# Mobile Communications

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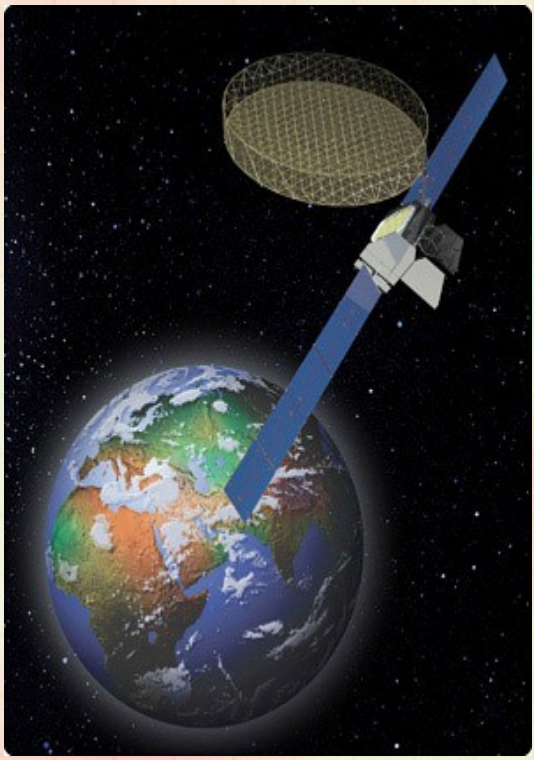
# What is Mobile Communications?

- A wireless form of communication in which voice and data information is emitted, transmitted and received via microwaves. This type of communication allows individuals to converse with one another and/or transmit and receive data while moving from place to place. Some examples include: cellular and digital cordless telephones; pagers; telephone answering devices; air-to-ground telecommunications; and satellite-based communications.

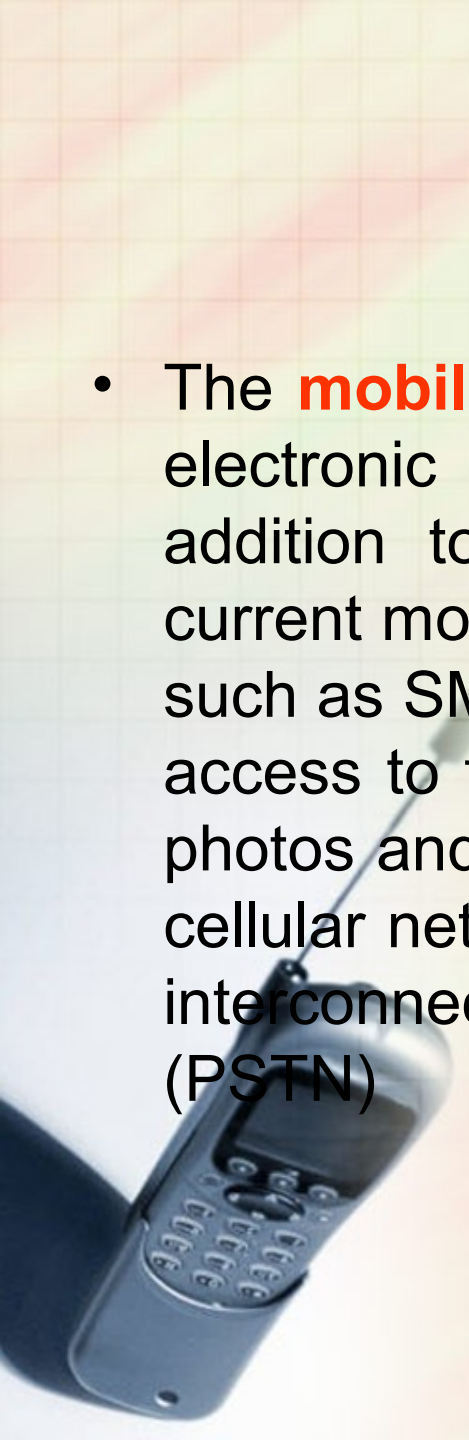


# What is a Mobile?

- **A cellular phone is a portable telephone that does not use a wired connection. It connects to a wireless carrier network using radio waves.**

# WHAT IS MOBILE PHONE?

- The **mobile phone** or **cell phone** is a long-range, portable electronic device used for mobile communication. In addition to the standard voice function of a telephone, current mobile phones can support many additional services such as SMS for text messaging, email, packet switching for access to the Internet, and MMS for sending and receiving photos and video. Most current mobile phones connect to a cellular network of base stations (cell sites), which is in turn interconnected to the public switched telephone network (PSTN)

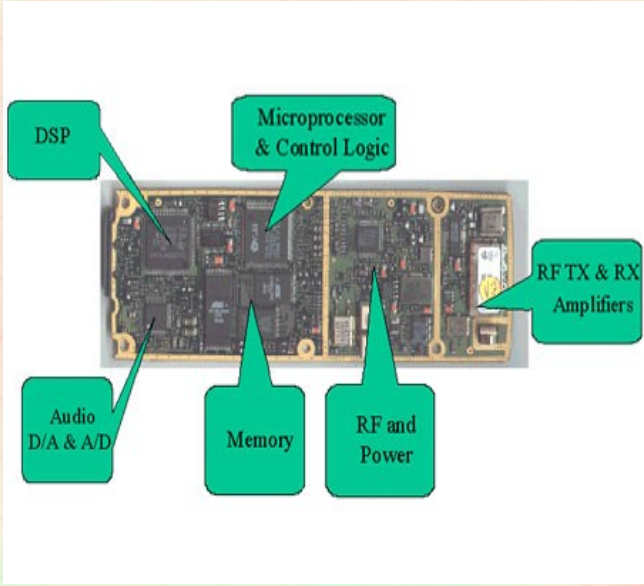


# Basics of the Cell Phones

- cellular phone is a portable telephone that does not use a wired connection.
- A cellular phone network uses a number of short-range radio transmitter-receivers to communicate.
- The wireless network is connected to the public telephone system, another wireless carrier network or the Internet for completing calls to another phone or to a computer.

# Inside a Cell Phone

- **Parts of A Cell Phone**
- A microscopic microphone
- A speaker
- An LCD or plasma display
- A keyboard not unlike the one we saw in a TV remote control
- An antenna
- A battery
- An amazing circuit board containing the guts of the phone




# Main Uses of Cell Phones

- **Voice calling**
- **Voice mail**
- **E-mail**
- **Messaging**
- **Mobile content**
- **Gaming**
- **Personalize your phone –Play music**
- **Take photos or videos**
- **Download and view images**
- **Organize personal information**
- **Shop**
- **Bank**
- **Location-based services**
- **Shop**
- **Bank.**

# Business Uses for Cell Phones

- **increase business productivity.**
- **Popular mobile business applications are:**

**E-mail**
**Messaging**
**Remote data**
**Customer relationship management (CRM)**
**Field service**
**Supply chain management (SCM)**

# Cell Phone Features

## General features

- A  network carrier is necessary to use cellphone
- Mobile phones include an alarm.
- can also send and receive data and faxes
- send short messages
- Provide full Internet access
- allow for sending and receiving pictures
- Sound and video recording is often also possible.
- Push to talk, available on some mobile phones,
- downloadable ring tones and logos, are also possible.

# Multi-Mode Cell Phones

- A phone which is designed to work on more than one GSM radio frequency.
- Some multi-mode phones can operate on analog networks as well most mobile phone networks now use one of two standards, GSM or CDMA. A third standard, iDEN is found in over 20 countries around the world.
- **Integrated Digital Enhanced Network (iDEN)** is a mobile telecommunications technology, developed by Motorola, which provides its users the benefits of a trunked radio and a cellular telephone.

# Data Communications

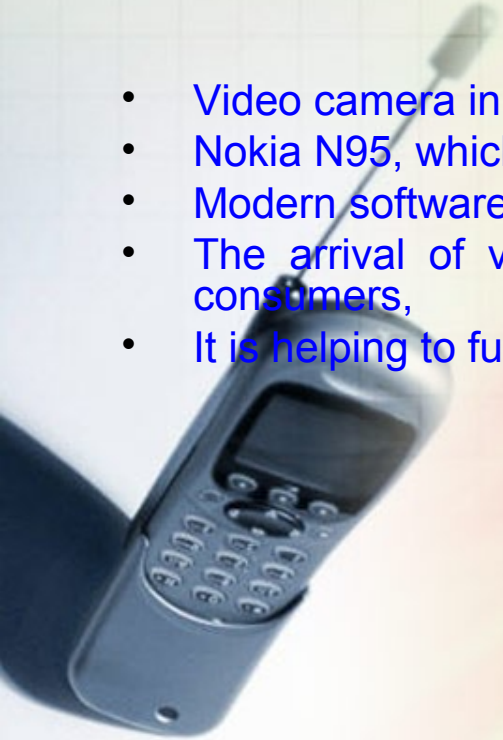
- Mobile phones used for data communications such as SMS messages, browsing mobile web sites, and even streaming audio and video files.
- Most cell phones can be used as wireless modems (via cable or Bluetooth),.
- With newer smart phones, screen resolution and processing power has become bigger and better.
- Some new phone CPUs run at over 400 MHz. Many complex programs are now available for the various smart phones,
- Connection speed is based on network support.

# New Features

- text messaging and e-mail.

- Java, Microsoft operating systems, Linux, or Symbian OS, may
- Bluetooth
- Ring tones and screensavers for certain phones.

# Video Cameras



- Video camera in many smart phones now
- Nokia N95, which has a 5M pixel camera.
- Modern software allows simple editing and publishing of video content from phones,
- The arrival of video camera phones is transforming the availability of video to consumers,
- It is helping to fuel the idea of citizen journalism

# Ways to Reduce your Phone Bill

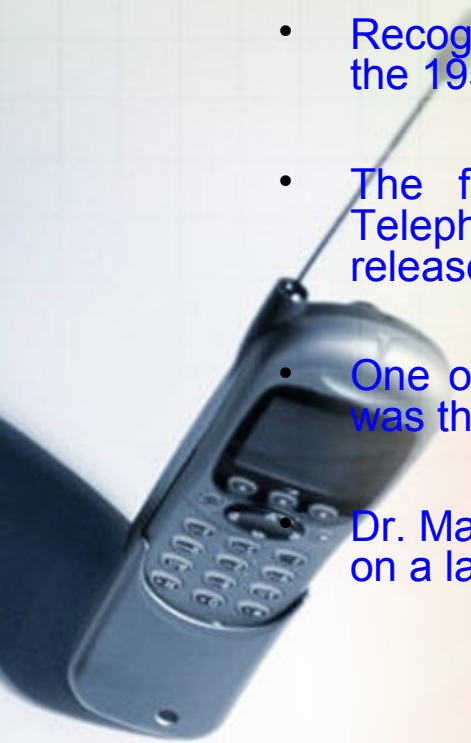
- Reduce Airtime
- Talk during Off-peak Hours
- Reduce Roaming
- Reduce Long-distance Calls
- Reduce Data Transfers

# History of the Cell Phones

- In the beginning, two-way radios (known as mobile rigs) were used in vehicles such as taxicabs, police cruisers, ambulances, and the like,
- Users could not dial phone numbers from their mobile radios in their vehicles.
- A large community of mobile radio users, known as the **mobileers,** popularized the During the early 1940s, Motorola developed a backpacked two-way radio, the Walkie-Talkie and later developed a large hand-held two-way radio for the US military. This battery powered “Handie-Talkie” (HT) was about the size of a man’s forearm.

# Early Years

- In December 1947, Douglas H. Ring and W. Rae Young, Bell Labs engineers, proposed hexagonal cells for mobile phones.
- Cellular technology was undeveloped until the 1960s, when Richard H. Frenkiel and Joel S. Engel of Bell Labs developed the electronics.
- radio telephony was introduced on passenger airplanes for air traffic security..
- Recognizable mobile phones with direct dialing have existed at least since the 1950s.
- The first fully automatic mobile phone system, called MTA (Mobile Telephone system A), was developed by Ericsson and commercially released in Sweden in 1956.
- One of the first truly successful public commercial mobile phone networks was the ARP network in Finland, launched in 1971.
- Dr. Martin Cooper of Motorola, made the first US analogue mobile phone call on a larger prototype model in 1973.



## First Generation

- The first handheld mobile phone to become commercially available to the US market was the Motorola DynaTAC 8000X, which received approval in 1983
- Mobile phones began to proliferate through the 1980s with the introduction of "cellular" phones based on cellular networks with multiple base stations.

## Second Generation

- In the 1990s, 'second generation' (2G) mobile phone systems such as GSM, IS-136 ("TDMA"), iDEN and IS-95 ("CDMA") began to be introduced.
- in 1991 the first GSM network (Radiolinja) opened in Finland.

## Third Generation

- At the beginning of the 21st century, 3G mobile phone systems such as UMTS and CDMA2000 1xEV-DO have now begun to be publicly available.
- Live streaming of radio and television to 3G handsets is one future direction for the industry, with companies from Real and Disney recently announcing services

## What is 4G technology

- **4G** is short for **Fourth Generation wireless Technology**. It is basically the extension in the **3G technology** with more bandwidth and services offers in the 3G. The expectation for the **4G technology** is basically the high quality audio/video streaming over end to end Internet Protocol. If the Internet Protocol (IP) multimedia sub-system movement achieves what it going to do, nothing of this possibly will matter. **WiMAX** or mobile structural design will become progressively more translucent, and therefore the acceptance of several architectures by a particular network operator ever more common.

# How Cell Phones work

## Cell Phone Networks

- A cellular phone network uses a number of short-range radio transmitter-receivers to communicate simultaneously with many mobile phones
- Commercial wireless networks have evolved over the past twenty years by developing advanced technologies
- The most common type of wireless network is a cellular network.
- Cellular technology is the leading telecommunications technology because of its high capacity, flexible deployment and cost-effectiveness.

# How does a Cell Phone work??

- Wireless network carriers use a system of areas or "cells“ served by radio communications
- The signal footprint of each radio antenna defines the location and size of its cell.
- As the mobile phone moves, the call is dropped by the cell being exited and simultaneously picked up by the cell being entered.
- The antennas can be mounted on freestanding towers, poles,

- Radio signals can be blocked by trees, buildings, hills and valleys,

- A consumer needs two things to use a mobile phone:
  **a handset** (or mobile communications device)
  **And a phone service plan** from a wireless network carrier or service provider.

# Generation of systems

- Mobile systems evolved from first generation analogue (1G) systems in the 1980s to second generation digital (2G) systems in the1990s.
- The first version of the third generation (3G) multimedia standards was completed in 1999.

# Missed call

- A **missed call** is the deliberate termination of an outgoing telephone call by the caller
- Missed calls can be used to notify another person of the caller's presence
- It can be used by one who has low credit balance
- The number of the caller is usually flashed on the screen of the caller who is using caller ID
- phenomenon  common in developing countries, particularly India, Pakistan,
- missed call serves as a cheap way of communication

# How Does SMS Service Work?

- SMS allows users to send short messages to other cell phones.
- invented by a Finnish civil servant named Matti Makkonen.
- messages are sent with a "store-and-forward" mechanism.
- The messages are sent to a Short Message Service Center (SMSC),
- Then relayed to the intended recipient.
- The signaling protocol is precisely 140 bytes.
- SMS messages have very constrained character limits.

# How MMS Works

- MMS messages are delivered using a combination of SMS and WAP (wireless Application Protocol) technologies.
- When a mobile phone receives an MMS message,
- what it is actually receiving is an MMS notification message which it receives over SMS.
- This MMS notification message contains header information about the MMS message,
- This URL pointer is a dynamically generated URL for the MMS message content which is stored on the MMSC.
- The sending phone initiates a data connection that provides TCP/IP network connectivity, usually over GPRS (General packet radio service).
- The sending phone performs an HTTP POST to an MMSC of the MMS message encoding in the MMS Encapsulation Format,
- The MMSC receives the MMS message submission and validates the message sender.
- The MMSC stores the content of the MMS message and makes it available as a dynamically generated URL link.
- The MMSC generates an MMS notification message, which is sent via WAP Push over SMS to the message recipient's). This MMS notification message contains a URL pointer to the dynamically generated MMS content.
- The recipient receives the MMS notification message.

# Ring Tone

sound made by a telephone to indicate an incoming call.

**Features**

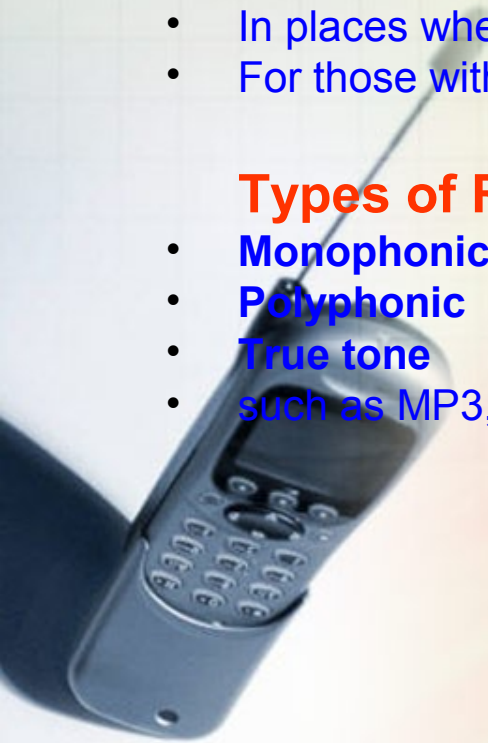
- phone personalization and customization.
- allow users to associate different ring tones with individual family members and friends.
- Some providers allow users to create their own music tones

**Vibrating Alert**

- An alternative to a ring tone for mobile phones is a vibrating alert. It may be useful:
- In noisy environments
- In places where ring tone noise would be disturbing
- For those with a hearing loss

## Types of Ring Tones

- **Monophonic**
- **Polyphonic**
- **True tone**
- such as MP3, AAC, or WMA format



# Dropped call

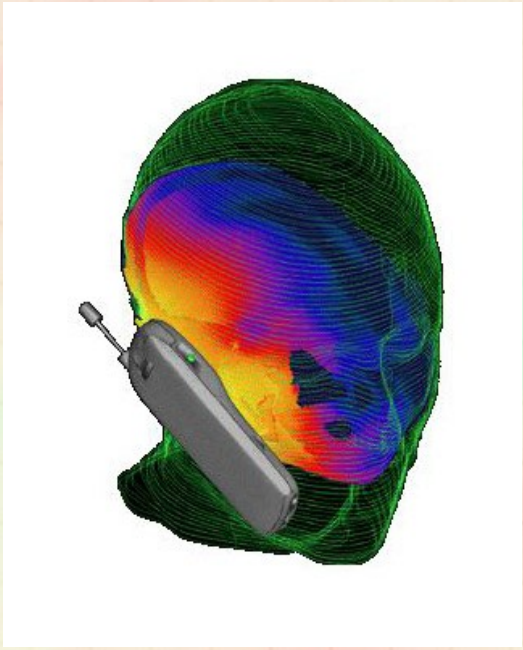
- **call** terminated unexpectedly as a result of technical reasons.
- Areas where users experience a large number of dropped calls are commonly referred to as dead zones.

**Reasons**

- when the mobile phone moves out of range of a wireless network.
- when a phone is taken into an area where wireless communication is unavailable, interrupted, interfered with, or jammed
- if a mobile phone at the other end of the call loses battery power and stops transmitting abruptly.

# Issues related with Cell Phones

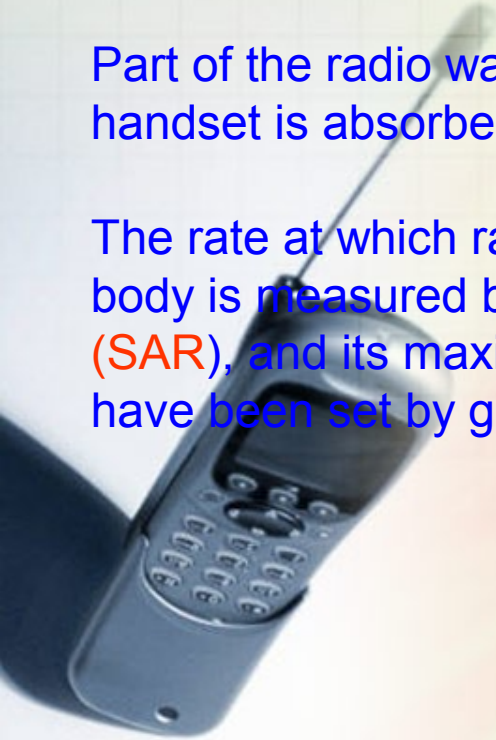
- **Mobile phone radiation and health** concerns have been raised, because mobile phones use electromagnetic radiation in the microwave range.



## Health Hazards of Hand Sets

Part of the radio waves emitted by a mobile telephone handset is absorbed by the human head.

The rate at which radiation is absorbed by the human body is measured by the Specific Absorption Rate (SAR), and its maximum levels for modern handsets have been set by governmental regulating agencies



# Thermal effects

- dielectric heating,
- most of the heating effect will occur at the surface of the head,
- some parts of the human head are more sensitive to damage from increases in temperature,

## Blood Brain Barrier Effects

- Swedish researchers have studied the effects of microwave radiation on the rat brain. They found a leakage of albumin into brain via a permeated blood-brain barrier

## Effects On Sleep

- A study showed that mobile phone signals affect sleep patterns and possibly delay sleep onset during exposure.

# Electrical sensitivity
# Effects

- burning and tingling sensations in the skin of the head and extremities,
- fatigue,
- sleep
- disturbances,
- dizziness,
- loss of mental attention,
- headaches,
- malaise,
- tachycardia (heart palpitations)
- disturbances of the digestive system
- Tumor risk

# Health hazards of base stations

- Radiation is  emitted by base stations
- Radiation emitted continuously and is more powerful at close quarters.
- People living within 300 meters of GSM cell towers in rural areas or within 100 m of base stations in urban areas complained
- **Fatigue**
- **Headache**
- **Sleep**
- **Disruption**
- **loss of memory**

# Occupational health hazards

- Telecommunication workers may be at risk of much greater exposure than the general population.
- Many times base stations are not turned off during maintenance,, so people work near "live" antennas.

# Safety standards and licensing

▪governments and regulatory bodies adopt safety standards, which translate to limits on exposure levels below a certain value.

▪International Commission for Non-Ionizing Radiation Protection (ICNIRP) has been adopted so far by more than 80 countries.

For radio stations, ICNIRP proposes two safety levels:

- one for occupational exposure,
- another one for the general population.

## LAW Suits

•In the USA, a small number of personal injury lawsuits have been filed by individuals against cellphone manufacturers,

# Mobile computing

- **Mobile computing** is a generic term describing one's ability to use technology 'untethered', facilitated by devices which provide mobile computer functionality.

**Cell Phones Supporting Computer Functionality**

- Personal digital assistant
- Smart phone
- Technical and other limitations of mobile computing
- Limited usability of Mobiles
- Limited Network Connectivity
- Batteries with long life are needed
- Weather problems as well as distance-limited connection
- Potential health damage from cellular radio frequency emission
- Screens and keyboards are too small

# How Cell Phone Viruses Work


## *INTRODUCTION*

***The first known cell-phone virus appeared in 2004***
Cabir.A infected only a small number of Bluetooth-enabled phones

**Most Common Viruses**
Cabir.A
Skulls.A
Commwarrior.A
Locknut.B
Fontal. A

## THE DAMAGE DONE

sit in the phone and try to spread itself.
might access and/or delete all of the contact information and calendar entries in phone.
send an infected MMS message to every number in phone book and MMS messages
delete or lock up certain phone applications

# How They Spread

- Internet downloads
- Bluetooth wireless connection
- The Multimedia Messaging Service –

# PROTECTING YOUR PHONE

- Turn off Bluetooth discoverable mode.
- Check security updates to learn about filenames you should keep an eye out for.
- Security sites with detailed virus information include:
  - F-Secure
  - McAfee
  - Symantec
- Install some type of security software on your phone


Thank You
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