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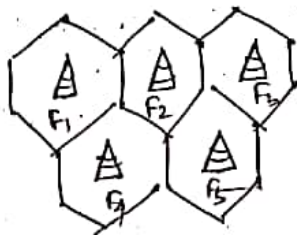
• Basic Concept of mobile communication systems:

- i) The term mobile is used to classify any radio terminal that could be moved during operation. Comprehensively, it is a radio terminal that can be attached to a high speed moving platform. Example: A cellular telephone in a fast moving vehicle.
- ii) The term portable describes a radio terminal that can be hand held used by someone at walking distance. Eg: walkie-talkie.
- iii) Subscriber is a mobile or portable user as each user pays subscription fees to use the communication system.

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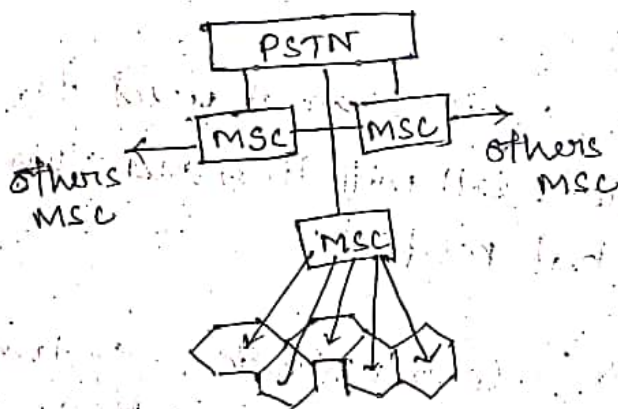
• Mobile communication (wireless) based on some equipments.

1. Base Stations: A fixed radio station in a radio communication system used for radio communication with mobile stations (MS). Base stations are located at the centre or on the edge of a coverage region and consist of radio channels and transmitters and receiver antennas mounted on a tower.



2. ▶ Mobile stations (MS): A station in a cellular radio service intended for use while in motion at unspecified locations. Mobile stations may be hand-held personal units (portables) or installed in vehicles (mobiles).

3. ▶ Mobile Switching Centers (MSC): Switching centers that coordinates the routing of calls in a large service area. In a cellular radio system, the MSC connects the cellular base stations and the mobiles to the PSTN. An MSC is also called the Mobile Switching Telephone Network (MSTN).



4. ▶ Subscriber: A user who pays subscription charges for using a mobile communication system.

5. ▶ Transceiver: A device capable of simultaneously transmitting and receiving radio signals.

6. ▶ Roamer: A mobile station which operates in service area (market) other than that from which services has been subscribed.

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7. The MS is in roaming when it enters the MSC other than its home registry.

7. Page: A brief message which is broadcast over the entire service area, usually in a simulcast fashion by many base stations at the same time.

8. Forward channel: Radio channel used for transmission of information from the BS to the mobile.

9. Reverse channel: A radio channel used for transmission of information from the mobile to base station.

10. Control channel: Radio channel used for call setup, call request, call initiation and other beacon or control purpose.

11. Simplex systems: Communication systems which provided only one way communication.

12. Full duplex system: Simultaneous 2 way communication. Transmission and reception is typically on two different channels (FDD)

13. Half duplex systems: Two way communication but once at a time, because same radio channel for both transmission and reception.

6.3 At any given instant, the user can only transmit or receive information.

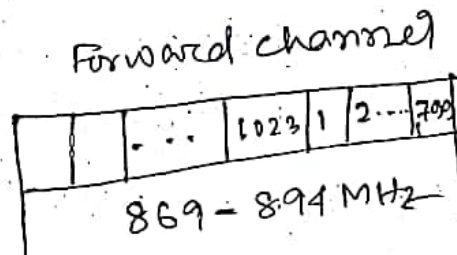
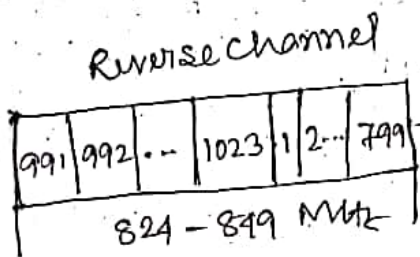
## 2. Frequency band used in mobile communication:

o Spectrum for US cellular telephone.

Identically labeled channels in two bands from the forward and reverse channel pair used for duplex communication between base station and mobile.

o The forward and reverse channels in each pair is separated by 45 MHz.

o channels labeled 800-900 are unused.



## ⊛ Frequency Band spectrum in India:

In India, operates 2G, 3G, 4G capabilities

2G → GSM 900, GSM 1800

3G → UMTS 900, UMTS 2100

4G → LTE 850 (5), LTE (1800 (3), LTE (2100) (1)  
LTE 2300 (40), LTE 2500 (41)

• Airtel (India) operates 2 GSM bands, 2 UMTS bands, 1 LTE band  
(total 5 band)

~~Free~~ GSM: 900 (E-GSM) → interface → GSM  
1800 (DCS) → GSM

• Supported GSM protocols: EDGE → Generation 2.5G

• UMTS: UMTS protocols  
Name Generation

UMTS 3G  
HSPA+ 3.5G (4G speed)

• LTE: Name interface Generation  
B40 (TD2300) LTE 4G

• JIO: JIO (India) uses 3 LTE bands  
Name Interface Generation

B3 (1800+) LTE } 4G  
B5 (850) LTE }  
B40 (TD2300) LTE }

• Vodafone - India: 2 GSM band & 1 UMTS band

• GSM { Name Interface protocols Generation  
900 (E-GSM) GSM EDGE 2.5G  
1800 (DCS) GSM

• UMTS { B1 (2100) UMTS } 3G  
HSPA+ } 3.5G (4G speed)

• BSNL: 2 GSM bands & 1 UMTS band

Name, interface, protocols, Gen... all same as Voda