

Processor Interfaces (GSM Originating Call)				
Cell	Mobile Network		Fixed Network	EventStudio System Designer 4.0
Mobile Station	Base Stations	NSS	PSTN	13-Sep-08 21:38 (Page 1)

LEG: GSM Mobile Originated Call

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This scenario describes the call setup for a GSM originating call. A mobile user calling a land line subscriber is covered here.
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Begin RR Connection Establishment

Call related information needs to be transported from the mobile phone to the Mobile Switching Center (MSC). This requires the establishment of a Radio Resource (RR) connection to MSC. The first phase of the call setup just sets up this RR connection.

RR CHANNEL REQUEST
RACH

RR connection establishment is triggered by sending the Channel Request message. This message requests the Base Station System (BSS) for allocation for radio resources for the RR connection setup. The mobile now waits for an assignment on the Access Grant Channel (AGCH). At this point the mobile is listening to the AGCH for a reply.

Note: The RR CHANNEL REQUEST is sent on a Random Access Channel (RACH). This is a slotted aloha channel that can be used at random, without any coordination between the mobiles. Any mobile can transmit on this channel whenever it wishes. If two mobiles transmit on the channel at the same time, their messages will be lost in a collision. The mobiles will detect the collision via a timeout and retransmit the message after a random back off.

RR IMMEDIATE ASSIGNMENT

AGCH, Radio_Resource = (TCH, Frequency, Timeslot), Time Correction, Frequency Correction

The BSS transmits the radio resource assignment to the Mobile via the AGCH channel. The message also contains the time and frequency corrections. The time corrections allow the mobile to time it's transmissions so that they reach the BSS only in the specified slot. The frequency corrections correct for the Doppler shift caused by the mobile's motion.

RR SABM + MM CM SERVICE REQUEST
TCH, SAPI = 0

This is the first message that is sent after tuning to the channel. The Mobile initiates a LAPm connection with the BSC by sending a Set Asynchronous Balanced Mode (SABM) message. The service request message meant for the MSC is also sent in this message.

RR UA

TCH, SAPI = 0

The BSS replies with Unnumbered Acknowledge (UA) to complete the LAPm setup handshake

SCCP CONNECTION REQUEST + MM CM SERVICE REQUEST
SS7

The BSS receives the CM Service Request message from the mobile and forms a "BSSMAP COMPLETE LAYER 3 INFORMATION". The BSS then piggy backs the message on the SCCP connection request message.

LEG: Skip Authentication Procedure

Enable Ciphering

BSSMAP CIPHER MODE COMMAND

Since the subscriber has been successfully authenticated, the MSC initiates ciphering of the data being sent on the channel. The channel is ciphered so as to protect the call from eavesdropping.

RR CIPHERING MODE COMMAND
mode = CLEAR

The BSS sends the CIPHERING MODE COMMAND to the mobile. The mobile will be able to receive this message as the transmission from the BSS is still in clear.

RR CIPHERING MODE COMPLETE
mode = CIPHERED

Ciphering has already been enabled, so this message is transmitted with ciphering. The BSS will receive this message as it is already expecting ciphered data in the receive direction.

BSSMAP CIPHER MODE COMPLETE

BSS replies back to the MSC, indicating that ciphering has been successfully enabled.

RR Connection Establishment Completed

At this point a connection has been setup between the Mobile and the MSC. From this point onward, the BSS is just acting as a conduit for transporting the signaling messages between the Mobile and the MSC.

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