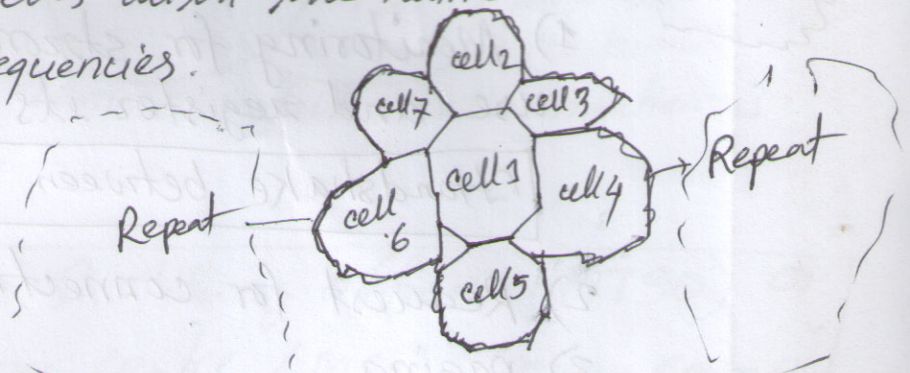


Mobile System

- use one powerful transmitter (BS)
- upto 50 km
- problem: Frequency cannot be reused throughout the system.

Cellular System: Multiple smaller transmitter (BS) with less power.

→ Frequency Reuse: cells with the same number have the same set of frequencies.



→ Each base station allocated portion of allocated channels of entire system

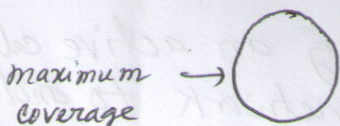
Example: if a telephone system has bandwidth of 3 MHz one channel needs 30 KHz.

$$\text{Channel per BS/BTS} = \frac{\text{Available bandwidth}}{\text{no. of station} \times \text{per channel capacity}}$$

→ Criteria for shape of cell are:

- Area without overlap
- Geometric shape
- Area of cell

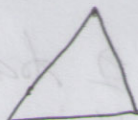
→ Shape of cell



maximum coverage

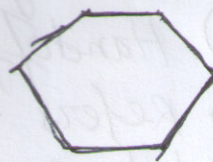
Area overlap

criteria not fulfilled



No overlapping

Area to circle



No overlapping

Area to circle 73%



No overlapping

Area to circle 63.7%

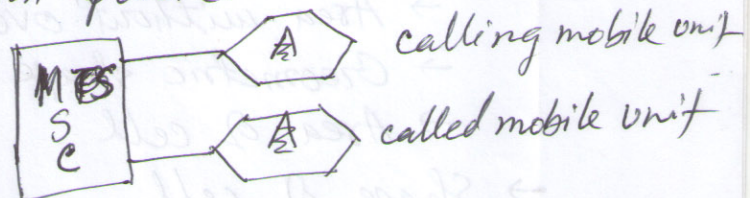
Lec-04 Cellular Network-02

②



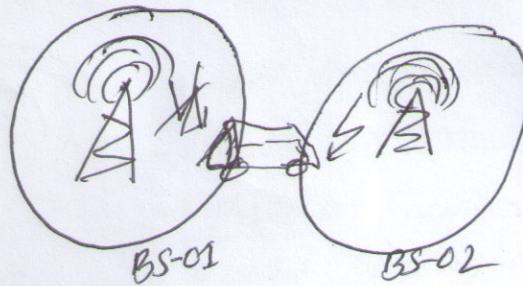
communication process

- 1) Monitoring for strongest signal for identifying use and register its location/Mobile unit initialization
Handshake between mobile unit and MSC
- 2) Request for connection/Mobile-originated call
- 3) paging
 - one-to-one communication betⁿ mobile and the base station.
 - It is a procedure the network uses to find out a subscriber's location before actual call establishment
 - Used to alert the mobile station of an incoming call
 - Paging is initiated by the network subsystem (NSS) and is based on the location registration information the mobile subscriber has supplied when performing the location update.
- 4) call accepted
- 5) Ongoing Call
- 6) Handoff
 - Refers to the process of transferring an active call or data session from one cell in a cellular network to another or from one channel in a cell to another.



Handoff

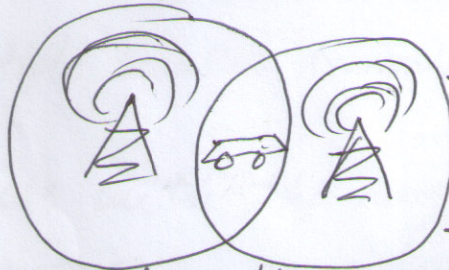
→ Hard handoff



Disconnect first then join/connect another BS.

→ Soft Hand off

→ costly



→ two connection from two diff. base station.

→ No break

→ Hold previous connect until new connection is established

PTR

→ Mobile Telephone Switching Office (MTSO) or Mobile Switching Centre (MSC) are same.

Additional Functions in MSC controlled call

- Call blocking
- Call terminal
- Call drop
- calls to/from fixed and remote mobile subscriber