3GPP TSG-CN Meeting #23 **NP-040031**
10th - 12th March 2004. Phoenix, USA.

Source: **TSG CN WG 1**

Title: **CR to Rel-5 on Work Item TEI5 (originally as TRFO-OOBTC) towards 23.009**

Agenda item: **8.8**

Document for: **APPROVAL**

Introduction:

This document contains **1** CR, **Rel-5** on Work Item **"TEI5"**, that have been agreed by **TSG CN WG1 in CN1#33 meeting**, and are forwarded to TSG CN Plenary meeting #23 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Meeting-2nd-Level
23.009	102	2	Rel-5	Renaming of the Available Codecs List to Iu Supported Codecs List	F	5.7.0	5.8.0	N1-040468	N1-33

3GPP TSG CN WG4 Meeting #22
Atlanta, USA, 16th – 20st February 2003

N4-040303
(rev of Tdoc N4-040279)

3GPP TSG-CN1 Meeting #33
Atlanta, Georgia, USA 16 – 20 February 2004

Tdoc N1-040468
(rev of Tdoc N1-040389)

CR-Form-v7

CHANGE REQUEST

⌘ **23.009** **CR** **102** ⌘ **rev** **2** ⌘ Current version: **5.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Renaming of the Available Codecs List to Iu Supported Codecs List
Source:	⌘	Siemens AG
Work item code:	⌘	TEI5~~TRFO-OOBTC~~
Date:	⌘	19.02.2004
Category:	⌘	**F**
Release:	⌘	REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘

During analysis of the interworking between inter-MSC SRNS Relocation and TrFO-related core network signalling procedures like BICC Codec Modification and Mid-call Codec Negotiation, it became clear that the Available Codecs List in TS 23.009 should be renamed to Iu Supported Codecs List.

This CR affects the nomenclature only, but it is necessary from Rel-5 onwards, since the parameter Available Codecs List was introduced in TS 23.009, Rel-5, and it will not be possible to rename it in later releases without creating further confusion.

The reason for the proposed change is that in the interworking scenarios with TrFO there are two codec lists exchanged via the MAP/E interface:
- the first list is sent by the anchor MSC to the target MSC and contains the codecs supported by the UE and the anchor MSC;
- the second one is returned by the target MSC and consists of all codecs of the first list that are also supported by the target MSC and the target RNC.

Codec lists with a similar functionality exist in the BICC protocol used on the Nc interface between anchor and target MSC. To avoid confusion, it is proposed to align the names of the lists exchanged via the MAP/E interface with the names of the corresponding lists exchanged via the Nc interface.

A prefix 'Iu' is used

	- to indicate that the Iu Supported Codecs List and Iu Available Codecs List exchanged via MAP signalling are applicable to the Iu interface between target MSC and target RNC, and - to allow to distinguish them in TS 23.153 from the Supported Codecs List (BICC) and Available Codecs List (BICC) exchanged via BICC signalling and applicable to the Nb interface between anchor and target MSC. Note: since the parameters Iu Available Codecs List, Supported Codecs List (BICC), and Available Codecs List (BICC) need to be supported only when TrFO is supported, the use of these lists will be described in the TrFO stage 2, TS 23.153.
Summary of change: ⌘	The Available Codecs List is renamed to Iu Supported Codecs List. The term 'preferred codec' is defined in subclause 3.2. The selected codec is renamed to Iu Selected Codec and the currently used codec to Iu Currently used codec.
Consequences if not approved: ⌘	Confusing naming conventions in TS 23.153, TrFO stage 2.

Clauses affected: ⌘	3.2, 4.4.1, 6.2.3.1, 7.1, 8.1.1.1, 8.2.1, 8.3.1.1, 8.3.3.1.1, 8.3.3.2.1, 13.1, 13.2, 13.3, 13.4.1				
	Y	**N**			
Other specs affected: ⌘	**X**		Other core specifications	⌘	29.002: 667, 669
		X	Test specifications		
		X	O&M Specifications		
Other comments: ⌘					

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Definitions

The following terms are used in this Technical Specification:

A/Gb mode: mode of operation of the MS when connected to the Core Network via GERAN and the A and/or Gb interfaces. Throughout this specification the term GSM refers to GERAN A/Gb mode.

Iu mode: mode of operation of the MS when connected to the Core Network via GERAN or UTRAN and the Iu interface. Throughout this specification the term UMTS refers to UTRAN or GERAN Iu mode.

Iur interface: the logical interface between two UTRAN RNSs.

Iur-g interface: the logical interface between two BSSs or a BSC and an RNC and it is only considered in Iu mode.

Iu Currently used codec: the codec used by the UE/MS in UTRAN or GERAN Iu mode before a handover or SRNS relocation.

Iu Selected codec: the codec to be used by the UE/MS in UTRAN or GERAN Iu mode after the handover or SRNS relocation.

~~Available~~**Iu Supported Codecs List:** a list of codecs supported by the MS and by the core network, provided by MSC-A/3G_MSC-A to 3G_MSC-B during Inter-MSC handover/relocation. The ~~Available~~Iu Supported Codecs List may contain separate list of codecs for UTRAN Iu mode and GERAN Iu mode. Within each list, the codecs are ordered in decreasing order of priority, the first entry in the list being the highest priority codec (preferred codec) and the last entry the lowest priority codec.

Default speech codec: In UTRAN Iu mode the default speech codec is the UMTS AMR or UMTS AMR2 codec, dependent on the capabilities of the UE/MS. For a description of how the network determines the default UMTS speech codec, see [10], subclause 5.2.1.11. If necessary, 3G_MSC-B shall use the Radio Resource Information instead of the GSM Bearer Capability, since the GSM Bearer Capability is not available in MSC-B.

In GERAN Iu mode the default speech codec is the AMR FR codec.

UE Specific Behaviour Information - Iu (UESBI-Iu): information that is sent from the MSC to the RAN and that can be used to derive specific information about the UE's capabilities.

********** NEXT MODIFIED SECTION **********

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. 3G_MSC-B notifies MSC-A or 3G_MSC-A of intra-3G_MSC-B InterSystem handover and intra GSM handovers, by using the A-HANDOVER-PERFORMED message.

- If the security algorithms have been changed during an intra-3G_MSC-B SRNS relocation; or
- if the ~~selected~~ codec type or codec modes of the Iu Selected codec have been changed during this relocation and the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B before,

then 3G_MSC-B shall indicate the changed parameters, i.e. the selected UMTS algorithm(s) and/or the ~~selected~~ codec type and codec modes of the Iu Selected codec, to MSC-A or 3G_MSC-A in the MAP-PROCESS-ACCESS-SIGNALLING request.

Encapsulated in the MAP-PROCESS-ACCESS-SIGNALLING request 3G_MSC-B shall send:

- an A-HANDOVER-PERFORMED message, when encapsulated BSSAP is used on the E interface; or
- an Iu-LOCATION-REPORT message, when encapsulated RANAP is used on the E interface.

On reception of an order to perform location reporting at change of Service Area from 3G_MSC-A, 3G_MSC-B shall be responsible to re-issue the Iu-LOCATION-REPORTING-CONTROL message after subsequent Intra-3G_MSC-B relocations/handovers. This shall be performed immediately after the successful completion of the Relocation Resource Allocation procedure.

In a network implementing the "Flexible Iu interface for handover/relocation" option, in the Intra-3G_MSC handover/relocation case, 3G_MSC-B may optionally use a global title based on the Global RNC-Id for the addressing of the Iu interface messages towards the target RNC.

For subsequent inter-MSC handover/relocation to an area where "Intra Domain Connection of RAN Nodes to Multiple CN Nodes" is applied, 3G_MSC-B can have multiple target CN nodes for each handover target in a pool-area as specified in 3GPP TS 23.236 [18].

The role of 3G_MSC-B is also to provide transcoder resources. For speech calls in UMTS, 3G_MSC-B shall select an Iu Selected codec from the ~~Available~~Iu Supported Codecs List provided by MSC-A/3G_MSC-A in the MAP-PREPARE-HANDOVER request. If the ~~Available~~Iu Supported Codecs List was not received, 3G_MSC-B shall select the appropriate default speech codec.

If an intra-3G_MSC-B intersystem handover to UMTS is performed, and the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B during the basic inter MSC handover/relocation procedure, then 3G_MSC-B shall indicate the Iu S~~s~~elected codec to MSC-A or 3G_MSC-A in MAP-PROCESS-ACCESS-SIGNALLING request.

In the Inter-3G_MSC 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 RANAP 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 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 UMTS to GSM 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 BSS-B. 3G_MSC-B will do some processing on the BSSMAP information received on the E-interface or the BSSMAP information received on the A-interface whereas it will relay the DTAP information transparently between A-interface and E-interface. 3G_MSC-A initiates and drives a subset of BSSMAP procedures towards 3G_MSC-B, while 3G_MSC-B controls them towards its BSSs to the extent that 3G_MSC-B is responsible for the connections of its BSSs. The release of the dedicated resources between 3G_MSC-B and BSS-B is under the responsibility of 3G_MSC-B and BSS-B, and is not directly controlled by 3G_MSC-A. When clearing is to be performed due to information received from BSS-B, 3G_MSC-B shall transfer this clearing indication to 3G_MSC-A, to clear its connection with BSS-B, to terminate the dialogue with 3G_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 BSS-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 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 GSM to UMTS 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.

At intra-PLMN handover/relocation, 3G_MSC-B shall send Service Handover related information to the BSC/RNC if and only if this Service Handover information is received from 3G_MSC-A. 3G_MSC-B shall not modify Service Handover related information received from a 3G_MSC-A within the same PLMN.

For network sharing (see 3GPP TS 25.401 [20], subclause 7.2.3) when SNA information is received by 3G_MSC-B from 3G_MSC-A, 3G MSC-B shall send the SNA information to the RNS.

If 3G_MSC-B does not support the optional supplementary service Mutlicall (see 3GPP TS 23.135) and 3G_MSC-A requests to relocate multiple bearers, 3G_MSC-B shall indicate that it does not support multiple bearers to 3G_MSC-A.

If 3G_MSC-B supports the optional supplementary service Multicall (see 3GPP TS 23.135) and UE is engaged with multiple bearers the following description applies:

- In the basic relocation case, the 3G_MSC-B shall be able to allocate a Handover Number for each bearer. The 3G_MSC-B shall also be able to select some bearers to be handed over according to the priority level defined as RAB parameters in 3GPP TS 25.413 [11] so that the number of bearers will fulfill the maximum number of bearers supported by the 3G_MSC-B. If a selection has to be made between bearers of the same priority level, then the selection criteria are implementation dependent.

- In the Intra-3G_MSC relocation case, the 3G_MSC-B tries to relocate all bearers to a new RNS.

- In the subsequent relocation back to the 3G_MSC-A or to a third 3G_MSC-B' case, the 3G_MSC-B tries to request to the 3G_MSC-A to relocate all bearers to the 3G_MSC-A or to the 3G_MSC-B'.

- In the Intra-3G_MSC inter-system UMTS to GSM handover case and the subsequent inter-system UMTS to GSM handover back to the 3G_MSC-A or to a third MSC-B' case, the 3G_MSC-B shall be able to select one bearer to be handed over according to 3GPP TS 22.129 [9] and tries to handover the selected bearer.

If 3G_MSC-B supports the "Provision of UE Specific Behaviour Information to Network Entities" (see 3GPP TS 23.195 [21]), and if it received UESBI-Iu from MSC-A or 3G_MSC-A during the basic inter-MSC handover/relocation, then 3G_MSC-B shall store the UESBI-Iu and forward it to RNS-B during basic inter-MSC handover/relocation and subsequent intra-3G_MSC-B handover/relocation.

********** NEXT MODIFIED SECTION **********

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). For the relocation of a speech call to UTRAN Iu mode, 3G_MSC-A shall include the NAS Synch Indicator in the Iu-RELOCATION-REQUEST, if the Iu Selected codec to be used after the relocation is different from the Iu C~~e~~urrently used codec. 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 3GPP TS 25.430 series and 3GPP TS 25.413 [11].

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.

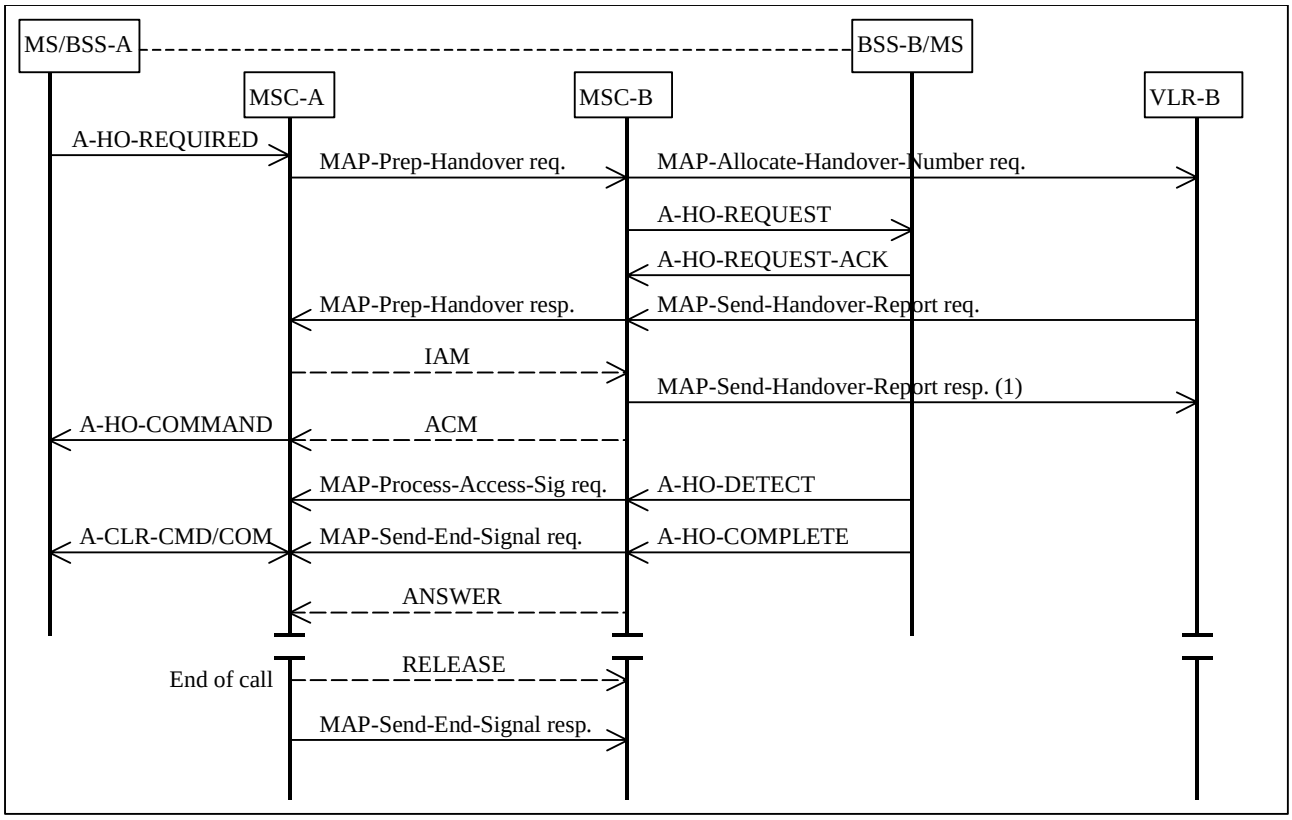
In all cases the existing connection to the UE shall not be cleared except in the case of expiry of the timer for receipt of Iu-RELOCATION-COMPLETE.

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.

********** NEXT MODIFIED SECTION **********

7.1 Basic handover procedure requiring a circuit connection between MSC-A and MSC-B

The procedure used for successful Inter-MSC Handover is shown in figure 12. Initiation of the handover procedure is described in clause 5. The procedure described in this clause makes use of messages from the 3GPP TS 08.08 [5] and of the transport mechanism from the Mobile Application Part (MAP) (3GPP TS 29.002 [12]). After an Inter-MSC handover further Intra-MSC handovers may occur on MSC-B, these handovers will follow the procedures specified in the previous clause.



NOTE 1: Can be sent at any time after the reception of IAM.

Figure 12: Basic Handover Procedure requiring a circuit connection

The handover is initiated as described in clause 6.1. (This is represented by A-HO-REQUIRED in figure 12. Upon receipt of the A-HO-REQUIRED from BSS-A, MSC-A shall send a MAP-PREPARE-HANDOVER request to MSC-B including a complete A-HO-REQUEST message.

NOTE: 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 3GPP TS 08.08 [5]. For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be handed over. For speech calls, MSC-A shall also include the ~~Available~~Iu Supported Codecs List to be used by MSC-B for subsequent intra-MSC-B intersystem handover to UMTS and intra-MSC-B SRNS relocation. 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 MSC-A to MSC-B. If a traffic channel is available in MSC-B the MAP-PREPARE-HANDOVER response, sent to MSC-A will contain the complete A-HO-REQUEST-ACKNOWLEDGE message received from BSS-B, containing the radio resources definition to be sent by BSS-A to the 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 optionaly be sent back to MSC-A. The further traffic channel allocation result (A-HO-REQUEST-ACK or A-HO-FAILURE) will be transferred to 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 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 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 MSC-A and MSC-A will terminate the handover attempt. MSC-A may retry the handover attempt

using the cell identity list, if provided, or may reject the handover attempt towards BSS-A. The existing connection to the MS shall not be cleared.

When the A-HO-REQUEST-ACKNOWLEDGE has been received, MSC-A shall establish a circuit between MSC-A and MSC-B by signalling procedures supported by the network. In figure 12 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 MS (clause 6.1) on the radio path when the ACM is sent and MSC-A initiates the handover execution when ACM is received (illustrated by the A-HO-COMMAND and described in the clause 6.1).

MSC-B transfers to MSC-A the acknowledgement received from the correct MS (A-HO-DETECT/A-HO-COMPLETE). The A-HO-DETECT, if received, is transferred to MSC-A using the MAP-PROCESS-ACCESS-SIGNALLING request. The A-HO-COMPLETE, when received from the correct MS, is included in the MAP-SEND-END-SIGNAL request and sent back to MSC-A. The circuit is through-connected in 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 MSC-A and MSC-B. When the MAP-SEND-END-SIGNAL request including the A-HO-COMPLETE message is received in MSC-A the resources in BSS-A shall be cleared.

In order not to conflict with the PSTN/ISDN signalling system(s) used between 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 MSC-A and MSC-B has been established.

If the circuit between MSC-A and MSC-B cannot be established (e.g. an unsuccessful backward message is received instead of ACM). MSC-A terminates the inter-MSC handover attempt by sending an appropriate MAP message, for example an ABORT. MSC-A may retry the handover at this point, see clause 6.1.

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

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

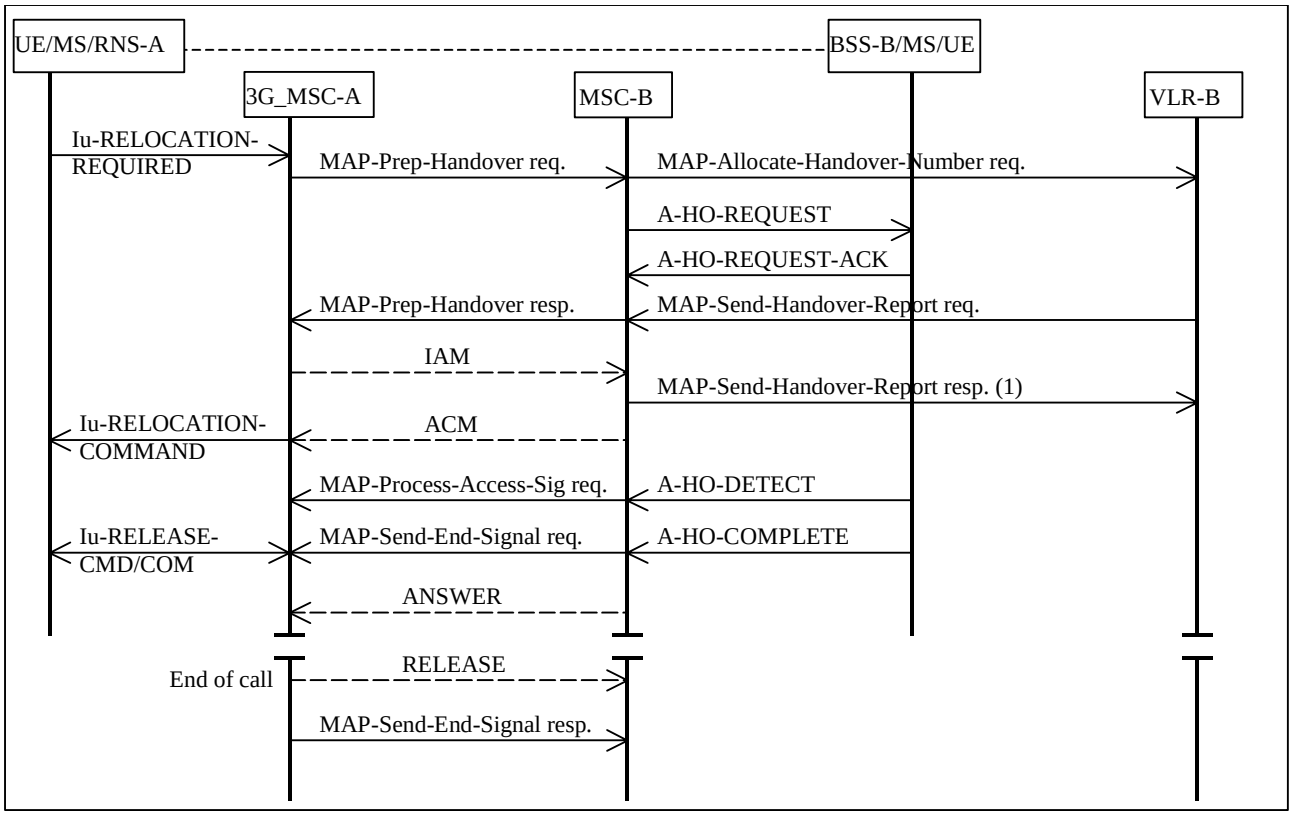
MSC-A may terminate the procedure at any time by sending an appropriate MAP message to MSC-B. If establishment of the circuit between MSC-A and MSC-B has been initiated, the circuit must also be cleared.

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

********** NEXT MODIFIED SECTION **********

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 clause 5. The procedure described in this clause makes use of messages from the 3GPP TS 08.08 and of the transport mechanism from the Mobile Application Part (MAP) (3GPP TS 29.002 [12]). 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 clause.



NOTE 1: Can be sent at any time after the reception of IAM.

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

8.1.1.1 With one circuit connection

The UMTS to GSM handover is initiated as described in clause 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 3GPP TS 08.08. For compatibility reasons, the MAP-PREPARE-HANDOVER request will also identify the cell to which the call is to be handed over. For speech calls, 3G_MSC-A shall also include the ~~Available~~Iu Supported Codecs List to be used by MSC-B for subsequent intra-MSC-B intersystem handover to UMTS and intra-MSC-B SRNS relocation. 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 (clause 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 clause 6.2.1). 3G_MSC-A removes the transcoder from the path to the other party. As handover to GSM means that a transcoder is inserted in the BSS-B then G.711 [16] is assumed on the E-interface.

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.

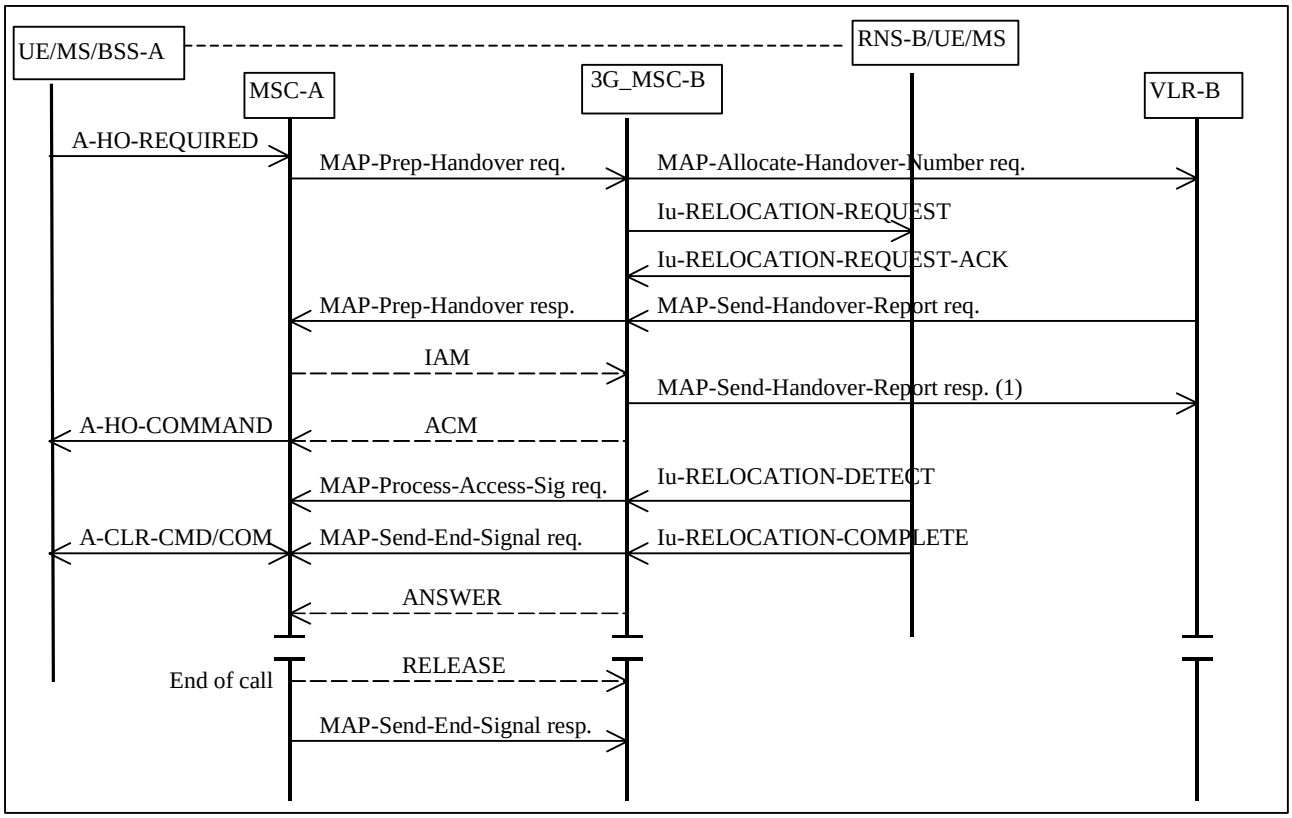
3G_MSC-A may terminate the procedure at any time by sending an appropriate MAP message to MSC-B. If establishment of the circuit between 3G_MSC-A and MSC-B has been initiated, the circuit must also be cleared.

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.

********** NEXT MODIFIED SECTION **********

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

The procedure used for successful Inter-3G_MSC Handover from GSM to UMTS is shown in figure 24. Initiation of the GSM to UMTS handover procedure is described in clause 5. The procedure described in this clause makes use of messages from the 3GPP TS 08.08 [5], 3GPP TS 25.413 [11] and of the transport mechanism from the Mobile Application Part (MAP) (3GPP TS 29.002 [12]). After an Inter-3G_MSC handover further Intra-3G_MSC handovers may occur on 3G_MSC-B, these handovers will follow the procedures specified in the previous clauses.



NOTE 1: Can be sent at any time after the reception of IAM.

Figure 24: Basic GSM to UMTS Handover Procedure requiring a circuit connection

The GSM to UMTS handover is initiated as described in clause 6.2.2. (This is represented by A-HO-REQUIRED in figure 24). Upon receipt of the A-HO-REQUIRED from BSS-A, MSC-A shall send a MAP-PREPARE-HANDOVER request to 3G_MSC-B including a complete A-HO-REQUEST message.

NOTE: 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 RNS-B, see 3GPP TS 08.08 [5].

The MAP-PREPARE-HANDOVER request shall also carry the identity of the target RNS to which the call is to be handed over, see 3GPP TS 29.002 [12]. 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 MSC-A to 3G_MSC-B.

For speech calls, 3G_MSC-B shall select an Iu Selected codec from the ~~Available~~Iu Supported Codecs List, generate associated RAB parameters and connect a transcoder. If the ~~Available~~Iu Supported Codecs List was not received, 3G_MSC-B shall select the appropriate default speech codec.

For handover to UTRAN Iu mode, 3G_MSC-B shall also generate a NAS Synch Indicator for the Iu-RELOCATION-REQUEST message. If the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B, then the Iu S~~s~~elected codec shall be indicated in the MAP-PREPARE-HANDOVER response, sent from 3G_MSC-B to MSC-A.

If radio resources are available in RNS-B the MAP-PREPARE-HANDOVER response will contain the complete A-HO-REQUEST-ACK message generated from the Iu-RELOCATION-REQUEST-ACK received from RNS-B, containing the radio resources definition to be sent by BSS-A to the UE/MS. If the radio resource allocation is not possible, the MAP-PREPARE-HANDOVER response containing an A-HO-FAILURE will be sent to MSC-A. 3G_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. 3G_MSC-B simply reports the events related to the dialogue. It is up to 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 MSC-A and MSC-A will terminate the handover attempt. MSC-A shall reject the handover attempt towards BSS-A. The existing connection to the UE/MS shall not be cleared.

When the A-HO-REQUEST-ACK has been received, MSC-A shall establish a circuit between MSC-A and 3G_MSC-B by signalling procedures supported by the network. In figure 24 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/MS (clause 6.2.2) on the radio path when the ACM is sent and MSC-A initiates the handover execution when ACM is received (illustrated by the A-HO-COMMAND and described in the clause 6.2.2).

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

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

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

If the circuit between MSC-A and 3G_MSC-B cannot be established (e.g. an unsuccessful backward message is received instead of ACM). MSC-A terminates the inter3G_MSC handover attempt by sending an appropriate MAP message, for example an ABORT.

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

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 MSC-A and 3G_MSC-B has been initiated, the circuit must also be cleared.

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

********** NEXT MODIFIED SECTION **********

8.3.1.1 With one circuit connection

The relocation is initiated as described in clause 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 IU-RELOC-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 IU-RELOC-REQUEST all information needed by 3G_MSC-B for allocating radio resources in the case of SRNS relocation without Iur interface, see 3GPP TS 25.413 [11].

For speech calls, 3G_MSC-A shall include the Iu Ccurrently used codec and the ~~Available~~Iu Supported Codecs List in the MAP-PREPARE-HANDOVER request. 3G_MSC-A shall configure the RANAP RAB parameters according to the appropriate default speech codec. For a relocation to UTRAN Iu mode, if this codec is different from the Iu Ccurrently used codec, 3G_MSC-A shall also include the NAS Synch Indicator for the default speech codec in the Iu-RELOCATION-REQUEST.

Alternatively, if 3G_MSC-B is known to support the use of the ~~Available~~Iu Supported Codecs List, 3G_MSC-A may configure the RANAP RAB parameters according to the preferred codec and indicate this to 3G_MSC-B by including the RAB configuration indicator in the MAP-PREPARE-HANDOVER request. For a relocation to UTRAN Iu mode, if the preferred codec is different from the Iu Ccurrently used codec, 3G_MSC-A shall also include the NAS Synch Indicator for the preferred codec in the Iu-RELOCATION-REQUEST. The decision to use this option is based on internal configuration information in 3G_MSC-A.

MAP-PREPARE-HANDOVER request shall also carry the identity of the target RNS to which the call is to be relocated, see 3GPP TS 29.002. 3G_MSC-B will return the MAP-PREPARE-HANDOVER response after having retrieved one or several Handover Numbers from its associated VLR (exchange of the messages MAP-allocate-handover-number request and MAP-send-handover-report request). The Handover Numbers shall be used for routing the connections of the calls from 3G_MSC-A to 3G_MSC-B.

For speech calls, 3G_MSC-B shall select an Iu Selected codec from the ~~Available~~Iu Supported Codecs List and connect a transcoder. If the ~~Available~~Iu Supported Codecs List was not received, 3G_MSC-B shall select the appropriate default speech codec.

3G_MSC-B shall reconfigure the RANAP RAB parameters according to the Iu Sselected codec:

- if the RAB configuration indicator is included in the MAP-PREPARE-HANDOVER request and the codec selected by 3G_MSC-B is different from the preferred codec; or

- if the RAB configuration indicator is not included in the MAP-PREPARE-HANDOVER request and the codec selected by 3G_MSC-B is different from the appropriate default speech codec.

Additionally, for a relocation to UTRAN Iu mode, if the Iu Sselected codec is different from the Iu Ccurrently used codec, 3G_MSC-B shall include the NAS Synch Indicator for the Iu Sselected codec in the Iu-RELOCATION-REQUEST. If the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B, then the Iu Sselected codec shall be indicated in the MAP-PREPARE-HANDOVER response, sent from 3G_MSC-B to 3G_MSC-A.

If radio resources are available in 3G_MSC-B, the MAP-PREPARE-HANDOVER response will contain the complete IU-RELOC-REQUEST-ACKNOWLEDGE message 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 RANAP information, amended by 3G_MSC-B due to the possible interworking between the RANAP protocol carried on the E-interface and the RANAP protocol used on the Iu-interface. If the radio resource allocation is not possible, the MAP-PREPARE-HANDOVER response containing an IU-RELOCATION-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 IU-RELOC-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 (clause 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 clause 6.2.3). 3G_MSC-A shall remove the transcoder between the MSC and other party.

3G_MSC-B transfers to 3G_MSC-A the acknowledgement received from the correct UE (IU-RELOC-DETECT/IU-RELOC-COMPLETE). The IU-RELOC-DETECT, if received, is transferred to 3G_MSC-A 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 and sent back to 3G_MSC-A. The circuit is through connected in 3G_MSC-A when the IU-RELOC-DETECT or the IU-RELOC-COMPLETE is received from 3G_MSC-B. The old radio resources are released when the IU-RELOC-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 IU-RELOC-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.

********** NEXT MODIFIED SECTION **********

8.3.3.1.1 With 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 target RNS where the call has to be relocated and including a complete IU-RELOC-REQUEST message.

For speech calls, 3G_MSC-B shall configure the RANAP RAB parameters according to the appropriate default speech codec. For a relocation to UTRAN Iu mode, if this codec is different from the Iu Cecurrently used codec, 3G_MSC-B shall also include the NAS Synch Indicator for the default speech codec in the Iu-RELOCATION-REQUEST.

Alternatively, if 3G_MSC-A is known to support the use of the AvailableIu Supported Codecs List, 3G_MSC-B may configure the RANAP RAB parameters according to the preferred codec and indicate this to 3G_MSC-A by including the RAB configuration indicator in the MAP-PREPARE-SUBSEQUENT-HANDOVER request. For a relocation to UTRAN Iu mode, if the preferred codec is different from the Iu Cecurrently used codec, 3G_MSC-B shall also include the NAS Synch Indicator for the preferred codec in the Iu-RELOCATION-REQUEST.

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.

For speech calls, 3G_MSC-A shall select an Iu Selected codec and connect a transcoder.

3G_MSC-A shall reconfigure the RANAP RAB parameters according to the Iu Sselected codec:

- if the RAB configuration indicator is included in the MAP-PREPARE-SUBSEQUENT-HANDOVER request, and the codec selected by 3G_MSC-A is different from the preferred codec; or
- if the RAB configuration indicator is not included in the MAP-PREPARE-SUBSEQUENT-HANDOVER request and the codec selected by 3G_MSC-A is different from the appropriate default speech codec.

Additionally, for a relocation to UTRAN Iu mode, if the Iu Sselected codec is different from the Iu Cecurrently used codec, 3G_MSC-A shall include the NAS Synch Indicator for the Iu Sselected codec in the Iu-RELOCATION-REQUEST.

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 and possible extra RANAP information, amended by 3G_MSC-A due to the possible interworking between the RANAP protocol carried on the E-interface and the RANAP protocol used on the Iu-interface. 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 IU-RELOC-REQUEST is not consistent with the target 3G_MSC number, the MAP-PREPARE-SUBSEQUENT-HANDOVER response containing an IU-RELOC-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.

********** NEXT MODIFIED SECTION **********

8.3.3.2.1 With 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 RNS identity and including a complete IU-RELOC-REQUEST, 3G_MSC-A then starts a basic relocation procedure towards 3G_MSC-B'.

For speech calls, 3G_MSC-B shall configure the RANAP RAB parameters according to the appropriate default speech codec. For a relocation to UTRAN Iu mode, if this codec is different from the Iu Cecurrently used codec, 3G_MSC-B shall also include the NAS Synch Indicator for the default speech codec in the Iu-RELOCATION-REQUEST.

Alternatively, if 3G_MSC-A and 3G_MSC-B' are known to support the use of the AvailableIu Supported Codecs List, 3G_MSC-B may configure the RANAP RAB parameters according to the preferred codec and indicate this to 3G_MSC-A by including the RAB configuration indicator in the MAP-PREPARE-SUBSEQUENT-HANDOVER request. For a relocation to UTRAN Iu mode, if the preferred codec is different from the Iu Cecurrently used codec, 3G_MSC-B shall also include the NAS Synch Indicator for the preferred codec in the Iu-RELOCATION-REQUEST. The decision to use this option is based on internal configuration information in 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' and possible extra RANAP information, amended by 3G_MSC-A due to the possible interworking between the RANAP protocol carried on the E-interface between 3G_MSC-A and 3G_MSC-B' and the RANAP 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'. 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 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 IU-RELOC-REQUEST is not consistent with the target 3G_MSC number, 3G_MSC-A informs 3G_MSC-B by using the IU-RELOC-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.

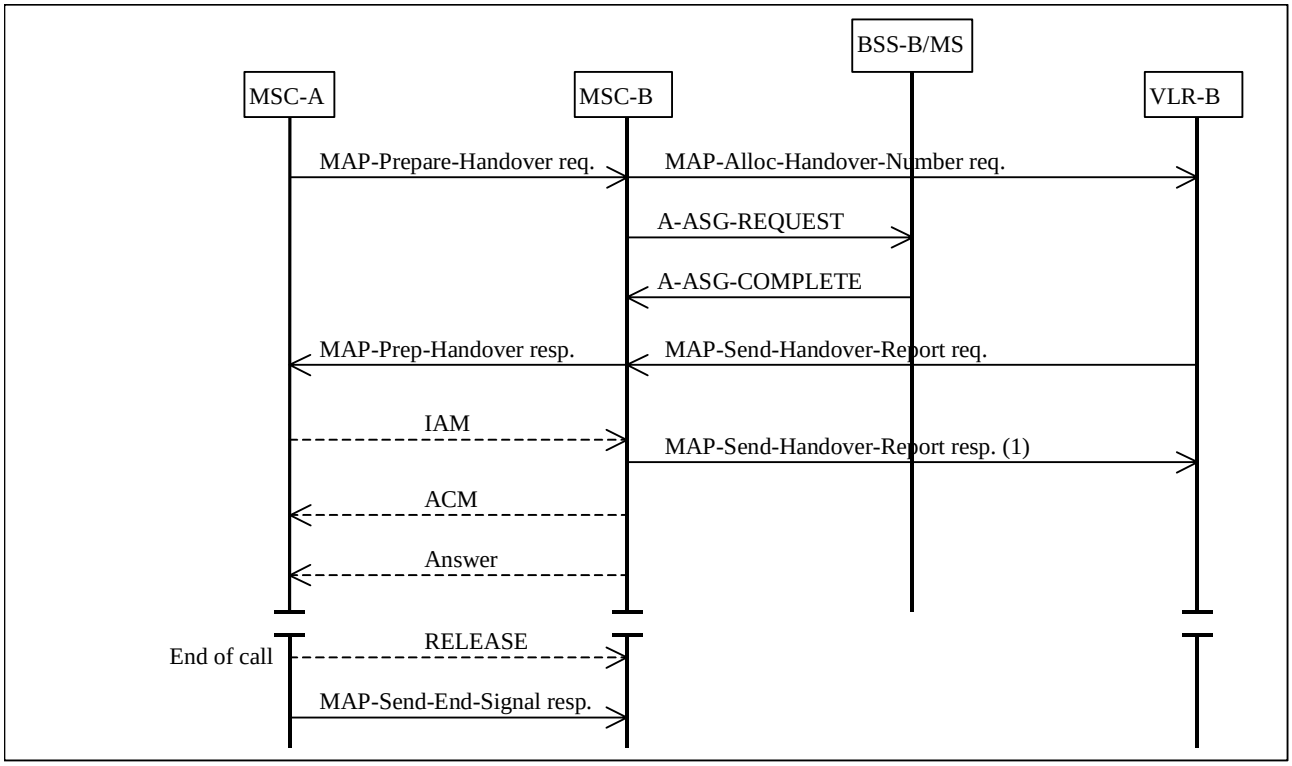
********** NEXT MODIFIED SECTION **********

13.1 GSM handover

If a circuit connection has to be set up (for example for a Mobile Originated or Mobile Terminated Call Establishment) after an Inter-MSC handover without circuit connection, MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the A-ASSIGNMENT-REQUEST, on the established MAP connection. For speech calls, MSC-A shall also include the AvailableIu Supported Codecs List to be used by MSC-B for subsequent intra-MSC-B intersystem handover to UMTS and intra-MSC-B SRNS relocation. If MSC-B indicates to MSC-B and to MSC-A that at least one of two procedures assignment or Handover Number allocation can not be completed, then MSC-A shall terminate the circuit establishment attempt. The existing connection to the MS shall be maintained, if possible.

Upon receipt of the MAP-PREPARE-HANDOVER request MSC-B shall perform the requested assignment operation towards the BSS. In addition it shall retrieve a Handover Number from VLR-B. If a failure occurs in the 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 assignment procedure outcome and the Handover Number allocation outcome or by a MAP-PREPARE-HANDOVER error).

When MSC-A receives a successful MAP-PREPARE-HANDOVER response it shall establish a circuit connection to MSC-B by using the appropriate network supported procedures. In figure 36 this is indicated by the IAM (Initial Address Message) and ACM (Address Complete Message). MSC-B shall also send the Answer message if appropriate to the signalling system. Upon receipt of the Answer MSC-A shall consider the circuit connection establishment phase complete. If a failure occurs during the cirucit establishment phase then the existing connection to the MS shall be maintained, if possible.



NOTE: Can be sent at any time after the reception of IAM.

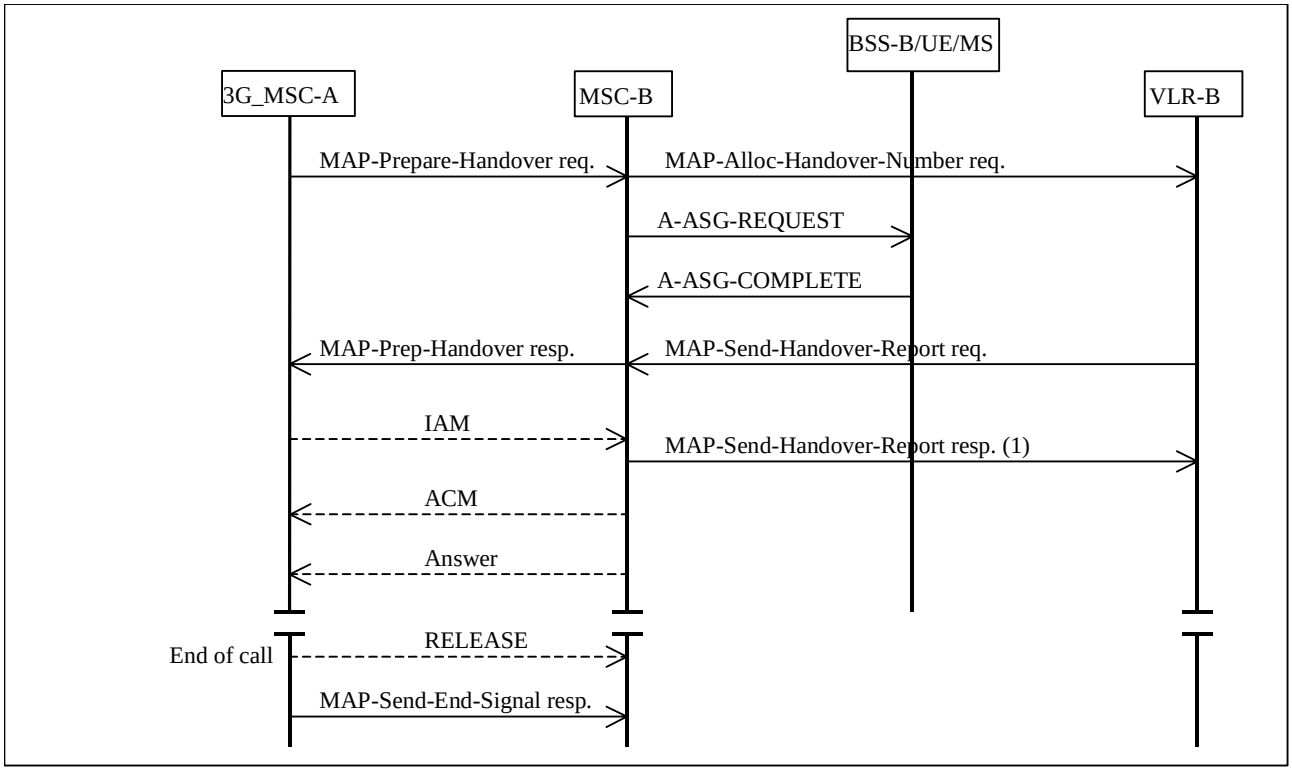
Figure 36: Successful circuit-switched call establishment after a Basic Handover without circuit connection

13.2 UMTS to GSM handover

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 UMTS to GSM handover without circuit connection, 3G_MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the A-ASSIGNMENT-REQUEST, on the established MAP connection. For speech calls, 3G_MSC-A shall also include the ~~Available~~Iu Supported Codecs List to be used by MSC-B for subsequent intra-MSC-B intersystem handover to UMTS and intra-MSC-B SRNS relocation. If MSC-B indicates to MSC-B and to 3G_MSC-A that at least one of two procedures 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/MS shall be maintained, if possible.

Upon receipt of the MAP-PREPARE-HANDOVER request MSC-B shall perform the requested assignment operation towards the BSS. In addition it shall retrieve a Handover Number from VLR-B. If a failure occurs in the 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 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 MSC-B by using the appropriate network supported procedures. In figure 37 this is indicated by the IAM (Initial Address Message) and ACM (Address Complete Message). 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/MS shall be maintained, if possible.



NOTE 1: Can be sent at any time after the reception of IAM.

Figure 37: Successful circuit-switched call establishment after a Basic UMTS to GSM Handover without circuit connection

13.3 GSM to UMTS handover

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 GSM to UMTS handover without circuit connection, MSC-A shall request a Handover Number using a MAP-PREPARE-HANDOVER request, containing the A-ASSIGNMENT-REQUEST, on the established MAP connection. If 3G_MSC-B indicates to 3G_MSC-B and to MSC-A that at least one of two procedures assignment or Handover Number allocation can not be completed, then MSC-A shall terminate the circuit establishment attempt. The existing connection to the UE/MS shall be maintained, if possible.

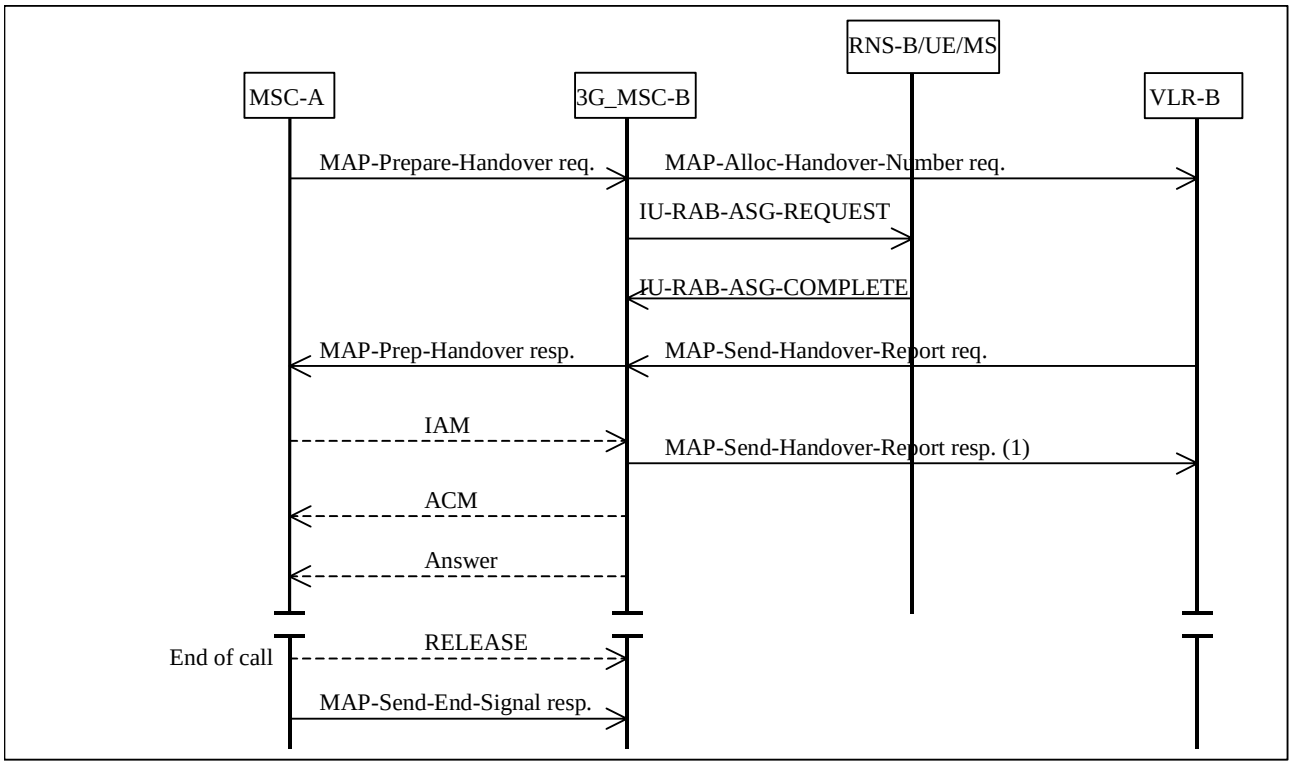
Upon receipt of the MAP-PREPARE-HANDOVER request 3G_MSC-B shall perform the requested assignment operation towards the RNS. In addition it shall retrieve a Handover Number from VLR-B. If a failure occurs in the assignment or Handover Number allocation then it shall be reflected in the MAP-PREPARE-HANDOVER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

For speech calls, 3G_MSC-B shall select a codec from the ~~Available~~Iu Supported Codecs List, generate associated RAB parameters and connect a transcoder. If the ~~Available~~Iu Supported Codecs List was not received, 3G_MSC-B shall select the appropriate default speech codec.

For an assignment in UTRAN Iu mode, 3G_MSC-B shall also generate a NAS Synch Indicator for the Iu-RAB-ASSIGNMENT-REQUEST message. If the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B, then the Iu S~~s~~elected codec shall be indicated in the MAP-PREPARE-HANDOVER response, sent from 3G_MSC-B to MSC-A.

When 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 38 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 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/MS shall be maintained, if possible.



NOTE 1: Can be sent at any time after the reception of IAM.

Figure 38: Successful circuit-switched call establishment after a Basic GSM to UMTS Handover without circuit connection

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, on the established MAP connection.

For speech calls, 3G_MSC-A shall include the ~~Available~~Iu Supported Codecs List in the MAP-PREPARE-HANDOVER request. 3G_MSC-A shall configure the RANAP RAB parameters according to the appropriate default speech codec.

Alternatively, if 3G_MSC-B is known to support the use of the ~~Available~~Iu Supported Codecs List, 3G_MSC-A may configure the RANAP RAB parameters according to the preferred codec and indicate this to 3G_MSC-B by including the RAB configuration indicator in the MAP-PREPARE-HANDOVER request. The decision to use this option is based on internal configuration information in 3G_MSC-A.

For an assignment in UTRAN Iu mode, 3G_MSC-A shall also include the NAS Synch Indicator in the Iu-RAB-ASSIGNMENT-REQUEST.

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.

For speech calls, 3G_MSC-B shall select an Iu Selected codec from the ~~Available~~Iu Supported Codecs List and connect a transcoder. If the ~~Available~~Iu Supported Codecs List was not received, 3G_MSC-B shall select the appropriate default speech codec.

3G_MSC-B shall reconfigure the RANAP RAB parameters according to the Iu S~~s~~elected codec:

- if the RAB configuration indicator is included in the MAP-PREPARE-HANDOVER request and the codec selected by 3G_MSC-B is different from the preferred codec; or

- if the RAB configuration indicator is not included in the MAP-PREPARE-HANDOVER request and the codec selected by 3G_MSC-B is different from the appropriate default speech codec.

Additionally, for an assignment in UTRAN Iu mode, 3G_MSC-B shall include the NAS Synch Indicator for the Iu S~~s~~elected codec in the Iu-RAB-ASSIGNMENT-REQUEST. If the ~~Available~~Iu Supported Codecs List was received by 3G_MSC-B, then the Iu S~~s~~elected codec shall be indicated in the MAP-PREPARE-HANDOVER response, sent from 3G_MSC-B to 3G_MSC-A.

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.