Module Interfaces (GSM Originating Call)

Cell	Mobile Network	Fixed Network	EventStudio System Designer 4.0

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

LEG: Skip Authentication Procedure

Enable Ciphering

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.

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.

Call Setup

CC SETUP
Dialed Digits

The Mobile sends the setup message to establish a voice call. The message contains the dialed digits and other information needed for call establishment.

CC CALL PROCEEDING

The mobile is informed that the call setup is in progress.

Mode Modify

RR CHANNEL MODE MODIFY

The BSS notifies the Mobile about the changeover to voice mode.

RR CHANNEL MODE MODIFY ACKNOWLEDGE

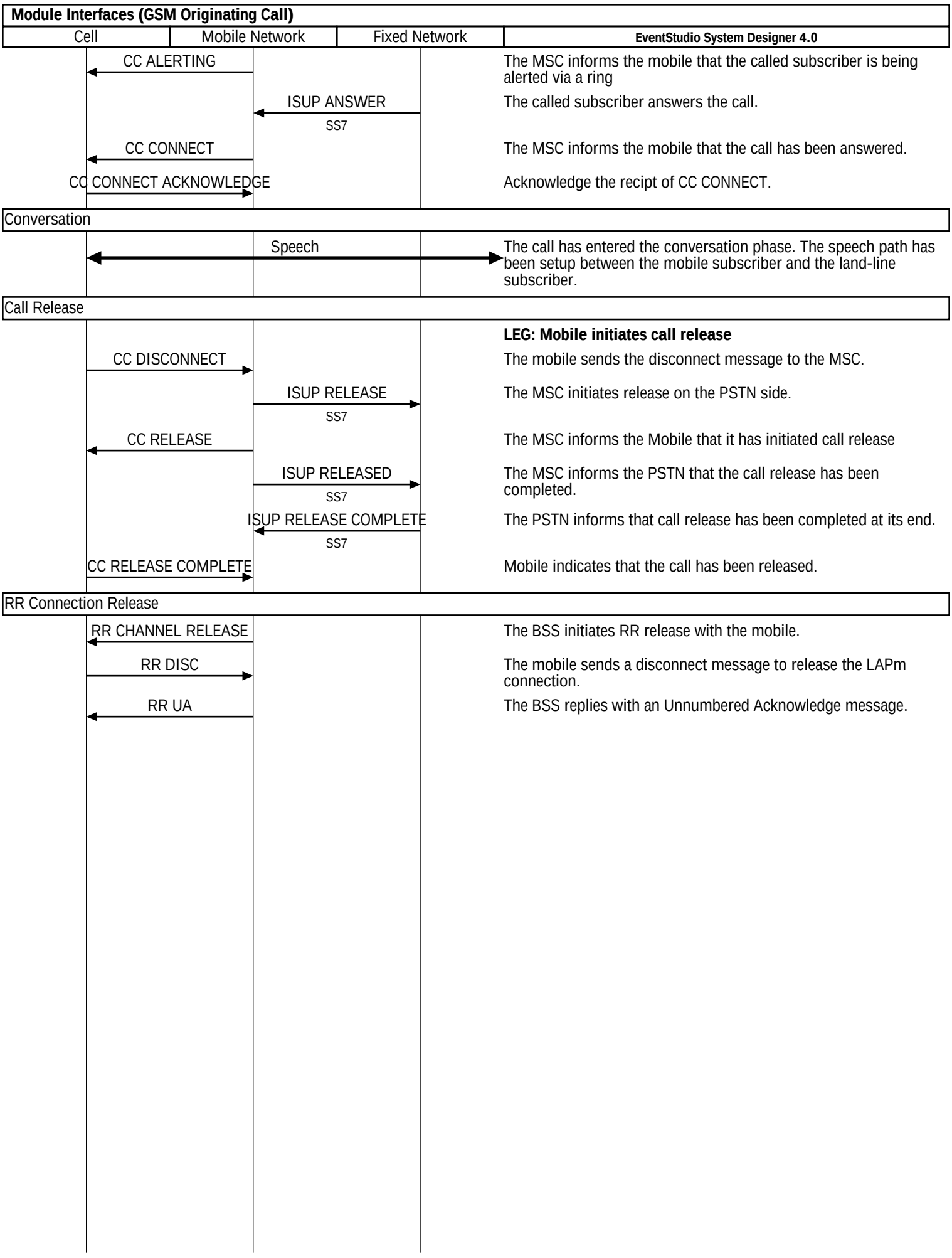
Mobile acknowledges.

ISUP INITIAL ADDRESS MESSAGE
SS7, Dialed Digits

The MSC routes the call and sends the call towards the called subscriber

ISUP ADDRESS COMPLETE MESSAGE
SS7

The PSTN indicates to the MSC that it has received all the digits and the called subscriber is being rung.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CC ALERTING
The MSC informs the mobile that the called subscriber is being alerted via a ring
ISUP ANSWER
SS7
The called subscriber answers the call.
CC CONNECT
The MSC informs the mobile that the call has been answered.
CC CONNECT ACKNOWLEDGE
Acknowledge the recipt of CC CONNECT.
Conversation
Speech
The call has entered the conversation phase. The speech path has been setup between the mobile subscriber and the land-line subscriber.
Call Release
LEG: Mobile initiates call release
CC DISCONNECT
The mobile sends the disconnect message to the MSC.
ISUP RELEASE
SS7
The MSC initiates release on the PSTN side.
CC RELEASE
The MSC informs the Mobile that it has initiated call release
ISUP RELEASED
SS7
The MSC informs the PSTN that the call release has been completed.
ISUP RELEASE COMPLETE
SS7
The PSTN informs that call release has been completed at its end.
CC RELEASE COMPLETE
Mobile indicates that the call has been released.
RR Connection Release
RR CHANNEL RELEASE
The BSS initiates RR release with the mobile.
RR DISC
The mobile sends a disconnect message to release the LAPm connection.
RR UA
The BSS replies with an Unnumbered Acknowledge message.