GSM Mobile Termining Call Flow (GSM Mobile Terminated Call)

Highway		Maryland				GSM		Fixed Network	EventHelix.com/EventStudio 2.5
GSM Mobiles		Maryland Location Area		Maryland GSM Equipment		GSM Common Equipment		PSTN	
GSM Mobile	Other GSM Mobile	Rockville Cell	Bethesda Cell	Maryland BSC	Maryland MSC VLR	HLR	GMSC	PSTN	31-Aug-04 22:15 (Page 1)

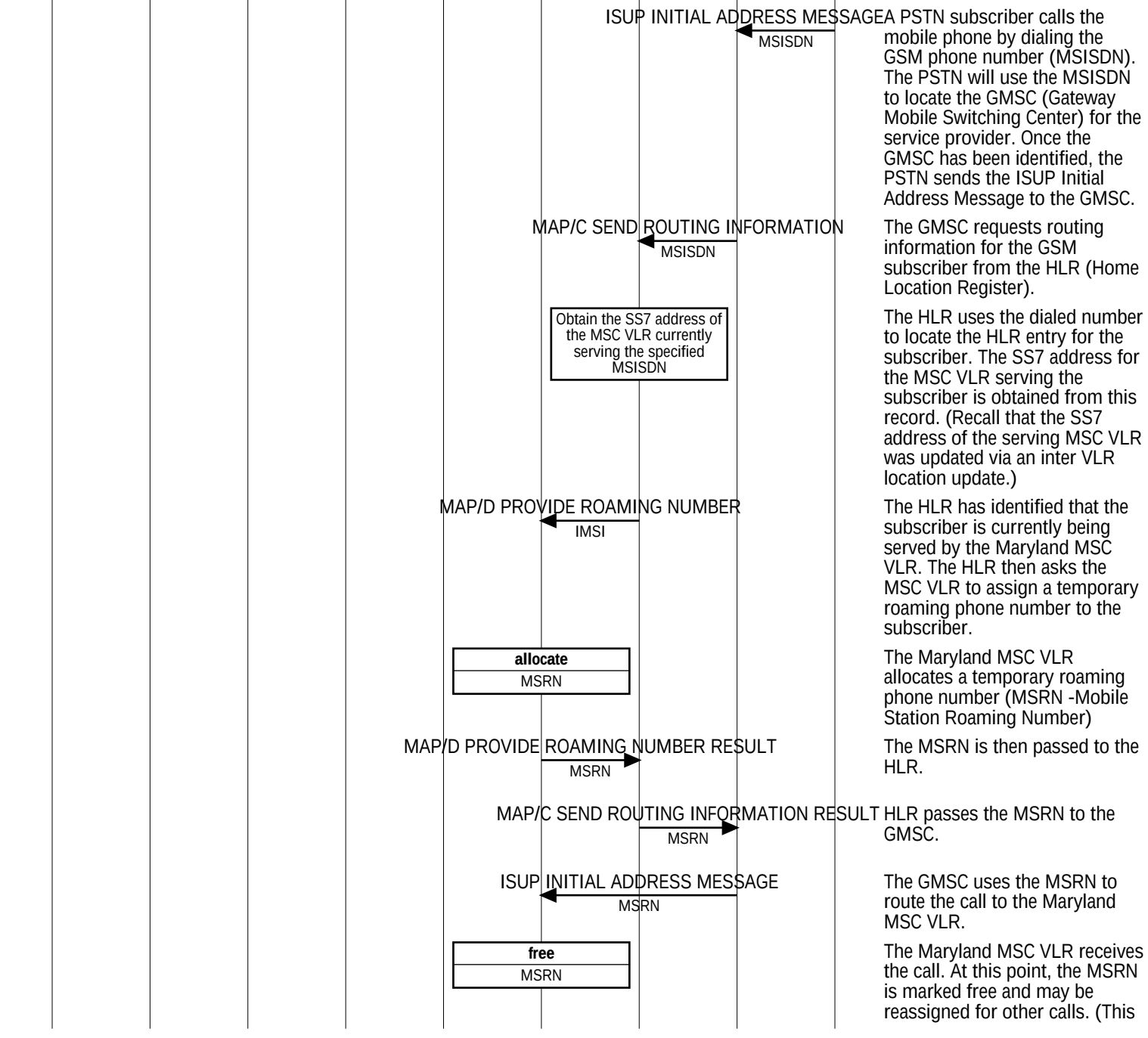
How does a GSM mobile phone receive a call?

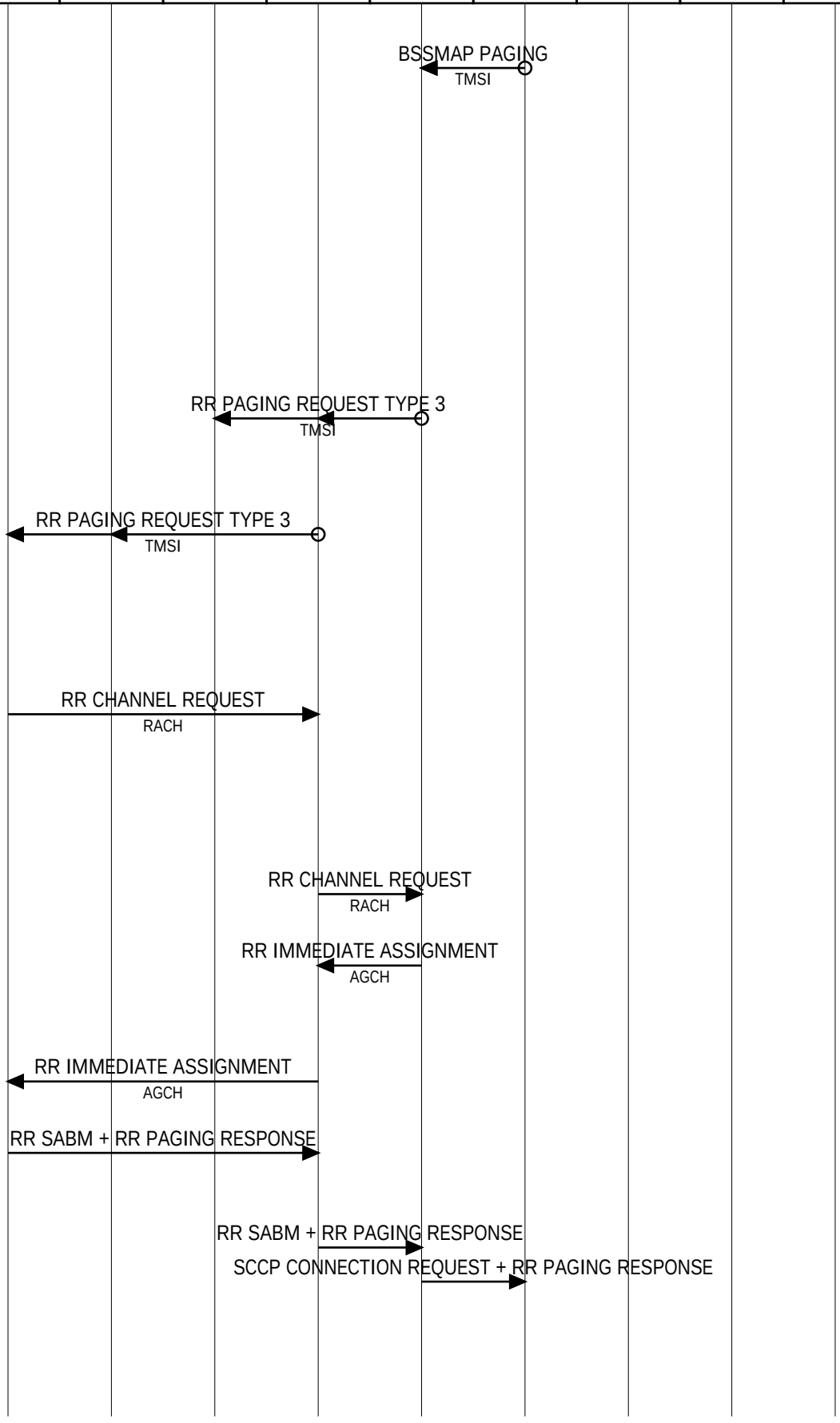
We have already seen that GSM mobiles keep the GSM network informed about their current location area. The knowledge of the location area is not adequate for setting up a terminating call as the location area might spawn several cells.

In this call flow we will look at how a terminating call is handled in GSM. Setting up a terminating call is a two step process. (1) Interrogation procedure to locate the subscriber (2) Actual call setup after the subscriber has been located.

http://www.EventHelix.com/RealtimeMantra/Telecom/GSM_network_example.htm

Interrogation procedure





is implementation dependent.)

Now the MSC VLR needs to locate the subscriber in the location area. Since the location area might spawn several cells, a paging mechanism is used to locate the subscriber. The MSC VLR uses a TMSI (Temporary Mobile Subscriber Identify) to address the mobile phone. The TMSI is used so as to protect the privacy of the called subscriber. Note that, the BSSMAP PAGING message will be sent to all the BSCs that handle the Maryland Location Area.

The Maryland BSC receives the page message. The BSC will send the Page message to all the cells that serve the subscriber's location area.

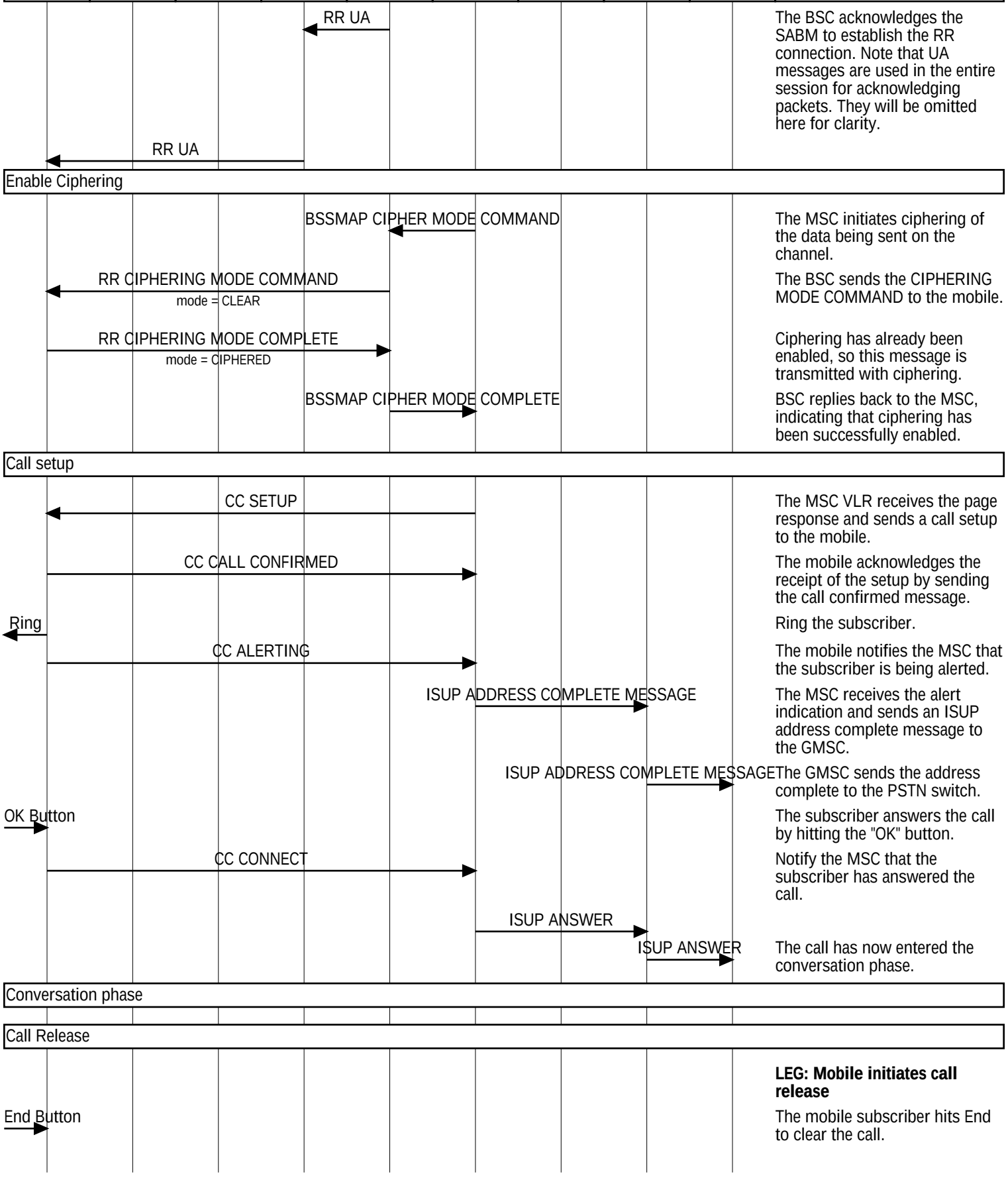
All cells in the location area will broadcast the Page message on the Paging Channel (PCH). All mobile phones listen to this channel every few seconds. The mobile is located in the Betheda cell. It receives this page message.

The mobile finds that the TMSI specified in the page message matches its own TMSI. The mobile decides to respond to the page. An RR connection establishment is initiated by sending a channel request to the network.

The network assigns a channel to the terminal and sends the assignment and time/frequency corrections in the immediate assignment message.

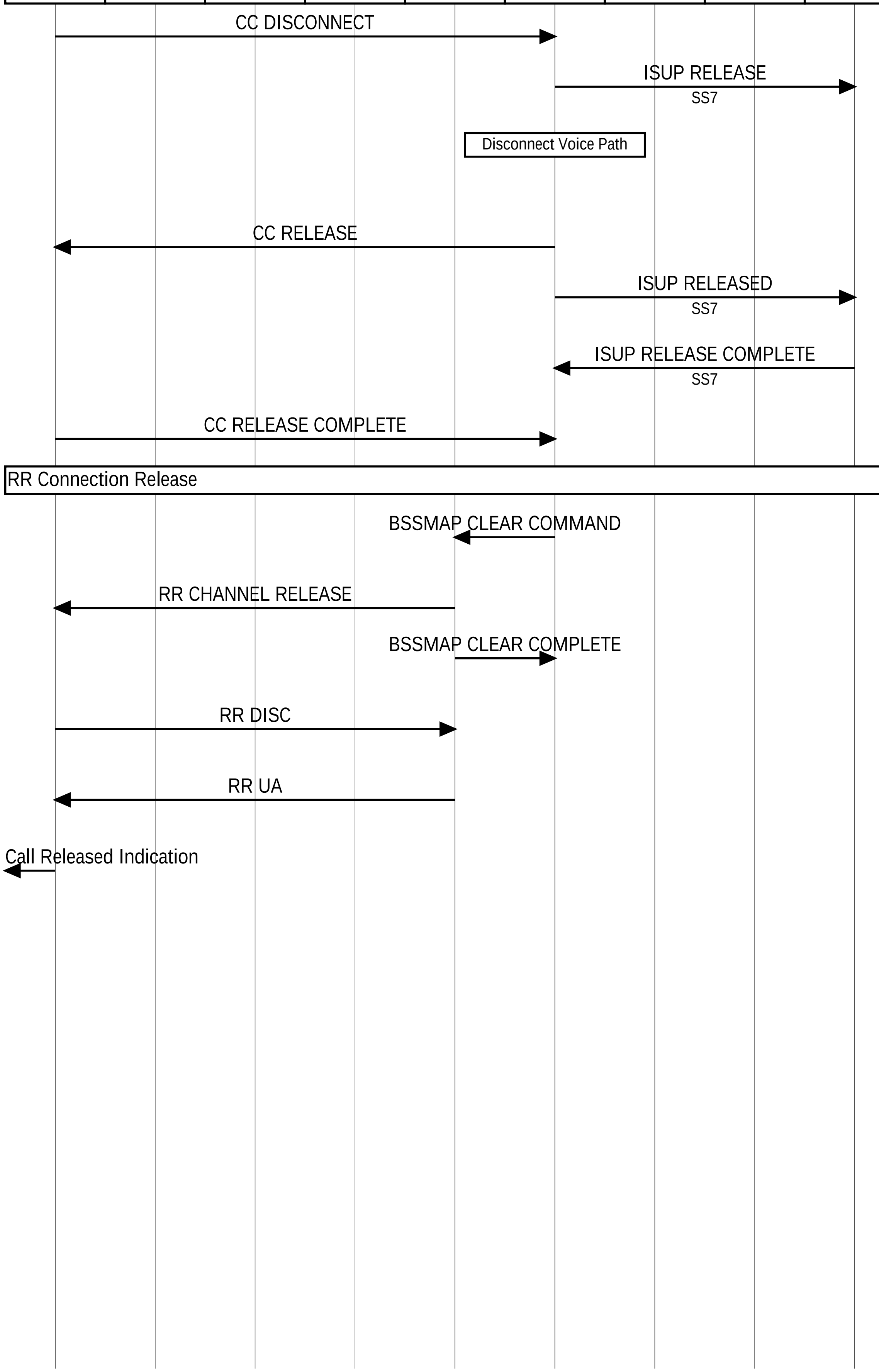
The mobile tunes to the assigned channel and transmits the page response and the SABM to initiate the RR session.

The BSC sends a SCCP connection request to the MSC VLR. The page response message is piggy backed with the request.


RR UA
The BSC acknowledges the SABM to establish the RR connection. Note that UA messages are used in the entire session for acknowledging packets. They will be omitted here for clarity.
RR UA
Enable Ciphering
BSSMAP CIPHER MODE COMMAND
The MSC initiates ciphering of the data being sent on the channel.
RR CIPHERING MODE COMMAND
mode = CLEAR
The BSC sends the CIPHERING MODE COMMAND to the mobile.
RR CIPHERING MODE COMPLETE
mode = CIPHERED
Ciphering has already been enabled, so this message is transmitted with ciphering.
BSSMAP CIPHER MODE COMPLETE
BSC replies back to the MSC, indicating that ciphering has been successfully enabled.
Call setup
CC SETUP
The MSC VLR receives the page response and sends a call setup to the mobile.
CC CALL CONFIRMED
The mobile acknowledges the receipt of the setup by sending the call confirmed message.
Ring
Ring the subscriber.
CC ALERTING
The mobile notifies the MSC that the subscriber is being alerted.
ISUP ADDRESS COMPLETE MESSAGE
The MSC receives the alert indication and sends an ISUP address complete message to the GMSC.
ISUP ADDRESS COMPLETE MESSAGE
The GMSC sends the address complete to the PSTN switch.
OK Button
The subscriber answers the call by hitting the "OK" button.
CC CONNECT
Notify the MSC that the subscriber has answered the call.
ISUP ANSWER
ISUP ANSWER
The call has now entered the conversation phase.
Conversation phase
Call Release
LEG: Mobile initiates call release
End Button
The mobile subscriber hits End to clear the call.

GSM Mobile Termining Call Flow (GSM Mobile Terminated Call)

Highway		Maryland				GSM		Fixed Network	EventHelix.com/EventStudio 2.5
GSM Mobiles		Maryland Location Area		Maryland GSM Equipment		GSM Common Equipment		PSTN	
GSM Mobile	Other GSM Mobile	Rockville Cell	Bethesda Cell	Maryland BSC	Maryland MSC VLR	HLR	GMSC	PSTN	31-Aug-04 22:15 (Page 4)



The mobile sends the disconnect message to the MSC.

The MSC initiates release on the PSTN side.

The MSC disconnects the voice path and also releases the voice circuit between the BSC and the MSC.

The MSC informs the mobile that it has initiated call release

The MSC informs the PSTN that the call release has been completed.

The PSTN informs that call release has been completed at its end.

Mobile indicates that the call has been released.

Call release has been completed, now the RR connection is released by the MSC.

The BSC initiates RR release with the mobile.

The BSC informs the MSC that the RR connection has been released.

The mobile sends a disconnect message to release the LAPm connection.

The BSC replies with an Unnumbered Acknowledge message.

Mobile goes back to the default display to indicate that call has been completely released.