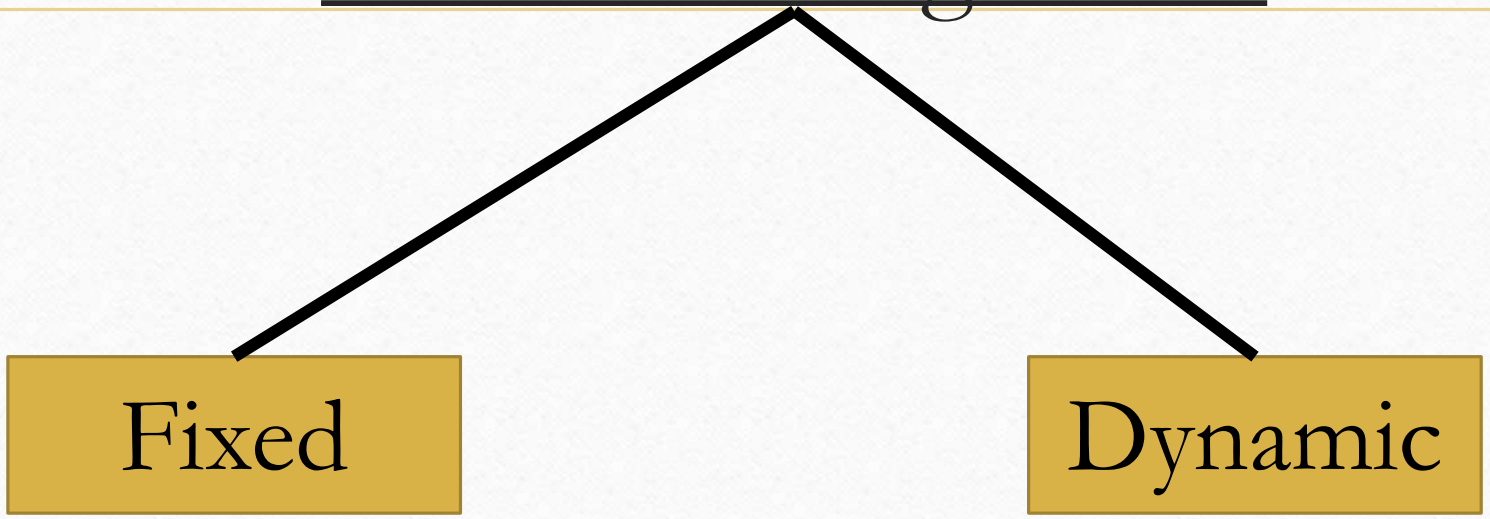
Chapter 3

Channel Assignment Strategies

- Are required for Chanel/ frequency reuse.
- Various channel assignment strategies can be assigned .
- Can be fixed or dynamic

Channel Assignment



Fixed Channel Assignment

- Predetermined set of voice Channels.
- If channels are occupied , than calls are blocked
- Several Variation Exists : **Borrowing Voice Channel**
  - Situation : Cell do not have unused cells
  - Channel is borrowed from neighboring cell under supervision of MSC

Dynamic Channel

- Voice channels are not allocated .
- Each time a request is made, BS request channel from MSC .
- MSC allocates channel to BS after computation of algo which may include
  - Reuse distance
  - Interference
  - Billing

Dynamic Channel

- Only frequency is given that that do not fall within calculated minimum restricted reuse distance of neighboring cells.
- Advantages : Less probability of call clocking , increasing capacity , increasing trunking
- Disadvantages : MSC needs to collect real data , traffic distribution , and RSSI of all channels

Advantage of Fixed strategy

Handoff Strategy

- **Hand off**
- When a mobile moves into different cell while a conversation is in progress, MSC automatically transfers the call to new channel belonging to new Base station .
- The hand off operation not only involves identifying new BS , but also requires to allocate new control and voice signals

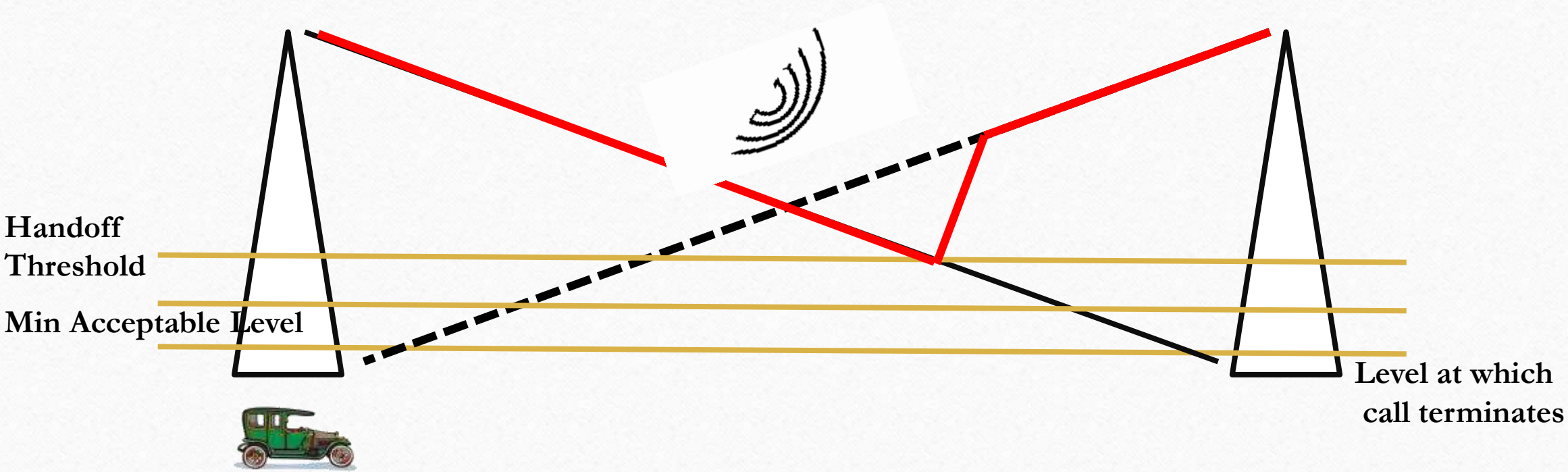
Hand off Continued

- Handoff strategies prioritize handoff request over call initiation request when allocating unused channel .
- Optimum signal level need to be defined at which handoff needs to take place.
- Similarly a particular signal level is specified as the minimum useable signal for acceptable voice quality (-90 dbm to -100dbm)
- A slightly stronger signal level is kept for handoff threshold at BS

Hand off Continued

- This difference or margin is given as Δ= Pr handoff – Pr minimum useable
- Large Δ: Unnecessary handoffs burdening MSC .
- Small Δ: Insufficient time for MSCC to computer hand off.

Hand off


Handoff
Threshold
Min Acceptable Level
Level at which
call terminates

Delays and Handoff

- The drop call event can occur when there is an excessive delay during hand off by MSC in assigning a handoff
- Delays may also occur during high traffic timings , when computation load at MSC is high

Hand off : Consdeirations

- It is important while measure drop in signal level , that the drop is not due to momentarily fading , and mobiles actually moving away from BS
- In order to ensure this momentarily fading BS monitors, the signal level for a certain time, before hand off is initiated.
- Speed is also to be considered , while computing hand offs .

Dwell time

- The time over which call may be maintained in cell
- Governed by
  - Propagation
  - Distance b/w subscriber nad BS

First Generation and Second Generation handoff

- First G:
- Signal Strength is measured by BS and supervised by MSC.
- BS Continuously monitors signal strength of all reverse voice channel to determine the location
- In addition to measuring of RSSI of units engaged in call within cell , a spare antenna (receiver) is used to calculate the RSSI of MS of neighboring cells
- This LOCATOR RECIVER is controlled by MSC.

Second Generation and Second Generation handoff

- 2 G
- MAHO
- Every mobile phone measures the revived power from BS in surrounding cells
- Report results to Serving BS
- A hand off is initiated when power received from a certain serving station drops below a certain level, and the power of signals from a neighboring cell increases

Inter system Hand Offs

- Occurs when
- MS moves from once MSC to another MSC
- Some Considerations
  - local CALL may become long distance call
  - Compatibility between two MSCs

Prioritizing Hand offs

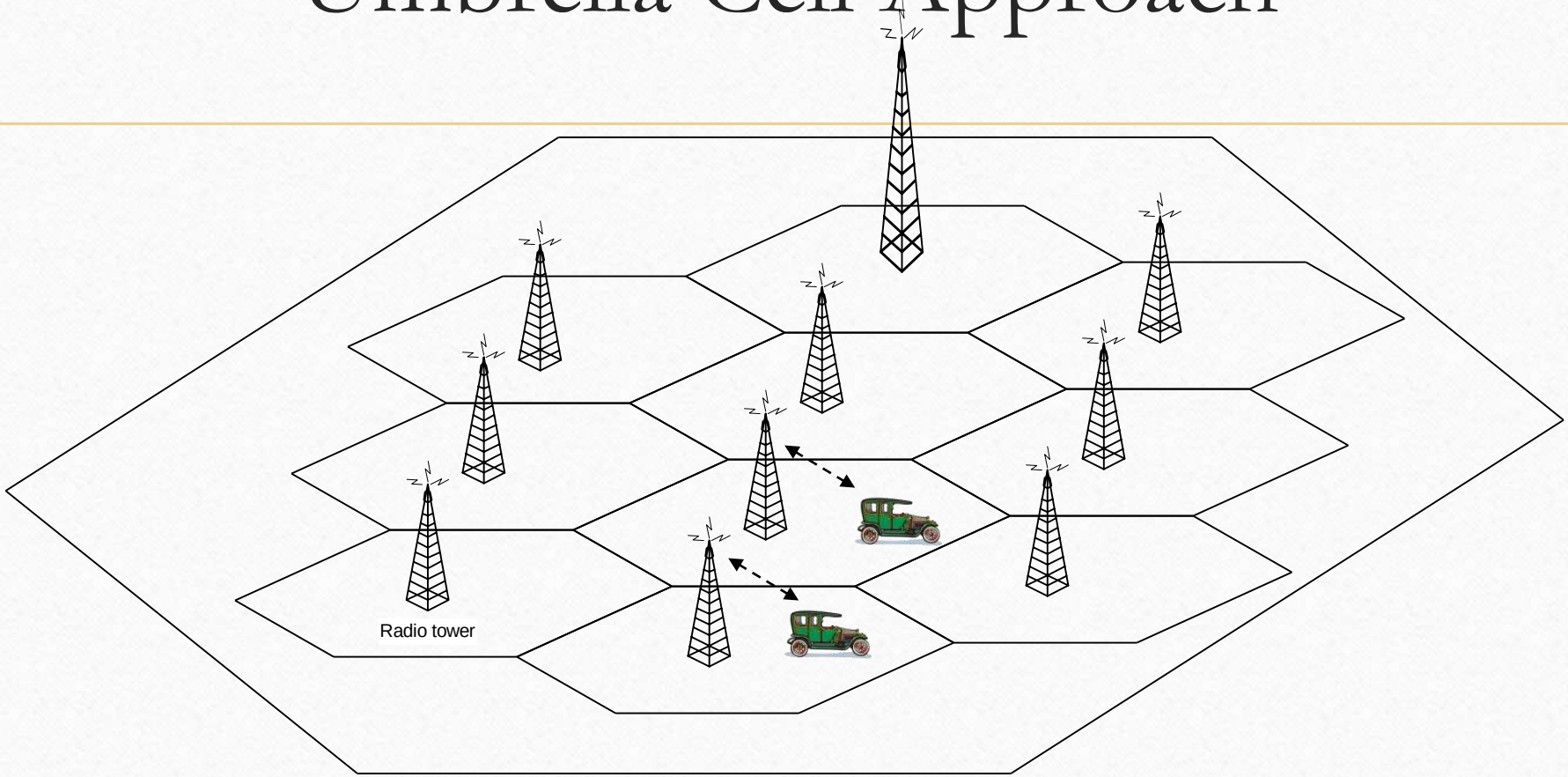
- Methods for prioritizing Handoffs

1. Guard Channel Concept
2. Queing

Practical Handoff Considerations

- Few Issues
- High speed vehicles vs Pedestrains .
- MSC becomes burden

Umbrella Cell Approach



Cell dragging

- LOS
- Causes Traffic management

One G and 2 G

- One G
  - Time 10 Second
  - Δ= 6db to 12 Db
- Two G
  - Time 0-2 Second
  - Δ= 0db to 6 db

Interference and System Capacity

- Interference Factors
  - Another mobile in same cell
  - Call in progress in neighboring cell
  - BS working at same frequency
- Tow main Interferences
- Co channel Interference
- Adjacent Channel interference

Co channel Interference