

GSM

Global System for Mobile Communication

A wireless mobile telecommunication Standard

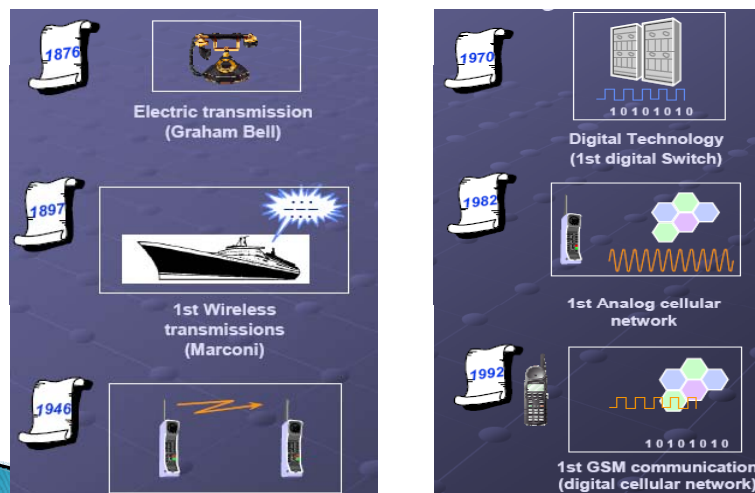
GSM History

- ▶ 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 for 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.

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

CONT'D



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 systems use FM Modulation.
- ▶ Example : AMPS (Advanced Mobile Phone Services)
- ▶ 1G wireless systems provide analog speech and inefficient, low-rate data transmission between the base station and the mobile user.
- ▶ 1G cellular radio network includes
 - Mobile terminals
 - The Base Stations
 - MSC

1G (Draw backs)

- ▶ Weak security systems– results in hacking of telephone lines.
- ▶ Poor voice quality Poor battery life Large phone size No security, frequent call drops Limited capacity and poor handoff reliability between cells

Advantages 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 such as SMS.
- ▶ Using digital signals between headset and mobile increases the 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.

2nd Generation Wireless Networks

- ▶ Example of 2nd Generation wireless systems include : GSM
- ▶ GSM stands for Global System for Mobile Communication
- ▶ Employ digital modulation and advanced call processing capabilities, also have data services(GPRS, EDGE, SMS) for mobile.
- ▶ Use Digital Systems.
- ▶ 2nd generation wireless networks have introduced new network architectures and have reduced the computational burden of MSC.

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- ▶ GSM introduced the concept of BSC (Base Station controller), which is inserted between several base stations and the MSC.
- ▶ In second 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 received power reporting, adjacent base station scanning, data encoding and encryption.

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- ▶ 2nd Generation telephone standard (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.

2.5G Wireless Technology

- ▶ GPRS (General Packet Radio Service)
- ▶ GPRS 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 data rates of 56–114 kbit/second
- ▶ GPRS is referred to 2.5 G wireless technology
- ▶ 2.5 G is a technology between the second (2G) and third (3G) generations of mobile telephony

2.75G Wireless Technology

- ▶ EDGE (Enhanced Data Rates for Global Evolution)
- ▶ Data Rate –384Kbps
- ▶ Enables three times as many bits as GPRS, during the same period of time.
- ▶ Shorter Range (more sensitive to noise/interference)

3rd Generation wireless Technology

- ▶ Third Generation wireless networks designed to increase voice capacity and provide high-speed data over 2G and 2.5G networks.
- ▶ A 3G network must provide a minimum of 144kbps.
- ▶ CDMA (Code Division Multiple Access) provides the basis for 3G technology
- ▶ Implemented as CDMA2000 and WCDMA (UMTS)
- ▶ CDMA assigns unique codes to each communication to differentiate it from others in the same spectrum

GSM Evolution for Data Access

