

The Cellular Concept

Unit 3

3.3 Channel Assignment Strategies

- Frequency reuse scheme
 - increases capacity
 - minimize interference
- Channel assignment strategy
 - fixed channel assignment
 - dynamic channel assignment

- Fixed channel assignment

- each cell is allocated a predetermined set of voice channel
- any new call attempt can only be served by the unused channels
- the call will be *blocked* if all channels in that cell are occupied
- borrowing strategy- cell borrows channel from neighboring cell

- Dynamic channel assignment
 - channels are not allocated to cells permanently.
 - allocate channels based on request from mobile switching center(MSC)
 - reduce the likelihood of blocking, increase capacity.

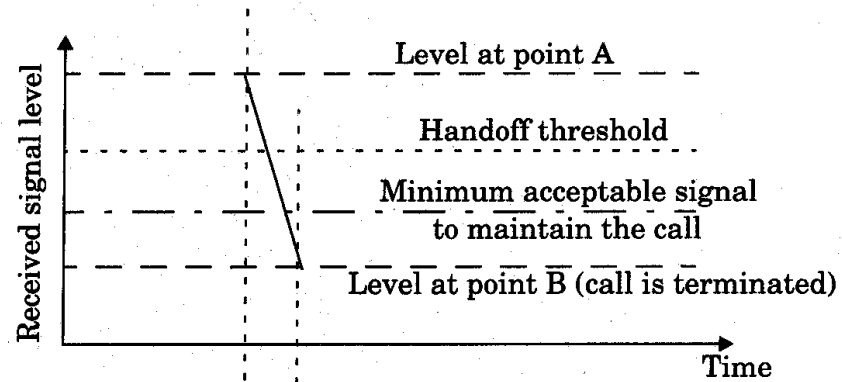
3.4 Handoff Strategies

- When a mobile moves into a different cell while a conversation is in progress, the MSC automatically transfers the call to a new channel belonging to the new base station.
- Handoff operation
 - identifying a new base station
 - re-allocating the voice and control channels with the new base station

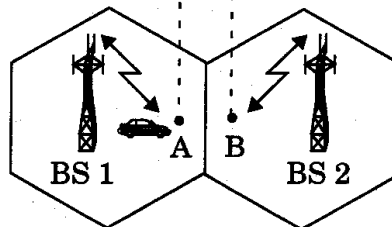
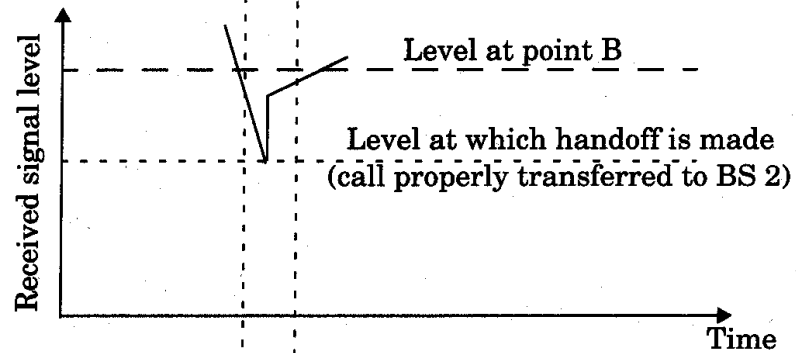
3.4 Handoff Strategies

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- Handoff Threshold
 - Minimum usable signal for acceptable voice quality (-90dBm to -100dBm)
 - Handoff margin $\Delta = P_{r,handoff} - P_{r,minimumusable}$ cannot be too large or too small.
 - If Δ is too large, unnecessary handoffs burden the MSC
 - If Δ is too small, there may be insufficient time to complete handoff before a call is lost.

(a) Improper handoff situation



(b) Proper handoff situation



- Handoff must ensure that the drop in the measured signal is not due to momentary fading and that the mobile is actually moving away from the serving base station.
- Running average measurement of signal strength should be optimized so that unnecessary handoffs are avoided.
 - Depends on the speed at which the vehicle is moving.
 - Steep short term average -> the hand off should be made quickly
 - The speed can be estimated from the statistics of the received short-term fading signal at the base station

- Dwell time: the time over which a call may be maintained within a cell without handoff.
- Dwell time depends on
 - propagation
 - interference
 - distance
 - speed