RTMI: in Japan

6

1G Draw Backs

- Week security Systems- Results in hacking of telephone lines.
- Only has voice facility
- Poor voice quality and battery life
- Large and bulky phone size
- No security
- Frequent call drops
- Limited capacity
- Poor handoff

AMPS HANDSET (MOTOROLA)

7

Advantage of Digital System

- Low power signal requires less battery
- Digital voice encoding allows digital error checking which could increase sound quality by reducing the noise.
- Going all digital resulted in the introduction of digital data services like SMS(Short Messaging Service)
- Increase in capacity of the system
- Allows more calls to be packed in the same amount of radio Bandwidth
- Digital voice data can be compressed and multiplexed more effectively than analog voice

8

2nd Generation Wireless Networks

* Example of 2nd generation wireless system includes; GSM
* GSM-Global System for Mobile Communications
* Introduction of BSC, results in reduction of the computational burden of MSC.
* Employs digital modulation and advanced call processing capabilities, also have data services

(GPRS, EDGE, SMS) for mobile.

9

Cont'd

* GSM introduced the concept of BSC (Base Station Controller), which is inserted between several base stations and the MSC.
* In 2nd Generation wireless networks, the handoff is mobile-controlled and is known as MAHO (Mobile Assisted Handoff)
* Mobile networks in these networks performs several other functions not performed by 1G subscriber units, such as receiver power reporting, adjacent base station scanning, data encoding and encryption.

10

Cont'd

* 2nd Generation telephone stand (DECT) allows each phone to communicate with any of a number of base stations, by automatically selecting the base station with the greatest signal level.
* 2nd Generation wireless networks have been specifically designed to provide data services such as high data rate network access.

11

2.5 Wireless Technology

* GPRS (General Packet Radio Service)
* Referred to 2.5G wireless technology
* Enables the 2G Phones to send and receive data more rapidly.
* GPRS is the end to end packet switching technology provided on the basis of GSM Technology
* It provides the data rate of 56-114 kbit/s

12

2.75G Wireless Technology

* EDGE: Enhanced Data Rates for GSM Evolution
* Referred to 2.75 G Wireless Technology
* EDGE was deployed on GSM networks beginning in 2003 initially by Cingular (now AT&T) in USA.
* Data rate- 384Kbps
* EDGE is four times as efficient as GPRS
* EDGE delivers higher bit-rates per radio channel, resulting in increase in capacity and performance compared with an ordinary GSM/GPRS connection

13