

Science & Tech

Class - 9

Topic - Basic Connect of ICT,

Wire and Wireless Communication

ICT (Information Communication Technology)

Communication

- Voice traffic
- Two way
- +3G, +4G

Information

- Data traffic
- One way

Narrowband

Broadband → (256 Kbps) — In 2004 India

VoIP / Internet Telephony
Voice Over Internet Protocol

Skype

Mode of Communication

Wirebased / Landline

- Cu wire
- optical fibres

wireless / WLL

(wireless in local loop)

CDMA

(Code Division Multiple Access)

GSM

(Global System of Mobile Communication)

2

Cu Wire

- ⇒ Cu, Rusting Problem
- ⇒ Limited Connection
- ⇒ Congestion / Cross Connection
- ⇒ Voice Quality not Good
- ⇒ Repeaters used at small distance
- ⇒ Not having high heat resistance.
- ⇒ Defence - never prefer
- ⇒ Bandwidth - very low
- ⇒ Narrowband

Optical fibre

- ⇒ made up of Si, SiO₂
 - ⇒ No Rusting
 - ⇒ Single optical fibre > Loop Connection.
 - ⇒ Multiplexing → no congestion
No cross connection
 - ⇒ voice quality increased
 - ⇒ min at a distance of 80 km Reapter are used
 - ⇒ Heat Resistance upto 400° - 500°C
 - ⇒ Defence Prefer
 - ⇒ Bandwidth - Higher
- Broadband.

+ { DSL - Digital Subscriber Line
ADSL - Asymmetrical Digital Subscriber line

{ DSL
ADSL
Cable Modem

Wireless

CDMA
(Code Division Multiple Access)

GSM

(3)

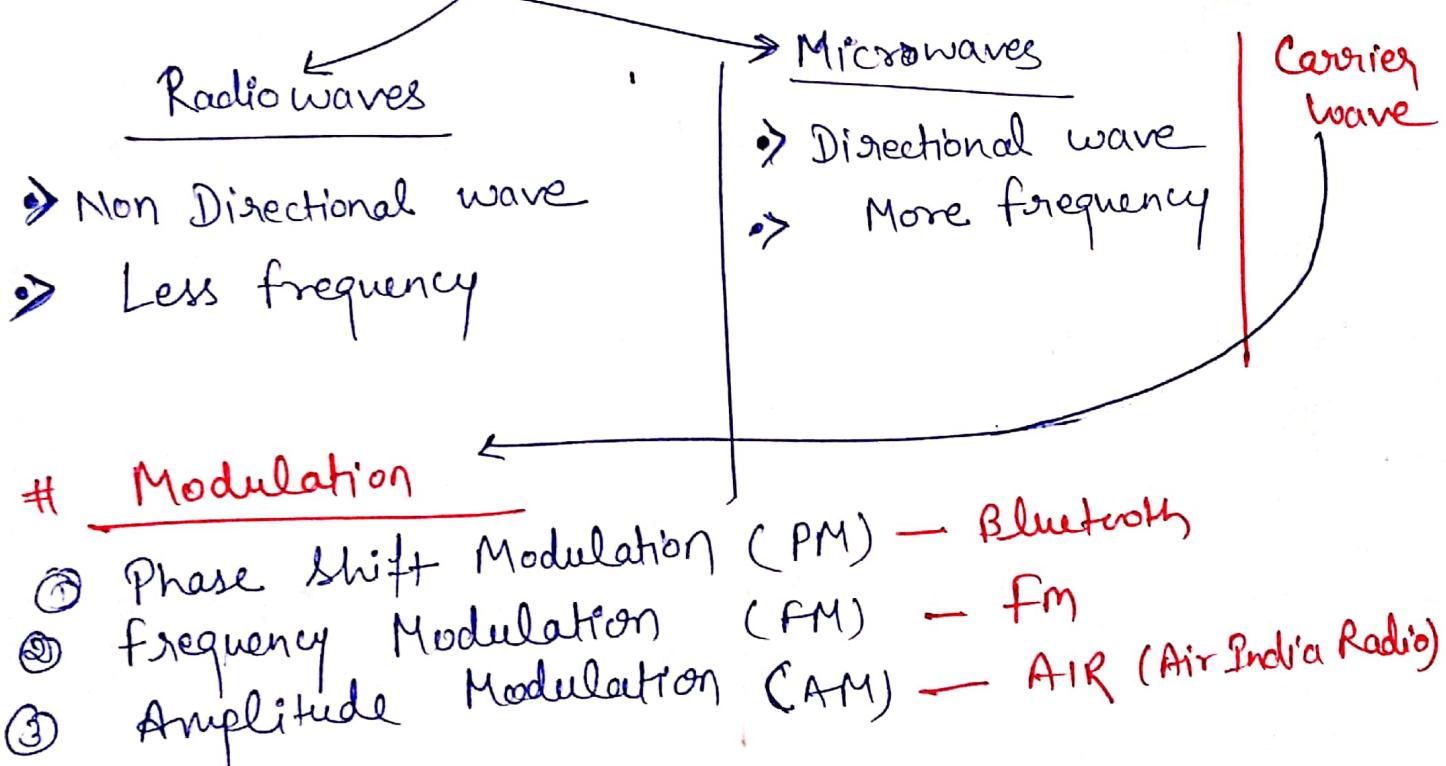
Wireless

- ① FDMA (Freq.) — 1st Generation (1G) — (Analog)
- ② TDMA (Time.)
- ③ CDMA (Code)] 2nd Generation (2G) — (Digital)

Wireless

Technology working through Electromagnetic Waves
 ↓
 (Invisible waves)

Electromagnetic Wave



Modulation

- ④ Phase Shift Modulation (PM) — Bluetooth
- ⑤ Frequency Modulation (FM) — FM
- ⑥ Amplitude Modulation (AM) — AIR (Air India Radio).

Electromagnetic Wave

- frequency → Max^m tendency to do work in a certain period of time. ∝ Energy
- Wavelength → Distance travelled by waves
- Amplitude → thickness of waves

④

CDMA

(Code Division Multiple Access)

- ⇒ Introduced earlier
- ⇒ Later on (India)
- ⇒ 10-15% people → USA + S. Korea
- ⇒ Technology → costly
- ⇒ Reliance phone battery fastly discharge.
- ⇒ More safe and secure
- ⇒ Echo, calldrop, Cross connection
 └ (Rare Problem)
- ⇒ Defence always prefer CDMA
- ⇒ CDMA

GSM

(Global System of Mobile Communication)

- (GSM is variant of TDMA)
- ⇒ Later on (World wide)
- ⇒ first in (India) → 100%.
- ⇒ 85-90% people - European
- ⇒ Technology → cheaper.
- ⇒ Not have discharging battery problem.
- ⇒ Echo, calldrop, Cross Connection
- ⇒ flexibility
- ⇒ Enhance bandwidth / Quality (Improved Generation)

Problem with Chinese handset

IMEI → (International Mobile Equipment Identity Number)

SIM Card : Subscriber Identity Module Card.

1992 - Radiolinja Company at Munich in Germany.

IMSI no. → International Mobile Subscriber Identity No.

Conventional Phone

- Connected from Tower to Tower.
- Ionosphere

Satellite Phone

- Signal goes to satellite then back to earth.
- Call delay + Call minutes are costly.
- No tower — still Connect.

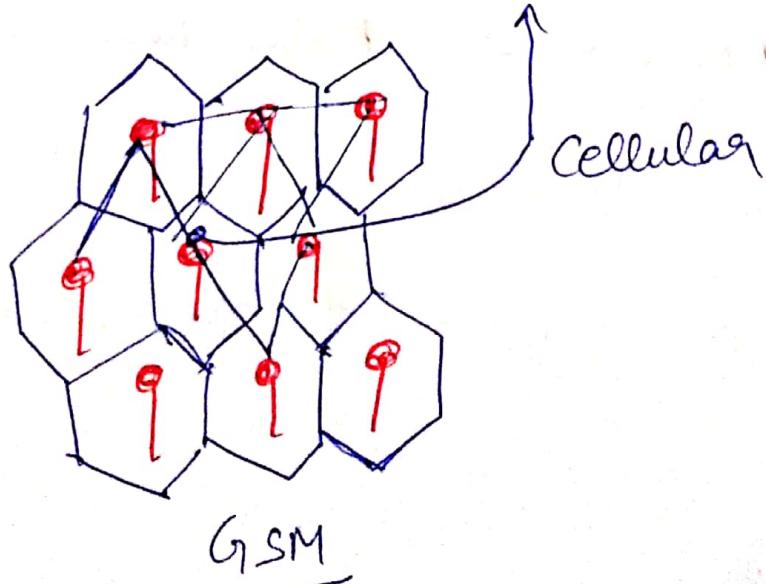
{ Sahara Desert,
Polar Region, Himalaya,
Ocean }

Globalstar
Thuraya
Iridium }
→ Satellite Phone

Mobile Generation

Mobile Phone

Cell phone



⑥

0G - Zero Generation

0G \Rightarrow Radiophone / Taxiophone

A device was mounted in a vehicle & its headset was close to driver seat

No tower introduced.

Not a cellphone Generation.

1G - first Generation

1G \rightarrow FDMA (frequency Division Multiple Access)

\rightarrow Based on Analog Signals

\rightarrow Power Consumption was very fast

2G - Second Generation

2G \rightarrow TDMA
CDMA $\xrightarrow{\hspace{1cm}}$ GSM

\rightarrow Performing on Digital Signal

Performance ↑

\rightarrow Power Consumption low

Accuracy ↑

2.5G - GPRS (General Packet Radio Services)

\downarrow
WAP (Wireless Application Protocol)

\rightarrow Browsing and Surfing

\rightarrow MMS (Multimedia Messaging Services)