

NSS Interfaces (GSM Originating Call)					
Cell		Mobile Network		Fixed Network	EventStudio System Designer 4.0 23-Feb-07 06:54 (Page 1)
Mobile Station		Base Stations	NSS	PSTN	
User	Mobile	BSS	MSC VLR	PSTN	

LEG: GSM Mobile Originated Call

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

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.

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.

1:SCCP CONNECTION REQUEST + MM CM SERVICE REQUEST

SS7

Check subscriber authentication

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

MSC checks if the subscriber has been authenticated. In this case, the subscriber has already been authenticated, so the authentication procedure is skipped.

Enable Ciphering

1:BSSMAP CIPHER MODE COMMAND

2:BSSMAP CIPHER MODE COMPLETE

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.

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.

Call Setup

1:CC SETUP

Dialed Digits

2:CC CALL PROCEEDING

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

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

Mode Modify

allocate

Voice circuit towards BSS

1:BSSMAP ASSIGNMENT REQUEST

Voice circuit

2:BSSMAP ASSIGNMENT COMPLETE

3:ISUP INITIAL ADDRESS MESSAGE

SS7,
Dialed Digits

4:ISUP ADDRESS COMPLETE MESSAGE

SS7

5:CC ALERTING

6:ISUP ANSWER

SS7

7:CC CONNECT

8:CC CONNECT ACKNOWLEDGE

The MSC allocates a voice circuit on one of the digital trunks between the MSC and the BSS.

MSC informs the BSS about the allocated voice circuit. The call is also switched from signaling to voice.

The BSS responds back to the MSC.

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

The PSTN indicates to the MSC that it has received all the digits and the called subscriber is being rung.

The MSC informs the mobile that the called subscriber is being alerted via a ring

The called subscriber answers the call.

The MSC informs the mobile that the call has been answered.

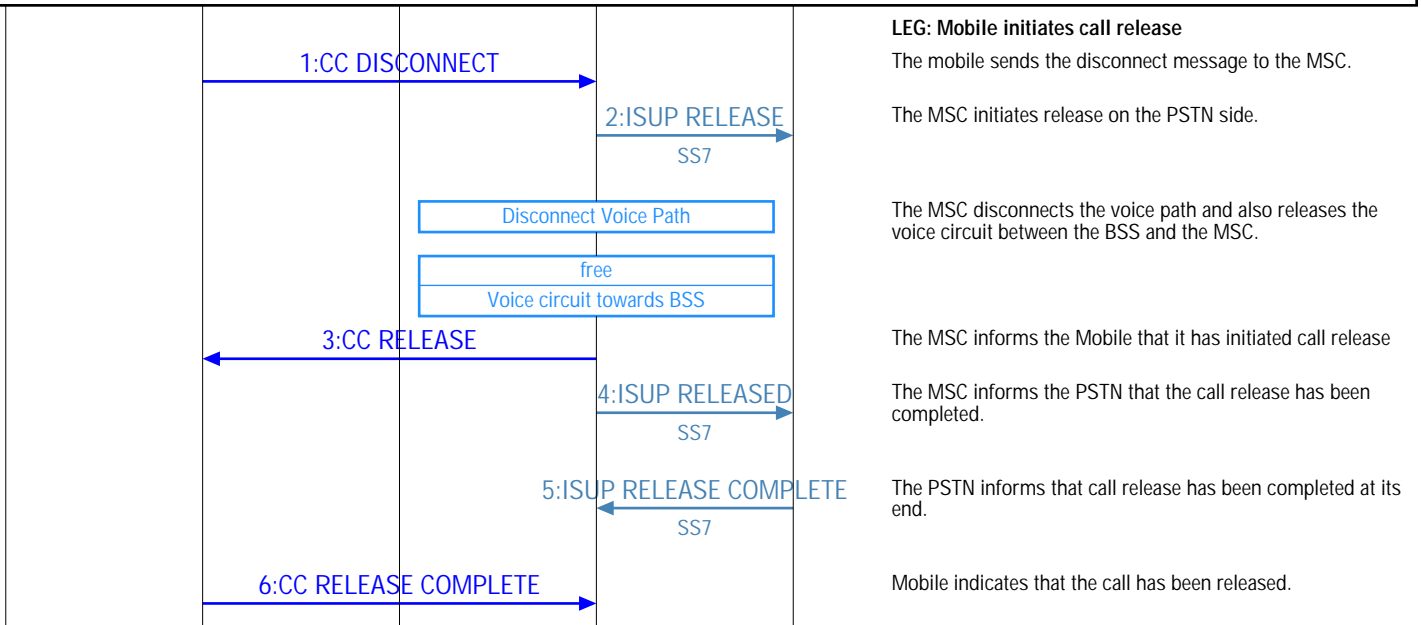
Acknowledge the receipt of CC CONNECT.

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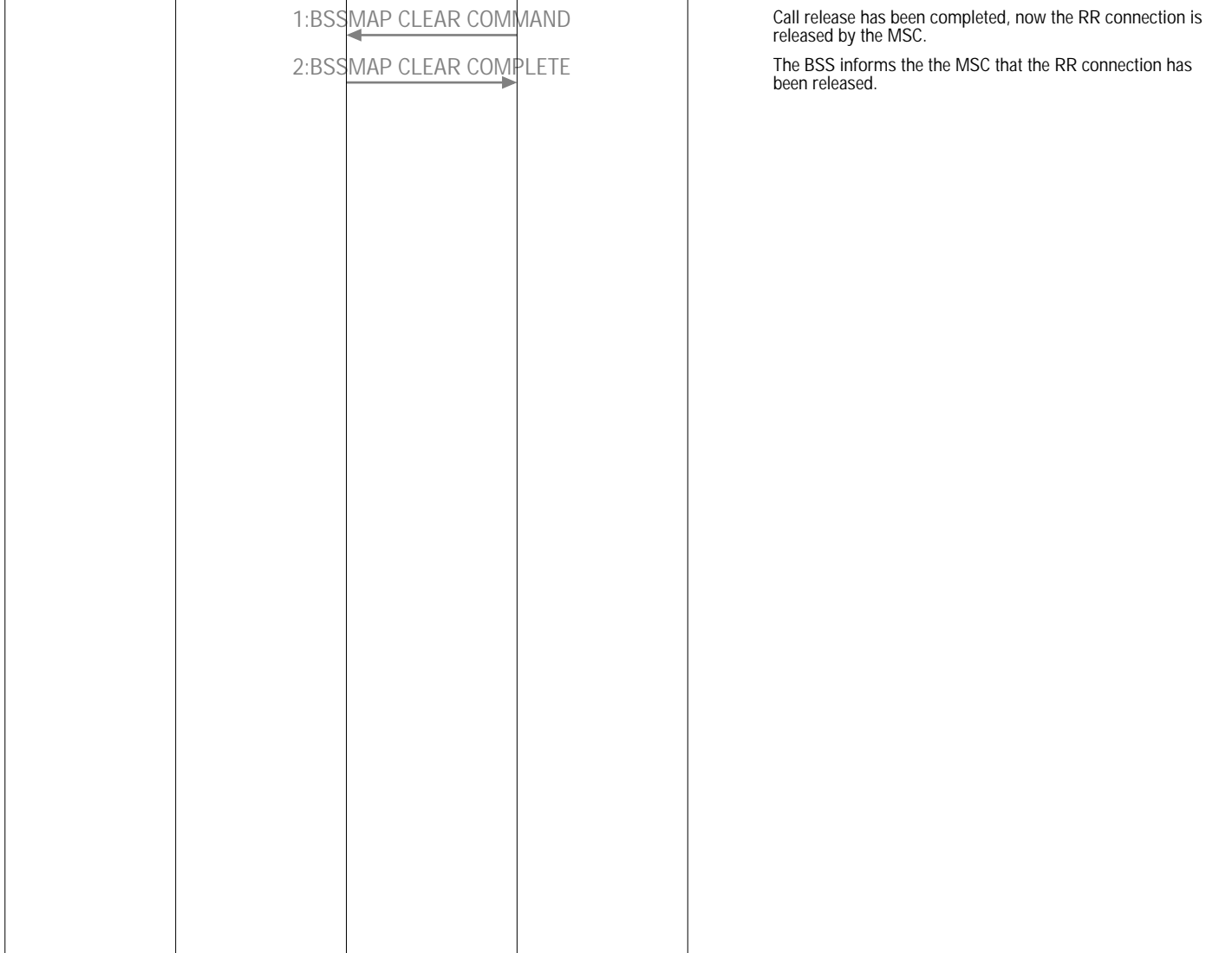
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Conversation

Call Release



RR Connection Release



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LEG: GSM Mobile Terminated Call

1: BSSMAP PAGING

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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: Initiate Authentication Procedure

Obtain the tuple of (RAND, SRES, Kc)

2: MM AUTHENTICATION REQUEST

RAND

3: MM AUTHENTICATION RESPONSE

SRES

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SS7,
Dialed Digits

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SS7

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SS7

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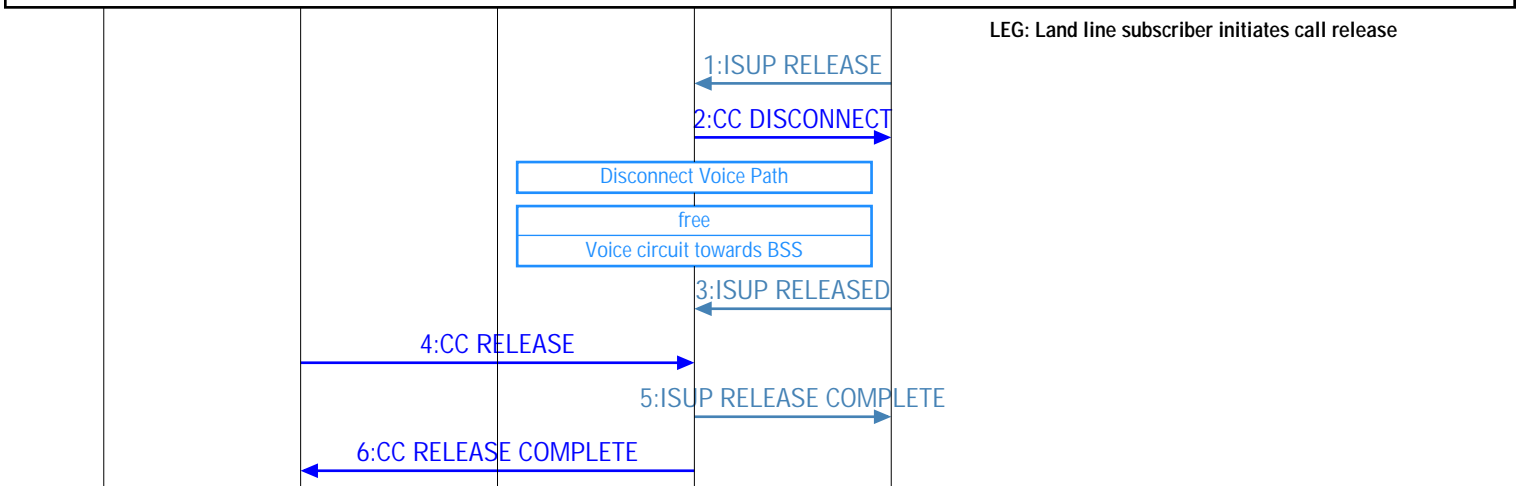
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User	Mobile	BSS	MSC VLR	PSTN	23-Feb-07 06:54 (Page 4)



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Acknowledge the receipt of CC CONNECT.

Conversation

Call Release



LEG: Land line subscriber initiates call release

RR Connection Release



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

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