Microcells

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Advantages of microcells:
1. Small in size and high bit rate.
2. Use of smaller cells enables the use of lower and provides superior propagation conditions.

Operation in cellular systems:
In the approximate center of each cell is a base station (BS). The BS includes an antenna, a controller, and a number of transceivers, for communicating on the channels assigned to that cell. The controller is used to handle the call process between the mobile unit and the rest of the network. Each BS is connected to a mobile telecommunications switching office (MTSO), with one MTSO serving multiple BSs. The MTSO connects calls between moblile units. The MTSO is also connected to the public telephone or telecommunications network and can make a connection between a fixed subscriber to the public network an da mobile subscriber to the cellular network.

1. Mobile unit initialization:
When the moble unit is turned on, it scans and selects the strongest setup control channel used for this system. Cells with different frequency bands repetitely broadcast on different setup channel. The effect of this procedure is that the mobile unit has automatically selected the BS antenna of the cell within which it will operate. Than a handshaking is done. The handshake is used to identify the user and register its location, As long as the mobile unit is on, this scanning procedure is repeated periodically to account for the motion of the unit. If the unit enters a new cell, then a new BS is selected.

2. Mobile originating call:
A mobile unit originates a call by sending the number of the called unit on the preselected setup channel. The receiver at the mobile unit first checks that the setup channel is idle by examining information in the forward channel. When an idle is detected, the mobile may transmit on the correspon--ding reverse channel. The BS sends the request to the MTSO.

3. Paging:
The MTSO then attempts to complete the connection to the called unit. The MTSO sends a paging message to certain BSs depending on the called mobile number. Each BS transmits the paging signal on its own assigned setup channel.

4. Call accepted:
The mobile unit recognises its number on the setup channel beign monitored and responds to that BS, which sends the response to the MTSO. The MTSO

sets up a circuit between the calling and called BSs. At the same time, the MTSO selects an available traffic channel within each BS's cell and notifies each BS, which in turn notifies its mobile unit. The two mobile units tune to their respective assigned channels.

5. Ongoing call:
While the connection is maitained, the two mobile units exxhage voice or data singals, going through their respective BSs and the MTSO.

6. Call blocking:
During the mobile−initiated call stage, if all the traffic channels assigned to the nearest BS are busy, then the mobile unit makes a preconfigured number of repeated attempts. After a certain number of failed tries, a busy tone is returned to the user.

7. Call termination:
When one of the two users hangs up, the MTSO is informed and the traffic channels at the two BSs are released.

8. Call drop:
During a connection, because of interference or weak signal spots in certain areas, if the BS cannot maintain the minimum required signal strength for a certain period of time, the traffic channel to the user is dropped and the MTSO is informed.

9. Calls to/from fixed and remote mobile subscriber:
The MTSO connects to the public switched telephone network. Thus the MTSO can set up a connection between a mobile user in its area and a fixed subscriber via the telephone network. Furhter, the MTSO can connect to a remote MTSO via the telephone network or via dedicated lines and set up a connection between a mobile user in its area and a remote mobile user.