3GPP TSG CN Plenary
Meeting #11, Palm Springs, U.S.A
14th - 16th March 2001

Tdoc NP-010074

Source: **TSG CN WG4**

Title: **CRs to R99 on Work Item Handover**

Agenda item: **7.15**

Document for: **APPROVAL**

<u>**Introduction:**</u>

This document contains **4** CRs on **R99** Work Item **"Handover"**, that have been agreed by **TSG CN WG4**, and are forwarded to TSG CN Plenary meeting #11 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.002	249		N4-010364	R99	GSM to UMTS handover: addition of MAP parameter Target RNC ID	F	3.7.2
29.002	250		N4-010365	Rel-4	GSM to UMTS handover: addition of MAP parameter Target RNC ID	A	4.2.1
29.010	012		N4-010366	R99	GSM to UMTS handover: addition of MAP parameter Target RNC ID	F	3.4.0
29.010	013		N4-010367	R99	Inter MSC relocation: addition of MAP parameter Target RNC ID	F	3.4.0

CR-Form-v3

CHANGE REQUEST

⌘ **29.002 CR 249** ⌘ rev **-** ⌘ Current version: **3.7.2** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	GSM to UMTS handover: addition of MAP parameter Target RNC ID	
Source: ⌘	CN4	
Work item code: ⌘	Handover	***Date:*** ⌘ 19th February 01
Category: ⌘	**F** (agreed by consensus)	***Release:*** ⌘ R99

Use one of the following categories:	*Use one of the following releases:*
***F** (essential correction)*	*2 (GSM Phase 2)*
***A** (corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
***B** (Addition of feature),*	*R97 (Release 1997)*
***C** (Functional modification of feature)*	*R98 (Release 1998)*
***D** (Editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change: ⌘	When handover according to MAP phase 2 was specified, it was established as a principle that the MSC receiving the MAP_PREPARE_HANDOVER or MAP_PREPARE SUBSEQUENT_HANDOVER request would receive the target Cell Id not only within the an-APDU (Handover Request), but also as a separate MAP parameter. The reasoning at that time was that the contents of the an-APDU was destined for the target BSS, not for the MSC; therefore, parameters needed by the MSC, e.g. for the routing of messages, should be provided also as parameters on MAP level. For reasons of consistency the same principle should apply also to the new inter-system handover and relocation procedures, however, according to the current state of the specification: - in case of GSM->GSM handover and UMTS->GSM handover the target Cell Id is included, - in case of UMTS->UMTS relocation the target RNC Id is included, - but in case of GSM->UMTS handover the target RNC Id is **not** included. The only reason given in CR 23.009-014 for the latter deviation was that the same parameter is already included in the BSSAP message Handover Request. However, this is the same argument that was brought forward when MAP phase 2 handover was standardised, and there is no compelling reason to abandon the principle that was agreed in those days. To allow the re-use of existing software concepts, it is proposed to add the target RNC Id as a MAP parameter to the MAP_PREPARE_HANDOVER and MAP_PREPARE SUBSEQUENT_HANDOVER service.
Summary of change: ⌘	
Consequences if not approved: ⌘	A protocol design principle that was valid since introduction of MAP phase 2 handover would be broken without need.

Clauses affected:	⌘	8.4.1.3, 8.4.5.3, 19.2.2.1		
Other specs affected:	⌘	**X** Other core specifications	⌘	23.009 CR ???, 29.010 CR 012
		Test specifications		
		O&M Specifications		
Other comments:	⌘			

How to create CRs using this form:

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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

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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.

8.4.1 MAP_PREPARE_HANDOVER service

8.4.1.1 Definition

This service is used between MSC-A and MSC-B (E-interface) when a call is to be handed over or relocated from MSC-A to MSC-B.

The MAP_PREPARE_HANDOVER service is a confirmed service using the primitives from table 8.4/1.

8.4.1.2 Service primitives

Table 8.4/1: MAP_PREPARE_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
HO-NumberNotRequired	C	C(=)		
IMSI	C	C(=)		
Integrity Protection Information	C	C(=)		
Encryption Information	C	C(=)		
Radio Resource Information	C	C(=)		
AN-APDU	C	C(=)	C	C(=)
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

Target Cell Id

For definition of this parameter see subclause 7.6.2. This parameter is only included if the service is not in an ongoing transaction. This parameter shall also be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target RNC Id

For definition of this parameter see subclause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

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

8.4.5 MAP_PREPARE_SUBSEQUENT_HANDOVER service

8.4.5.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to inform MSC-A that it has been decided that a handover or relocation to either MSC-A or a third MSC (MSC-B') is required.

The MAP_PREPARE_SUBSEQUENT_HANDOVER service is a confirmed service using the primitives from table 8.4/5.

8.4.5.2 Service primitives

Table 8.4/5: MAP_PREPARE_SUBSEQUENT_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
Target MSC Number	M	M(=)		
Selected RAB ID	C	C(=)		
AN-APDU	M	M(=)	C	C(=)
User error			C	C(=)
Provider error				O

8.4.5.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

Target Cell Id

For definition of this parameter see subclause 7.6.2. This parameter shall be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target RNC Id

For definition of this parameter see subclause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target MSC Number

For definition of this parameter see subclause 7.6.2.

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

19.2.2 Handover procedure in MSC-A

This subclause describes the handover or relocation procedure in MSC-A, including the request for a basic handover or relocation to another MSC (MSC-B), subsequent handover or relocation to a third MSC (MSC-B') or back to the controlling MSC (MSC-A).

19.2.2.1 Basic handover

When MSC-A has decided that a call has to be handed over or relocated to MSC-B, the Handover Control Application in MSC-A requests the MAP application to initiate the MAP_PREPARE_HANDOVER request to MSC-B.

MSC-A opens the dialogue to MSC-B with a MAP_OPEN request containing no user specific parameters and sends a MAP_PREPARE_HANDOVER request. This request shall contain all the information required by MSC-B to allocate the necessary radio resources. In addition, it may optionally contain:

- an indication that a handover number allocation is not required;

- the targetCellId, for compatibility reasons in case of handover or inter-system handover to GSM(except for inter-system handover from GSM to UMTS);

- the targetRNCId, in case of SRNS relocation or inter-system handover from GSM to UMTS;

- the IMSI;

- UMTS encryption information and UMTS integrity protection information, which are necessary parameters for inter-system handover from GSM to UMTS;

- GSM radio resource information (channel type) shall be included at inter-MSC relocation to prepare for a possible subsequent intra-MSC handover from UMTS to GSM in MSC-B.

The conditions when these parameters shall be included and the processing of them in MSC-B (3G_MSC-B) are described in detail in 3G TS 29.010 and 3G TS 23.009.

If MSC-B accepts the dialogue, it returns a MAP_PREPARE_HANDOVER confirmation containing a handover number or one or several relocation numbers, unless the request has included the HO-NumberNotRequired parameter, and BSSAP or RANAP information which is forwarded to and handled by the Handover Control Application in MSC-A.

Optionally MSC-A can receive, after a MAP_PREPARE_HANDOVER confirmation, a MAP_PROCESS_ACCESS_SIGNALLING indication containing BSSAP or RANAP information.

When the connection has been established between the MS and MSC-B, MSC-A will be informed by a MAP_SEND_END_SIGNAL indication.

When MSC-A wants to clear the connection with BSS-B, an indication from the Handover Control Application is received in the Map Application to send the MAP_SEND_END-SIGNAL response to MSC-B to close the MAP dialogue.

MSC-A may abort the handover or relocation procedure at any time (e.g. if the call is cleared).

CR-Form-v3

CHANGE REQUEST

⌘   **29.002** CR **250**   ⌘ rev **-** ⌘   Current version: **4.2.1** ⌘

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

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	GSM to UMTS handover: addition of MAP parameter Target RNC ID	
Source: ⌘	CN4	
Work item code: ⌘	Handover	***Date:*** ⌘ 19th February 01
Category: ⌘ **A**		***Release:*** ⌘ Rel-4

Use one of the following categories:
    F *(essential 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)*

Reason for change: ⌘	When handover according to MAP phase 2 was specified, it was established as a principle that the MSC receiving the MAP_PREPARE_HANDOVER or MAP_PREPARE SUBSEQUENT_HANDOVER request would receive the target Cell Id not only within the an-APDU (Handover Request), but also as a separate MAP parameter. The reasoning at that time was that the contents of the an-APDU was destined for the target BSS, not for the MSC; therefore, parameters needed by the MSC, e.g. for the routing of messages, should be provided also as parameters on MAP level.

For reasons of consistency the same principle should apply also to the new inter-system handover and relocation procedures, however, according to the current state of the specification:
- in case of GSM->GSM handover and UMTS->GSM handover the target Cell Id is included,
- in case of UMTS->UMTS relocation the target RNC Id is included,
- but in case of GSM->UMTS handover the target RNC Id is **not** included.

The only reason given in CR 23.009-014 for the latter deviation was that the same parameter is already included in the BSSAP message Handover Request. However, this is the same argument that was brought forward when MAP phase 2 handover was standardised, and there is no compelling reason to abandon the principle that was agreed in those days.

To allow the re-use of existing software concepts, it is proposed to add the target RNC Id as a MAP parameter to the MAP_PREPARE_HANDOVER and MAP_PREPARE SUBSEQUENT_HANDOVER service. |
| ***Summary of change:*** ⌘ | |
| ***Consequences if not approved:*** ⌘ | A protocol design principle that was valid since introduction of MAP phase 2 handover would be broken without need. |

Clauses affected:	⌘	8.4.1.3, 8.4.5.3, 19.2.2.1		
Other specs affected:	⌘	**X** Other core specifications	⌘	23.009 CR ???, 29.010 CR 012
		Test specifications		
		O&M Specifications		
Other comments:	⌘			

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8.4.1 MAP_PREPARE_HANDOVER service

8.4.1.1 Definition

This service is used between MSC-A and MSC-B (E-interface) when a call is to be handed over or relocated from MSC-A to MSC-B.

The MAP_PREPARE_HANDOVER service is a confirmed service using the primitives from table 8.4/1.

8.4.1.2 Service primitives

Table 8.4/1: MAP_PREPARE_HANDOVER

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HO-NumberNotRequired	C	C(=)		
IMSI	C	C(=)		
Integrity Protection Information	C	C(=)		
Encryption Information	C	C(=)		
Radio Resource Information	C	C(=)		
AN-APDU	C	C(=)	C	C(=)
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

Target Cell Id

For definition of this parameter see subclause 7.6.2. This parameter is only included if the service is not in an ongoing transaction. This parameter shall also be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target RNC Id

For definition of this parameter see subclause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

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

8.4.5 MAP_PREPARE_SUBSEQUENT_HANDOVER service

8.4.5.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to inform MSC-A that it has been decided that a handover or relocation to either MSC-A or a third MSC (MSC-B') is required.

The MAP_PREPARE_SUBSEQUENT_HANDOVER service is a confirmed service using the primitives from table 8.4/5.

8.4.5.2   Service primitives

Table 8.4/5: MAP_PREPARE_SUBSEQUENT_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
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Target RNC Id	C	C(=)		
Target MSC Number	M	M(=)		
Selected RAB ID	C	C(=)		
AN-APDU	M	M(=)	C	C(=)
User error			C	C(=)
Provider error				O

8.4.5.3   Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

Target Cell Id

For definition of this parameter see subclause 7.6.2. This parameter shall be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target RNC Id

For definition of this parameter see subclause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3G TS 23.009.

Target MSC Number

For definition of this parameter see subclause 7.6.2.

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

19.2.2   Handover procedure in MSC-A

This subclause describes the handover or relocation procedure in MSC-A, including the request for a basic handover or relocation to another MSC (MSC-B), subsequent handover or relocation to a third MSC (MSC-B') or back to the controlling MSC (MSC-A).

19.2.2.1   Basic handover

When MSC-A has decided that a call has to be handed over or relocated to MSC-B, the Handover Control Application in MSC-A requests the MAP application to initiate the MAP_PREPARE_HANDOVER request to MSC-B.

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The conditions when these parameters shall be included and the processing of them in MSC-B (3G_MSC-B) are described in detail in 3G TS 29.010 and 23.009.

If MSC-B accepts the dialogue, it returns a MAP_PREPARE_HANDOVER confirmation containing a handover number or one or several relocation numbers, unless the request has included the HO-NumberNotRequired parameter, and BSSAP or RANAP information which is forwarded to and handled by the Handover Control Application in MSC-A.

Optionally MSC-A can receive, after a MAP_PREPARE_HANDOVER confirmation, a MAP_PROCESS_ACCESS_SIGNALLING indication containing BSSAP or RANAP information.

When the connection has been established between the MS and MSC-B, MSC-A will be informed by a MAP_SEND_END_SIGNAL indication.

When MSC-A wants to clear the connection with BSS-B, an indication from the Handover Control Application is received in the Map Application to send the MAP_SEND_END-SIGNAL response to MSC-B to close the MAP dialogue.

MSC-A may abort the handover or relocation procedure at any time (e.g. if the call is cleared).

CR-Form-v3

CHANGE REQUEST

⌘ **29.010** CR **012** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	GSM to UMTS handover: addition of MAP parameter Target RNC ID	
Source: ⌘	CN4	
Work item code: ⌘	Handover	***Date:*** ⌘ 19th February 01
Category: ⌘ **F** (agreed by consensus)		***Release:*** ⌘ R99

Use one of the following categories:	*Use one of the following releases:*
F *(essential correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(Addition of feature),*	*R97 (Release 1997)*
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D *(Editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change: ⌘	When handover according to MAP phase 2 was specified, it was established as a principle that the MSC receiving the MAP_PREPARE_HANDOVER or MAP_PREPARE SUBSEQUENT_HANDOVER request would receive the target Cell Id not only within the an-APDU (Handover Request), but also as a separate MAP parameter. The reasoning at that time was that the contents of the an-APDU was destined for the target BSS, not for the MSC; therefore, parameters needed by the MSC, e.g. for the routing of messages, should be provided also as parameters on MAP level. For reasons of consistency the same principle should apply also to the new inter-system handover and relocation procedures, however, according to the current state of the specification: - in case of GSM->GSM handover and UMTS->GSM handover the target Cell Id is included, - in case of UMTS->UMTS relocation the target RNC Id is included, - but in case of GSM->UMTS handover the target RNC Id is **not** included. The only reason given in CR 23.009-014 for the latter deviation was that the same parameter is already included in the BSSAP message Handover Request. However, this is the same argument that was brought forward when MAP phase 2 handover was standardised, and there is no compelling reason to abandon the principle that was agreed in those days. To allow the re-use of existing software concepts, it is proposed to add the target RNC Id as a MAP parameter to the MAP_PREPARE_HANDOVER and MAP_PREPARE SUBSEQUENT_HANDOVER service.
Summary of change: ⌘	
Consequences if not approved: ⌘	A protocol design principle that was valid since introduction of MAP phase 2 handover would be broken without need.

Clauses affected:	⌘	4.7.1, 4.7.2		
Other specs affected:	⌘	**X** Other core specifications	⌘	23.009 CR ???, 29.002 CR 249
		Test specifications		
		O&M Specifications		
Other comments:	⌘			

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4.7 Inter-MSC Handover (GSM to UMTS)

The general principles of the handover procedures are given in 3GPP TS 23.009. 3GPP TS 29.010 gives the necessary information for interworking between the 3GPP TS 25.413 RANAP protocol, GSM handover procedures and the 3GPP TS 29.002 MAP protocol. The RANAP protocol is used between the RNS and the 3G_MSC.

The following four principles apply for the Inter-MSC handover GSM to UMTS:

The BSSMAP parameters required for Inter-MSC handover GSM to UMTS are generated as in GSM.

Received RANAP parameters, e.g. cause code or transparent container, are mapped to the appropriate BSSMAP parameters, e.g. cause code or Handover command.

The RANAP parameters required for Inter-MSC handover GSM to UMTS are generated from received or stored GSM parameters.

4.7.1 Basic Inter-MSC Handover

...

Negative outcome:

```
BSS-A              MSC-A                         3G-MSC-B              RNS-B
  |                  |                              |                    |
  |                  |   MAP U/P -ABORT             |                    |
  |                  |----------------------------->|                    |
  |                  |                              | IU RELEASE COMMAND |
  |                  |                              |------------------->|
  |                  |                              |                    |
```
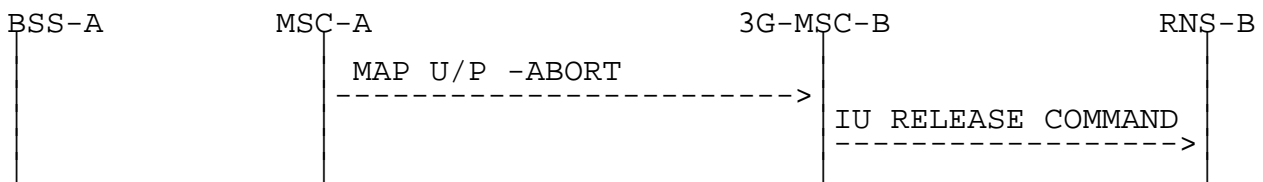
Figure 42: Signalling for Basic Inter-MSC Handover completion (Negative outcome)

> NOTE 2: From interworking between MAP and RANAP point of view, when the call is released.

```
BSS-A              MSC-A                         3G-MSC-B              RNS-B
  |                  |                              |                    |
  |                  |                              |  LOCATION REPORT   |
  |                  |                              |<-------------------|
  |                  | MAP PROCESS ACCESS           |                    |
  |                  |<---------------------------- |                    |
  |                  | SIGNALLING                   |                    |
```
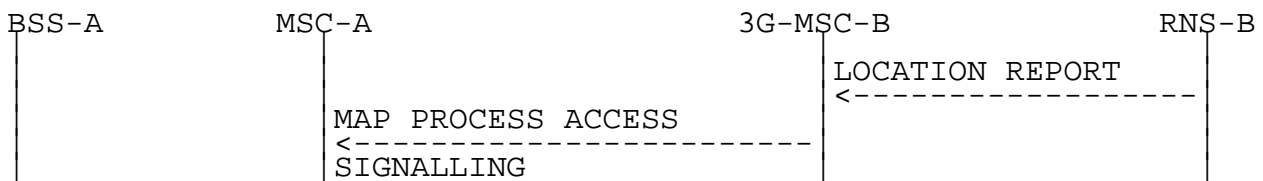
Figure ~~xx~~42a: Signalling for updating of anchor MSC after change of location in RNS

The handover procedure is normally triggered by BSS-A by sending a HANDOVER REQUIRED message on A-Interface to MSC-A. The invocation of the Basic Inter-MSC handover procedure is performed and controlled by MSC-A. The sending of the MAP Prepare-Handover request to 3G_MSC-B is triggered in MSC-A upon receipt of the HANDOVER REQUIRED message. The identity of the target RNC where the call is to be handed over in 3G_MSC-B area, provided in the HANDOVER REQUIRED message in the information element Cell Identifier List (Preferred), is mapped to the target RNC Id MAP parameter and t~~T~~he HANDOVER REQUEST message is encapsulated in the an-APDU MAP parameter of the Prepare-Handover MAP request. 3G_MSC-B can invoke another operation towards the VLR-B (allocation of the handover number described in 3GPP TS 29.002).

Additionally, if tracing activity has been invoked, the trace related message can be transferred on the E-Interface encapsulated in the an-APDU MAP parameter of the Prepare-Handover Request. If transferred, one complete trace related message at a time shall be included in the an-APDU MAP parameter after the HANDOVER REQUEST message. Note: UMTS supports only CN initiated tracing.

The interworking between Prepare Handover and HANDOVER REQUIRED is as follows:

```
-----------------------------------------------------------------------
        |       08.08                      29.002             | Notes
--------+------------------------------------------------------+------
Forward | HANDOVER REQUIRED    MAP PREPARE HANDOVER request   |
message |                                                      |
        |                        -ho-NumberNotRequired|  1
        |   BSSMAP  information  -target RNC Id                |
        |                                                      |
        |          elements     -IMSI                          |
        |                        -Integrity protection|   2
        |                          info                        |
        |                        -Encryption info              |
        |                        -an-APDU(            |   3
        |                         HANDOVER REQUEST,            |
        |                         MSC INVOKE TRACE)    |   4
--------+------------------------------------------------------+------
Positive|                        MAP PREPARE HANDOVER response |
result  |                                                      |   5
        |                        -handover number              |
        |                        -an-APDU(                     |
        |                          HANDOVER REQUEST            |
        |                          ACKNOWLEDGE or              |
        |                          HANDOVER FAILURE)           |
--------+------------------------------------------------------+------
Negative| HANDOVER REQUIRED REJECT    MAP PREPARE HANDOVER | 6
result  |                                                      |
        |   equipment failure         System Failure           |
        |   equipment failure         No Handover Number       |
        |                               available              |
        |   equipment failure         UnexpectedDataValue      |
        |   equipment failure         Data Missing             |
        |                                                      |
        |   equipment failure         MAP CLOSE                |
        |   equipment failure         MAP U/P -ABORT           |
        |                                                      |
-----------------------------------------------------------------------
```

NOTE 1: The ho-NumberNotRequired parameter is included by MSC-A, when MSC-A decides not to use any circuit connection with 3G_MSC-B. No handover number shall be present in the positive result. Any negative response from 3G_MSC-B shall not be due to handover number allocation problem.

NOTE 2: Integrity protection information, encryption information and IMSI parameters are included by MSC-A, only when the MSC-A uses 29.002 as per release 99. These IEs are not included if the MSC-A is R98 or earlier.

NOTE 3: The process performed on the BSSMAP information elements received in the HANDOVER REQUIRED message is described in the GSM Recommendation 08.08.

NOTE 4: The process performed on the BSSMAP information elements received in the MSC INVOKE TRACE message is described in subclause 4.5.5.6.

NOTE 5: The response to the Prepare-Handover request can include in its an-APDU parameter, identifying the GSM 08.06 protocol, either a BSSMAP HANDOVER REQUEST ACKNOWLEDGE or a BSSMAP HANDOVER FAILURE.

In the first case, the positive result triggers in MSC-A the sending on A-Interface of the HANDOVER COMMAND.

In the second case, the positive result triggers in MSC-A optionally the sending of the HANDOVER REQUIRED REJECT.

(The possible sending of the HANDOVER REQUIRED REJECT message upon receipt of the HANDOVER FAILURE is out of the scope of 3GPP TS 29.010 and lies in GSM 08.08).

NOTE 6: The possible sending of the HANDOVER REQUIRED REJECT message is described in GSM 08.08.

The interworking between Prepare Handover and RELOCATION REQUEST in 3G_MSC-B is as follows:

```
   ----------------------------------------------------------------------
          |       29.002                     25.413             |Notes
   --------|----------------------------------------------------|-----
  Forward  | MAP PREPARE HANDOVER     RELOCATION REQUEST         |
  message  | request                                            |
           | -ho-NumberNotRequired                              |
|          | -target RNC Id                                     |
           | -IMSI                                              |
           | -Integrity protection info                        |   1
           | -Encryption info                                  |
           | -an-APDU(                                          |
           | HANDOVER REQUEST,                                  |
           | MSC INVOKE TRACE)                                  |
           |                                                   |
           | BSSMAP information      RANAP information          |
           |    elements:               elements:              |
           |                                                   |
           |    Channel Type            RAB parameters         |
           |    Cause                   Cause                  |
           |    sRNC to tRNC container  sRNC to tRNC container  |
           |                                                   |
           |                         info stored/generated     |
           |                         in/by 3G_MSC-B:           |
           |                            CN domain indicator    |
   --------|----------------------------------------------------|-----
  Positive | MAP PREPARE HANDOVER     RELOCATION REQUEST ACK    |
  result   | response                                          |
           | -an-APDU(                                          |
           |  HANDOVER REQUEST ACK)                             |
           |                                                   |
           | BSSMAP information      RANAP information          |
           |    elements:               elements:              |
           |                                                   |
           |    Layer 3 info            tRNC to sRNC container  |
   --------|----------------------------------------------------|-----
  Negative | MAP PREPARE HANDOVER     RELOCATION FAILURE        |
  result   | response                                          |
           | -an-APDU(                                          |
           |  HANDOVER FAILURE)                                 |
           |                                                   |
   ----------------------------------------------------------------------
```

NOTE 1: Integrity protection information, encryption information and IMSI parameters are included by MSC-A, only when the MSC-A uses 29.002 as per release 99. These IEs are not included if the MSC-A is R98 or earlier.

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

4.7.2   Subsequent Inter-MSC Handover from MSC-B back to 3G_MSC-A

…
```
RNS-B          3G-MSC-A                    MSC-B              BSS-A
 |               |     MAP U/P -ABORT        |                 |
 |               |<-------------------------|                 |
 |               |                          | CLEAR COMMAND   |
 |               |                          |---------------->|
 |               |                          | (Note 1)        |
 |               |                          |                 |
```
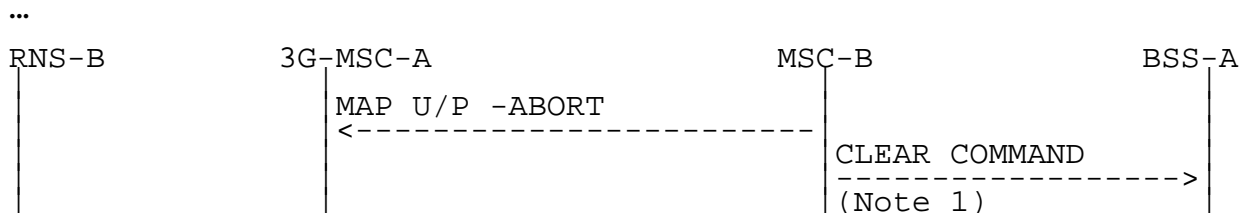
**Figure 47: Signalling for Subsequent Inter-MSC Handover back to 3G_MSC-A completion
(Unsuccessful completion of the procedure)**

NOTE 1: Abnormal end of the procedure that triggers the clearing of all resources in MSC-B.

The interworking between Prepare Subsequent Handover and HANDOVER REQUIRED is as follows:

```
---------------------------------------------------------------------
        |      08.08                        29.002            | Notes
---------------------------------------------------------------------
Forward | HANDOVER REQUIRED  MAP PREPARE SUBSEQUENT HANDOVER  |
message |                               request               |   1
        |                                                     |
        |                               -target MSC number    |
        |    BSSMAP information          -target RNC Id        |
        |                                                     |
        |        elements               -an-APDU(             |
        |                                 HANDOVER REQUEST)    |
---------------------------------------------------------------------
Positive| HANDOVER REQUIRED  MAP PREPARE SUBSEQUENT HANDOVER  |
result  |                               response              |   2
        |                               -an-APDU(             |
        |                                 HANDOVER REQUEST     |
        |                                 ACKNOWLEDGE or       |
        |                                 HANDOVER FAILURE)    |
---------------------------------------------------------------------
Negative| HANDOVER REQUIRED REJECT   MAP PREPARE SUBSEQUENT   |   3
result  |                           HANDOVER response         |
        |    equipment failure          Unknown MSC           |
        |    equipment failure          Subsequent Handover   |
        |                                        Failure       |
        |    equipment failure          UnexpectedDataValue   |
        |    equipment failure          Data Missing          |
        |                                                     |
        |    CLEAR COMMAND                                    |
        |                                                     |
        |    equipment failure          MAP CLOSE             |
        |    equipment failure          MAP U/P -ABORT        |
---------------------------------------------------------------------
```

NOTE 1: The processing performed on the BSSMAP information elements received in the HANDOVER REQUIRED message is out of the scope of the present document. The target MSC number is provided to 3G_MSC-A by MSC-B based on the information received from RNS-B.

NOTE 2: The response to the Prepare-Subsequent-Handover request can include in its an-APDU parameter, identifying the GSM 08.06 protocol, either a BSSMAP HANDOVER REQUEST ACKNOWLEDGE or a BSSMAP HANDOVER FAILURE.

In the first case, the positive result triggers in MSC-B the sending on A-Interface of the HANDOVER COMMAND.

In the second case, the positive result triggers in MSC-B optionally the sending of the HANDOVER REQUIRED REJECT.

(The possible sending of the HANDOVER REQUIRED REJECT message upon receipt of the HANDOVER FAILURE is out of the scope of 3GPP TS 29.010 and lies in GSM 08.08).

NOTE 3: The possible sending of the HANDOVER REQUIRED REJECT message is described in GSM 08.08.

The interworking between Prepare Subsequent Handover and RELOCATION REQUEST in 3G_MSC-A is as follows:

	29.002	25.413	Notes

Forward message	MAP PREPARE SUB HANDOVER request
	-ho-NumberNotRequired
	-target RNC ID
	
	-an-APDU(
	HANDOVER REQUEST,
	MSC INVOKE TRACE)
	
	BSSMAP information
	    elements:
	
	  Cause
	  sRNC to tRNC container
		RELOCATION REQUEST
		
		RANAP information
		    elements:
		
		  Cause
		  sRNC to tRNC container
		
		info stored/generated
		in/by 3G_MSC-A:
		  CN domain indicator
		  RAB parameters
		  Permanent NAS UE id
		  Encryption info
		  Integrity protection
		      info	

Positive result	MAP PREPARE SUB HANDOVER response
	-an-APDU(
	 HANDOVER REQUEST ACK)
	
	BSSMAP information
	    elements:
	
	  Layer 3 info
		RELOCATION REQUEST ACK
		
		RANAP information
		    elements:
		
		  tRNC to sRNC container	

Negative result	MAP SUB PREPARE HANDOVER response -an-APDU(HANDOVER FAILURE)	RELOCATION FAILURE	

<table>
<tr><td colspan="3" align="right">*CR-Form-v3*</td></tr>
<tr><td colspan="3" align="center"># **CHANGE REQUEST**</td></tr>
</table>

CR-Form-v3
CHANGE REQUEST
⌘　**29.010** CR **013**　⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Inter MSC relocation: addition of MAP parameter Target RNC ID
Source:	⌘	CN4
Work item code: ⌘	Handover	*Date:* ⌘ 19th February 01
Category:	⌘ **F** (agreed by consensus)	*Release:* ⌘ R99

Use one of the following categories:	*Use one of the following releases:*
F (essential correction)	*2 (GSM Phase 2)*
A (corresponds to a correction in an earlier release)	*R96 (Release 1996)*
B (Addition of feature),	*R97 (Release 1997)*
C (Functional modification of feature)	*R98 (Release 1998)*
D (Editorial modification)	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change:	⌘	Description of the mapping of the target RNC Id in the case of Inter MSC relocation is missing.
Summary of change: ⌘		
Consequences if not approved:	⌘	Incomplete specification

Clauses affected:	⌘	4.8.1, 4.8.2
Other specs affected:	⌘ ☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ 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/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

4.8 Inter-MSC Relocation

The general principles of the relocation procedures are given in Technical Specification TS 23.009. TS 29.010 gives the necessary information for interworking between the TS 25.413 relocation protocol and the TS 29.002 MAP protocol.

For intra UMTS handovers, RANAP is carried over the MAP-E interface instead of BSSAP. Please refer to 3GPP TS 29.108.

4.8.1 Basic Inter-MSC Relocation

...

Negative outcome:

```
RNS-A          3G-MSC-A                        3G-MSC-B            RNS-B
│               │                               │                   │
│               │   MAP U/P -ABORT              │                   │
│               │------------------------------>│                   │
│               │                               │ IU RELEASE COMMAND │
│               │                               │------------------->│
│               │                               │                   │
```
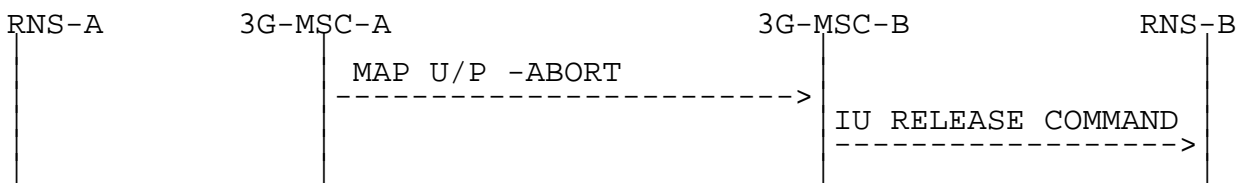
Figure 54: Signalling for Basic Inter-MSC Relocation completion (Negative outcome)

The relocation procedure is normally triggered by RNS-A by sending a RELOCATION REQUIRED message on Iu-Interface to 3G_MSC-A. The invocation of the Basic Inter-MSC relocation procedure is performed and controlled by 3G_MSC-A. The sending of the MAP Prepare-Handover request to 3G_MSC-B is triggered in 3G_MSC-A upon receipt of the RELOCATION REQUIRED message. The identity of the target RNC where the call is to be handed over in 3G_MSC-B area, provided in the RELOCATION REQUIRED message, is mapped to the target RNC Id MAP parameter and tThe RELOCATION REQUEST message is encapsulated in the an-APDU MAP parameter of the Prepare-Handover MAP request. 3G_MSC-B can invoke another operation towards the VLR-B (allocation of the relocation numbers described in 3GPP TS 29.002).

Additionally, if tracing activity has been invoked, the trace related messages can be transferred on the E-Interface encapsulated in the an-APDU MAP parameter of the Prepare-Handover Request. If transferred, one complete trace related message at a time shall be included in the an-APDU MAP parameter after the RELOCATION REQUEST message.

The interworking between Prepare Handover and RELOCATION REQUIRED is as follows:

	25.413	29.002	Notes
Forward message	RELOCATION REQUIRED	MAP PREPARE HANDOVER request	
		-ho-NumberNotRequired -target RNC Id	1
	RANAP information elements	-Radio Resource Info =an-APDU(RELOCATION REQUEST, CN INVOKE TRACE)	2
Positive result		MAP PREPARE HANDOVER response	3
		-relocation numbers -an-APDU(	
	RELOCATION COMMAND	RELOCATION REQUEST ACKNOWLEDGE or	
	RELOCATION PREP FAILURE	RELOCATION FAILURE)	
Negative result	RELOCATION PREP FAILURE	MAP PREPARE HANDOVER	
	Unspecified failure	System Failure	
	Unspecified failure	No Handover Number available	
	Unspecified failure	UnexpectedDataValue	
	Unspecified failure	Data Missing	
	Unspecified failure	MAP CLOSE	
	Unspecified failure	MAP U/P -ABORT	

NOTE 1: The RANAP information elements are already stored in 3G_MSC.

The ho-NumberNotRequired parameter is included by 3G_MSC-A, when 3G_MSC-A decides not to use any circuit connection with 3G_MSC-B. No relocation numbers shall be present in the positive result. Any negative response from 3G_MSC-B shall not be due to relocation number allocation problem.

NOTE 2: The process performed on the RANAP information elements received in the RELOCATION REQUIRED message is described in the 3GPP TS 25.413.

NOTE 3: The response to the Prepare-Handover request can include in its an-APDU parameter, identifying the 3GPP TS 25.413 protocol, either a RANAP RELOCATION REQUEST ACKNOWLEDGE or a RANAP RELOCATION FAILURE.

In the first case, the positive result triggers in 3G_MSC-A the sending on Iu-Interface of the RELOCATION CMD.

In the second case, the positive result triggers in 3G_MSC-A the sending of the RELOCATION PREP FAILURE.

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

4.8.2 Subsequent Inter-MSC Relocation back to 3G_MSC-A

…

```
RNS-A            3G-MSC-B                          3G-MSC-A              RNS-B
|               |  MAP U/P -ABORT                 |                     |
|               |<------------------------        |                     |
|               |                                 |  IU RELEASE COMMAND |
|               |                                 |-------------------->|
|               |                                 |  (Note 1)           |
|               |                                 |                     |
```
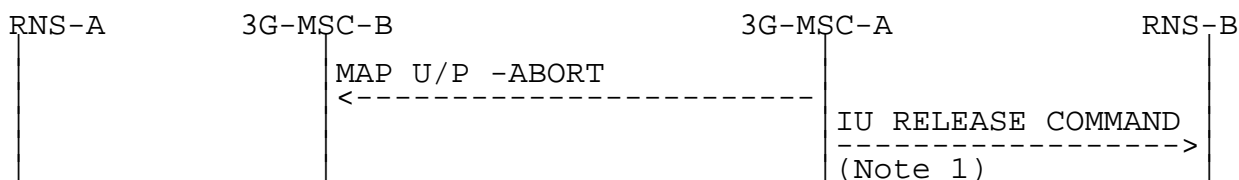
Figure 59: Signalling for Subsequent Inter-MSC Relocation back to 3G_MSC-A completion
(Unsuccessful completion of the procedure)

NOTE: Abnormal end of the procedure that triggers the clearing of all resources in 3G_MSC-B.

The interworking between Prepare Subsequent Handover and RELOCATION REQUIRED is as follows:

```
-------------------------------------------------------------------------------
            |        25.413                           29.002            | Notes
------------|--------------------------------------------------------------|-----
Forward     | REL. REQUIRED        MAP PREPARE SUBSEQUENT HANDOVER         |
message     |                              request                        |
            |                                                             |
            |                        -target MSC number                   |
            |                        -target RNC Id                       |
------------|  RANAP information      -an-APDU(                           |  1
            |      elements             RELOCATION REQ)                   |
            |                                                             |
            |                                                             |
------------|--------------------------------------------------------------|-----
Positive    |                       MAP PREPARE SUBSEQUENT HANDOVER        |  2
result      |                              response                       |
            |                        -an-APDU(                            |
            | RELOCATION CMD.          RELOCATION REQUEST                 |
            |                          ACKNOWLEDGE                        |
            |                          or                                 |
            | RELOCATION PREP FAILURE  RELOCATION FAILURE)                |
------------|--------------------------------------------------------------|-----
Negative    | REL. PREP. FAILURE      MAP PREPARE SUBSEQUENT             |
result      |                         HANDOVER response                  |
            | Unspecified failure       Unknown MSC                      |
            | Unspecified failure       Subsequent Handover              |
            |                                   Failure                   |
            | Unspecified failure       UnexpectedDataValue              |
            | Unspecified failure       Data Missing                     |
            |                                                             |
            | Iu RELEASE COMMAND        MAP CLOSE                         |
            |                           MAP U/P -ABORT                    |
            | Unspecified failure                                        |
            | Unspecified failure                                        |
-------------------------------------------------------------------------------
```

NOTE 1:   The processing performed on the RANAP information elements received in the RELOCATION
          REQUIRED message is out of the scope of the present document. The target MSC number is provided to
          3G_MSC-A by 3G_MSB-B based on the information received from RNS-B.

NOTE 2:   The response to the Prepare-Subsequent-Handover request can include in its an-APDU parameter,
          identifying the 3GPP TS 25.413 protocol, a RANAP RELOCATION REQUEST ACKNOWLEDGE or a
          RANAP RELOCATION FAILURE.

          In the first case, the positive result triggers in 3G_MSC-B the sending on Iu-Interface of the
          RELOCATION COMMAND.

          In the second case, the positive result triggers in 3G_MSC-B the sending of the RELOCATION
          PREPARATION FAILURE.