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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document describes the subset of Radio Access Network Application Part (RANAP) messages and procedures, defined in 3GPP TS 25.413 [4], which is used on the E-interface. A general description can be found in 3GPP TS 23.002 [7] and 3GPP TS 23.009 [2].

For the initiation and execution of relocation of SRNS (relocation for short, throughout the whole document) between MSCs a subset of RANAP procedures are used. For the subsequent control of resources allocated to the User Equipment (UE) RANAP procedures are used. The Direct Transfer Elementary Procedure (EP) of RANAP, is used for the transfer of connection management and mobility management messages between the UE and the controlling 3G_MSC.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary".

[2] 3GPP TS 23.009: "Handover procedures".

[3] Void

[4] 3GPP TS 25.413: "UTRAN Iu Interface Radio Access Network Application Part (RANAP) signalling".

[5] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[6] 3GPP TS 29.010: "Information element mapping between Mobile Station - Base Station System (MS - BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".

[7] 3GPP TS 23.002: "Network architecture".

[8] Void

3 Abbreviations

For the purposes of the present document, the abbreviations defined in TR 21.905 [1] and the following apply:

3G_MSC	A third generation Mobile services Switching Centre that supports the Iu interface (and possibly also the A-interface)
3G_MSC-A	The controlling 3G_MSC on which the call was originally established
3G_MSC-B	The 3G_MSC to which the UE is handed over in a Basic Handover
3G_MSC-B'	The 3G_MSC to which the UE is handed over in a Subsequent Handover
3G_MSC-I	Interworking 3G_MSC
3G_MSC-T	Target 3G_MSC
EP	Elementary Procedure
NNSF	NAS Node Selection Function
RNC	Radio Network Controller

4 Principles for the use of RANAP on the E-interface

4.1 General

The mechanism for the transfer of the RANAP messages on the E-interface is defined in TS 29.002 [5]. The operation of the relocation procedures between 3G_MSCs and the use of the RANAP messages for those procedures is described in TS 23.009 [2] and TS 29.010 [6].

RANAP is defined to connect the RNS to both, the cs and ps domain of an UMTS CN. Procedures, messages and IEs, only defined for communication between the RNS and the ps domain of an UMTS CN will, of course, never appear on the E-interface.

In the same way as a the connection oriented service of SCCP is used for the messages relating to one UE on the 3G_MSC-RNS interface a TCAP dialogue is used on the E-interface for messages relating to one UE. As no correspondence to the connectionless service on the 3G_MSC-RNS interface is used on the E-interface none of the global procedures are applicable.

The management of the terrestrial circuits between the 3G_MSCs is outside the scope of the E-interface (see TS 23.009 [2]), therefore all procedures, messages and information elements relating to terrestrial circuits are also excluded from the RANAP procedures and messages used on the E-interface.

4.2 Transfer of RANAP layer 3 messages on the E-interface

The RANAP data which on the 3G_MSC-RNS interface is contained in the user data field of the exchanged SCCP frames is on the E-interface transferred as the contents of the access network signalling info in the AN-APDU parameter as described in TS 29.002 [5], indicating the access network protocol identification "ts3G-25413".

4.3 Roles of 3G_MSC-A, 3G_MSC-I and 3G_MSC-T

For the description in the present document, the 3G_MSC's functionality related to the relocation between 3G_MSCs has been split into three logical parts, 3G_MSC-A, 3G_MSC-T and 3G_MSC-I. The different roles need not necessarily be performed by different 3G_MSCs.

3G_MSC-A is the call/connection controlling part of the 3G_MSC where the call/connection was originally established and the switching point for relocation between 3G_MSCs. (This corresponds to 3G_MSC-A as defined in TS 23.009 [2] and TS 29.002 [5]). The 3G_MSC that is the 3G_MSC-A will not be changed during the duration of a call/connection.

3G_MSC-T is the part relating to the transitory state during the relocation for the 3G_MSC controlling the RNS the serving RNS functionality is relocated to, when basic relocation or subsequent relocation (see TS 23.009) take place. (This corresponds, depending on the type of relocation to 3G_MSC-A, 3G_MSC-B or 3G_MSC-B' in TS 23.009 [2] and TS 29.002 [5]).

3G_MSC-I is the part of a 3G_MSC through which the 3G_MSC-A, via an E-interface (or an internal interface) is in contact with the UE. (This corresponds, depending on the type of relocation to 3G_MSC-A, 3G_MSC-B or 3G_MSC-B' in TS 23.009 [2] and TS 29.002 [5]).

The 3G_MSC that is the 3G_MSC-A can also have the role of either the 3G_MSC-I or the 3G_MSC-T during a period of the call/connection.

The following is applicable for the involved 3G_MSCs concerning the exchange of RANAP data on an E-interface before and after a successful inter 3G_MSC relocation:

1) At basic relocation, two 3G_MSCs are involved, one 3G_MSC being 3G_MSC-A and one being 3G_MSC-T. When this relocation has been performed, the two 3G_MSCs interworking on the E-interface have the roles of 3G_MSC-A and 3G_MSC-I respectively, i.e. the 3G_MSC that is the 3G_MSC-T during the relocation is now the 3G_MSC-I.

2) At subsequent relocation back to 3G_MSC-A, two 3G_MSCs are involved. The 3G_MSC having the role of 3G_MSC-A has also the role of 3G_MSC-T. The other 3G_MSC involved has the role of 3G_MSC-I. When this

relocation has been completed, there is no exchange of RANAP data on the E-interface, i.e. the 3G_MSC being the 3G_MSC-I before and during the relocation is now no longer taking part.

3) At subsequent relocation of SRNS to an 3G_MSC not being 3G_MSC-A, three 3G_MSCs are involved. The roles of these 3G_MSCs are 3G_MSC-A, 3G_MSC-I, and 3G_MSC-T respectively. When this relocation has been performed, the two 3G_MSCs interworking on an E-interface have the roles of 3G_MSC-A and 3G_MSC-I respectively, i.e. the 3G_MSC that is the 3G_MSC-T during the relocation is now the 3G_MSC-I and the 3G_MSC being 3G_MSC-I during the relocation is now no longer taking part.

5 Use of the RANAP on the E-interface

The dedicated RANAP procedures used on the E-interface to some extent are:

- RAB assignment;
- RAB Release Request;
- Iu Release Request;
- Relocation resource allocation;
- Relocation Detect;
- Relocation Complete;
- Relocation Cancel;
- CN Invoke Trace;
- Security mode control;
- Location Reporting Control;
- Location Report;
- Direct Transfer;
- Error Indication;
- Common ID;
- Location Related Data;
- UE Specific Information;
- RAB Modification Request.

5.1 RAB Assignment

The RAB Assignment procedure (TS 25.413 [4] subclause 8.2) is applied on the E-interface with following conditions:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

The handling of terrestrial resources is not applicable, i.e. the RANAP IEs *Transport Layer Address* and *Iu Transport Association* will be assigned by the 3G_MSC-I.

5.2 RAB Release Request

For the RAB Release Request procedure (TS 25.413 [4] subclauses 8.3) the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-I acts as the RNS;
- the 3G_MSC-A acts as the 3G_MSC.

5.3 Iu Release Request

For the Iu Release Request procedure (TS 25.413 [4] subclause 8.4) the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-I acts as the RNS;
- the 3G_MSC-A acts as the 3G_MSC.

Additionally, at basic Inter-3G_MSC relocation and at subsequent Inter-3G_MSC relocation (TS 23.009 [2]), if the 3G_MSC that is the 3G_MSC-A is not also the 3G_MSC-T, the Iu Release Request procedure (TS 25.413 [4] subclause 8.4) is applied on the E-interface with the following conditions:

- the 3G_MSC-T acts as the RNS;
- the 3G_MSC-A acts as the 3G_MSC.

5.4 Relocation Resource Allocation

At basic Inter-3G_MSC relocation (TS 23.009 [2]) the Relocation Resource Allocation procedure (TS 25.413 [4] subclause 8.7) is applied on the E-interface with the following conditions:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-T acts as the target RNS.

At subsequent Inter-3G_MSC relocation the Relocation Resource Allocation procedure is applied on the E-interface with the following conditions:

- the 3G_MSC-I acts as the 3G_MSC;
- the 3G_MSC-T acts as the target RNS;
- if the 3G_MSC that is the 3G_MSC-A is not also the 3G_MSC-T, then this 3G_MSC shall act as the target RNS towards the 3G_MSC-I and as the 3G_MSC towards the 3G_MSC-T.

The handling of terrestrial resources is not applicable, i.e. the RANAP IEs *Transport Layer Address* and *Iu Transport Association* will be assigned by the 3G_MSC-T.

In case NNSF is active, the *Iu Signalling Connection Identifier* IE and the *Global CN ID* IE shall be set by the 3G_MSC_T towards Target RNC.

5.5 Relocation Cancel

For subsequent Inter-3G_MSC relocation the Relocation Cancel procedure (TS 25.413 [4] subclause 8.10) is applied on the E-interface with the following conditions.

- the 3G_MSC-A, acts as the 3G_MSC;
- the 3G_MSC-I, acts as the serving RNS.

5.6 Relocation Detect and Relocation Complete

For the Relocation Detect and Relocation Complete procedure (TS 25.413 [4] subclauses 8.8 and 8.9) the applicable parts on the E-interface are the transfer of RELOCATION DETECT, RELOCATION COMPLETE messages at inter 3G_MSC relocation. For those parts, the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;

- the 3G_MSC-T acts as the target RNS.

5.7 CN Trace invocation

For the CN Trace invocation procedure (TS 25.413 [4], subclause 8.17), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

Additionally, at basic Inter-3G_MSC relocation and at subsequent Inter-3G_MSC relocation (TS 23.009 [2]), if the 3G_MSC that is the 3G_MSC-A is not also the 3G_MSC-T, the CN Trace invocation procedure (TS 25.413 [4], subclause 8.17) is applied on the E-interface with the following conditions:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-T acts as the RNS.

5.8 Security mode control

For the Security mode control procedure (TS 25.413 [4], subclause 8.18), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.9 Location Reporting Control

For the Location Reporting Control procedure (TS 25.413 [4], subclause 8.19), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

Additionally, at basic Inter-3G_MSC relocation and at subsequent Inter-3G_MSC relocation (3GPP TS 23.009 [2]), if the 3G_MSC that is the 3G_MSC-A is not also the 3G_MSC-T, the Location Reporting Control procedure (TS 25.413 [4] subclause 8.19) is applied on the E-interface with the following conditions:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-T acts as the RNS.

5.10 Location Report

For the Location Report procedure (TS 25.413 [4], subclause 8.20, the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.11 Direct Transfer

For the Direct Transfer procedure (TS 25.413 [4], subclause 8.23), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;

- the 3G_MSC-I acts as the RNS.

5.12 Error Indication

For the Error Indication procedure (TS 25.413 [4], subclause 8.27), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.13 CN Deactivate Trace

For the CN Deactivate Trace procedure procedure (TS 25.413 [4], subclause 8.28), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.14 Common ID

For the Common ID procedure (TS 25.413 [4], subclause 8.16), the involved 3G MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.15 Location Related Data

For the Location Related Data procedure (TS 25.413 [4], subclause 8.31), the involved 3G_MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.16 UE Specific Information

For the UE Specific Information procedure (TS 25.413 [4], subclause 8.33), the involved 3G MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

5.17 RAB Modification Request

For the RAB Modification Request procedure (TS 25.413 [4], subclause 8.30), the involved 3G MSCs shall act according to the following:

- the 3G_MSC-A acts as the 3G_MSC;
- the 3G_MSC-I acts as the RNS.

6 RANAP messages transferred on the E-interface

The list given below shows the RANAP messages, defined in TS 25.413 [4] subclause 9.1(tabular format) and 9.3 (ASN.1 notation) that are transferred on the E-interface.

	RAB ASSIGNMENT REQUEST	(3G_MSC-A -> 3G_MSC-I)
	RAB ASSIGNMENT RESPONSE	(3G_MSC-I -> 3G_MSC-A)
	RAB RELEASE REQUEST	(3G_MSC-I -> 3G_MSC-A)
	IU RELEASE REQUEST	(3G_MSC-I -> 3G_MSC-A and 3G_MSC-T -> 3G_MSC-A)
*	RELOCATION REQUEST	(3G_MSC-A -> 3G_MSC-T and 3G_MSC-I -> 3G_MSC-A)
*	RELOCATION REQUEST ACKNOWLEDGE	(3G_MSC-T -> 3G_MSC-A and 3G_MSC-A -> 3G_MSC-I)
*	RELOCATION DETECT	(3G_MSC-T -> 3G_MSC-A)
*	RELOCATION COMPLETE	(3G_MSC-T -> 3G_MSC-A)
*	RELOCATION FAILURE	(3G_MSC-T -> 3G_MSC-A and 3G_MSC-A -> 3G_MSC-I)
*	RELOCATION CANCEL	(3G_MSC-I -> 3G_MSC-A)
*	RELOCATION CANCEL ACKNOWLEDGE	(3G_MSC-A -> 3G_MSC-I)
#	CN INVOKE TRACE	(3G_MSC-A -> 3G_MSC-I and 3G_MSC-A -> 3G_MSC-T)
	SECURITY MODE COMMAND	(3G_MSC-A -> 3G_MSC-I)
	SECURITY MODE COMPLETE	(3G_MSC-I -> 3G_MSC-A)
	SECURITY MODE REJECT	(3G_MSC-I -> 3G_MSC-A)
	LOCATION REPORTING CONTROL	(3G_MSC-A -> 3G_MSC-I and 3G_MSC-A -> 3G_MSC-T)
	LOCATION REPORT	(3G_MSC-I -> 3G_MSC-A)
	DIRECT TRANSFER	(3G_MSC-A -> 3G_MSC-I and 3G_MSC-I -> 3G_MSC-A)
	ERROR INDICATION	(3G_MSC-A -> 3G_MSC-I and 3G_MSC-I -> 3G_MSC-A)
#	CN DEACTIVATE TRACE	(3G_MSC-A -> 3G_MSC-I)
	COMMON ID	(3G_MSC-A -> 3G_MSC-I)
	LOCATION RELATED DATA REQUEST	(3G_MSC-A -> 3G_MSC-I)
	LOCATION RELATED DATA RESPONSE	(3G_MSC-I -> 3G_MSC-A)
	LOCATION RELATED DATA FAILURE	(3G_MSC-I -> 3G_MSC-A)
	UE SPECIFIC INFORMATION INDICATION	(3G_MSC-A -> 3G_MSC-I)
	RAB MODIFY REQUEST	(3G_MSC-I -> 3G_MSC-A)

All other RANAP messages shall be considered as non-existent on the E-interface.

Some of the messages above are qualified by * or #. This indicates whether the message, when sent on the E interface, is considered as:

- relocation related message (*); or
- trace related message (#).

7 Exceptions for RANAP message contents and information element coding when transferred on the E-interface

7.1 Message Contents

For the applicable RANAP messages transferred on the E-interface the following exceptions to the descriptions in TS 25.413 [4] are valid:

RAB ASSIGNMENT REQUEST message

- Transport Layer Address IE:

  if received, this IE shall be ignored;

- Iu Transport Association IE:

  if received, this IE shall be ignored;

- UP Mode Versions IE:

  the information given within this IE is only useful in case of TrFO.

RELOCATION REQUEST message

- Transport Layer Address IE:

  if received, this IE shall be ignored;

- Iu Transport Association IE:

  if received, this IE shall be ignored;

- UP Mode Versions IE:

  the information given within this IE is only useful in case of TrFO;

- Iu Signalling Connection Identifier IE:

  if received, this IE shall be ignored;

- Global CN ID IE:

  if received, this IE shall be ignored.

8 RANAP message error handling when transferred on the E-interface

The RANAP error handling (TS 25.413 [4], clause 10) is applicable. The handling of faults concerning the use of SCCP is not applicable.

The RANAP error messages sent on the E-interface shall only be sent as response to RANAP messages received on the same interface.

Annex A (informative): Change history

Change history					
TSG RAN#	**Version**	**CR**	**Tdoc RAN**	**New Version**	**Subject/Comment**
RAN_08	2.0.0	-	RP-000258	3.0.0	Approved at TSG RAN #8 and placed under Change Control
RAN_10	3.0.0	001 002	RP-000634	3.1.0	Approved at TSG RAN #10

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
03/2001	11	-	-		Approved at TSG RAN #11 and placed under Change Control	-	4.0.0
09.2001	13	RP-010590	004		Iu Signalling Connection identifier on E-i/f	4.0.0	4.1.0
03/2002	15	-	-		Approved at TSG RAN #15 and placed under Change Control	4.1.0	5.0.0
06/2002	16	RP-020416	007		Location Related Data procedure missing	5.0.0	5.1.0
12/2002	18	RP-020755	010	1	Explicit indication of relocation related messages	5.1.0	5.2.0
03/2003	19	RP-030079	013	1	Corrections to the list of RANAP messages transferred on the E-interface	5.2.0	5.3.0
12/2003	22	-	-	-	Introduction of Release 6 specification	5.3.0	6.0.0
06/2004	24	RP-040177	015	-	PUESBINE support over E-interface	6.0.0	6.1.0
03/2005	27	RP-050120	017	-	Full RANAP support of network initiated SCUDIF	6.1.0	6.2.0
03/2006	31	-	-	-	Introduction of Release 7 specification	6.2.0	7.0.0
06/2003	32	RP-060278	019	-	Iu-Flex for Inter-3G_MSC Relocation	7.0.0	7.1.0
12/2008	42				Upgrade to Release 8 without technical change	7.1.0	8.0.0
12/2009	-	-	-	-	Upgrade to Release 9 without technical change	8.0.0	9.0.0
03/2011					Upgrade to Release 10 without technical change	9.0.0	10.0.0
06/2011	52	RP-110684	020		Corrections of References	10.0.0	10.1.0
09/2012					Update to Rel-11 version (MCC)	10.1.0	11.0.0
09/2014					Update to Rel-12 version (MCC)	11.0.0	12.0.0
12/2015					Update to Rel-13 version (MCC)	12.0.0	13.0.0

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2017-03	SA#75					Promotion to Release 14 without technical change	14.0.0
2018-07	SA#80	-	-	-	-	Promotion to Release 15 without technical change	15.0.0
2020-07	SA#88-e	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0
2022-03	SA#95-e					Promotion to Release 17 without technical change	17.0.0
2024-03	SA#103	-	-	-	-	Update to Rel-18 version (MCC)	18.0.0
2025-09	SA#109	-	-	-	-	Update to Rel-19 version (MCC)	19.0.0

History

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