3GPP TSG_CN#7 **NP-000095**
ETSI SMG3 Plenary Meeting #7,
Madrid, Spain
13th – 15th March 2000

Agenda item: **5.1.3**

Source: **TSG_N WG1**

Title: **CRs to 3G Work Item Multicall**

Introduction:

This document contains **"5"** CRs on **Work Item Multicall,** that have been agreed by **TSG_N WG1,** and are forwarded to **TSG_N Plenary** meeting #7 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N1-000489	24.008	CR032	10	B	R99	3.2.1	3.3.0	Addition of the Stream Identifier Information Element
N1-000490	24.008	CR157	2	C	R99	3.2.1	3.3.0	Multicall Information in Call Control Capability IE
N2B000465	23.009	CR002	3	B	R99	3.1.0	3.2.0	CR to 23.009 on Handover scenario for Multicall
N1-000492	23.108	CR004		C	R99	3.1.0	3.2.0	Clarification on timing to release TCH
N1-000560	24.008	CR178	2	B	R99	3.2.1	3.3.0	Introduction of NW CC Capability for Multicall

3GPP/SMG Meeting #11
Umea, Sweden, 28 February - 03 March.2000

N1-000489
Document Revised N1-000358
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.008	CR	032r10	Current Version:	3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#7 *list expected approval meeting # here ↑*	for approval	X	strategic	X	*(for SMG use only)*
	for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	X

Source: CN1 **Date:** 01/03/00

Subject: Addition of the Stream Identifier Information Element

Work item: Multicall

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Multicall feature shall allow a mobile station to handle more than one bearer service simultaneously. For this case, it is necessary to identify each bearer in order to control the complete call. The name for this element could be Stream Identifier, abbreviated as SI.

Clauses affected: 5.2.1, 5.2.2, 5.2.3, 9.3.2, 9.3.5, 9.3.8, 9.3.23, 10.5.4

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.008, 23.016, 23.018, 29.002
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

The following issues, which ware pointed out in the Multicall ad hoc meeting held on 17-18 February, should be reflected to the CR related to introduction of stream identifier IE.

- When the mobile station is located in the network not supporting multiple traffic channel, it shall not use any other than "1" as SI value.

- When the mobile station re-use an existing traffic channel, it shall indicate "No Bearer" in the CALL CONFIRMED message, and include the existing SI value in the CONNECT message.

- After the mechanism to transfer CN multicall capability to the mobile station has been agreed, the need for an SI value check in the non multicall R99 network ceased to exist.

Some modifications for clarification are needed. (E.g. the descriptions apply to either supporting or non-supporting network.)

1

help.doc

2 <--------- double-click here for help and instructions on how to create a CR.

3

5 Elementary procedures for circuit-switched Call Control

5.2 Call establishment procedures

5.2.1 Mobile originating call establishment

The call control entity of the mobile station initiates establishment of a CC connection by requesting the MM sublayer to establish a mobile originating MM connection and entering the "MM connection pending" state. There are two kinds of a mobile originating call: basic call and emergency call. The request to establish an MM connection shall contain a parameter to specify whether the call is a basic or an emergency call. This information may lead to specific qualities of services to be provided by the MM sublayers. Timer T303 is started when the CM SERVICE REQUEST message is sent.

For mobile stations supporting eMLPP basic calls may optionally have an associated priority level as defined in GSM 03.67. This information may also lead to specified qualities of service to be provided by the MM sublayers.

While being in the "MM connection pending" state, the call entity of the mobile station may cancel the call prior to sending the first call control message according to the rules given in section 4.5.1.7.

Having entered the "MM connection pending" state, upon MM connection establishment, the call control entity of the mobile station sends a setup message to its peer entity. This setup message is

- a SETUP message, if the call to be established is a basic call, and
- an EMERGENCY SETUP message, if the call to be established is an emergency call.

It then enters the "call initiated" state. Timer T303 is not stopped.

- The setup message shall contain all the information required by the network to process the call. In particular, the SETUP message shall contain the called party address information. If the mobile station supports multicall, it shall include the Stream Identifier (SI) information element. For the first call i.e. when there are no other ongoing calls the SI value shall be 1.

If timer T303 elapses in the "MM connection pending" state, the MM connection in progress shall be aborted and the user shall be informed about the rejection of the call.

5.2.1.1 Call initiation

The “call initiated” state is supervised by timer T303.For normal MO calls, this timer will have already been started after entering the "MM connection pending" state. For network-initiated MO calls this timer will be started in the recall present state as defined in section 5.2.3.4

When the call control entity of the mobile station is in the "call initiated" state and if it receives:

i) a CALL PROCEEDING message, it shall proceed as described in section 5.2.1.3;

ii) an ALERTING message, it shall proceed as described in section 5.2.1.5;

iii) a CONNECT message, it shall proceed as described in section 5.2.1.6;

iv) a RELEASE COMPLETE message it shall proceed as described in section 5.2.1.2.

Abnormal case:

- If timer T303 elapses in the "call initiated" state before any of the CALL PROCEEDING, ALERTING, CONNECT or RELEASE COMPLETE messages has been received, the clearing procedure described in section 5.4 is performed.

5.2.1.2 Receipt of a setup message

In the "null" or "recall present" states, upon receipt of a setup message (a SETUP message or an EMERGENCY SETUP message, see section 5.2.1.1), the call control entity of the network enters the "call initiated" state. It shall then analyse the call information contained in the setup message.

In UMTS, network shall include the SI received in the SETUP message into the RABid and send it back to the mobile station. For RABid see TS 25.413. If the network receives the SETUP message with no SI, the network shall set the SI value to 1.

i) If, following the receipt of the setup message, the call control entity of the network determines that the call information received from the mobile station is invalid (e.g. invalid number), then the network shall initiate call clearing as defined in section 5.4 with one of the following cause values:

1 "unassigned (unallocated) number"

3 "no route to destination"

22 "number changed"

28 "invalid number format (incomplete number)"

ii) If, following the receipt of the setup message, the call control entity of the network determines that a requested service is not authorized or is not available, it shall initiate call clearing in accordance with section 5.4.2 with one of the following cause values:

8 "operator determined barring",

57 "bearer capability not authorized",

58 "bearer capability not presently available",

63 "service or option not available, unspecified", or

65 "bearer service not implemented".

iii) Otherwise, the call control entity of the network shall either:

- send a CALL PROCEEDING message to its peer entity to indicate that the call is being processed; and enter the "mobile originating call proceeding" state.

- or: send an ALERTING message to its peer entity to indicate that alerting has been started at the called user side; and enter the "call received" state.

- or: send a CONNECT message to its peer entity to indicate that the call has been accepted at the called user side; and enter the "connect request" state.

The call control entity of the network may insert bearer capability information element(s) in the CALL PROCEEDING message to select options presented by the mobile station in the Bearer Capability information element(s) of the SETUP message. The bearer capability information element(s) shall contain the same parameters as received in the SETUP except those presenting a choice. Where choices were offered, appropriate parameters indicating the results of those choices shall be included.

The CALL_PROCEEDING message may also contain the priority of the call in the case where eMLPP is applied and where the network has assigned a different priority to the call than that requested by the user, or where the user has not requested a priority and the network has assigned a default priority. Mobile stations supporting eMLPP shall indicate this priority level to higher sublayers and store this information for the duration of the call for further action. Mobile stations not supporting eMLPP shall ignore this information element if provided in a CALL PROCEEDING message.

The call control entity of the network having entered the "mobile originating call proceeding" state, the network may initiate the assignment of a traffic channel according to section 5.2.1.9 (early assignment).

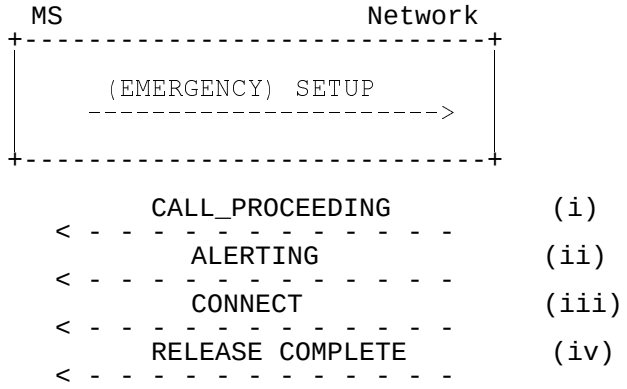

Figure 5.2/TS 24.008 Mobile originated call initiation and possible subsequent responses.

****** Next Modified Section ******

5.2.1.9 Traffic channel assignment at mobile originating call establishment

The mobile station supporting multicall includes the Stream Identifier (SI) in the SETUP message. The multicall supporting network shall interprets the SI value as follows:

a) Mobile station generates a new SI value at the initiation of an originating call, then a new traffic channel shall be assigned to the mobile originating call.

b) Mobile station indicates an existing SI value, then the indicated traffic channel shall be used for the mobile originating call.

Mobile station supporting multicall shall never send an additional SETUP with indication that a new traffic channel is requested to a network that does not support multicall.

It is a network dependent decision when to initiate the assignment of an appropriate traffic channel during the mobile originating call establishment phase. Initiation of a suitable RR procedure to assign an appropriate traffic channel does neither change the state of a call control entity nor affect any call control timer.

NOTE: During certain phases of such an RR procedure, transmission of CC and MM messages may be suspended, see GSM 04.18, section 3 and GSM 08.08.

The assignment procedure does not affect any call control timer.

****** Next Modified Section ******

5.2.2 Mobile terminating call establishment

5.2.2.3 Call confirmation

5.2.2.3.1 Response to SETUP

Having entered the "call present state" the call control entity of the mobile station shall - with the exception of the cases described below - acknowledge the SETUP message by a CALL CONFIRMED message, and enter the "mobile terminating call confirmed" state.

If the mobile station supports multicall, it shall include the Stream Identifier (SI) information element in the CALL CONFIRMED message.

If the mobile station is located in the network supporting multicall, it shall never include the SI that is in use and shall include with either of the following two values:

- SI=”no bearer”

- SI=new value (not used by any of the existing bearers)

If the mobile station supporting multicall is located in the network not supporting multicall, it shall include the SI with value 1.

The call control entity of the mobile station may include in the CALL CONFIRMED message to the network one or two bearer capability information elements to the network, either preselected in the mobile station or corresponding to a service dependent directory number (see TS 29.007). The mobile station may also include one or two bearer capabilities in the CALL CONFIRMED message to define the radio channel requirements. In any case the rules specified in section 9.3.2.2 shall be followed.

NOTE: The possibility of alternative responses (e.g., in connection with supplementary services) is for further study.

A busy MS which satisfies the compatibility requirements indicated in the SETUP message shall respond either with a CALL CONFIRMED message if the call setup is allowed to continue or a RELEASE COMPLETE message if the call setup is not allowed to continue, both with cause #17 "user busy".

If the mobile user wishes to refuse the call, a RELEASE COMPLETE message shall be sent with the cause #21 "call rejected" .

In the cases where the mobile station responds to a SETUP message with RELEASE COMPLETE message the mobile station shall release the MM connection and enter the "null" state after sending the RELEASE COMPLETE message.

The network shall process the RELEASE COMPLETE message in accordance with section 5.4.

5.2.2.3.2 Receipt of CALL CONFIRMED and ALERTING by the network

The call control entity of the network in the "call present" state, shall, upon receipt of a CALL CONFIRMED message: stop timer T303, start timer T310 and enter the "mobile terminating call confirmed" state.

In UMTS, network shall include the SI received in the CALL CONFIRMED message into the RABid and send it back to the mobile station. For RABid see TS 25.413. If the network receives the CALL CONFIRMED message with no SI, the network shall set the SI value to 1.

The call control entity of the mobile station having entered the "mobile terminating call confirmed" state, if the call is accepted at the called user side, the mobile station proceeds as described in 5.2.2.5. Otherwise, if the signal information element was present in the SETUP message user alerting is initiated at the mobile station side; if the signal information element was not present in the SETUP message, user alerting is initiated when an appropriate channel is available.

Here, initiation of user alerting means:

- the generation of an appropriate tone or indication at the mobile station; and
- sending of an ALERTING message by the call control entity of the MS to its peer entity in the network and entering the "call received" state.

The call control entity of the network in the "mobile terminated call confirmed" state shall, upon receipt of an ALERTING message: send a corresponding ALERTING indication to the calling user; stop timer T310; start timer T301, and enter the "call received" state.

In the "mobile terminating call confirmed" state or the "call received" state, if the user of a mobile station is User Determined User Busy then a DISCONNECT message shall be sent with cause #17 "user busy". In the "mobile terminating call confirmed" state, if the user of a mobile station wishes to reject the call then a DISCONNECT message shall be sent with cause #21 "call rejected".

5.2.2.3.3 Call failure procedures

In case of abnormal behaviour the following call failure procedures apply:

i. If the network does not receive any response to the SETUP message prior to the expiration of timer T303, then the network shall: initiate clearing procedures towards the calling user with cause #18 "no user responding"; and

initiate clearing procedures towards the called mobile station in accordance with 5.4.4 using cause #102 "recovery on timer expiry".

ii. If the network has received a CALL CONFIRMED message, but does not receive an ALERTING, CONNECT or DISCONNECT message prior to the expiration of timer T310, then the network shall:

- initiate clearing procedures towards the calling user with cause #18 "no user responding"; and

- initiate clearing procedures towards the called MS in accordance with section 5.4.4 using cause #102 "recovery on timer expiry".

iii. If the network has received an ALERTING message, but does not receive a CONNECT or DISCONNECT message prior to the expiry of timer T301 (or a corresponding internal alerting supervision timing function), then the network shall: initiate clearing procedures towards the calling user with cause #19 "user alerting, no answer"; and initiate clearing procedures towards the called mobile station in accordance with section 5.4.4, using cause #102 "recovery on timer expiry" or using cause #31 "normal, unspecified".

NOTE: The choice between cause #31 and cause #102 may have consequences on indications generated by the mobile station, see GSM 02.40.

5.2.2.3.4 Called mobile station clearing during mobile terminating call establishment

See section 5.4.2.

****** Next Modified Section ******

5.2.2.5 Call accept

In the "mobile terminating call confirmed" state or the "call received" state, the call control entity in the mobile station indicates acceptance of a mobile terminating call by:

- sending a CONNECT message to its peer entity in the network;

- starting Timer T313; and

- entering the "connect request" state.

If the call control entity of the mobile station has indicated “No Bearer” as the SI value in the CALL CONFIRMED message, it shall assign the SI value and include the SI information element in the CONNECT message. Otherwise the SI information element shall not be included in the CONNECT message.

5.2.2.6 Active indication

In the "mobile terminated call confirmed" state or in the "call received" state, the call control entity of the network shall, upon receipt of a CONNECT message: through connect the traffic channel (including the connection of an interworking function, if required), stop timers T310, T303 or T301 (if running); send a CONNECT ACKNOWLEDGE message to its peer entity at the mobile station of the called user; initiate procedures to send a CONNECT message towards the calling user and enter the "active" state.

In the "connect request" state, the call control entity of the mobile station shall, upon receipt of a CONNECT ACKNOWLEDGE message: stop timer T313 and enter the "active" state.

When timer T313 expires prior to the receipt of a CONNECT ACKNOWLEDGE message, the mobile station shall initiate clearing in accordance with section 5.4.3.MS

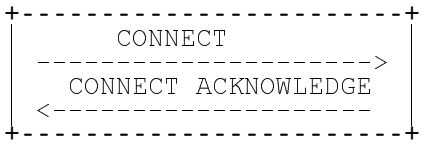

Figure 5.7/TS 24.008 Call acceptance and active indication at mobile terminating call establishment

5.2.2.7 Traffic channel assignment at mobile terminating call establishment

After receiving the SETUP message, the mobile station supporting multicall may either require a new traffic channel or, reuse an existing traffic channel.

If a mobile station in the network supporting multicall requires a new traffic channel, it shall:

- send a CALL CONFIRMED message including the SI indicating a new value, not used by any of the existing traffic channels.

If a mobile station in the network supporting multicall does not require a new traffic channel, it shall:

- send a CALL CONFIRMED message including the SI equal to “no bearer”

After the mobile station has send the CALL CONFIRMED with SI=”no bearer”, the SI value in the CONNECT message will tell to the network if a user requests a new traffic channel or one of the existing ones will be re-uesd.

If a new traffic channel is requested by the user, the mobile station in the network supporting multicall shall:

- send a CONNECT message containing the SI with a new value, not used by any existing traffic channel.

If the user decides that an existing traffic channel will be reused, the mobile station in the network supporting multicall shall:

- send a CONNECT message with an SI indicating an existing value used by an existing traffic channel.

It is a network dependent decision when to initiate the assignment of a traffic channel during the mobile terminating call establishment phase.

Initiation of the assignment phase does not directly change the state of a CC entity nor affect any call control timer, but may have some secondary effects (see e.g. clause 5.2.2.3.2).

****** Next Modified Section ******

5.2.3 Network initiated MO call $(CCBS)$

The procedures of section 5.2.3 are mandatory for mobile stations supporting “Network initiated MO call”.

NOTE: The behaviour of a mobile station that does not support “Network initiated MO call” is described in section 4.

5.2.3.1 Initiation

Before call establishment can be initiated in the mobile station, the MM connection shall be established by the network.

After the arrival of an appropriate stimulus (for example a Remote User Free Indication), the corresponding call control entity in the network shall initiate the MM connection establishment according to section 4, enter the "CC connection pending" state and start timer T331. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the received stimulus.

Upon completion of the MM connection, the call control entity of the mobile station shall send a START CC message to its peer entity in the network. The mobile station shall then enter the “Wait for network information” state and start timer T332.

If the network receives a START CC message while in the “CC connection pending” state, the network stops T331, sends the CC-ESTABLISHMENT message, starts timer T333 and enters the “CC-establishment present” state.

The MM connection establishment may be unsuccessful for a variety of reasons, in which case the MM sublayer in the network will inform the CC entity in the network with an indication of the reason for the failure. The CC entity shall then stop all running timers, enter the “Null” state and inform all appropriate entities within the network.

If timer T331 expires, the network shall abort the MM connection establishment attempt, stop all running CC timers, enter the “Null” state and inform all appropriate entities within the network.

5.2.3.2 CC-Establishment present

In the “CC establishment present” state, the mobile station, upon receipt of the CC-ESTABLISHMENT message, shall stop timer T332.

The CC-ESTABLISHMENT message contains information which the mobile station shall use for the subsequent SETUP message (if any) related to this CC-ESTABLISHMENT.

The CC-ESTABLISHMENT message shall contain the *Setup Container IE*.

If no CC-ESTABLISHMENT message is received by the call control entity of the mobile station before the expiry of timer T332, then the mobile station shall initiate clearing procedures towards the network using a RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and proceed in accordance with section 5.4.2.

Upon receipt of a CC-ESTABLISHMENT message the mobile station shall perform checks on the Setup Container IE in order to align the contained information with the mobile’s present capabilities and configuration. The “recall alignment procedure” is defined later on in this section.

If the recall alignment procedure has succeeded, the call control entity of the Mobile Station shall:

- form and store the SETUP message for sending later in the “Recall present” state,
- acknowledge the CC-ESTABLISHMENT message with a CC-ESTABLISHMENT CONFIRMED message,
- start timer T335, and
- enter the “CC-establishment confirmed“ state.

Exception:

A busy mobile station which has successfully performed the recall alignment procedure shall respond with a CC-ESTABLISHMENT CONFIRMED message with cause #17 "user busy", and proceed as stated above.

A mobile station, for which the recall alignment procedure failed, shall respond with a RELEASE COMPLETE message in accordance with section 5.4.2 with the appropriate cause code as indicated in the description of the recall alignment procedure.

The SETUP message is constructed from the *Setup Container IE* received in the CC ESTABLISHMENT MESSAGE. The mobile station shall assume that the *Setup Container IE* contains an entire SETUP message with the exception of the Protocol Discriminator, Transaction ID and Message Type elements. The mobile station may assume that the contents of the *Setup Container IE* are the same as were sent from the subscriber in a previous SETUP message of the mobile originating call establishment attempt. The mobile station shall copy the *Setup Container* to the SETUP message and not modify the contents except as defined in the recall alignment procedure and as defined in *exceptions* below. The mobile station shall not add other Information Elements to the end of the SETUP message.

Exceptions:

*Bearer Capability IE(s), HLC IE(s) and LLC (s) IE(s) (*including *Repeat Indicator(s),* if there are 2 bearer capabilities) require handling as described in the recall alignment procedure below.

If the *CC Capabilities* in the *Setup Container IE* is different to that supported by the mobile station, the mobile station shall modify the *CC Capabilities* in the SETUP message to indicate the true capabilities of the mobile station.

Facility IE(s) and SS Version IE(s) require handling as described in the recall alignment procedure.

Stream Identifier IE requires handling as described in the recall alignment procedure.

If no response to the CC-ESTABLISHMENT message is received by the call control entity of the network before the expiry of timer T333, then the network shall initiate clearing procedures towards the called mobile station using a RELEASE COMPLETE message with cause #102 "recovery on timer expiry" and inform all appropriate entities within the network, proceeding in accordance with section 5.4.2.

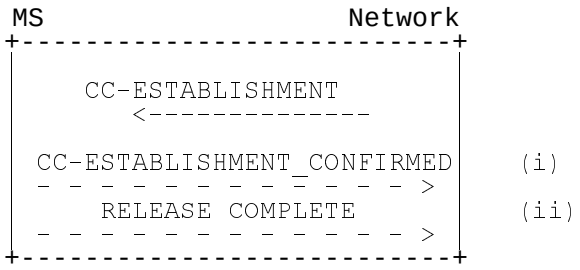

Figure 5.7a/TS 24.008 Call initiation and possible subsequent responses.

5.2.3.2.1 Recall Alignment Procedure

The recall alignment procedure consists of three~~two~~ parts :

- basic service group alignment,~~ and~~
- facility alignment, and
- stream identifier alignment.~~.~~

Basic service group alignment:

The mobile station shall check that the *Bearer Capability*, *HLC* and *LLC* and *Repeat Indicator* fields, which are embedded in the *Setup Container IE,* match a basic service group supported by the mobile station.

If this check fails, then the recall alignment procedure has failed. The mobile station shall use the cause #88 “incompatible destination” afterwards.

Otherwise, the mobile station is allowed to alter the content within the *Bearer Capability*, *HLC* and *LLC* Information Elements (e.g. the speech coder version(s), the data rate, the radio channel requirement) provided that the basic service group is not changed. The result shall be that the mobile station has derived *Bearer Capability*, *HLC* and *LLC* Information Elements, which it can use for a later call setup according to its configuration and capabilities.

Facility alignment:

This only applies if the *Setup Container* contains 1 or more *Facility IEs.* Each *Facility IE* within the *Setup Container* will be associated with the common *SS Version IE,* if present. The handling for each *Facility IE* is defined below. The mobile station shall align each facility IE contained in the *Setup Container*. The rules defined in GSM 04.10 also apply.

The *Facility IE* is encoded as ‘simple recall alignment’, ‘advanced recall alignment’ or ‘recall alignment not essential’ (see GSM 04.10). If the encoding indicates, that

- a simple recall alignment is required, the mobile station shall copy the Facility IE and the common SS version IE from the *Setup Container* to the SETUP message without modifying the content.
- an advanced recall alignment is required, the mobile station must recognise and support the operation defined in the facility. If the mobile station does not recognise or support the operation, then the recall alignment procedure has failed and the mobile station shall use the cause #29 “facility rejected” in the subsequent rejection of the CC establishment request.
- the recall alignment is not essential, then the facility operation is not an essential part of the SETUP. If the MS does not recognise the operation then the SS Version IE and Facility IE are discarded, and NOT copied into the SETUP message.

NOTE. A mobile station may include a *Facility IE* without an associated *SS Version IE*. This would indicate that the SS operation is encoded using Phase 1 protocols.

Further details on Facility handling are given in GSM 04.10

Stream identifier alignment:

The mobile station shall check whether the *Stream Identifier* field is contained in the *Setup Container* or not.

If the *Stream Identifier* is contained in the *Setup Container*, the mobile station shall behave as one of the following.

- the mobile station re-assign the *Stream Identifier* value, and modify the *Stream Identifier* field.
- the mobile station remove the *Stream Identifier* field.

If the *Stream Identifier* is not contained in the *Setup Container*, the mobile station may behave as follows.

- the mobile station assign the *Stream Identifier* value, and add the *Stream Identifier IE* to the end of the SETUP message.

****** Next Modified Section ******

9 Message functional definitions and contents

9.3 Messages for circuit-switched call control

9.3.2 Call confirmed

This message is sent by the called mobile station to confirm an incoming call request.

See table 9.56/TS 24.008.

Message type: CALL CONFIRMED

Significance: local

Direction: mobile station to network

Table 9.56/TS 24.008: CALL CONFIRMED message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Call confirmed message type	Message type 10.4	M	V	1
D-	Repeat Indicator	Repeat Indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	O	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
08	Cause	Cause 10.5.4.11	O	TLV	4-32
15	CC Capabilities	Call Control Capabilities 10.5.4.5a	O	TLV	3
2D	Stream Identifier	Stream Identifier 10.5.4.XX	O	TLV	3

9.3.2.1 Repeat indicator

The *repeat indicator* information element shall be included if *bearer capability 1* information element and *bearer capability 2* IE are both included in the message.

9.3.2.2 Bearer capability 1 and bearer capability 2

The *bearer capability 1* information element shall be included if and only if at least one of the following five cases holds:

- the mobile station wishes another bearer capability than that given by the *bearer capability 1* information element of the incoming SETUP message;
- the *bearer capability 1* information element is missing or not fully specified in the SETUP message;
- the *bearer capability 1* information element received in the SETUP message is accepted and the "radio channel requirement" of the mobile station is other than "full rate support only mobile station";
- the *bearer capability 1* information element received in the SETUP message indicates speech and is accepted and the mobile station supports other speech versions than GSM version 1;
- the *bearer capability 1* information element received in the SETUP message included the “fixed network user rate“ parameter.

When the *bearer capability 1* information element is followed by the *bearer capability 2* IE in the SETUP, the above rules apply to both *bearer capability* 1 IE and bearer capability 2 IE. Except those cases identified in TS 27.001, if either *bearer capability* needs to be included, both shall be included.

Furthermore, both *bearer capability* information elements may be present if the mobile station wishes to reverse the order of occurrence of the *bearer capability* information elements (which is referred to in the *repeat indicator* information element, see section 10.5.4.22) in cases identified in TS 27.001.

9.3.2.3 Cause

This information element is included if the mobile station is compatible but the user is busy.

9.3.2.4 CC Capabilities

This information element may be included by the mobile station to indicate its call control capabilities.

9.3.2.5 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

****** Next Modified Section ******

9.3.5 Connect

9.3.5.2 Connect (mobile station to network direction)

This message is sent by the called mobile station to the network to indicate call acceptance by the called user.

See table 9.59a/TS 24.008.

Message type: CONNECT

Significance: global

Direction: mobile station to network

Table 9.59a/TS 24.008: CONNECT message content (mobile station to network direction)

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Connect message type	Message type 10.4	M	V	1
1C	Facility	Facility 10.5.4.15	O	TLV	2-?
4D	Connected subaddress	Connected subaddress 10.5.4.14	O	TLV	2-23
7E	User-user	User-user 10.5.4.25	O	TLV	3-131
7F	SS version	SS version indicator 10.5.4.24	O	TLV	2-3
2D	Stream Identifier	Stream Identifier 10.5. 4.XX	O	TLV	3

9.3.5.2.1 Facility

This information element may be used for functional operation of supplementary services.

9.3.5.2.2 User-user

This information element is included when the answering mobile station wants to return user information to the calling remote user.

9.3.5.2.3 SS version

This information element shall not be included if the *facility* information element is not present in this message.

This information element shall be included or excluded as defined in TS 24.010. This information element should not be transmitted unless explicitly required by TS 24.010.

9.3.5.2.4 Stream Identifier

This information element shall be included by a mobile station that supports multicall when a mobile station has indicated “No Bearer” as the SI value in the CALL CONFIRMED message.

****** Next Modified Section ******

9.3.8 Emergency setup

This message is sent from the mobile station to initiate emergency call establishment.

See table 9.62/TS 24.008.

Message type: EMERGENCY SETUP

Significance: global

Direction: mobile station to network

Table 9.62/TS 24.008: EMERGENCY SETUP message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Emergency setup message type	Message type 10.4	M	V	1
04	Bearer capability	Bearer capability 10.5.4.5	O	TLV	3-9
2D	Stream Identifier	Stream Identifier 10.5. 4.XX	O	TLV	3

9.3.8.1 Bearer capability

If the element is not included, the network shall by default assume speech and select full rate speech version 1. If this information element is included, it shall indicate speech, the appropriate speech version(s) and have the appropriate value of radio channel requirement field.

9.3.8.2 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

****** Next Modified Section ******

9.3.23 Setup

9.3.23.2 Setup (mobile originating call establishment)

This message is sent from the mobile station to the network to initiate a mobile originating call establishment.

See table 9.70a/TS 24.008.

Message type: SETUP

Significance: global

Direction: mobile station to network

Table 9.70a/TS 24.008: SETUP message content (mobile station to network direction)

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2

	Setup message type	Message type 10.4	M	V	1
D-	BC repeat indicator	Repeat indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	M	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
1C	Facility(simple recall alignment)	Facility 10.5.4.15	O	TLV	2-
5D	Calling party sub-address	Calling party subaddr. 10.5.4.10	O	TLV	2-23
5E	Called party BCD number	Called party BCD num. 10.5.4.7	M	TLV	3-43
6D	Called party sub-address	Called party subaddr. 10.5.4.8	O	TLV	2-23
D-	LLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7C	Low layer compatibility I	Low layer comp. 10.5.4.18	O	TLV	2-18
7C	Low layer compatibility II	Low layer comp. 10.5.4.18	O	TLV	2-18
D-	HLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7D	High layer compatibility i	High layer comp. 10.5.4.16	O	TLV	2-5
7D	High layer compatibility ii	High layer comp. 10.5.4.16	O	TLV	2-5
7E	User-user	User-user 10.5.4.25	O	TLV	3-35
7F	SS version	SS version indicator 10.5.4.24	O	TLV	2-3
A1	CLIR suppression	CLIR suppression 10.5.4.11a	C	T	1
A2	CLIR invocation	CLIR invocation 10.5.4.11b	C	T	1
15	CC capabilities	Call Control Capabilities	O	TLV	3

		10.5.4.5a			
1D	Facility $(CCBS)$ (advanced recall alignment)	Facility 10.5.4.15	O	TLV	2-?
1B	Facility (recall alignment Not essential) $(CCBS)$	Facility 10.5.4.15	O	TLV	2-?
2D	Stream Identifier	Stream Identifier 10.5. 4.XX	O	TLV	3

9.3.23.2.1 BC repeat indicator

The *BC repeat indicator* information element is included if and only if *bearer capability 1* IE and *bearer capability 2* IE are both present in the message.

9.3.23.2.2 Facility

The information element may be included for functional operation of supplementary services.

Three different codings of this IE exist, for further details see 04.10.

9.3.23.2.3 LLC repeat indicator

The *LLC repeat indicator* information element is included if and only if both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *low layer compatibility I* IE is contained in the message.

If included, the *LLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.2.4 Low layer compatibility I

The information element is included in the MS-to-network direction when the calling MS wants to pass low layer compatibility information to the called user.

9.3.23.2.5 Low layer compatibility II

Included if and only if the *LLC repeat indicator* information element is contained in the message.

9.3.23.2.6 HLC repeat indicator

The *HLC repeat indicator* information element is included if and only if both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *high layer compatibility i* IE is contained in the message.

If included, the *HLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.2.7 High layer compatibility i

The information element is included when the calling MS wants to pass high layer compatibility information to the called user.

9.3.23.2.8 High layer compatibility ii

Included if and only if the *HLC repeat indicator* information element is contained in the message.

9.3.23.2.9 User-user

The information element is included in the calling mobile station to network direction when the calling mobile station wants to pass user information to the called remote user.

9.3.23.2.10 SS version

This information element shall not be included if the *facility* information element is not present in this message.

This information element shall be included or excluded as defined in TS 24.010. This information element should not be transmitted unless explicitly required by TS 24.010.

9.3.23.2.11 CLIR suppression

The information element may be included by the MS (see TS 24.081). If this information element is included the *CLIR invocation* IE shall not be included.

9.3.23.2.12 CLIR invocation

The information element may be included by the MS (see TS 24.081). If this information element is included the *CLIR suppression* IE shall not be included.

9.3.23.2.13 CC Capabilities

This information element may be included by the mobile station to indicate its call control capabilities.

9.3.23.2.14 Stream Identifier

This information element shall be included by the mobile station supporting multicall.

****** Next Modified Section ******

10 General message format and information elements coding

10.5 Other information elements

10.5.4 Call control information elements.

10.5.4.XX Stream Identifier

The purpose of the stream identifier (SI) information element is to associate a particular call with a Radio Access Bearer (RAB), and to identify whether a new traffic channel shall be assigned within the interface controlled by these signalling procedures. The SI value indicated in the CC protocol shall be sent in the RAB setup message. And mobile station is informed the relationship between the call and the RAB.

The Stream identifier information element is coded as shown in figure 10.5.XX/TS 24.008 and table 10.5.XX/TS 24.008.

The Stream Identifier is a type 4 information element with 3 octets length.

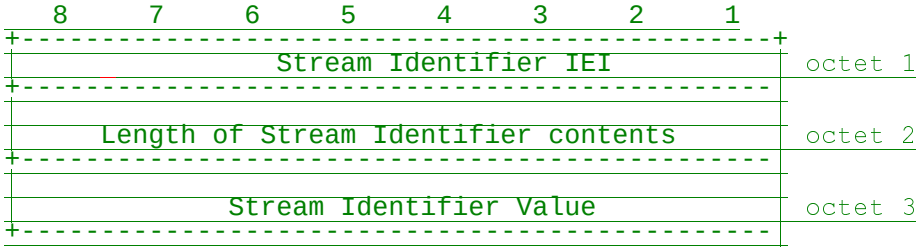

Figure 10.5.XX/TS 24.008: Stream Identifier information element

Table 10.5.XX/TS 24.008: Stream Identifier information element

Stream Identifier value(octet 3)	
Bit	
87654321	
00000000	No bearer
00000001	1
:	
:	
11111111	255

3GPP/SMG Meeting #11
Umea, Sweden, 28 February - 03 March.2000

Document N1-000490
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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24.008	**CR**	**157r2**	Current Version:	3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#7 *list expected approval meeting # here ↑*

for approval **X** | for information

strategic | non-strategic *(for SMG use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM | ME **X** | UTRAN / Radio | Core Network **X**

Source: CN1 **Date:** 28 February, 2000

Subject: Multicall Information in *Call Control Capability* IE

Work item: Multicall

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	X
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: For the decision of NDUB, the number of maximum bearers supported in an MS needs to be indicated to the network. Because of the limitation of transcoder, the number of supported speech bearer may be further limited so that it is necessary to be informed to the network. Since these capability is related to call control, the information shall be set in *Call Control Capability* IE defined in CC protocol.

Clauses affected: 10.5.4.5a

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments: The concept of this CR is endorsed by Multicall ad hoc held at Sophia Antipolis.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

10.5.4.5a Call Control Capabilities

The purpose of the Call Control Capabilities information element is to identify the call control capabilities of the mobile station.

The Call Control Capabilities information element is coded as shown in figure 10.5.89/TS 24.008 and table 10.5.116/TS 24.008.

The Call Control Capabilities is a type 4 information element with a length of ~~3~~ 4 octets

~~8 7 6 5 4 3 2 1~~

~~Call Control Capabilities IEI — octet 1~~

~~Length of Call Control Capabilities contents — octet 2~~

~~0 0 0 0 0 0 spare PCP DTMF — octet 3~~

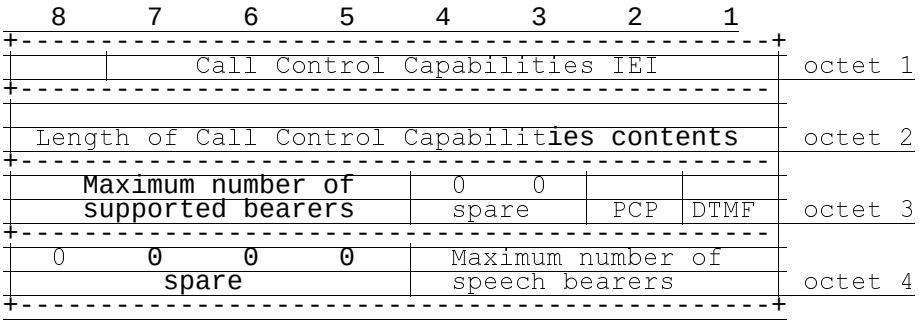

Figure 10.5.89/TS 24.008 Call Control Capabilities information element

Table 10.5.116/TS 24.008: Call Control Capabilities

DTMF (octet 3, bit 1)
0 This value is reserved for earlier versions of the protocol.
1 This value indicates that the mobile station supports DTMF as specified in section 5.5.7 of this specification.

PCP (octet 3, bit 2)

0 This value indicates that the mobile station does not support the Prolonged Clearing Procedure
1 This value indicates that the mobile station supports the Prolonged Clearing Procedure.

Maximum number of supported bearers (octet 3, bit 5 to bit 8)
0 0 0 0 1 bearer supported

All values are interpreted as the binary representation of the number of bearers supported.

Bit 5 of octet 3 is the least significant bit and bit 8 of octet 3 is the most significant bit.

Maximum number of speech bearers (octet 4, bit 1 to bit 4)

All values are interpreted as the binary representation of the number of bearers supported.

Bit 1 of octet 4 is the least significant bit and bit 4 of octet 4 is the most significant bit.

Note: In this version of the protocol, the MS should not indicate more than one speech bearer.

3GPP TSG-CN2B meeting #5
Kista, Sweden, 02 - 03 March 2000

Document N2B000465
Revision of N2B000424
(N1-000491)

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23.009	CR	002r3	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-N #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: CN1/CN2 **Date:** 2000-03-03

Subject: CR to 23.009 on Handover scenario for Multicall

Work item: Multicall

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	X
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: In current 23.009, handover procedures for only one bearer are specified. It is required to align handover procedures to Multicall requirement as an implementation option.

Clauses affected: 2, 6.2.1, 6.2.3, 8.1.1, 8.1.3, 8.3.1, 8.3.3, 13.4

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	29.002-100r5
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments: Clarify a phrase “As an implementation option…” in CR 23.009-002r2 (N1-000491/N2B000424).
For example,
“As an implementation option, capability of handling multiple bearers for a UE is specified (See TS 23.135). If 3G_MSC-A supports multiple bearers 3G_MSC-A tries to handover all bearers to 3G_MSC-B…..”
is simply modified to,
“If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A tries to handover all bearers to 3G_MSC-B…..”

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<--------- double-click here for help and instructions on how to create a CR.

First Change

2. References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] ITU-T Recommendation Q.118: "Special release arrangements".

[2] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2a] TS 21.905: "3G Vocabulary"

[3] GSM 03.68: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2."

[4] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[5] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[6] GSM 08.58: "Digital cellular telecommunications system (Phase 2+); Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".

[7] GSM 09.08: "Digital cellular telecommunications system (Phase 2+); Application of the Base Station System Application Part (BSSAP) on the E-interface".

[8] TS 29.010: " Information element mapping between Mobile Station - Base Station System (MS-BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".

[9] TS 22.129: "Handover Requirements between UMTS and GSM or other Radio Systems".

[10] TS 24.008: "Mobile radio interface layer 3 specification".

[11] TS 25.413: "UTRAN Iu interface RANAP signalling".

[12] TS 29.002: "Mobile Application Part (MAP) specification".

[13] TS 25.303: “Interlayer procedures in Connected Mode”

[14] TS 25.331: “RRC Protocol Specification”

[15] TS 23.135: “Multicall supplementary service - Stage 2”

Next Change

4.3 3G_MSC-A

For roles and functional composition of the 3G_MSC-A working as pure GSM MSC, please see previous chapter ("MSC-A").

4.3.1 Role of 3G_MSC-A

In the Intra-3G_MSC handover/relocation case, the 3G_MSC-A (simply termed 3G_MSC) controls the call, the mobility management and the radio resources before, during and after an Intra-3G_MSC handover/relocation. When RANAP procedures have to be performed, they are initiated and driven by 3G_MSC-A.

In the Inter-3G_MSC handover/relocation case, 3G_MSC-A is the 3G_MSC that controls the call and the mobility management of the UE/MS during the call, before, during and after a basic or subsequent handover/relocation. When RANAP procedures related to dedicated resources have to be performed towards the UE/MS, they are initiated and driven by 3G_MSC-A. The 3G_MSC-A - 3G_MSC-B interface works as a 3G_MSC - BSS interface for the RANAP procedures, sent as BSSMAP procedures. The Direct Transfer signalling is relayed transparently by 3G_MSC-B between 3G_MSC-A and the UE/MS.

During a basic handover/relocation, 3G_MSC-A initiates and controls all the handover/relocation procedure, from its initiation (reception of Relocation Required from RNS-A on Iu-interface) until its completion (reception of Relocation Complete from 3G_MSC-B on E-interface).

During a subsequent handover/relocation back to 3G_MSC-A, 3G_MSC-A acts as an RNS towards 3G_MSC-B, which controls the handover/relocation procedure until the termination in 3G_MSC-A of the handover radio resources allocation (sending of the Relocation Request Acknowledge to 3G_MSC-B from 3G_MSC-A). Then all handover/relocation related messages shall terminate at 3G_MSC-A (e.g. Relocation Detect/Complete from RNS-B, Relocation Failure from RNS-A).

During a subsequent handover/relocation to a third 3G_MSC, 3G_MSC-A works towards 3G_MSC-B' as described above in the basic handover/relocation paragraph and towards 3G_MSC-B as described above in subsequent handover/relocation paragraph.

In the Inter-System, inter-3G_MSC handover case, 3G_MSC-A is the 3G_MSC which controls the call and the mobility management of the UE/MS during the call, before, during and after a basic or subsequent inter-system handover. When BSSAP procedures related to dedicated resources have to be performed towards the UE/MS, they are initiated and driven by 3G_MSC-A. The 3G_MSC-A – MSC-B interface works as a 3G_MSC – BSS interface for a subset of BSSMAP procedures. These BSSMAP procedures described in GSM 09-08 are those related to dedicated resources. The DTAP signalling is relayed transparently by MSC-B between 3G_MSC-A and the UE/MS.

During a basic inter-system handover, 3G_MSC-A initiates and controls all the handover procedure, from its initiation (reception of Relocation Required from RNS-A on Iu-interface) until its completion (reception of Handover Complete from MSC-B on E-interface).

During a subsequent inter-system handover back to 3G_MSC-A, 3G_MSC-A acts as a BSS towards MSC-B, which controls the handover procedure until the termination in 3G_MSC-A of the handover radio resources allocation (sending of the Handover Request Acknowledge to MSC-B from 3G_MSC-A). Then all handover related messages shall terminate at 3G_MSC-A (e.g. Handover Detect/Complete from BSS-B, Relocation Failure from RNS-A).

During a subsequent inter-system handover to a third 3G_MSC, 3G_MSC-A works towards MSC-B' as described above in the basic inter-system handover paragraph and towards 3G_MSC-B as described above in subsequent inter-system handover paragraph.

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A tries to handover all bearers to 3G_MSC-B if UE is engaged with multiple bearers in basic handover/relocation procedure. If 3G_MSC-A receives an indication that the 3G_MSC-B does not support multiple bearers, then 3G_MSC-A shall be able to select one bearer to be handed over according to the priority for each bearer.

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A tries to handover all bearers to 3G_MSC-B' if UE is engaged with multiple bearers in subsequent handover/relocation procedure. If 3G_MSC-A receives an indication that the 3G_MSC-B' does not support multiple bearers, then 3G_MSC-A shall be able to select one bearer to be handed over according to the priority for each bearer. The priority means the priority level defined as RAB parameters in TS 25.413.

Next Change

4.4 3G_MSC-B

For roles and functional composition of the 3G_MSC-B working as pure GSM MSC, please see previous chapter ("MSC-B").

4.4.1 Role of 3G_MSC-B

In the Intra-3G_MSC handover/relocation case, the 3G_MSC-B keeps the control of the whole Intra-3G_MSC handover/relocation procedure.

In the Inter-3G_MSC handover/relocation case, the role of 3G_MSC-B (3G_MSC-B') is only to provide radio resources control within its area. This means that 3G_MSC-B keeps control of the radio resources connection and release towards RNS-B. 3G_MSC-B will do some processing on the BSSMAP information received on the E-interface or the RANAP information received on the Iu-interface whereas it will relay the Direct Transfer information transparently between Iu-interface and E-interface. 3G_MSC-A initiates and drives RANAP procedures as BSSMAP procedures towards 3G_MSC-B, while 3G_MSC-B controls them towards its RNSs to the extent that 3G_MSC-B is responsible for the connections of its RNSs. The release of the dedicated resources between 3G_MSC-B and RNS-B is under the responsibility of 3G_MSC-B and RNS-B, and is not directly controlled by 3G_MSC-A. When clearing is to be performed due to information received from RNS-B, 3G_MSC-B shall transfer this clearing indication to 3G_MSC-A, to clear its connection with RNS-B, to terminate the dialogue with 3G_MSC-A through the E-interface, and to release its circuit connection with 3G_MSC-A, if any. In the same way, the release of the connection to its RNS-B, is initiated by 3G_MSC-B, when the dialogue with 3G_MSC-A ends normally and a release is received from the circuit connection with 3G_MSC-A, if any, or when the dialogue with the 3G_MSC-A ends abnormally.

When a release is received by 3G_MSC-B for the circuit connection with 3G_MSC-A then 3G_MSC-B shall release the circuit connection.

In the Inter-system Inter-3G_MSC handover case, the role of 3G_MSC-B (3G_MSC-B') is only to provide radio resources control within its area. This means that 3G_MSC-B keeps control of the radio resources connection and release towards RNS-B. 3G_MSC-B will do some processing on the BSSMAP information received on the E-interface or the RANAP information received on the Iu-interface whereas it will relay the Direct Transfer information transparently between Iu-interface and E-interface. MSC-A initiates and drives a subset of BSSMAP procedures towards 3G_MSC-B, while 3G_MSC-B controls them towards its RNSs to the extent that 3G_MSC-B is responsible for the connections of its RNSs. The release of the dedicated resources between 3G_MSC-B and RNS-B is under the responsibility of 3G_MSC-B and RNS-B, and is not directly controlled by MSC-A. When clearing is to be performed due to information received from RNS-B, 3G_MSC-B shall transfer this clearing indication to MSC-A, to clear its connection with RNS-B, to terminate the dialogue with MSC-A through the E-interface, and to release its circuit connection with MSC-A, if any. In the same way, the release of the connection to its RNS-B, is initiated by 3G_MSC-B, when the dialogue with MSC-A ends normally and a release is received from the circuit connection with MSC-A, if any, or when the dialogue with the MSC-A ends abnormally.

When a release is received by 3G_MSC-B for the circuit connection with MSC-A then 3G_MSC-B shall release the circuit connection.

If 3G_MSC-B supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-B shall be able to allocate multiple handover numbers for each bearer to be handed over. When 3G_MSC-B receives IU-RELOCATION-REQUEST indicating multiple bearers in MAP-PREPARE-HANDOVER request and 3G_MSC-B does not support multiple bearers, then 3G_MSC-B shall indicate this in the MAP-PREPARE-HANDOVER response to 3G_MSC-A.

If 3G_MSC-B supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-B tries to handover all bearers to 3G_MSC-B' via 3G_MSC-A if UE is engaged with multiple bearers in subsequent handover/relocation procedure. If 3G_MSC-B' does not support multiple bearers, 3G_MSC-B may receive the result in which the number of bearers is restricted to cope with 3G_MSC-B' capability.

Next Change

6.2.1 Intra-3G_MSC Handover from UMTS to GSM

The procedure for a successful Intra-3G_MSC handover from UMTS to GSM is shown in figure 8. It is assumed that selection of a candidate UE/MS has already taken place within the RNS based upon the criteria presented in section 5. The exact algorithm, in the RNS, for determining a candidate UE/MS is not addressed in this Technical Specification. The procedures discussed do not make use of the Mobile Application Part (MAP), represented by signalling function 4 in figures 4 and 6. The procedure described in this section covers case ii).

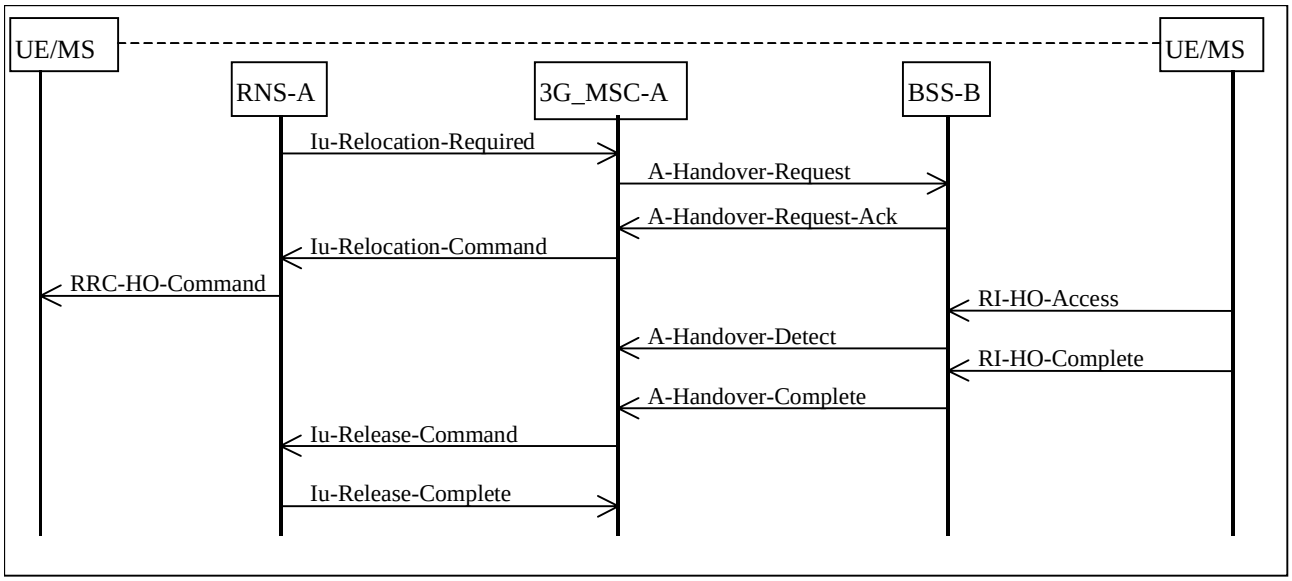


Figure 8: Basic Intra-3G_MSC Handover from UMTS to GSM Procedure

6.2.1.1 With no bearer or one bearer

The successful operation of the procedure is as follows. When the RNS (RNS-A), currently supporting the UE/MS, determines that the UE/MS requires to be handed over to GSM it will send an IU-RELOCATION-REQUIRED message to the 3G_MSC (3G_MSC-A). The IU-RELOCATION-REQUIRED message shall contain a single cell, to which the UE/MS can be handed over. When the 3G_MSC-A receives the IU-RELOCATION-REQUIRED message it shall begin the process of handing over the UE/MS to a BSS (BSS-B). The 3G_MSC-A shall generate an A-HANDOVER-REQUEST message to the selected BSS (BSS-B). When BSS-B receives the A-HANDOVER-REQUEST message it shall take the necessary action to allow the UE/MS to access the radio resource of BSS-B, this is detailed in GSM 08.58 [6] and in GSM 05.08 [4]. The switching of the radio resource through the necessary terrestrial resources is detailed in TS 24.008 [10] and GSM 08.08 [5].

Once resource allocation has been completed by BSS-B it shall return an A-HANDOVER-REQUEST-ACK. to 3G_MSC-A. When this message is received by 3G_MSC-A it shall begin the process of instructing the UE/MS to tune to a new dedicated radio resource. An IU-RELOCATION-COMMAND will be sent by the 3G_MSC-A to RNS-A. On receipt of the IU-RELOCATION-COMMAND message RNS-A will send the radio resource control message RRC-HANDOVER-COMMAND, containing a Handover Reference number previously allocated by BSS-B, to the UE/MS. The UE/MS will then access the new radio resource using the Handover Reference number contained in the RI-HANDOVER-ACCESS message. The number will be checked by BSS-B to ensure it is as expected and the correct UE/MS has been captured. If this is the correct UE/MS then the BSS-B shall send an A-HANDOVER-DETECT to 3G_MSC-A. When the UE/MS is successfully communicating with the BSS-B a RI-HANDOVER-COMPLETE message will be sent by the UE/MS to BSS-B. The BSS-B will then send an A-HANDOVER-COMPLETE message to 3G_MSC-A.

NOTE: The A-HANDOVER-REQUEST-ACK from BSS-B contains the complete radio resource control message that shall be sent by RNS-A to the UE/MS in the RRC-HANDOVER-COMMAND, 3G_MSC-A transparently passes this radio interface message onto RNS-A.

After 3G_MSC-A has received the A-HANDOVER-COMPLETE message from BSS-B it shall begin to release the resources allocated on RNS-A. In figure 8 the resource is released by using the IU-RELEASE-COMMAND sequence.

If a failure occurs during the handover attempt, for example A-HANDOVER-FAILURE returned from BSS-B, then 3G_MSC-A will terminate the handover to BSS-B and send an IU-RELOCATION-PREPARATION-FAILURE message to RNS-A.

If RNS-A has decided to cancel the handover, it sends IU-RELOCATION-CANCEL message to 3G_MSC-A. The 3G_MSC-A will then terminate the handover towards BSS-B (if initiated) and send IU-RELOCATION-CANCEL-ACKNOWLEDGE message to RNS-A.

In all cases the existing connection to the UE/MS shall not be cleared except in the case of expiry of the timer for receipt of A-HANDOVER-COMPLETE.

During the period that the UE/MS is not in communication with the network 3G_MSC-A shall queue all appropriate messages. All messages shall be delivered to the UE/MS once communication is resumed. In the case of an Intra-3G_MSC handover from UMTS to GSM on 3G_MSC-B then the messages shall be queued by 3G_MSC-B.

6.2.1.2 With multiple bearers (Optional functionality)

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A shall have the following functionality additionally to the description in section 6.2.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A 3G_MSC-A shall select one bearer to be handed over if the UE has engaged with multiple bearers. After that, 3G_MSC-A generates an A-HO-REQUEST message to the BSS (BSS-B).

When an A-HO-REQUEST-ACK is received from BSS-B, 3G_MSC-A shall release all RABs except for the selected bearer to be handed over. After that, 3G_MSC-A sends IU-RELOCATION-COMMAND to RNS-A.

Next Change

6.2.3 Procedure for Intra-3G_MSC SRNS Relocation

The procedure for a successful Intra-3G_MSC SRNS Relocation is shown in figures 10 and 11. SRNS Relocation is used to relocate the serving RNS functionality from one RNS to another. The procedure may or may not involve change of the radio resources assigned for the corresponding UE. Whether or not the Relocation includes change of radio resources assigned for the UE does not affect the SRNS Relocation procedure in the Core Network.

It is assumed that selection of a candidate UE has already taken place within RNS based upon the criteria presenting in section 5. The exact algorithm, in RNS, for determining a candidate UE is not addressed in this Technical Specification. The procedure discussed does not make use of the Mobile Application Part (MAP), represented by signalling function 4 in figures 4 and 6. The procedure described in this section covers case ii).

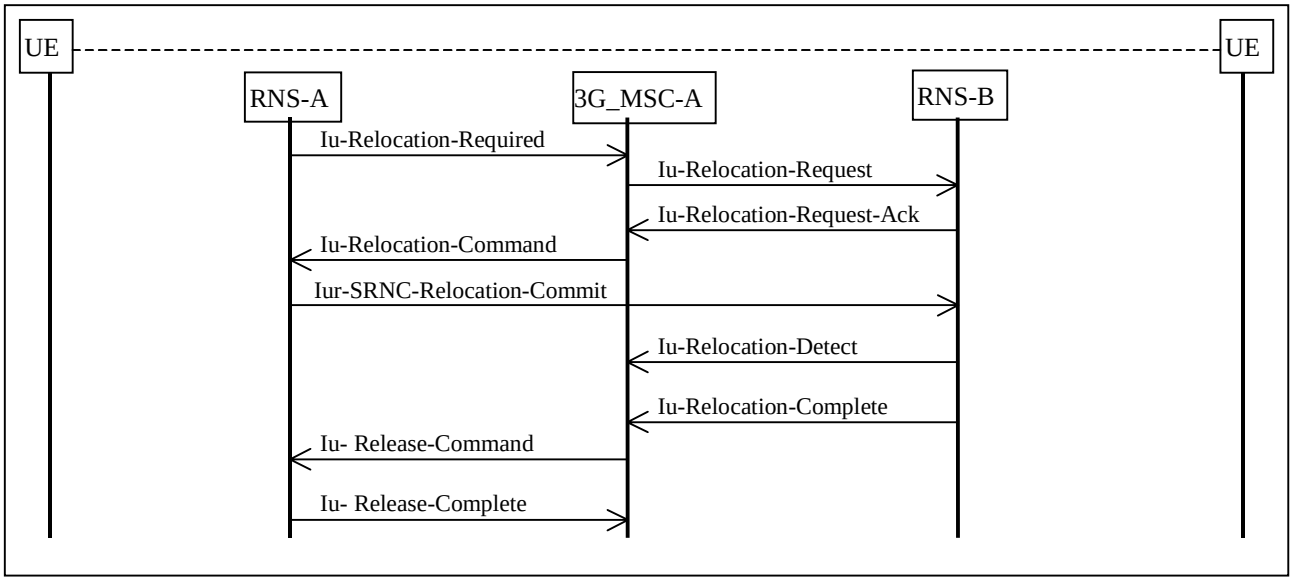


Figure 10 Basic intra-3G_MSC SRNS Relocation Procedure

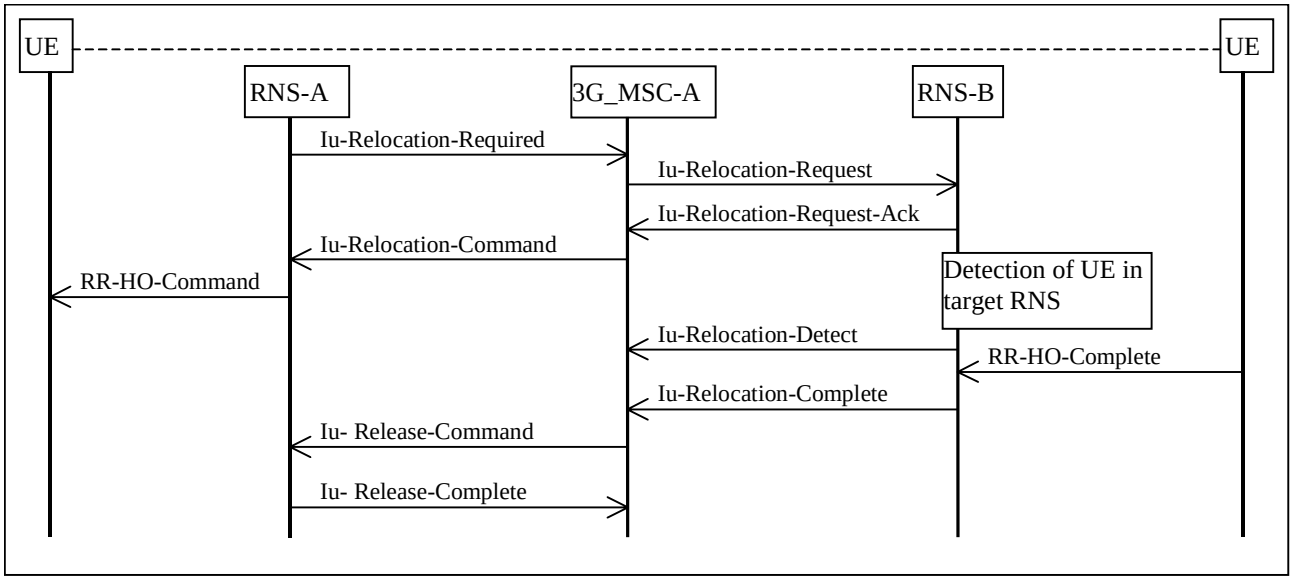


Figure 11 Basic intra-3G_MSC SRNS Relocation Procedure combined with hard change of radio resources (Hard Handover with switch in the Core Network)

6.2.3.1 With no bearer or one bearer

The successful operation of the procedure is as follows. When the Serving RNS (RNS-A) makes the decision to perform the SRNS Relocation procedure it will send an IU-RELOCATION-REQUIRED message to the 3G_MSC (3G_MSC-A). The IU-RELOCATION-REQUIRED message shall contain the identifier of the target RNS to which the Relocation is to be performed. When the 3G_MSC-A receives the IU-RELOCATION-REQUIRED message it shall begin the process of relocating the serving RNS functionality to the new RNS (RNS-B). The 3G_MSC-A shall generate an IU-RELOCATION-REQUEST message to the selected RNS (RNS-B). When RNS-B receives the IU-RELOCATION-REQUEST message it shall take the necessary action to establish the new Iu transport bearers for each Radio Access Bearer related to 3G_MSC-A for the UE in question, this is detailed in the TS 25.430 series and TS 25.413 Technical Specification.

Once resource allocation has been completed by RNS-B it shall return an IU-RELOCATION-REQUEST-ACKNOWLEDGE to 3G_MSC-A. When this message is received by 3G_MSC-A, and 3G_MSC-A is ready for the move in Serving RNS functionality, it shall indicate the completion of the preparation phase on the core network side for the SRNS Relocation. An IU-RELOCATION-COMMAND message is sent by 3G_MSC-A to RNS-A. RNS-A acts as follows:

i) If the procedure is a SRNS Relocation without change of radio resources, which means that the Iur interface between RNS-A and RNS-B can be used for the procedure, the RNS-A shall send IUR-SRNS-RELOCATION-COMMIT message to the RNS-B to trigger the Relocation execution. See figure 10.

ii) If the procedure is a SRNS Relocation with change of radio resources, which means that the Iur interface between RNS-A and RNS-B is not used for the procedure, the RNS-A shall trigger the handover procedure on the air interface by sending the RRC-HANDOVER-COMMAND to the UE. The UE will then access the new radio resources. See figure 11.

NOTE: The IU-RELOCATION-REQUEST-ACKNOWLEDGE from RNS-B may optionally contain a transparent container, which is transferred by 3G_MSC-A to the RNS-A using the IU-RELOCATION-COMMAND message.

When the relocation execution trigger is received, RNS-B shall then take the necessary action to assume the role of Serving RNS and shall send an IU-RELOCATION-DETECT message to 3G_MSC-A. When the UE is successfully in communication with the RNS-B, then RNS-B shall send an IU-RELOCATION-COMPLETE message to 3G_MSC-A.

After 3G_MSC-A has received the IU-RELOCATION-COMPLETE message from RNS-B, it shall begin to release the resources associated to the RNS-A. In figures 10 and 11, the resources are released by using the IU-RELEASE-COMMAND sequence.

If a failure occurs during the SRNS Relocation attempt, then 3G_MSC-A will terminate the relocation to RNS-B. For example, if IU-RELOCATION-FAILURE is returned from RNS-B then 3G_MSC-A will terminate the relocation to RNS-B and send IU-RELOCATION-PREPARATION-FAILURE to RNS-A. If IU-RELOCATION-CANCEL is returned from RNS-A, then 3G_MSC-A will terminate the relocation to RNS-B and send IU-RELOCATION-CANCEL-ACKNOWLEDGE to RNS-A.

In all cases the existing connection to the UE shall not be cleared.

During the period that the UE is not in communication with the network, 3G_MSC-A shall queue all appropriate messages. All messages shall be delivered to the UE once communication is resumed. In the case of an Intra-3G_MSC SRNS Relocation (with or without change of radio resources) on 3G_MSC-B, then the messages shall be queued by 3G_MSC-B.7General description of the procedures for inter - MSC handovers

The following sections describe two options for the Basic and Subsequent Handover procedures. The first, as described in section 7.1 and 7.3 respectively, provides for a circuit connection between MSC-A and MSC-B. The second, as described in section 7.2 and 7.4 respectively, provides for a Basic and Subsequent Handover without the provision of a circuit connection between MSC-A and MSC-B.

In all the above mentioned sections, the following principles apply:

During the handover resource allocation, only the handover related messages that are part of the applicable BSSAP subset - as defined in GSM 09.08[7] - shall be transferred on the E-interface.

The trace related messages that are part of the applicable BSSAP subset - as defined in GSM 09.08 [7] - can be sent by the MSC-A on the E-interface after successful handover resource allocation. In the sections 7.1 and 7.2, it is however allowed at basic handover initiation on the E-Interface to transfer one trace related message that is part of the applicable BSSAP subset - as defined in GSM 09.08 [7] - together with the applicable handover related message. The applicable handover related message shall always appear as the first message.

During the handover execution, ie while the MS is not in communication with the network, the MSC-A shall queue all outgoing BSSAP messages until the communication with the MS is resumed.

Finally, during supervision, ie while the MS is not in the area of MSC-A after a successful Inter-MSC handover, the subset of BSSAP procedures and their related messages - as defined in GSM 09.08 [7] - shall apply on the E-Interface.

During the intra-MSC-B handover execution, if any, the MSC-B shall queue all outgoing BSSAP messages until the communication with the MS is resumed.

6.2.3.2 With multiple bearers (Optional functionality)

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A shall have the following functionality additionally to the description in section 6.2.3.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A, 3G_MSC-A generates an IU-RELOCATION-REQUEST message, which may include multiple bearers, to RNS-B.

When an IU-RELOCATION-REQUEST-ACK is received from RNS-B, 3G_MSC-A shall release all RABs, which have failed to set up in RNS-B. After that, 3G_MSC-A sends IU-RELOCATION-COMMAND to RNS-A.

Next Change

8.1.1 Basic Handover procedure requiring a circuit connection between 3G_MSC -A and MSC-B

The procedure used for successful Inter-3G_MSC UMTS to GSM Handover is shown in figure 18. Initiation of the UMTS to GSM handover procedure is described in section 5. The procedure described in this section makes use of messages from the Technical Specification GSM 08.08 and of the transport mechanism from the Mobile Application Part (MAP) (Technical Specification GSM 29.002). After an Inter-3G_MSC relocation/handover, Intra-3G_MSC UMTS to GSM handover may occur on 3G_MSC -B, this handover will follow the procedures specified in a previous section.

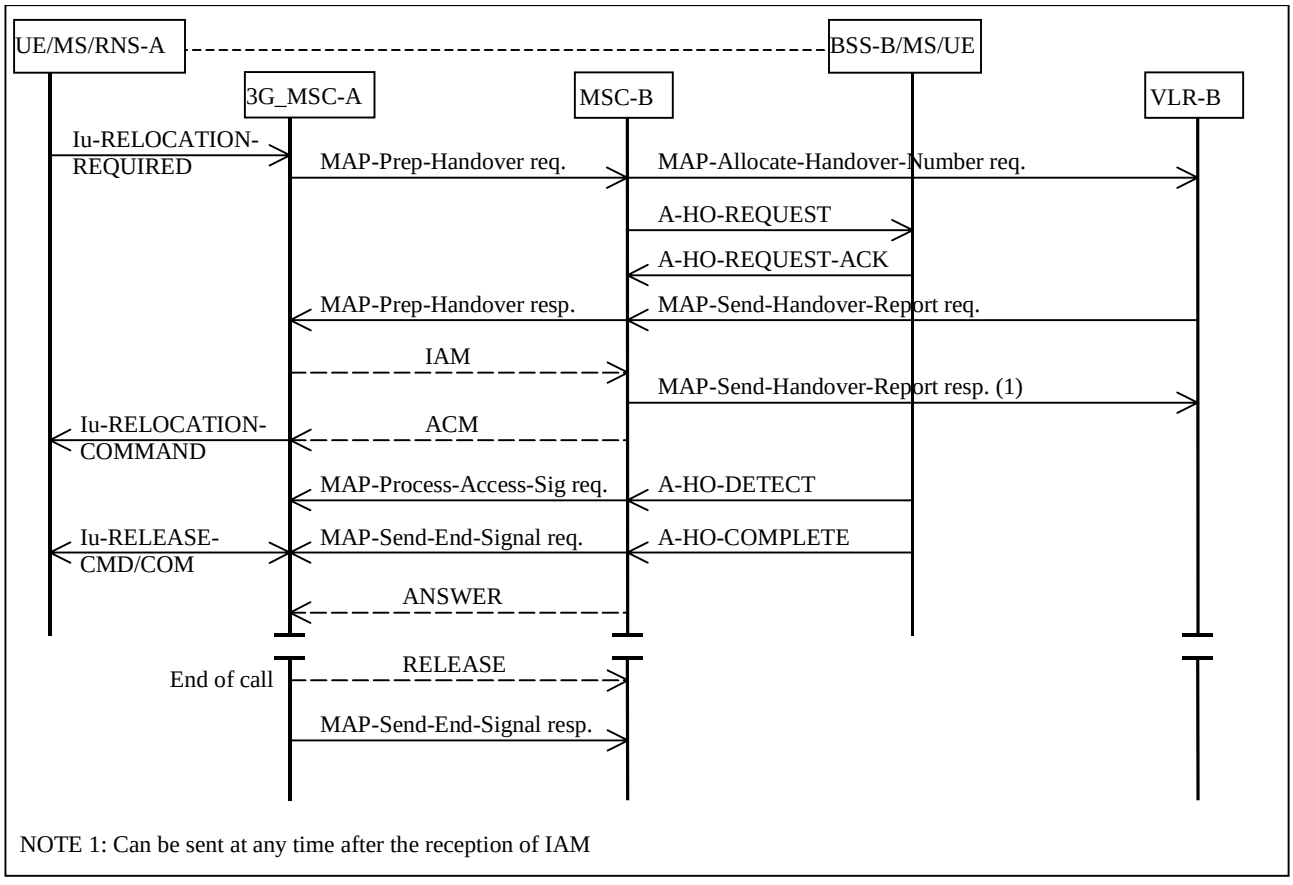


Figure 18: Basic UMTS to GSM Handover Procedure requiring a circuit connection

8.1.1.1 With no circuit connection or one circuit connection

The UMTS to GSM handover is initiated as described in section 6.2.1. (This is represented by Iu-RELOCATION-REQUIRED in figure 18). Upon receipt of the Iu-RELOCATION-REQUIRED from RNS-A, 3G_MSC -A shall send a MAP-PREPARE-HANDOVER request to MSC-B including a complete A-HO-REQUEST message. (NOTE:

3G_MSC-A shall not send further MAP-PREPARE-HANDOVER requests while a MAP-PREPARE-HANDOVER response is pending or before any timeouts). The MAP-PREPARE-HANDOVER request shall carry in the A-HO-REQUEST all information needed by MSC-B for allocating a radio channel, see Technical Specification GSM 08.08. For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be handed over. MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved a Handover Number from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). The Handover Number shall be used for routing the connection of the call from 3G_MSC-A to MSC-B. If a traffic channel is available in MSC-B the MAP-PREPARE-HANDOVER response, sent to 3G_MSC-A will contain the complete A-HO-REQUEST-ACKNOWLEDGE message received from BSS-B, containing the radio resources definition to be sent by RNS-A to the UE/MS and possible extra BSSMAP information, amended by MSC-B due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the traffic channel allocation is queued by BSS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-A. The further traffic channel allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. If the traffic channel allocation is not possible, the MAP-PREPARE-HANDOVER response containing an A-HO-FAILURE will be sent to 3G_MSC-A. MSC-B will do the same if a fault is detected on the identity of the cell where the call has to be handed over. MSC-B simply reports the events related to the dialogue. It is up to 3G_MSC-A to decide the action to perform if it receives negative responses or the operation fails due to the expiry of the MAP-PREPARE-HANDOVER timer.

If an error related to the TCAP dialogue or to the MAP-PREPARE-HANDOVER request is returned from MSC-B, this will be indicated to 3G_MSC-A and 3G_MSC-A will terminate the handover attempt. 3G_MSC-A rejects the handover attempt towards RNS-A. The existing connection to the UE/MS shall not be cleared.

When the A-HO-REQUEST-ACKNOWLEDGE has been received, 3G_MSC-A shall establish a circuit between 3G_MSC-A and MSC-B by signalling procedures supported by the network. In figure 18 this is illustrated by the messages IAM (Initial Address Message) and ACM (Address Complete Message) of Signalling System no 7. MSC-B awaits the capturing of the UE/MS (section 6.2.1) on the radio path when the ACM is sent and 3G_MSC-A initiates the UMTS to GSM handover execution when ACM is received (illustrated by the Iu-RELOCATION-COMMAND and described in the section 6.2.1).

MSC-B transfers to 3G_MSC-A the acknowledgement received from the correct UE/MS (A-HO-DETECT/A-HO-COMPLETE). The A-HO-DETECT, if received, is transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. The A-HO-COMPLETE, when received from the correct UE/MS, is included in the MAP-SEND-END-SIGNAL request and sent back to 3G_MSC-A. The circuit is through connected in 3G_MSC-A when the A-HO-DETECT or the A-HO-COMPLETE is received from MSC-B. The old radio channel is released when the A-HO-COMPLETE message is received from MSC-B. The sending of the MAP-SEND-END-SIGNAL request starts the MAP supervision timer for the MAP dialogue between 3G_MSC-A and MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in 3G_MSC-A, the resources in RNS-A shall be cleared.

In order not to conflict with the PSTN/ISDN signalling system(s) used between 3G_MSC-A and MSC-B, MSC-B must generate an answer signal when A-HO-DETECT/COMPLETE is received.

MSC-B shall release the Handover Number when the circuit between 3G_MSC-A and MSC-B has been established.

If the circuit between 3G_MSC-A and MSC-B cannot be established, (e.g. an unsuccessful backward message is received instead of ACM), 3G_MSC-A terminates the inter-3G_MSC UMTS to GSM handover attempt by sending an appropriate MAP message, for example an ABORT.

3G_MSC-A shall retain overall call control until the call is cleared by the fixed subscriber or the UE/MS and there is no further call control functions to be performed (e.g. servicing waiting calls, echo cancellers).

When 3G_MSC-A clears the call to the UE/MS it also clears the call control functions in 3G_MSC-A and sends the MAP-SEND-END-SIGNAL response to release the MAP resources in MSC-B.

3G_MSC-A may terminate the procedure at any time by sending an appropriate MAP message to MSC-B. If establishment of the circuit between 3G_MSC-A and MSC-B has been initiated, the circuit must also be cleared.

The UMTS to GSM handover will be aborted by 3G_MSC-A if it detects clearing or interruption of the radio path before the call has been established on MSC-B.

8.1.1.2 With multiple circuit connections (Optional functionality)

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A shall have the following functionality additionally to the description in section 8.1.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A 3G_MSC-A shall select one bearer to be handed over if the UE has engaged with multiple bearers. After that, the 3G_MSC-A generates an A-HO-REQUEST message and sends it to MSC-B over MAP-PREPARE-HANDOVER request.

When MAP-PREPARE-HANDOVER response including an A-HO-REQUEST-ACK is received from MSC-B, 3G_MSC-A shall release all RABs except for the selected bearer to be handed over. After that, 3G_MSC-A sends IU-RELOCATION-COMMAND to RNS-A.

Next Change

8.1.3 Procedure for subsequent UMTS to GSM handover requiring a circuit connection between 3G_MSC-A and 3G_MSC-B

After the call has been handed over from 3G_MSC-A to 3G_MSC-B, if the UE/MS leaves the area of 3G_MSC-B during the same call and enters a GSM area, subsequent UMTS to GSM handover is necessary in order to continue the connection.

The following cases apply:

i) the UE/MS moves back to the area of MSC-A;

ii) the UE/MS moves into the area of a third MSC (MSC-B').

In both cases the call is switched in 3G_MSC-A; the circuit between 3G_MSC-A and MSC-B shall be released after a successful subsequent handover has been performed (remember that 3G_MSC-A can be a pure GSM MSC).

8.1.3.1 Description of subsequent UMTS to GSM handover procedure i): 3G_MSC-B to MSC-A

The procedure for successful UMTS to GSM handover from MSC-B back to 3G_MSC-A is shown in figure 20.

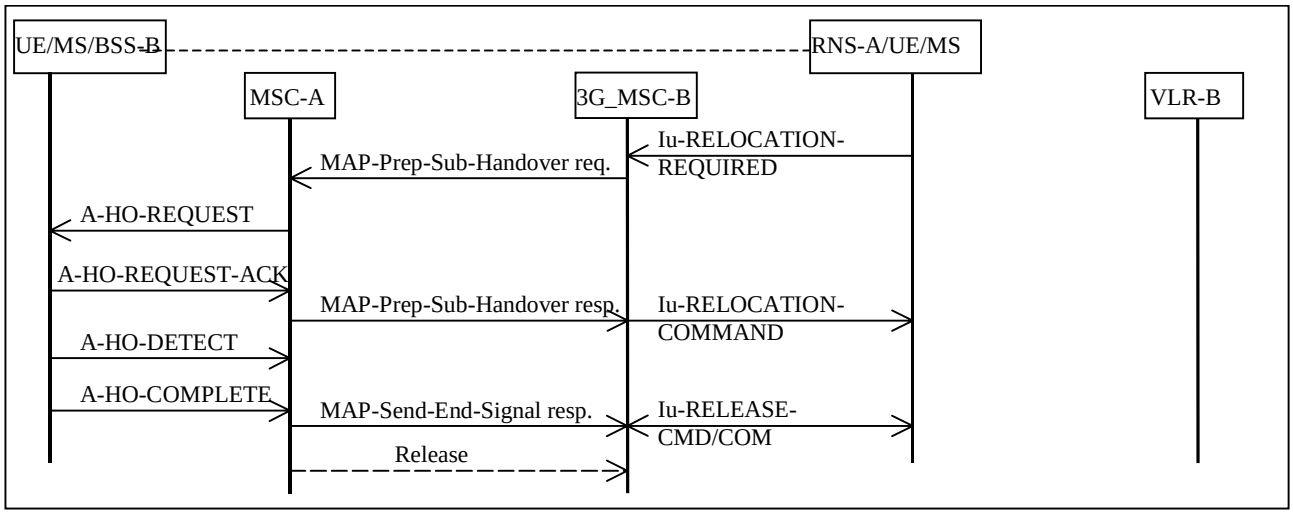


Figure 20: Subsequent UMTS to GSM handover procedure i): successful UMTS to GSM handover from 3G_MSC-B to MSC-A using a circuit connection

8.1.3.1.1 With no circuit connection or one circuit connection

The procedure is as follows:

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to MSC-A indicating the new MSC number (MSC-A number), indicating also the identity of the cell where the call has to be handed over and including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-B shall not send further MAP-PREPARE-SUBSEQUENT-HANDOVER requests while a handover attempt is pending or before any timeouts). Since MSC-A is the call controlling MSC, this MSC needs no Handover Number for routing purposes; MSC-A can immediately initiate the search for a free radio channel.

When a radio channel can be assigned, MSC-A shall return in the MAP-PREPARE-SUBSEQUENT-HANDOVER response the complete A-HO-REQUEST-ACKNOWLEDGE message received from the BSS-B and possible extra BSSMAP information, amended by MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the traffic channel allocation is queued by BSS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. The further traffic channel allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-B using the MAP-FORWARD-ACCESS-SIGNALLING request. If a radio channel cannot be assigned or if a fault is detected on the target cell identity, or the target cell identity in the A-HO-REQUEST is not consistent with the target MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an A-HO-FAILURE message shall be given to 3G_MSC-B, in addition 3G_MSC-B shall maintain the connection with the UE/MS.

If the procedure in MSC-A is successful then 3G_MSC-B can request the UE/MS to retune to the new BSS-B on MSC-A. This is illustrated in figure 20 by the Iu-RELOCATION-COMMAND message. The operation is successfully completed when MSC-A receives the A-HO-COMPLETE message.

After UMTS to GSM handover MSC-A shall release the circuit to 3G_MSC-B.

MSC-A must also terminate the MAP procedure for the basic UMTS to GSM handover between MSC-A and 3G_MSC-B by sending an appropriate MAP message. 3G_MSC-B will clear the resources in RNS-A when the MAP-SEND-END-SIGNAL response is received.

8.1.3.1.2 With multiple circuit connections (Optional functionality)

If 3G_MSC-B supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-B shall have the following functionality additionally to the description in section 8.1.3.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A which indicates the target is BSS, 3G_MSC-B shall select one bearer to be handed over if the UE has engaged with multiple bearers. After that, the 3G_MSC-B generates an A-HO-REQUEST message and sends it to 3G_MSC-A over MAP-PREPARE-SUBSEQUENT-HANDOVER request.

When MAP-PREPARE-SUBSEQUENT-HANDOVER response including an A-HO-REQUEST-ACK is received from the 3G_MSC-A, 3G_MSC-B shall release all RABs except for the selected bearer to be handed over. After that, 3G_MSC-B sends IU-RELOCATION-COMMAND to RNS-A.

8.1.3.2 Description of subsequent UMTS to GSM handover procedure ii): 3G_MSC-B to MSC-B'

The procedure for successful UMTS to GSM handover from 3G_MSC-B to MSC-B' is shown in figure 21.

The procedure consists of two parts:

- a subsequent UMTS to GSM handover from 3G_MSC-B back to 3G_MSC-A as described in section 8.1.3.1 (3G_MSC-A can also be a pure GSM MSC, the procedure is the same in both casess); and

- a basic handover from 3G_MSC-A to MSC-B' as described in section 7.1.

8.1.3.2.1 With no circuit connection or one circuit connection

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new MSC number (which is the identity of MSC-B'), indicating also the target cell identity and including a complete A-HO-REQUEST, 3G_MSC-A then starts a basic handover procedure towards MSC-B'.

When 3G_MSC-A receives the ACM from MSC-B', 3G_MSC-A informs 3G_MSC-B that MSC-B' has successfully allocated the radio resources on BSS-B' side by sending the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing the complete A-HO-REQUEST-ACKNOWLEDGE received from BSS-B' and possible extra BSSMAP

information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface between 3G_MSC-A and MSC-B' and the BSSMAP protocol carried on the E-interface between 3G_MSC-A and 3G_MSC-B. Now 3G_MSC-B can start the procedure on the radio path.

For 3G_MSC-A the UMTS to GSM handover is completed when it has received the MAP-SEND-END-SIGNAL REQUEST from MSC-B' containing the A-HO-COMPLETE received from the BSS-B'. The circuit between 3G_MSC-A and 3G_MSC-B is released. 3G_MSC-A also sends the MAP-SEND-END-SIGNAL response to 3G_MSC-B in order to terminate the original MAP dialogue between 3G_MSC-A and 3G_MSC-B. 3G_MSC-B releases the radio resources when it receives this message.

If the traffic channel allocation is queued by the BSS-B', the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. If no radio channel can be allocated by MSC-B' or no circuit between 3G_MSC-A and MSC-B' can be established or a fault is detected on the target cell identity or the target cell identity in the A-HO-REQUEST is not consistent with the target MSC number, 3G_MSC-A informs 3G_MSC-B by using the A-HO-FAILURE message included in the MAP-PREPARE-SUBSEQUENT-HANDOVER response. 3G_MSC-B shall maintain the existing connection with the UE/MS.

When the subsequent UMTS to GSM handover is completed, MSC-B' is considered as MSC-B. Any further inter-MSC handover is handled as described earlier for a subsequent handover.

8.1.3.2.2 With multiple circuit connections (Optional functionality)

If 3G_MSC-B supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-B shall have the following functionality additionally to the description in section 8.1.3.2.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-B 3G_MSC-B shall select one bearer to be handed over if the UE has engaged with multiple bearers. After that, the 3G_MSC-B generates an A-HO-REQUEST message.

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new MSC number (which is the identity of MSC-B'), indicating also the target Cell identity and including a complete A-HO-REQUEST. 3G_MSC-A then starts a basic relocation procedure towards MSC-B'.

When 3G_MSC-A receives the ACM from MSC-B', 3G_MSC-A informs 3G_MSC-B that MSC-B' has successfully allocated the radio resources on BSS-B' side by sending the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing the complete A-HO-REQUEST-ACK received from BSS-B' and possible extra BSSAP information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface between 3G_MSC-A and MSC-B' and the RANAP protocol carried on the E-interface between 3G_MSC-A and 3G_MSC-B.

When MAP-PREPARE-SUBSEQUENT-HANDOVER response including an A-HO-REQUEST-ACK is received from 3G_MSC-A, 3G_MSC-B shall release all RABs except for the selected bearer to be handed over. After that, 3G_MSC-B sends IU-RELOCATION-COMMAND to RNS-B.

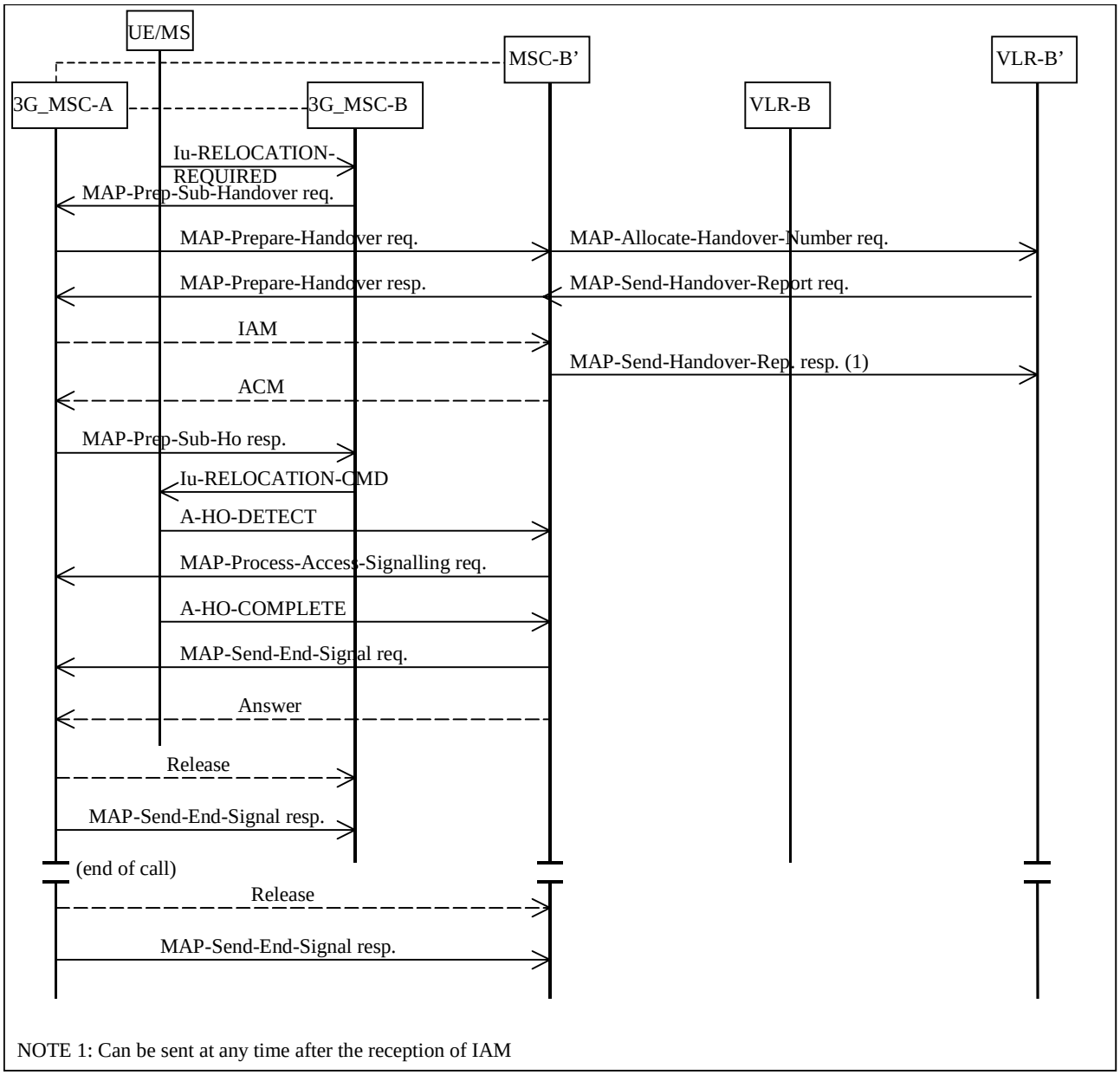


Figure 21: Subsequent handover procedure ii): Successful UMTS to GSM handover from 3G_MSC-B to MSC-B' requiring a circuit connection

Next Change

8.3.1 Basic relocation procedure requiring a circuit connection between 3G_MSC-A and 3G_MSC-B

The procedure used for successful Inter-3G_MSC SRNS relocation is shown in figure 30. Initiation of the relocation procedure is described in section 5. The procedure described in this section makes use of messages from the Technical Specification GSM 08.08 [5], TS 25.413 [11] and of the transport mechanism from the Mobile Application Part (MAP) (Technical Specification TS 29.002 [12]). After an Inter-3G_MSC SRNS relocation further Intra-3G_MSC relocations may occur on 3G_MSC-B, these relocations will follow the procedures specified in a previous section.

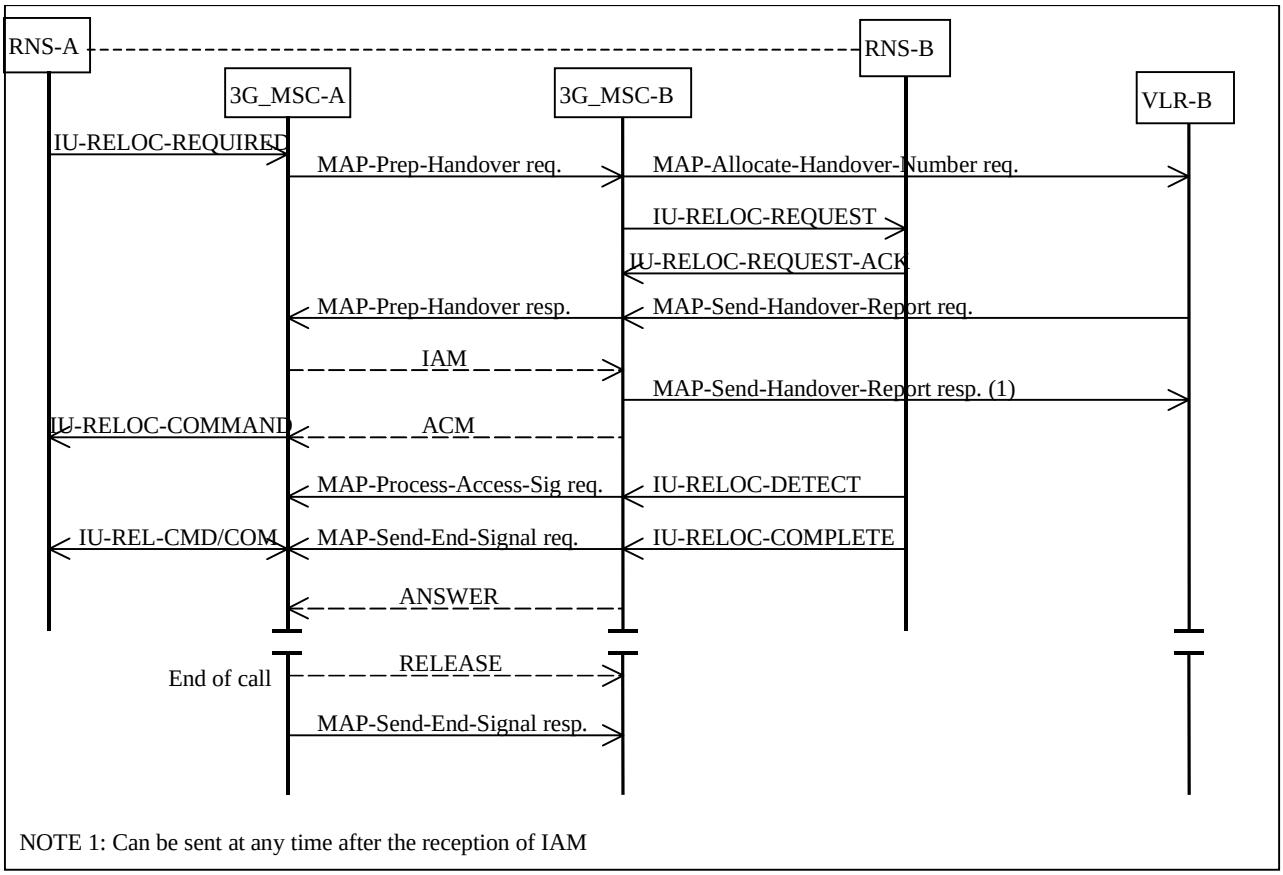


Figure 30: Basic SRNS Relocation Procedure requiring a circuit connection

8.3.1.1 With no circuit connection or one circuit connection

The relocation is initiated as described in section 6.2.3. (This is represented by IU-RELOC-REQUIRED in figure 30). Upon receipt of the IU-RELOC-REQUIRED from RNS-A, 3G_MSC-A shall send a MAP-PREPARE-HANDOVER request to 3G_MSC-B including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-A shall not send further MAP-PREPARE-HANDOVER requests while a MAP-PREPARE-HANDOVER response is pending or before any timeouts). The MAP-PREPARE-HANDOVER request shall carry in the A-HO-REQUEST all information needed by 3G_MSC-B for allocating radio resources in the case of SRNS relocation without Iur interface, see Technical Specification GSM 08.08 [5]. For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be relocated (*the cell id in the MAP message is FFS*). 3G_MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved a Handover Number from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). The Handover Number shall be used for routing the connection of the call from 3G_MSC-A to 3G_MSC-B. If radio resources are available in 3G_MSC-B, the MAP-PREPARE-HANDOVER response sent to 3G_MSC-A will contain the complete A-HO-REQUEST-ACKNOWLEDGE message generated from the IU-RELOC-REQUEST-ACKNOWLEDGE received from RNS-B, containing the radio resources definition to be sent by RNS-A to the UE (in case of relocation without Iur interface) and possible extra BSSMAP information, amended by 3G_MSC-B due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-A. The further radio resources allocation result (IU-RELOC-REQUEST-ACK or IU-RELOC-FAILURE sent in MAP as A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. If the radio resource allocation is not possible, the MAP-PREPARE-HANDOVER response containing an IU-RELOCATION-FAILURE sent as A-HO-FAILURE will be sent to 3G_MSC-A. 3G_MSC-B will do the same if a fault is detected on the identity of the RNS where the call has to be relocated. 3G_MSC-B simply reports the events related to the dialogue. It is up to 3G_MSC-A to decide the action to perform if it receives negative responses or the operation fails due to the expiry of the MAP-PREPARE-HANDOVER timer.

If an error related to the TCAP dialogue or to the MAP-PREPARE-HANDOVER request is returned from 3G_MSC-B, this will be indicated to 3G_MSC-A and 3G_MSC-A will terminate the relocation attempt. The existing connection to the UE shall not be cleared.

When the A-HO-REQUEST-ACKNOWLEDGE has been received, 3G_MSC-A shall establish a circuit between 3G_MSC-A and 3G_MSC-B by signalling procedures supported by the network. In figure 30 this is illustrated by the messages IAM (Initial Address Message) and ACM (Address Complete Message) of Signalling System no 7. 3G_MSC-B awaits the capturing of the UE (section 6.2.3) on the radio path when the ACM is sent and 3G_MSC-A initiates the relocation execution when ACM is received (illustrated by the IU-RELOC-COMMAND and described in the section 6.2.3).

3G_MSC-B transfers to 3G_MSC-A the acknowledgement received from the correct UE (IU-RELOC-DETECT/IU-RELOC-COMPLETE, sent as A-HO-DETECT/A-HO-COMPLETE). The IU-RELOC-DETECT, if received, is transferred to 3G_MSC-A as A-HO-DETECT using the MAP-PROCESS-ACCESS-SIGNALLING request. The IU-RELOC-COMPLETE, when received from the correct UE, is included in the MAP-SEND-END-SIGNAL request as A-HO-COMPLETE and sent back to 3G_MSC-A. The circuit is through connected in 3G_MSC-A when the A-HO-DETECT or the A-HO-COMPLETE is received from 3G_MSC-B. The old radio resources are released when the A-HO-COMPLETE message is received from 3G_MSC-B. The sending of the MAP-SEND-END-SIGNAL request starts the MAP supervision timer for the MAP dialogue between 3G_MSC-A and 3G_MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in 3G_MSC-A, the resources in RNS-A shall be released.

In order not to conflict with the PSTN/ISDN signalling system(s) used between 3G_MSC-A and 3G_MSC-B, 3G_MSC-B must generate an answer signal when IU-RELOC-DETECT/COMPLETE is received.

3G_MSC-B shall release the Handover Number when the circuit between 3G_MSC-A and 3G_MSC-B has been established.

If the circuit between 3G_MSC-A and 3G_MSC-B cannot be established, (e.g. an unsuccessful backward message is received instead of ACM) 3G_MSC-A terminates the inter-3G_MSC relocation attempt by sending an appropriate MAP message, for example an ABORT.

3G_MSC-A shall retain overall call control until the call is cleared by the fixed subscriber or the UE and there is no further call control functions to be performed (e.g. servicing waiting calls, echo cancellers).

When 3G_MSC-A clears the call to the UE it also clears the call control functions in 3G_MSC-A and sends the MAP-SEND-END-SIGNAL response to release the MAP resources in 3G_MSC-B.

3G_MSC-A may terminate the procedure at any time by sending an appropriate MAP message to 3G_MSC-B. If establishment of the circuit between 3G_MSC-A and 3G_MSC-B has been initiated, the circuit must also be cleared.

The relocation will be aborted by 3G_MSC-A if it detects release or interruption of the radio path before the call has been established on 3G_MSC-B.

8.3.1.2 With multiple circuit connections (Optional functionality)

8.3.1.2.1 3G_MSC-B does not support multiple bearers

If 3G_MSC-A supports the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A shall have the following functionality additionally to the description in section 8.3.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A, 3G_MSC-A generates IU-RELOCATION-REQUEST and sends a MAP-PREPARE-HANDOVER request to 3G_MSC-B including the IU-RELOCATION-REQUEST message, which may include multiple bearers. If 3G_MSC-A receives an indication that 3G_MSC-B does not support multiple bearers, 3G_MSC-A shall select one bearer to be handed over if the UE has engaged with multiple bearers. 3G_MSC-A generates IU-RELOCATION-REQUEST and sends again a MAP-PREPARE-HANDOVER request to 3G_MSC-B including the IU-RELOCATION-REQUEST message, which includes only the selected bearer.

When MAP-PREPARE-HANDOVER response including an IU-RELOCATION-REQUEST-ACK is received from 3G_MSC-B, 3G_MSC-A shall release all RABs except for the selected bearer to be handed over. After that, 3G_MSC-A sends IU-RELOCATION-COMMAND to RNS-A.

8.3.1.2.2 3G_MSC-B supports multiple bearers

If 3G_MSC-A and 3G_MSC_B support the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A and 3G_MSC-B shall have the following functionality additionally to the description in section 8.3.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A, 3G_MSC-A generates IU-RELOCATION-REQUEST and sends a MAP-PREPARE-HANDOVER request to 3G_MSC-B including the IU-RELOCATION-REQUEST message, which may include multiple bearers.

When MAP-PREPARE-HANDOVER request including an IU-RELOCATION-REQUEST message is received by the 3G_MSC-B and the number of bearers included in the IU-RELOCATION-REQUEST message has exceeded the maximum number of bearers supported by 3G_MSC-B, the 3G_MSC-B shall select several bearers so that the number of bearers will fulfil the range of 3G_MSC-B capability. In this case 3G_MSC-B shall reconstruct IU-RELOCATION-REQUEST message to cope with the capability of 3G_MSC-B and send it to RNS-B. The 3G_MSC-B shall retrieve multiple Handover Numbers from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request several times). The number of Handover Numbers depends on the number of RAB IDs in the reconstructed IU-RELOCATION-REQUEST.

After the reception of IU-RELOCATION-REQUEST-ACK from RNS-B and completion of multiple Handover Numbers allocation, the 3G_MSC-B shall generate Relocation Number List, which includes couples of RAB ID (See TS 25.413) and Handover Number successfully allocated. 3G_MSC-B shall select several bearers again if the number of successfully allocated Handover Numbers is less than the number of successfully allocated RABs. Then the 3G_MSC-B sends MAP-PREPARE-HANDOVER response including Relocation Number List back to the 3G_MSC-A.

Upon receipt of the MAP-PREPARE-HANDOVER response 3G_MSC-A shall establish circuits between 3G_MSC-A and 3G_MSC-B by signalling procedures supported by the network according to the Relocation Number List. When 3G_MSC-A receives all the results from attempted circuits (the results may be successful ACM message or unsuccessful backward message for each attempt) and if at least one circuit has been successfully established, 3G_MSC-A shall release all RABs which has failed to set up in RNC-B and all RABs associated with circuits which has failed to set up between 3G_MSC-A and 3G_MSC-B. After that, 3G_MSC-A sends IU-RELOCATION-COMMAND to RNS-A.

If no circuits have been successfully established 3G_MSC-A terminates the inter-3G_MSC relocation attempt by sending an appropriate MAP massage, for example ABORT.

Next Change

8.3.3 Procedure for subsequent relocation requiring a circuit connection between 3G_MSC-A and 3G_MSC-B

After the call has been relocated from 3G_MSC-A to 3G_MSC-B, if the UE leaves the area of 3G_MSC-B during the same call, subsequent relocation is necessary in order to continue the connection when no Iur interface exists between the involved RNSs, or to optimise the transmission path when the Iur interface is used.

The following cases apply:

i) the UE moves back to the area of 3G_MSC-A;

ii) the UE moves into the area of a third 3G_MSC (3G_MSC-B').

In both cases the call is switched in 3G_MSC-A; the circuit between 3G_MSC-A and 3G_MSC-B shall be released after a successful subsequent relocation has been performed.

8.3.3.1 Description of subsequent relocation procedure i): 3G_MSC-B to 3G_MSC-A

The procedure for successful relocation from 3G_MSC-B back to 3G_MSC-A is shown in figure 32.

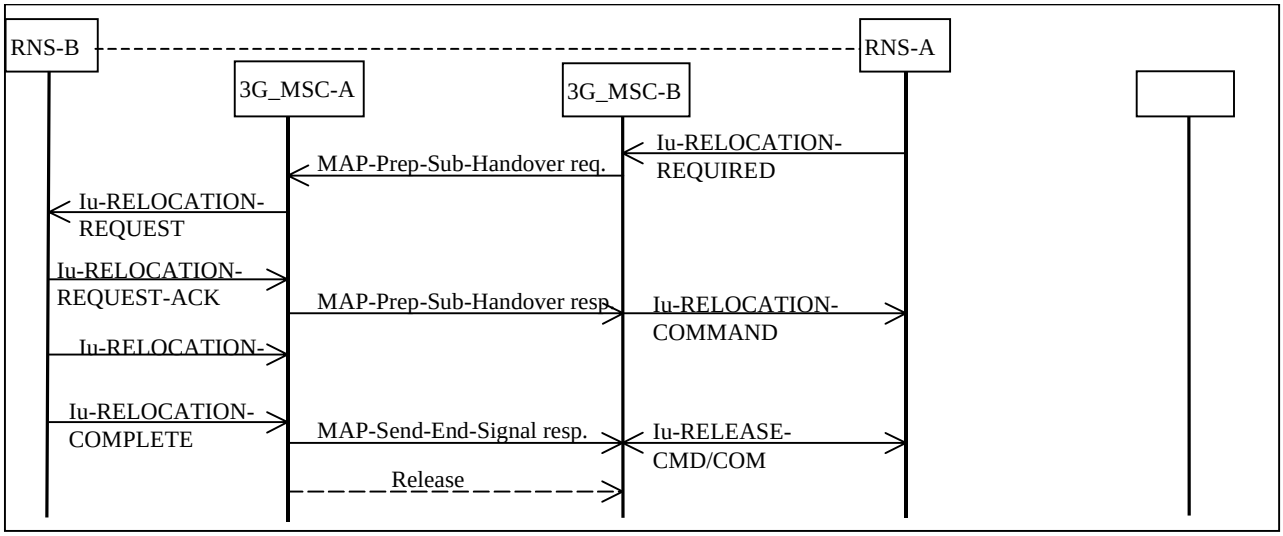


Figure 32: Subsequent relocation procedure i) successful relocation from 3G_MSC-B to 3G_MSC-A using a circuit connection

8.3.3.1.1 With no circuit connection or one circuit connection

The procedure is as follows:

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating the new 3G_MSC number (3G_MSC-A number), indicating also the identity of the cell (*the cell id in the MAP message is FFS*) where the call has to be relocated and including a complete A-HO-REQUEST message. (NOTE: 3G_MSC-B shall not send further MAP-PREPARE-SUBSEQUENT-HANDOVER requests while a relocation attempt is pending or before any timeouts). Since 3G_MSC-A is the call controlling 3G_MSC, this 3G_MSC needs no Handover Number for routing purposes; 3G_MSC-A can immediately initiate the relocation towards the target RNS.

When relocation can be initiated, 3G_MSC-A shall return in the MAP-PREPARE-SUBSEQUENT-HANDOVER response the complete IU-RELOC-REQUEST-ACKNOWLEDGE message received from the RNS-B as A-HO-REQUEST-ACKNOWLEDGE and possible extra BSSMAP information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface and the BSSMAP protocol used on the A-interface. If the radio resource allocation is queued by RNS-B, the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. The further radio resource allocation result (IU-RELOC-REQUEST-ACK or IU-RELOC-FAILURE, sent as A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 3G_MSC-B using the MAP-FORWARD-ACCESS-SIGNALLING request. If a radio resource cannot be assigned or if a fault is detected on the target RNS identity, or the target RNS identity in the A-HO-REQUEST is not consistent with the target 3G_MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an A-HO-FAILURE message shall be given to 3G_MSC-B, in addition 3G_MSC-B shall maintain the connection with the UE.

If the procedure in 3G_MSC-A is successful then 3G_MSC-B can request the UE to retune to the new RNS-B on 3G_MSC-A in the case of relocation without Iur interface, or request RNS-B to become serving RNS in the case of relocation with Iur interface. This is illustrated in figure 32 by the IU-RELOC-COMMAND message. The operation is successfully completed when 3G_MSC-A receives the IU-RELOC-COMPLETE message.

After relocation 3G_MSC-A shall release the circuit to 3G_MSC-B.

3G_MSC-A must also terminate the MAP procedure for the basic relocation between 3G_MSC-A and 3G_MSC-B by sending an appropriate MAP message. 3G_MSC-B will release the resources in RNS-A when the MAP-SEND-END-SIGNAL response is received.

8.3.3.1.2 With multiple circuit connections (Optional functionality)

If 3G_MSC-A and 3G_MSC_B support the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A and 3G_MSC-B shall have the following functionality additionally to the description in section 8.3.3.1.1.

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-A 3G_MSC-B generates IU-RELOCATION-REQUEST, which may include several bearers.

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new 3G_MSC number (which is the identity of 3G_MSC-A), indicating also the target RNC identity and including a complete IU-RELOCATION-REQUEST.

3G_MSC-A sends IU-RELOCATION-REQUEST to RNS-B and receives IU-RELOCATION-REQUEST-ACK.

When MAP-PREPARE-SUBSEQUENT-HANDOVER response is received from 3G_MSC-A 3G_MSC-B shall release all RABs which have failed to set up in RNS-B. After that, 3G_MSC-B sends IU-RELOCATION-COMMAND to RNS-A.

8.3.3.2 Description of subsequent relocation procedure ii): 3G_MSC-B to 3G_MSC-B'

The procedure for successful relocation from 3G_MSC-B to 3G_MSC-B' is shown in figure 33.

The procedure consists of two parts:

- a subsequent relocation from 3G_MSC-B back to 3G_MSC-A as described in section 8.3.3.1; and
- a basic handover from 3G_MSC-A to 3G_MSC-B' as described in section 8.3.1.

8.3.3.2.1 With no circuit connection or one circuit connection

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new 3G_MSC number (which is the identity of 3G_MSC-B'), indicating also the target cell identity (*the cell id in the MAP message is FFS*) and including a complete A-HO-REQUEST, 3G_MSC-A then starts a basic relocation procedure towards 3G_MSC-B'.

When 3G_MSC-A receives the ACM from 3G_MSC-B', 3G_MSC-A informs 3G_MSC-B that 3G_MSC-B' has successfully allocated the radio resources on RNS-B' side by sending the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing the complete IU-RELOC-REQUEST-ACKNOWLEDGE received from RNS-B' as A-HO-REQUEST-ACKNOWLEDGE and possible extra BSSMAP information, amended by 3G_MSC-A due to the possible interworking between the BSSMAP protocol carried on the E-interface between 3G_MSC-A and 3G_MSC-B' and the BSSMAP protocol carried on the E-interface between 3G_MSC-A and 3G_MSC-B. Now 3G_MSC-B can start the procedure on the radio path if needed.

For 3G_MSC-A the relocation is completed when it has received the MAP-SEND-END-SIGNAL REQUEST from 3G_MSC-B'containing the IU-RELOC-COMPLETE received from the RNS-B' as A-HO-COMPLETE. The circuit between 3G_MSC-A and 3G_MSC-B is released. 3G_MSC-A also sends the MAP-SEND-END-SIGNAL response to 3G_MSC-B in order to terminate the original MAP dialogue between 3G_MSC-A and 3G_MSC-B. 3G_MSC-B releases the radio resources when it receives this message.

If the radio resource allocation is queued by the RNS-B', the A-QUEUING-INDICATION may optionally be sent back to 3G_MSC-B. If no radio resource can be allocated by 3G_MSC-B' or no circuit between 3G_MSC-A and 3G_MSC-B' can be established or a fault is detected on the target RNS identity or the target RNS identity in the A-HO-REQUEST is not consistent with the target 3G_MSC number, 3G_MSC-A informs 3G_MSC-B by using the A-HO-FAILURE message included in the MAP-PREPARE-SUBSEQUENT-HANDOVER response. 3G_MSC-B shall maintain the existing connection with the UE.

When the subsequent relocation is completed, 3G_MSC-B' is considered as 3G_MSC-B. Any further inter-3G_MSC relocation is handled as described above for a subsequent relocation.

8.3.3.2.2 With multiple circuit connections (Optional functionality)

If 3G_MSC-A and 3G_MSC-B support the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A and 3G_MSC-B shall have the following functionality additionally to the description in section 8.3.3.2.1.

If 3G_MSC-B' does not support multiple bearers;

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-B 3G_MSC-B constructs IU-RELOCATION-REQUEST message, which may include several bearers.

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new 3G_MSC number (which is the identity of 3G_MSC-B'), indicating also the target RNC identity and including a complete IU-RELOCATION-REQUEST. 3G_MSC-A then starts a basic relocation procedure towards 3G_MSC-B'.

If 3G_MSC-A receives an indication that 3G_MSC-B' does not support multiple bearers 3G_MSC-A shall select one bearer to be handed over. Then 3G_MSC-A reconstructs IU-RELOCATION-REQUEST message, which includes only the selected bearer and send MAP-PREPARE-HANDOVER request again to 3G_MSC-B'.

When MAP-PREPARE-SUBSEQUENT-HANDOVER response is received from 3G_MSC-A 3G_MSC-B shall release all RABs except for the RABs included in IU-RELOCATION-REQUEST-ACK message over MAP-PREPARE-SUBSEQUENT-HANDOVER response. After that, 3G_MSC-B sends IU-RELOCATION-COMMAND to RNS-B.

If 3G_MSC-B' supports multiple bearers;

Upon receipt of the IU-RELOCATION-REQUIRED from RNS-B 3G_MSC-B constructs IU-RELOCATION-REQUEST message, which may include several bearers.

3G_MSC-B sends the MAP-PREPARE-SUBSEQUENT-HANDOVER request to 3G_MSC-A indicating a new 3G_MSC number (which is the identity of 3G_MSC-B'), indicating also the target RNC identity and including a complete IU-RELOCATION-REQUEST. 3G_MSC-A then starts a basic relocation procedure towards 3G_MSC-B'.

If the number of circuit connections successfully established to 3G_MSC-B' is less than that of RABs indicated in IU-RELOCATION-ACK included in MAP-PREPARE-HANDOVER response from 3G_MSC-B', then 3G_MSC-A shall select several bearers so that the number of bearers will fulfil the number of successfully established circuit connections and reconstruct IU-RELOCATION-ACK message. 3G_MSC_A then sends MAP-PREPARE-SUBSEQUENT-HANDOVER response including the IU-RELOCATION-REQUEST-ACK. If no circuit connection has been successfully established, 3G_MSC-A includes IU-RELOCATION-FAILURE instead of IU-RELOCATION-ACK in MAP-PREPARE-SUBSEQUENT-HANDOVER response.

When MAP-PREPARE-SUBSEQUENT-HANDOVER response is received from 3G_MSC-A, 3G_MSC-B shall release all RABs which are indicated as failed in IU-RELOCATION-REQUEST-ACK and all RABs to which circuit connections between 3G_MSC-A and 3G_MSC-B' have not been successfully established. After that, 3G_MSC-B sends IU-RELOCATION-COMMAND to RNS-B.

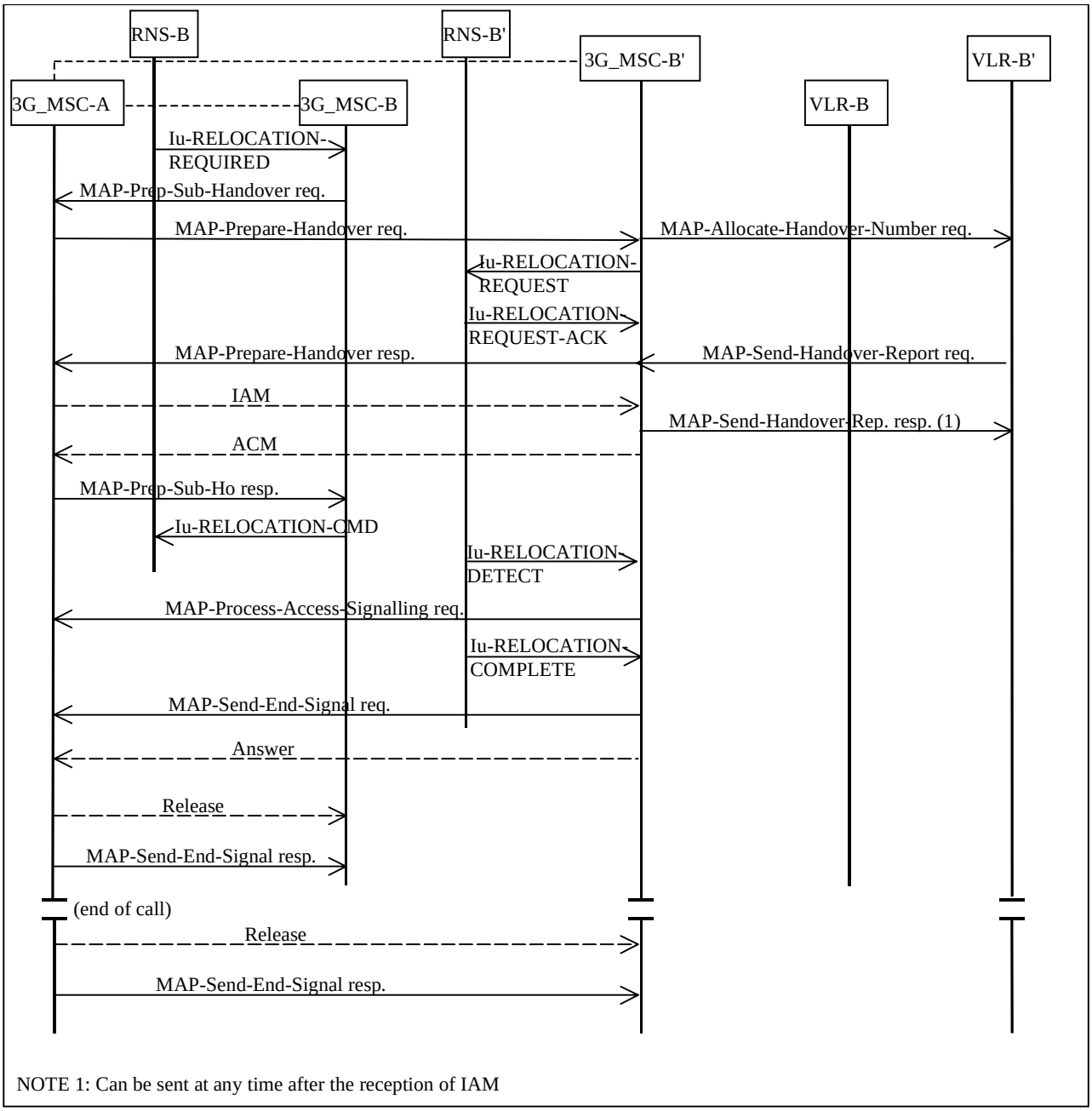


Figure 33: Subsequent relocation procedure ii) Successful SRNS relocation from 3G_MSC-B to 3G_MSC-B' requiring a circuit connection

Next Change

13 Subsequent channel assignment using a circuit connection between MSC-A and MSC-B

[Omitted]

13.4 SRNS Relocation

13.4.1 Without circuit connection

If a circuit connection has to be set up (for example for a Mobile Originated or Mobile Terminated Call Establishment) after an Inter-3G_MSC relocation without circuit connection, 3G_MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the IU-RAB-ASSIGNMENT-REQUEST as A-ASSIGNMENT-REQUEST, on the established MAP connection. If 3G_MSC-B indicates to 3G_MSC-B and to 3G_MSC-A that at least one of two procedures (RAB) assignment or Handover Number allocation can not be completed, then 3G_MSC-A shall terminate the circuit establishment attempt. The existing connection to the UE shall be maintained, if possible.

Upon receipt of the MAP-PREPARE-HANDOVER request, 3G_MSC-B shall perform the requested RAB assignment operation towards the RNS. In addition it shall retrieve a Handover Number from VLR-B. If a failure occurs in the RAB assignment or Handover Number allocation then it shall be reflected in the MAP-PREPARE-HANDOVER response that at least one of these two procedures has not been completed (i.e. either by a MAP-PREPARE-HANDOVER result with the RAB assignment procedure outcome and the Handover Number allocation outcome or by a MAP-PREPARE-HANDOVER error).

When 3G_MSC-A receives a successful MAP-PREPARE-HANDOVER response, it shall establish a circuit connection to 3G_MSC-B by using the appropriate network supported procedures. In figure 39 this is indicated by the IAM (Initial Address Message) and ACM (Address Complete Message). 3G_MSC-B shall also send the Answer message if appropriate to the signalling system. Upon receipt of the Answer 3G_MSC-A shall consider the circuit connection establishment phase complete. If a failure occurs during the circuit establishment phase then the existing connection to the UE shall be maintained, if possible.

13.4.2 With circuit connection (Optional functionality)

If 3G_MSC-A and 3G_MSC-B support the optional supplementary service Multicall (See TS 23.135), 3G_MSC-A and 3G_MSC-B shall have the following functionality additionally to the description in section 13.4.1.

A new circuit connection shall be able to set up (for example for a new Mobile Originated or a new Mobile Terminated Call Establishment) after an Inter-3G_MSC relocation with one or several circuit connections. The procedures for the establishment of the additional circuit connection in 3G_MSC-A and 3G_MSC-B are the same as that described in section 13.4.1.

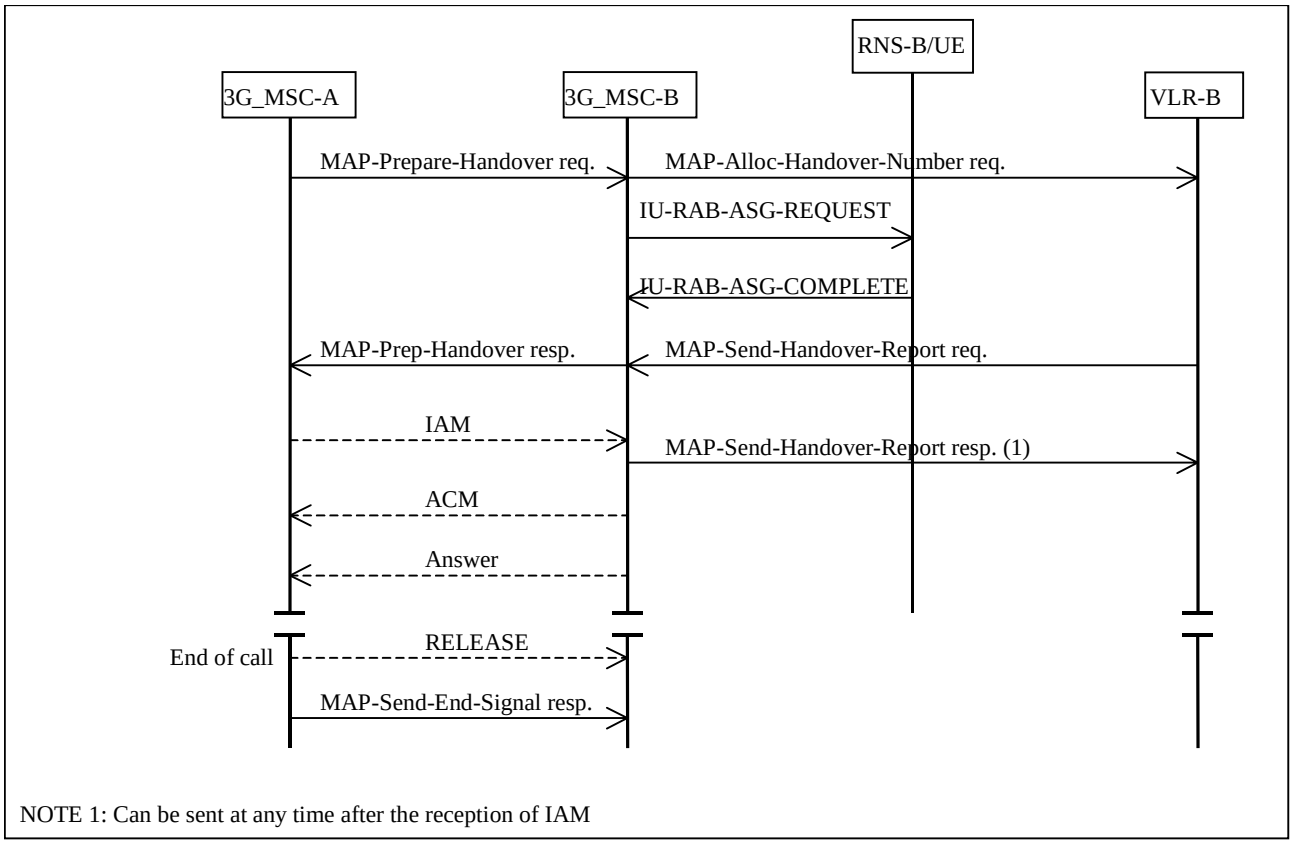


Figure 39: Successful circuit-switched call establishment after a Basic Relocation without circuit connection

3GPP TSG-CN 1 meeting #11
Umea, Sweden, 28 February – 03 March 2000

Document N1-000492

e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.108	CR	004	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-N #7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: CN1 **Date:** 2000-02-29

Subject: Clarification on timing to release TCH

Work item: Multicall

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	X
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: In current 23.108 the relationship between releasing a call and releasing a TCH is described. It is required that some clarification is needed for providing multiple TCH capability.

Clauses affected: 2, 7.3.4

Other specs affected:

Other 3G core specifications	X	→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments: Related to discussion paper N1-000485.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

First Change

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] GSM 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

[2] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[Omitted]

[78] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[79] 3G TS 23.135: "Multicall supplementary service - Stage 2"

Next Change

7.3.4 Call clearing

a) initiated by the network

The network initiates the clearing of a call by sending a DISCONNECT message to the mobile station (see also section 5.4.4).

Upon receiving the DISCONNECT message from the network the mobile station sends a RELEASE message to the network.

Upon receiving the RELEASE message from the mobile station, the network sends a RELEASE COMPLETE to the mobile station and, if the traffic channel is longer needed (e.g. last activity on the traffic channel), performs the channel release procedure as described in section 7.1.7.

Upon receiving the RELEASE COMPLETE message and if the cleared call was the last activity on the traffic channel, the mobile station waits for the release of the channel which is always initiated by the network.

When there exist multiple traffic channels in the Multicall environment the network does not release (i.e. retains) a traffic channel even if the cleared call was the last activity on the traffic channel under the condition as follows;

- a waiting call exists and the mobile station does not indicates to the network which bearer will be used for accepting the waiting call yet, and
- there exists no retained bearer for the waiting call.

When the mobile station receives SETUP message with Signal IE indicating Call Waiting, which means the network cannot provide any additional traffic channel, then;

- The MS shall not request a new SI value before releasing any other call (that leads to release any other bearers than the retained bearer).

- If the mobile station indicates the different SI value from the retained bearer after releasing any other calls (that leads to release any other bearer than the retained bearer), the network allocates a new TCH for the call, and releases the retained bearer.

Call clearing initiated by the network is shown in figure 7.12a.

b) initiated by the mobile station

The mobile station initiates the clearing of a call by sending a DISCONNECT message to the network (see also section 5.4.3).

Upon receiving the DISCONNECT message from the mobile station the network sends a RELEASE message to the mobile station.

Upon receiving the RELEASE message from the network, the mobile station sends a RELEASE COMPLETE to the network, which, if the traffic channel is no longer needed (e.g. last activity on the traffic channel), performs the channel release procedure as described in section 7.1.6.

When there exist multiple traffic channels in the Multicall environment the network does not release (i.e. retains) a traffic channel even if the cleared call was the last activity on the traffic channel under the condition as follows;

- a waiting call exists and the mobile station does not indicates to the network which bearer will be used for accepting the waiting call yet, and

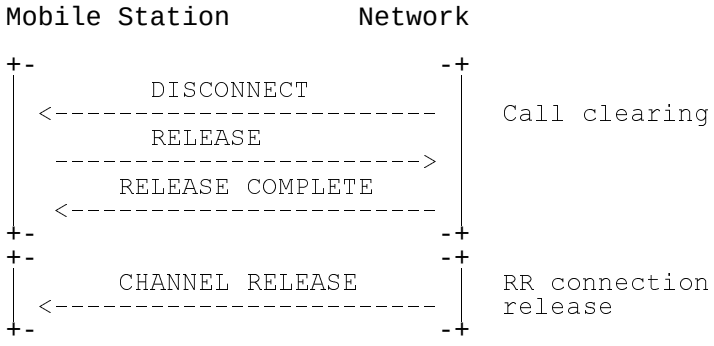
- there exists no retained bearer for the waiting call.

When the mobile station receives SETUP message with Signaling IE indicating Call Waiting, which means network cannot provide any additional traffic channel, then;

- The MS shall not request a new SI value before releasing any other call (that leads to release any other bearers than the retained bearer).

- If the mobile station indicates the different SI value from the retained bearer after releasing any other calls (that leads to release any other bearer than the retained bearer), the network allocates a new TCH for the call, and releases the retained bearer.

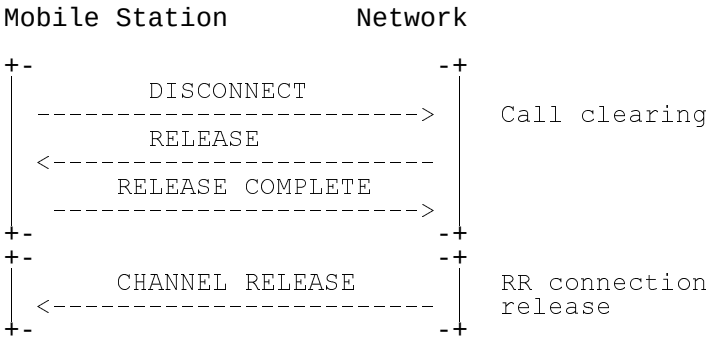
Call clearing initiated by the mobile station is shown in figure 7.12b.



a) Call clearing initiated by the network

Figure 7.12a/GSM 04.08 Call clearing

a)



b) Call clearing initiated by the MS

Figure 7.12b/GSM 04.08 Call clearing

3GPP/SMG Meeting #11
Umea, Sweden, 28 February - 03 March.2000

Document N1-000560
Revision of N1-000488
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

24.008	CR	178r2	Current Version:	3.2.1

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio		Core Network	X

Source: CN1 **Date:** 29-Feb-00

Subject: Introduction of NW CC Capability for Multicall

Work item: Multicall

Category: *(only one category shall be marked with an X)*			**Release:**	
F	Correction		Phase 2	
A	Corresponds to a correction in an earlier release		Release 96	
B	Addition of feature	X	Release 97	
C	Functional modification of feature		Release 98	
D	Editorial modification		Release 99	X
			Release 00	

Reason for change:

The pre-R99 specs don't specify the MSC behaviour for additional bearer initiation from when there is an ongoing call for the MS, since a pre-R99 MS is unable to handle multiple bearers. In the CR on introducing of the SI (N1-000210), it was implicitly assumed that a R99 MS never request multiple bearers in a pre-R99 network as such. To ensure this, the MS CC entity shall know the capability of the CC entity in the network rather than the local information what RAN is engaged.

It is proposed that the network call control capabilities from the NW to the MS shall be introduced as the Call Control capabilities from the MS to the NW and the multicall supported information shall be specified in it.

The Multicall supported information will also solve the following issue: If MS supports Muticall and the MSC/VLR is Release 99 but it does not support multicall, it will reject the setup message including a stream identifier greater than 1. This would mean that non first emergency call would be rejected by the network.

Since MS can recognize that visiting network does not support multiple bearers, it can ensure the emergency call establishment even if there is an ongoing call.

Clauses affected: 5.2.1; 5.2.1.2; 5.2.2.1; 9.3.3; 9.3.23; 10.5.4.x (new)

Other specs affected:			
Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

- Some procedural text that clarifies when the capability information shall be sent and how it shall be handled in the mobile station has to be included.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5.2 Call establishment procedures

[omitted]

5.2.1 Mobile originating call establishment

The call control entity of the mobile station initiates establishment of a CC connection by requesting the MM sublayer to establish a mobile originating MM connection and entering the "MM connection pending" state. There are two kinds of a mobile originating call: basic call and emergency call. The request to establish an MM connection shall contain a parameter to specify whether the call is a basic or an emergency call. This information may lead to specific qualities of services to be provided by the MM sublayers. Timer T303 is started when the CM SERVICE REQUEST message is sent.

\For mobile stations supporting eMLPP basic calls may optionally have an associated priority level as defined in GSM 03.67. This information may also lead to specified qualities of service to be provided by the MM sublayers.

While being in the "MM connection pending" state, the call entity of the mobile station may cancel the call prior to sending the first call control message according to the rules given in section 4.5.1.7.

The mobile station supporting multicall that is initiating an emergency call shall release one or more existing call to ensure the emergency call can be established if the multicall supported information stored in the mobile station described in section 5.2.1.2 and 5.2.2.1 indicates the network doesn't support multicall and some ongoing calls exists.

Having entered the "MM connection pending" state, upon MM connection establishment, the call control entity of the mobile station sends a setup message to its peer entity. This setup message is

- a SETUP message, if the call to be established is a basic call, and
- an EMERGENCY SETUP message, if the call to be established is an emergency call.

It then enters the "call initiated" state. Timer T303 is not stopped.

The setup message shall contain all the information required by the network to process the call. In particular, the SETUP message shall contain the called party address information.

If timer T303 elapses in the "MM connection pending" state, the MM connection in progress shall be aborted and the user shall be informed about the rejection of the call.

Next modification

5.2.1.2 Receipt of a setup message

In the "null" or "recall present" states, upon receipt of a setup message (a SETUP message or an EMERGENCY SETUP message, see section 5.2.1.1), the call control entity of the network enters the "call initiated" state. It shall then analyse the call information contained in the setup message.

i) If, following the receipt of the setup message, the call control entity of the network determines that the call information received from the mobile station is invalid (e.g. invalid number), then the network shall initiate call clearing as defined in section 5.4 with one of the following cause values:

   # 1 "unassigned (unallocated) number"

   # 3 "no route to destination"

   # 22 "number changed"

   # 28 "invalid number format (incomplete number)"

ii) If, following the receipt of the setup message, the call control entity of the network determines that a requested service is not authorized or is not available, it shall initiate call clearing in accordance with section 5.4.2 with one of the following cause values:

   # 8 "operator determined barring",

57 "bearer capability not authorized",

58 "bearer capability not presently available",

63 "service or option not available, unspecified", or

65 "bearer service not implemented".

iii) Otherwise, the call control entity of the network shall either:

- send a CALL PROCEEDING message to its peer entity to indicate that the call is being processed; and enter the "mobile originating call proceeding" state.
- or: send an ALERTING message to its peer entity to indicate that alerting has been started at the called user side; and enter the "call received" state.
- or: send a CONNECT message to its peer entity to indicate that the call has been accepted at the called user side; and enter the "connect request" state.

The call control entity of the network may insert bearer capability information element(s) in the CALL PROCEEDING message to select options presented by the mobile station in the Bearer Capability information element(s) of the SETUP message. The bearer capability information element(s) shall contain the same parameters as received in the SETUP except those presenting a choice. Where choices were offered, appropriate parameters indicating the results of those choices shall be included.

The CALL_PROCEEDING message may also contain the priority of the call in the case where eMLPP is applied and where the network has assigned a different priority to the call than that requested by the user, or where the user has not requested a priority and the network has assigned a default priority. Mobile stations supporting eMLPP shall indicate this priority level to higher sublayers and store this information for the duration of the call for further action. Mobile stations not supporting eMLPP shall ignore this information element if provided in a CALL PROCEEDING message.

The CALL_PROCEEDING message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a CALL PROCEEDING message. If the multicall supported information is not sent in the CALL_PROCEEDING message, the mobile station supporting multicall shall regard that the network doesn't support multicall.

The call control entity of the network having entered the "mobile originating call proceeding" state, the network may initiate the assignment of a traffic channel according to section 5.2.1.9 (early assignment).

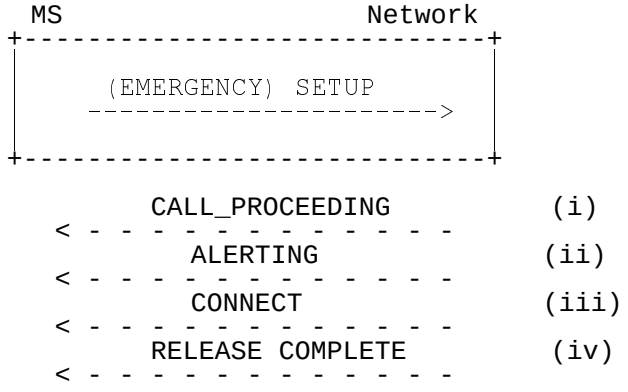


Figure 5.2/TS 24.008 Mobile originated call initiation and possible subsequent responses.

Next modification

5.2.2 Mobile terminating call establishment

Before call establishment can be initiated in the mobile station, the MM connection must be established by the network.

5.2.2.1 Call indication

After the arrival of a call from a remote user, the corresponding call control entity in the network shall: initiate the MM connection establishment according to section 4 and enter the "MM connection pending" state. The request to establish the MM connection is passed from the CM sublayer to the MM sublayer. It contains the necessary routing information derived from the SETUP message.

Upon completion of the MM connection, the call control entity of the network shall: send the SETUP message to its peer entity at the mobile station, start timer T303 and enter the "call present" state.

The SETUP message shall contain the multicall supported information in the network call control capabilities in the case where the network supports multicall and there are no other ongoing calls to the MS. Mobile stations supporting multicall shall store this information until the call control state for all calls returns to null. Mobile stations not supporting multicall shall ignore this information if provided in a SETUP message. If the multicall supported information is not sent in the SETUP message, the mobile station supporting multicall shall regard that the network doesn't support multicall.

Upon receipt of a SETUP message, the mobile station shall perform compatibility checking as described in 5.2.2.2. If the result of the compatibility checking was compatibility, the call control entity of the mobile station shall enter the "call present" state. An incompatible mobile station shall respond with a RELEASE COMPLETE message in accordance with section 5.2.2.3.4.

If no response to the SETUP message is received by the call control entity of the network before the expiry of timer T303, the procedures described in section 5.2.2.3.3 shall apply.

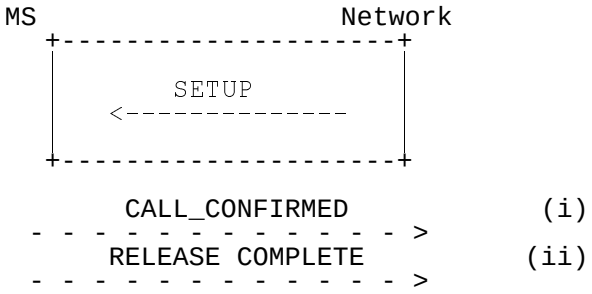


Figure 5.6/TS 24.008 Mobile terminating call initiation and possible subsequent responses.

Next modification

9 Message functional definitions and contents

[Omitted]

9.3 Messages for circuit-switched call control

[Omitted]

9.3.3 Call proceeding

This message is sent by the network to the calling mobile station to indicate that the requested call establishment information has been received, and no more call establishment information will be accepted.

See table 9.57/TS 24.008.

Message type: CALL PROCEEDING

Significance: local

Direction: network to mobile station

Table 9.57/TS 24.008: CALL PROCEEDING message content

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Call proceeding message type	Message type 10.4	M	V	1
D-	Repeat Indicator	Repeat Indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	O	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
1C	Facility	Facility 10.5.4.15	O	TLV	2-?
1E	Progress indicator	Progress indicator 10.5.4.21	O	TLV	4
8-	Priority granted	Priority Level 10.5.1.11	O	TV	1
2F	Network Call Control Capabilities	Network Call Control cap. 10.5.4.x	O	TLV	3

9.3.3.1 Repeat indicator

This information element is included if and only if *bearer capability 1* IE and *bearer capability 2 IE* are both contained in the message.

9.3.3.2 Bearer capability 1 and bearer capability 2

The *bearer capability 1* information element is included if the network has to specify at least one of the negotiable parameters described in TS 27.001, or if the *bearer capability 1* information element received in the SETUP message included the “fixed network user rate“ parameter.

When the *bearer capability 1* information element is followed by the *bearer capability 2* IE in the SETUP, the above rule applies to both *bearer capability* 1 IE and *bearer capability 2* IE. Except those cases identified in TS 27.001, if either *bearer capability* needs to be included, both shall be included.

9.3.3.3 Facility

This information element may be used for functional operation of supplementary services.

9.3.3.4 Progress Indicator

This information element may be included:

- in order to pass information about the call in progress e.g. in the event of interworking; and/or
- to make the MS attach the user connection for speech.

9.3.3.5 Priority granted

The priority field is provided by the network in the case that eMLPP is used and the priority assigned by the network is not the same as that requested by the mobile station.

9.3.3.6 Network Call Control Capabilities

This information shall be included by the network to indicate its call control capabilities if the network supports multicall.and there are no other ongoing calls to the MS.

Next modification

9.3.23 Setup

9.3.23.1 Setup (mobile terminated call establishment)

This message is sent by the network to the mobile station to initiate a mobile terminated call establishment.

See table 9.70/TS 24.008.

Message type: SETUP

Significance: global

Direction: network to mobile station

Table 9.70/TS 24.008: SETUP message content (network to mobile station direction)

IEI	Information element	Type / Reference	Presence	Format	Length
	Call control protocol discriminator	Protocol discriminator 10.2	M	V	1/2
	Transaction identifier	Transaction identifier 10.3.2	M	V	1/2
	Setup message type	Message type 10.4	M	V	1
D-	BC repeat indicator	Repeat indicator 10.5.4.22	C	TV	1
04	Bearer capability 1	Bearer capability 10.5.4.5	O	TLV	3-16
04	Bearer capability 2	Bearer capability 10.5.4.5	O	TLV	3-16
1C	Facility	Facility 10.5.4.15	O	TLV	2-?
1E	Progress indicator	Progress indicator 10.5.4.21	O	TLV	4
34	Signal	Signal 10.5.4.23	O	TV	2
5C	Calling party BCD	Calling party BCD num.	O	TLV	3-14

	number	10.5.4.9			
5D	Calling party sub-address	Calling party subaddr. 10.5.4.10	O	TLV	2-23
5E	Called party BCD number	Called party BCD num. 10.5.4.7	O	TLV	3-19
6D	Called party sub-address	Called party subaddr. 10.5.4.8	O	TLV	2-23
74	Redirecting party BCD number	Redirecting party BCD num. 10.5.4.21a	O	TLV	3-19
75	Redirecting party sub-address	Redirecting party subaddress. 10.5.4.21b	O	TLV	2-23
D-	LLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7C	Low layer compatibility I	Low layer comp. 10.5.4.18	O	TLV	2-18
7C	Low layer compatibility II	Low layer comp. 10.5.4.18	C	TLV	2-18
D-	HLC repeat indicator	Repeat indicator 10.5.4.22	O	TV	1
7D	High layer compatibility i	High layer comp. 10.5.4.16	O	TLV	2-5
7D	High layer compatibility ii	High layer comp. 10.5.4.16	C	TLV	2-5
7E	User-user	User-user 10.5.4.25	O	TLV	3-35
8-	Priority	Priority Level 10.5.1.11	O	TV	1
19	Alert	Alerting Pattern 10.5.4.26	O	TLV	3
2F	Network Call Control Capabilities	Network Call Control cap. 10.5.4.x	O	TLV	3

9.3.23.1.1 BC repeat indicator

The *BC repeat indicator* information element is included if and only if *bearer capability* 1 information element and *bearer capability 2* IE are both present in the message.

9.3.23.1.2 Bearer capability 1 and bearer capability 2

The *bearer capability 1* information element may be omitted in the case where the mobile subscriber is allocated only one directory number for all services (ref.: TS 29.007). The *bearer capability 2* IE is missing at least if the *bearer capability 1* IE is missing.

9.3.23.1.3 Facility

This information element may be included for functional operation of supplementary services.

9.3.23.1.4 Progress indicator

This information element is included by the network

- in order to pass information about the call in progress e.g. in the event of interworking and/or
- to make the MS attach the user connection for speech.

9.3.23.1.4a Called party BCD number

For all bands except for PCS1900, the maximum length of this IE sent by the network shall be 13 octets

9.3.23.1.5 Called party subaddress

Included in the Network-to-mobile station direction if the calling user includes a *called party subaddress* information element in the SETUP message.

9.3.23.1.6 LLC repeat indicator

The *LLC repeat indicator* information element is included if and only if both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *low layer compatibility I* IE is contained in the message.

If included, the *LLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.1.7 Low layer compatibility I

Included in the network-to-mobile station direction if the calling user specified a low layer compatibility.

9.3.23.1.8 Low layer compatibility II

Included if and only if the *LLC repeat indicator* information element is contained in the message.

9.3.23.1.9 HLC repeat indicator

The *HLC repeat indicator* information element is included if and only both following conditions hold:

- The *BC repeat indicator* IE is contained in the message.
- The *high layer compatibility i* IE is contained in the message.

If included, the *HLC repeat indicator* shall specify the same repeat indication as the *BC repeat indicator* IE.

9.3.23.1.10 High layer compatibility i

Included in the network-to-mobile station direction if the calling user specified a high layer compatibility.

9.3.23.1.11 High layer compatibility ii

Included if and only if the *HLC repeat indicator* information element is contained in the message.

9.3.23.1.12 User-user

May be included in the network to called mobile station direction when the calling remote user included a user-user information element in the SETUP message.

9.3.23.1.13 Redirecting party BCD number

May be included in the network to called mobile station direction when the call has been redirected.

9.3.23.1.14 Redirecting party subaddress

May be included in the network to called mobile station direction when the calling remote user included a called party subaddress in the SETUP message and the call has been redirected

9.3.23.1.15 Priority

May be included by the network to indicate the priority of the incoming call if eMLPP is used.

9.3.23.1.16 Alert $(Network Indication of Alerting in the MS)$

May be included by the network to give some indication about alerting (category or level). If supported in the MS, this optional indication is to be used by the MS as specified in GSM 02.07.

9.3.23.1.17 Network Call Control Capabilities

This information shall be included by the network to indicate its call control capabilities if the network supports multicall.and there are no other ongoing calls to the MS.

Next modification

10.5.4 Call control information elements.

[Omitted]

10.5.4.x Network Call Control Capabilities

The purpose of the *Network Call Control Capabilities* information element is to identify the call control capabilities of the network. The contents might affect the manner in which the mobile station handles the call.

The Network Call Control Capabilities information element is coded as shown in figure 10.5.x/TS 24.008 and table 10.5.x/TS 24.008.

The Network Call Control Capabilities is a type 4 information element with a length of 3 octets.

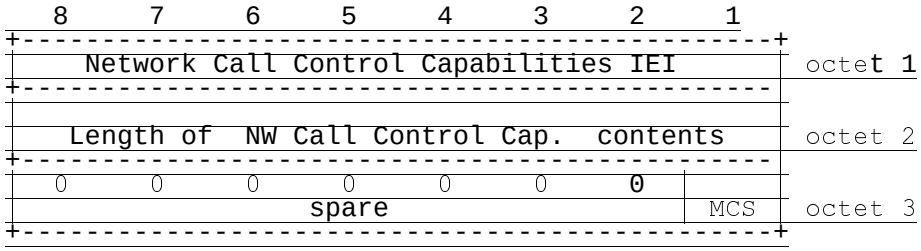


Figure 10.5.x/TS 24.008 Network Call Control Capabilities information element

Table 10.5.x/TS 24.008: Network Call Control Capabilities

MCS (octet 3, bit 1)	
0	This value indicates that the network does not support the multicall.
1	This value indicates that the network supports the multicall.