

20XW61 - Mobile Computing

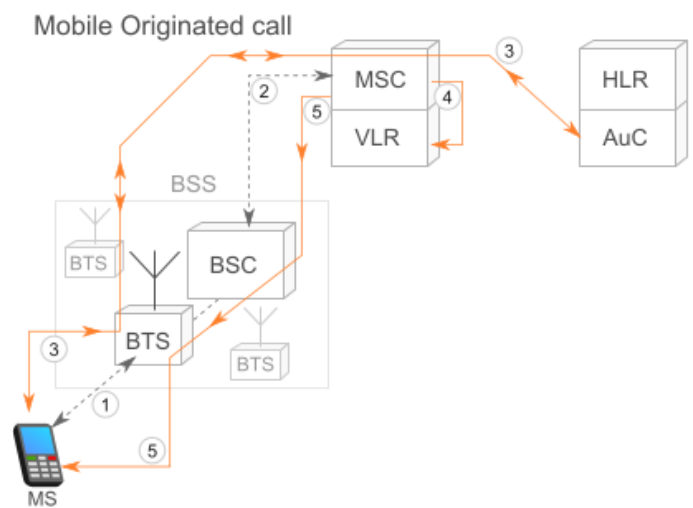
Assignment Presentation

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There are two different scenarios for call establishment, i.e., mobile originated call (MOC) and mobile terminated call (MTC). The Mobile/MS which initiates a Call, that call is known as MOC whereas the destination Mobile/MS for which the call has been initiated is known as MTC.

Mobile Originated Call (MOC):

1. Initiate call: MS requests BSS for radio resource allocation, which further connects to MSC. BSS assigns MS a channel with a given frequency and time slot, which has the communication route between the MS and the BSS.
2. Once MS confirms the established channel, the BSS initiates the connection to the MSC.
3. Once the MS has connected to the network, subscriber authentication is done by using IMSI number stored in the SIM card. After this, MS MSC can start communicating.



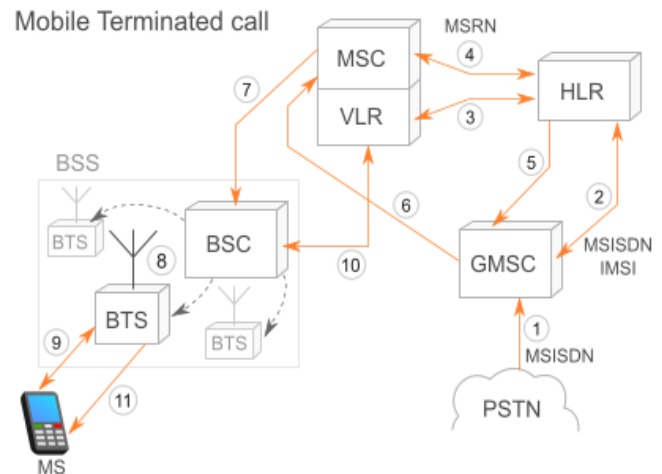
Ciphering procedure is started by MSC to ensure that the data is sent between BSS and MS/MSC which is transmitted to BTS which forwards it to MS.

4. To initiate call set up, MSC verifies that the requested service is allowed for the subscriber which is available in the Virtual Location Register (checks using location, preferences, allowed services). After confirmation, MSC starts the call setup.
5. Voice channel is allocated between MSC and BSS for the call to take place. BSS notifies the MS about the change to voice mode, and the MS returns a confirmation message. The MSC routes the call to the dialed number. When the call is received in the PSTN, the MSC is notified that the called subscriber is being alerted, at which point the originating MS receives a ring notification.

To disconnect the call by either party, a disconnect message is sent to the MSC, which releases the communication channels created with the PSTN and the BSS.

Mobile Terminated Call (MTC):

1. PSTN uses the information of the phone number being called to locate gateway MSC leading to subscriber's registered MSC.
2. GMSC requests information on subscriber's core network and current location by asking the HLR (Home Location Register).
3. HLR constantly updates locations of the MS stored in the VLRs the MS visits. In HLR, the subscriber MSISDN (phone no.) is associated with the IMSI number of the SIM card. HLR is aware of the visited MSC/VLR of the MS at a given time (due to authentication).
4. HLR requests a temporary roaming phone number from MSC to pass the call from GMSC to MSC. (called as Mobile Station Roaming Number – MSRN).
5. MSRN is sent back from HLR to GMSC.
6. GMSC forwards the call to MSC using the assigned MSRN.
7. MSC pages all the BSCs in the area that it serves upon receiving the call.
8. BSC page the BTSs assigned to them.
9. The called MS responds to the paging from the BTS, asking to establish a radio channel to the BTS.
10. The response is forwarded to MSC, which, once notified, authenticates the MS and initiates the ciphering of the call using the same procedure as in MO calls.
11. When MSC sends back to the radio network the call confirmation message, the called MS starts to ring.



At the other end, the MSC notifies the GMSC, which notifies the PSTN that the destination number is being alerted.