### 3GPP TSG\_CN Plenary Meeting #9, Oahu, Hawaii 20<sup>th</sup> – 22<sup>nd</sup> September 2000.

Source: TSG\_N WG 4

Title: Corrective CRs to R96, R97, R98, R99 Work Item Technical Enhancements and Improvements (TEI)

Agenda item:

Document for: APPROVAL

#### Introduction:

This document contains 17 Corrective CRs on R96, R97, R98, R99 Work Item TEI, that have been agreed by TSG\_N WG4, and is forwarded to TSG\_N Plenary meeting #9 for approval.

SM	TDoc	SPEC	CR	REV	PHAS	VERS	SUBJECT	CAT
CN9	N4-000495	03.08	A033		R98	7.3.0	Deletion of "Barring of roaming" stored in the SGSN	А
CN9	N4-000496	03.08	A034		R97	6.4.0	Deletion of "Barring of roaming" stored in the SGSN	F
CN9	N4-000487	09.02	A304		R96	5.15.0	Deletion of Annex C	F
CN9	N4-000488	09.02	A305		R97	6.8.0	Deletion of Annex C	А
CN9	N4-000489	09.02	A306		R98	7.5.0	Deletion of Annex C	А
CN9	N4-000735	03.16	A041		R98	7.3.0	Correction to Delete Subscriber Data	А
CN9	N4-000734	03.16	A042		R97	6.4.0	Correction to Delete Subscriber Data	F
CN9	N4-000625	23.003	023	1	R99	3.5.0	Alignment of 23.003 with text from 25.401	F
CN9	N4-000497	23.008	030		R99	3.3.0	Deletion of "Barring of roaming" stored in the SGSN	А
CN9	N4-000678	23.008	031		R99	3.4.0	Corrections of the description of BC allocation for VLR	А
CN9	N4-000490	29.002	157		R99	3.5.1	Deletion of Annex C	А
CN9	N4-000765	29.010	007	1	R99	3.2.0	Corrections and updates to align with current R99 specs	F
CN9	N4-000596	23.016	016		R99	3.5.0	Correction to Delete Subscriber Data	F
CN9	N4-000441	23.018	053		R99	3.5.0	Correction of connector numbering in process ICH_MSC	F
CN9	N4-000564	23.018	059		R99	3.5.0	Corrections to procedure obtain routeing address	F
CN9	N4-000569	23.018	060		R99	3.5.0	Corrections to process ICH_VLR	F
CN9	N4-000568	23.079	015		R99	3.2.0	Sheet 1 of Procedure OR_HLR_CF	F

### 3GPP-CN4 Meeting #3 Helsinki, Finland, 17-21 July

For submission to: CN#09 list expected approval meeting # here ↑

SPP-CN4 Meet Sinki, Finland	ing #3 d, 17-21 J	luly 2000				Document N e.g. for 3GPP or for SMG	<b>4-000495</b> Puse the format TP-99% to use the format P-99%	oox oxx
	C	CHANGE F	REQI	JEST	Please page fo	see embedded help file at or instructions on how to fill	the bottom of this in this form correctly	1.
		03.08	CR	A033		Current Version:	7.3.0	
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or submission to: expected approval meeting	<mark>CN#09</mark> g # here ↑	for ap for infor	oproval mation	X		strategic non-strategic	(for SMG X use only)	

	Form.	n: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.	.org/Information/CR-Form-v2.doc
Proposed cha (at least one should b	nge ne ma	e affects: (U)SIM ME UTRAN / Radio	Core Network X
Source:		N4 Date:	14.07.00
Subject:		Deletion of "Barring of roaming" stored in SGSN	
Work item:		TEI	
Category: (only one category shall be marked with an X) Reason for	F A B C D	Correction Corresponds to a correction in an earlier release Addition of feature Functional modification of feature Editorial modification Table 2 in section 4 currently indicates that Barring of roaming is corrected by the probability of th	Phase 2 Release 96 Release 97 Release 98 Release 99 Release 00
<u>change:</u>		both HLR and SGSN. The data, however, is permanent data stored section 2.8.2.3. And TS 03.15 also describes that the data is stored CR, therefore, proposes to correct the table.	in HLR according to in only HLR. This
Clauses affect	ted:	<u>.</u> 4	
Other specs affected:	C M B C	Other 3G core specifications $\rightarrow$ List of CRs:Other GSM core specifications $\rightarrow$ List of CRs:MS test specifications $\rightarrow$ List of CRs:BSS test specifications $\rightarrow$ List of CRs:D&M specifications $\rightarrow$ List of CRs:	
<u>Other</u> comments:			



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

### 2.8.2.3 Barring of roaming

Barring of roaming indicates which one of the following categories of operator determined barring of roaming applies to the subscriber:

- no barring of roaming;
- barring of roaming outside the home PLMN;
- barring of roaming outside the home PLMN country.

It is permanent data, and is stored conditionally in the HLR both for non-GPRS and GPRS subscription.

### \*\*\*\* Modified section \*\*\*\*

# 4 Accessing subscriber data

### Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN G	GSN TYPE	
IMSI	2.1.1.1	М	М	М	М	P Note
Network Access Mode	2.1.1.2	М	-	C (a)	-	P Note
International MS ISDN number	2.1.2	M	М	M	-	Т
multinumbering MSISDNs	2.1.3	С	-	-	-	T Note
Basic MSISDN indicator	2.1.3.1	C	-	-	-	Τ.
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	Т
P-TMSI	2.1.5	-	-	С	-	T Note
TIII	216	-	-	C C	-	Т
Random TI I I	217	-	-	C C	-	T Note
IMEL	219	-	-	C C	-	Т
RAND/SRES and Kc	231	М	-	M	-	т
Ciphering Key Sequence Number	232	-	-	M	-	т
Selected Ciphering Algorithm	233	-	-	M	-	T
Current Kc	234	-	-	M	-	Т
P-TMSI Signature	2.3.4		_	C	-	Т
Pouting Area Identity	2.3.3	_		M	-	т
Cell Global Identification	2.4.5	-	-	C		т
	2.4.4	-	-		-	<u>г</u>
	2.4.3		-		-	T Noto
	2.4.8.1		C (GS)	-	-	T Note
	2.4.8.2		-	-	-	P Note
RSZI Lists	2.4.10.1	C	-	-	-	P
Zone Code List	2.4.10.2	-	-	C	-	P
LA not allowed flag	2.4.12	-	-	М	-	1
SGSN area restricted flag	2.4.13	М	-	-	-	Т
Roaming Restriction in the SGSN	2.4.15.2	М	-	M	-	Т
Cell ID	2.4.16	-	-	С	-	Т
LSA Identity	2.4.17.1	С	С	С	-	Р
LSA Priority	2.4.17.2	С	С	С	-	Р
LSA Preferential Access Indicator	2.4.17.2A	С	С	С	-	Р
LSA Active Mode Support Indicator	2.4.17.2B	С	С	С	-	Р
LSA Only Access Indicator	2.4.17.3	С	С	С	-	Р
LSA Active Mode Indicator	2.4.17.4	С	С	С	-	Р
VPLMN Identifier	2.4.17.5	С	-	-	-	Р
Provision of teleservice	2.5.2	С	-	С	-	Р
Transfer of SM option	2.5.4	М	-	-	-	Р
MNRG	2.7.2	М	-	М	М	Т
MM State	2.7.3	-	-	М	-	Т
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	М	-	Т
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	М	-	Т
MS purged for GPRS flag	2.7.6	М	-	-	-	Т
MNRR	2.7.7	С	-	-	-	Т
Subscriber Status	2.8.1	Č	-	С	-	P
Barring of outgoing calls	2821	C	-	C C	-	P
Barring of roaming	2823	C.	-	-C	-	P
ODB PL MN-specific data	2.8.2.0	C	_	<u> </u>	_	P
Trace Activated in SGSN	2.0.0	C	-	C	-	P
	2.11.7	C	_	C	М	P
PDP Address	2.13.1	C	-	C	M	D
NSADI	2.13.2	0	-	C		<u>г</u>
DDD State	2.13.3	-	-		C	1 T
PDP State	2.13.4	-	-		-	
Access Doint Nome	2.13.3	-	-		-	D/T Mata
	2.13.0	с U	-			P/I NOTE
	2.13.7	-	-		-	
VPLIVIN Address Allowed	2.13.8	C	-	C	-	<u>۲</u>
Dynamic Address	2.13.9	-	-	-		
SGSN Address	2.13.10	-	-	-	М	<u>  </u>
GGSN-list	2.13.11	М	-	-	-	T
(continued)						

PARAMETER	Subclause	HLR	VLR	SGSN G	GSN TYPE	
Quality of Service Subscribed	2.13.12	С	-	С	-	Р
Quality of Service Requested	2.13.13	-	-	С	-	Т
Quality of Service Negotiated	2.13.14	-	-	С	Μ	Т
SND	2.13.15	-	-	С	С	Т
SNU	2.13.16	-	-	С	С	Т
DRX Parameters	2.13.17	-	-	Μ	-	Т
Compression	2.13.18	-	-	С	-	Т
NGAF	2.13.19	-	-	C (Gs)	-	Т
Classmark	2.13.20	-	-	Μ	-	Т
TID	2.13.21	-	-	С	С	Т
Radio Priority	2.13.22	-	-	С	-	Т
Radio Priority SMS	2.13.23	-	-	С	-	Т
PDP Context Identifier	2.13.24	С		С		Т

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

NOTE 1: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
 (Gs): The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

a): This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE 2: For special condition of storage see in the clauses 2.x.y referred-to. See clause 3 for explanation of M,C,T and P in table 2

### **3GPP-CN4 Me** Helsinki, Finla

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Work item:		TEI								
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(only one category shall be marked	B C	Addition of Functional	featur modifi	e cation of fea	ature			-	Release 97 Release 98	X

Release 99 Release 00

Table 2 in section 4 currently indicates that Barring of roaming is conditionally stored in **Reason for** both HLR and SGSN. The data, however, is permanent data stored in HLR according to change: section 2.8.2.3. And TS 03.15 also describes that the data is stored in only HLR. This CR, therefore, proposes to correct the table. **Clauses affected:** 4

<u>Other specs</u>	Other 3G core specifications	$\rightarrow$ List of CRs:
affected:	Other GSM core specifications	$\rightarrow$ List of CRs:
	MS test specifications	$\rightarrow$ List of CRs:
	BSS test specifications	$\rightarrow$ List of CRs:
	O&M specifications	$\rightarrow$ List of CRs:
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Other		

comments:

with an X)

D Editorial modification



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### 2.8.2.3 Barring of roaming

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Network Access Mode	2.1.1.2	Μ	-	C (a)	-	P Note
International MS ISDN number	2.1.2	М	М	М	-	Т
multinumbering MSISDNs	2.1.3	C	-	-	-	T Note
Basic MSISDN indicator	2.1.3.1	С	-	-	-	. -
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	I T. Noto
	2.1.5	-	-		-	
Random TI I I	2.1.0	-	-	Ċ	-	T Note
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RAND/SRES and Kc	2.3.1	М	-	M	-	τ .
Ciphering Key Sequence Number	2.3.2	-	-	M	-	Ť
Selected Ciphering Algorithm	2.3.3	-	-	М	-	Т
Current Kc	2.3.4	-	-	М	-	Т
P-TMSI Signature	2.3.5	-	-	С	-	Т
Routing Area Identity	2.4.3	-	-	М	-	Т
Cell Global Identification	2.4.4	-	-	С	-	Т
SGSN Number	2.4.8.1	М	C (Gs)	-	-	T Note
GGSN Number	2.4.8.2	©	-	-	-	P Note
VLR Number	2.4.5	M	-	C (Gs)	-	Т
RSZI Lists	2.4.10.1	С	-	-	-	Р
Zone Code List	2.4.10.2	-	-	C	-	P T
LA not allowed flag	2.4.12	-	-	IVI	-	
SGSN area restricted flag	2.4.13	IVI NA	-	-	-	
	2.4.15.2	IVI	-		-	і т
Den ID Provision of teleservice	2.4.10	-	-	Č	-	I D
Transfer of SM option	2.5.2	M	-	C	-	F D
Subscriber Status	2.3.4		-	- C	-	F P
Barring of outgoing calls	2821	C C	_	C C	-	P
Barring of roaming	2823	č	-	- <del>C</del>	-	P
ODB PLMN-specific data	2.8.3	č	-	<u> </u>	-	P
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	М	-	Т
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	М	-	Т
MS purged for GPRS flag	2.7.6	Μ	-	-	-	Т
MNRG	2.7.2	М	-	М	Μ	Т
MNRR	2.7.7	С	-	-	-	Т
Trace Activated in SGSN	2.11.7	С	-	C	-	Р
PDP Type	2.13.1	C	-	C	М	P
PDP Address	2.13.2	C	-	C	M	P T
	2.13.3	-	-	C	С	
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Access Point Name	2.13.3	-	-		-	I D/T Noto
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Quality of Service Subscribed	2.13.12	С	-	С	-	Р
Quality of Service Requested	2.13.13	-	-	С	-	Т
Quality of Service Negotiated	2.13.14	-	-	С	Μ	Т
SND	2.13.15	-	-	С	С	Т
SNU	2.13.16	-	-	С	С	Т
DRX Parameters	2.13.17	-	-	М	-	Т
Compression	2.13.18	-	-	С	-	Ţ
NGAF	2.13.19	-	-	C (Gs)	-	T
Classmark	2.13.20	-	-	M	-	
	2.13.21	-	-	C	С	
Radio Priority	2.13.22	-	-	C	-	1 T
Radio Priority SMS	2.13.23	-	-	C	-	
PDP Context Identifier	2.13.24	U		C		1

- NOTE: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
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- NOTE: For special condition of storage see in the clauses 2.x.y referred-to. See clause 3 for explanation of M,C,T and P in table 2.

3GPP TSG CN4 Meeting #4 Seattle, 28<sup>th</sup>August - 1<sup>st</sup> September 2000 Document N4-000735

			CHANGE	REQ	JEST				
			03.16	CR	A041	(	Current Versio	on: 7.3.0	
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Reason for		Category C3							
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<u>Other</u> comments:									

### 4.2.2 Deletion of data in the VLR or the SGSN

Deletion needs a separate dialogue.

HLR and VLR or SGSN actions are the same as above except for the following case:

- if, in response to deletion, one or more unsupported features are indicated by the VLR or the SGSN, the HLR may:
  - delete subscriber data including replacement feature(s) locally;
  - delete subscriber data including replacement feature(s) locally and in the VLR or the SGSN (NOTE);
  - take no further action.

Which of the three options apply for which feature is out of scope of this specification.

NOTE: This deletion in the VLR or the SGSN needs a separate dialogue.

The <u>VLR or SGSNHLR</u> shall terminate the dialogue <u>when sending</u> the response was received from to the <u>H</u>VLR or the SGSN.

3GPP TSG CN4 Meeting #4 Seattle, 28<sup>th</sup>August - 1<sup>st</sup> September 2000 Document N4-000734

			CHANGE	REC	QUES	T			
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<u>Other</u> comments:									

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The <u>VLR or SGSNHLR</u> shall terminate the dialogue <u>when sending</u> the response was received from to the <u>H</u>VLR or the SGSN.

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### 12.4 Service Area Identifier

The Service Area Identifier (SAI) is used to uniquely identify an area consisting of one or more cells belonging to the same Location Area. Such an area is called a Service Area and can be used for indicating the location of a UE to the CN.

The Service Area Code (SAC) together with the PLMN-Id and the LAC will constitute the Service Area Identifier.

#### - SAI = PLMN-Id + LAC + SAC

The SAC is defined by the operator, and set in the RNC via O&M.

For syntax description and the usage of this identifier in RANAP signalling, see 3G TS 25.413.

For Release 99 the broadcast (BC) domain requires that Service Area consist of one cell. This does not limit the usage of Service Area for other domains. Refer to TS 25.410 for a definition of the BC domain.

# 3GPP-CN4 Meeting #3 Helsinki, Finland, 17-21 July 2000

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### 2.8.2.3 Barring of roaming

Barring of roaming indicates which one of the following categories of operator determined barring of roaming applies to the subscriber:

- No barring of roaming;
- Barring of roaming outside the home PLMN;
- Barring of roaming outside the home PLMN country.

It is permanent data, and is stored conditionally in the HLR both for non-GPRS and GPRS subscription.

### \*\*\*\* Modified section \*\*\*\*

### Accessing subscriber data 4

### Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	Μ	М	М	М	P
Network Access Mode	2.1.1.2	М	-	C note1	-	Р
International MS ISDN number	2.1.2	М	М	М	-	т
multinumbering MSISDNs	2.1.3	С	-	-	-	т
Basic MSISDN indicator	2.1.3.1	Č	-	-	-	Ť.
MSISDN-Alert indicator	2.1.3.2	Č	-	-	-	T
P-TMSI	2.1.5	-	-	С	-	Ť
TLLI	2.1.6	-	-	C	-	т
Random TLLI	2.1.7	-	-	Č	-	Ť
IMEI	2.1.9	-	-	Č	-	Ť
RAND/SRES and Kc	2.3.1		-	Č	-	Ť
RAND, XRES, CK, IK, AUTN	2.3.2	М	-	Č	-	Ť
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	Ť
Current Kc	2.3.6	-	-	M	-	Ť
P-TMSI Signature	2.3.7	-	-	C	-	Ť
Routing Area Identity	2.4.3	-	-	M	-	Ť
VIR Number	2.4.5	М	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	Ť
GGSN Number	2.4.8.2	M	-	-	-	P
RSZLLists	2.4.11.1	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	С	-	P
LA not allowed flag	2.4.13	-	-	M	-	Т
SGSN area restricted flag	2.4.14	М	-	-	-	Ť
Roaming Restriction in the SGSN	2.4.15.2	M	-	М	-	Ť
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	Ť
LSA Identity	2.4.17.1	С	С	č	-	P
L SA Priority	2.4.17.2	č	Č	Č	-	P
LSA Preferential Access Indicator	2.4.17.2A	č	č	č		P
LSA Active Mode Support Indicator	2.\$.17.2B	č	č	č		P
LSA Only Access Indicator	2.4.17.3	č	č	č	-	P
LSA Active Mode Indicator	2.4.17.4	Č	Č	Č	-	P
VPLMN Identifier	2.4.17.5	Č	-	-	-	P
Provision of teleservice	2.5.2	Č	-	С	-	P
Transfer of SM option	2.5.4	M	-	-	-	Р
MNRG	2.7.2	Μ	-	М	М	Т
MM State	2.7.3	-	-	М	-	т
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	М	-	Т
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	М	-	Т
MS purged for GPRS flag	2.7.6	Μ	-	-	-	Т
MNRR	2.7.7	С	-	-	-	Т
Subscriber Status	2.8.1	С	-	С	-	Р
Barring of outgoing calls	2.8.2.1	С	-	С	-	Р
Barring of roaming	2.8.2.3	С	-	- <del>C</del>	-	Р
ODB PLMN-specific data	2.8.3	С	-	C	-	Р
Notification to CSE flag for ODB	2.8.4	С	-	-	-	Т
gsmSCF address list for ODB	2.8.5	С	-	-	-	Р
Trace Activated in SGSN	2.11.7	С	-	С	-	Р
PDP Type	2.13.1	С	-	С	М	Р
PDP Address	2.13.2	С	-	С	М	Р
NSAPI	2.13.3	-	-	С	С	Т
PDP State	2.13.4	-	-	С	-	Т
New SGSN Address	2.13.5	-	-	С	-	Т
Access Point Name	2.13.6	С	-	С	С	P/T
GGSN Address in Use	2.13.7	-	-	С	-	Т
VPLMN Address Allowed	2.13.8	С	-	С	-	Р
Dynamic Address	2.13.9	-	-	-	С	Т
SGSN Address	2.13.10	-	-	-	М	Т
GGSN-list	2.13.11	Μ	-	-	-	Т
	(continued)					

(continued)

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	С	-	С	-	P
Quality of Service Requested	2.13.13	-	-	С	-	Т
Quality of Service Negotiated	2.13.14	-	-	С	М	Т
SND	2.13.15	-	-	С	С	Т
SNU	2.13.16	-	-	С	С	Т
DRX Parameters	2.13.17	-	-	Μ	-	Т
Compression	2.13.18	-	-	С	-	Т
NGAF	2.13.19	-	-	C note2	-	Т
Classmark	2.13.20	-	-	Μ	-	Т
TID	2.13.21	-	-	С	С	Т
Radio Priority	2.13.22	-	-	С	-	Т
Radio Priority SMS	2.13.23	-	-	С	-	Т
PDP Context Identifier	2.13.24	С	-	С	-	Т
PDP Context Charging Characteristics	2.13.25	С	-	С	С	Р
Short Message Service CAMEL Subscription	2.14.4.1/1.8	С	-	С	-	Р
Information (SMS-CSI)						
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.4.2/1.9	С	-	С	-	С
SMS-CSI SGSN Negotiated CAMEL Capability	2.14.2.1	С	-	-	-	Р
Handling						
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	С	-	-	-	Р
SGSN Supported CAMEL Phases	2.14.2.3	С	-	-	-	Р
GsmSCF address for CSI	2.14.2.4	С	-	-	-	Р
Age Indicator	2.16.1	С	-	С	-	Т
Subscribed Charging Characteristics	2.19.1	С	-	С	С	Р

#### Table 2 (concluded): Overview of data used for GPRS Network Access Mode

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

note1: This parameter is relevant in the SGSN only when the Gs interface is installed.

note2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2. See clause 3 for explanation of M, C, T and P in table 2.

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		23.008	CR	031	С	urrent Versio	on: 3.4.0
GSM (AA.BB) or 30	G (AA.BBB) spe	cification number $\uparrow$		↑ C.	R number as al	llocated by MCC s	upport team
For submission	to: CN#(	09 for a for infor	oproval mation	X		strate non-strate	gic (for SMG gic X use only)
Fo	orm: CR cover she	et, version 2 for 3GPP and SMG	The latest	version of this	form is available	from: ftp://ftp.3gpp.o.	rg/Information/CR-Form-v2.doo
Proposed changes (at least one should be	ge affects: marked with an	(U)SIM	ME	I	UTRAN / R	Radio	Core Network
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### 2.5.3 Bearer capability allocation

Bearer capability allocation is a parameter stored against each ISDN number in the case when the Home PLMN allocates one directory number per teleservice and bearer service. In this case it is used to permit the establishment of the correct bearer capability on the connection to the MS. (See GSM 09.07). The bearer capability allocation is not required when the Home PLMN only allocates one directory number per subscriber for all bearer services and teleservices. It is permanent data stored conditionally in boththe HLR-and-VLR.

### 4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Mobile Station ISDN Number (MSISDN).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of the following reference:

- International Mobile Subscriber Identity (IMSI).

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE	
IMSI	2.1.1.1	М	Μ	Р	
Network Access Mode	2.1.1.2	М	-	Р	
International MS ISDN number	2.1.2	М	Μ	Р	
multinumbering MSISDNs	2.1.3	С	-	Р	
Basic MSISDN indicator	2.1.3.1	С	-	Р	
MSISDN-Alert indicator	2.1.3.2	С	-	Р	
TMSI	2.1.4	-	С	Т	
LMSI	2.1.8	С	С	Т	
Mobile Station Category	2.2.1	М	М	Р	
LMU Identifier	2.2.2	С	С	Р	
RAND, SRES and Kc	2.3.1		С	Т	
RAND, XRES, CK, IK and AUTN	2.3.2	М	С	Т	
Ciphering Key Sequence Number	2.3.3	-	М	Т	
MSRN	2.4.1	-	С	Т	
Location Area Identity	2.4.2	-	Μ	Т	
VLR number	2.4.5	Μ	-	Т	
MSC number	2.4.6	Μ	С	Т	
HLR number	2.4.7	-	С	Т	
Subscription restriction	2.4.10	С	-	Р	
RSZI lists	2.4.11.1	С	-	Р	
Zone Code List	2.4.11.2	-	С	Р	
MSC area restricted flag	2.4.12	Μ	-	Т	
LA not allowed flag	2.4.13	-	Μ	Т	
ODB-induced barring data	2.4.15.1	С	-	Т	
Roaming restriction due to unsupported feature	2.4.15.2	М	М	Т	
Cell Global ID or Service Area ID	2.4.16	-	С	Т	
LSA Identity	2.4.17.1	С	Ċ	Р	
LSA Priority	2.4.17.2	Ċ	Ċ	Р	
LSA Preferential Access Indicator	2.4.17.2A	Ċ	Ċ	Р	
LSA Active Mode Support Indicator	2.4.17.2B	С	С	Р	
LSA Only Access Indicator	2.4.17.3	Ċ	Ċ	Р	
LSA Active Mode Indicator	2.4.17.4	Ċ	Ċ	Р	
VPLMN Identifier	2.4.17.5	Ċ	-	Р	
Provision of bearer service	2.5.1	M	М	Р	
Provision of teleservice	2.5.2	M	M	P	
BC allocation	2.5.3	C	C	P	
IMSI detached flag	2.7.1	-	č	T	
Confirmed by Radio Contact indicator	2.7.4.1	-	M	Ť	
Subscriber Data Confirmed by HI R indicator	2742	-	M	Ť	
Location Information Confirmed in HLR indicator	2743	-	M	Ť	
Check SS indicator	2744	М	-	Ť	
MS purged for non-GPRS flag	275	M	-	Ť	
MNRR	2.7.7	C	-	Ť	
Subscriber status	281	č	С	P	
Barring of outgoing calls	2821	č	č	P	
Barring of incoming calls	2822	č	-	P	
Barring of roaming	2823	č	-	P	
Barring of premium rate calls	2824	č	С	P	
Barring of supplementary service management	2825	Č	č	P	
Barring of registration of call forwarding	2826	č	-	P	
Barring of invocation of call transfer	2827	č	С	P	
Operator determined barring PLMN-specific data	2.8.3	č	č	P	
Notification to CSE flag for ODB	284	č	-	Т	
gsmSCE address list for ODB	285	č	-	P	
Handover Number	291	-	Ċ	т	
Messages Waiting Data	2 10 1	C	-	Ť	
Mobile Station Not Reachable Flag	2 10 2	C C	М	Ť	
Memory Canacity Exceeded Flag	2 10 3	č	-	Ť	
monory depailing Endeeded hay	2.10.0	0	-	I	
(continued	)				

Table 1: Overview of data stored for non-GPRS Network Access Mode

(continued)

3GPP TSG CN4 Meeting #4 Seattle, 28<sup>th</sup>August - 1<sup>st</sup> September 2000 Document N4-000596

			23.016	CR	016		Current Versi	on: <mark>3.5.0</mark>		
For submissio	n to	D: CN#09	for a for infor	oproval mation	X		strate non-strate	egic X		
Form: CR cover sheet, version 2 for 3GPP and SMG       The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc         Proposed change affects:       (U)SIM       ME       UTRAN / Radio       Core Network       X         (at least one should be marked with an X)       (U)SIM       ME       UTRAN / Radio       Core Network       X										
Source:		N4					Date:	31 <sup>st</sup> July 200	0	
Subject:		Correction t	o Delete Subscrib	oer Data						
Work item:		TEI								
<u>Category:</u>	F A B C D	Correction Correspond Addition of Functional Editorial mo	ds to a correction f feature modification of fea odification	in an ea ature	rlier relea	se X	Release:	Phase 2 Release 96 Release 97 Release 98 Release 99 Release 00	X	
<u>Reason for</u> change:		To align with	n 29.002. The DSD	dialogue	is closed	by the V	LR or SGSN			
Clauses affect	ed	4.2.2								
Other specs affected:	C C N E C	Other 3G cor Other GSM c specificat AS test spec BSS test spe D&M specific	e specifications ore ions ifications cifications cations			CRs: CRs: CRs: CRs: CRs: CRs:	R00			
<u>Other</u> comments:										

### 4.2.2 Deletion of data in the VLR or the SGSN

Deletion needs a separate dialogue.

HLR and VLR or SGSN actions are the same as above except for the following case:

- if, in response to deletion, one or more unsupported features are indicated by the VLR or the SGSN, the HLR may:
  - delete subscriber data including replacement feature(s) locally;
  - delete subscriber data including replacement feature(s) locally and in the VLR or the SGSN (NOTE);
  - take no further action.

Which of the three options apply for which feature is out of scope of this specification.

NOTE: This deletion in the VLR or the SGSN needs a separate dialogue.

The <u>VLR or SGSNHLR</u> shall terminate the dialogue <u>when sending</u> the response was received from to the <u>H</u>VLR or the SGSN.

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

	CHANG	E REQI	JEST Please	e see embedded help f for instructions on how	ile at the bottom of this to fill in this form correctly.				
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Other comments:									

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#### Figure 66b: Process ICH\_MSC (sheet 2)



Figure 66c: Process ICH\_MSC (sheet 3)





#### Figure 66d: Process ICH\_MSC (sheet 4)





Figure 66e: Process ICH\_MSC (sheet 5)





Figure 66i: Process ICH\_MSC (sheet 9)
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e.g. for 3GPP use the format TP-99xxx or for SMG, use the format P-99-xxx

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Proposed change affects:       (U)SIM       ME       UTRAN / Radio       Core Network       X         (at least one should be marked with an X)       (U)SIM       ME       UTRAN / Radio       Core Network       X										
Source:	N4					Date:	01/08/00			
Subject:	Corrections	to process ICH_\	VLR.							
Work item:	TEI									
Category: F (only one category E shall be marked C with an X) E	Correction Corresponds Addition of f Functional n Editorial mo	s to a correction eature nodification of fea dification	in an ea ature	rlier rele	ase	Release:	Phase 2 Release 96 Release 97 Release 98 Release 99 Release 00	X		
<u>Reason for</u> change:	Mislabelled	Connector.								
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<u>Other</u> comments:										
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Figure 1a: Process ICH\_VLR (sheet 1)



Figure 1c: Process ICH\_VLR (sheet 3)



Figure 1f: Process ICH\_VLR (sheet 6)

#### 3GPP TSG-N4 #4 Seattle, USA, 28 Aug - 01 Sep 2000

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			CHA	NGE F	REQ	UEST					
			23	8.079	CR	015		Current	Versio	on: <u>3.5.0</u>	
For submissio	For submission to:       TSG-CN#09       for approval for approval for information       X       strategic         for information       non-strategic       X										
Proposed change affects: (U)SIM ME UTRAN / Radio Core Network X											
Source:		N4						<u>[</u>	Date:	2 <sup>nd</sup> August 2	000
Subject:		Sheet 1 of	Procedur	e OR_HL	R_CF						
Work item:		TEI									
<u>Category:</u>	F A B C D	Correction Correspon Addition of Functional Editorial m	ds to a co feature modifica odificatio	prrection i tion of fea n	in an ea ature	rlier relea	se	Rele	<u>ase:</u>	Phase 2 Release 96 Release 97 Release 98 Release 99 Release 00	X
<u>Reason for</u> change:		In TS 23.07 deleted. Th	79 v3.4.0 iis was no	the first s of correct	sheet of ed in v3	Procedure .5.0. This	e OR_H CR re-i	ILR_CF v	was ao e first	ccidentally sheet.	
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<u>Other</u> comments:											

### 9.5.1 Procedure OR\_HLR\_CF

Sheet 1: if the HLR does not support optimal routeing of basic mobile-to-mobile calls, the test "Optimal routeing allowed" takes the "No" exit.

2

Sheet 2: the procedures Handle\_CFB, Handle\_CFNRc and Handle\_CFNRy are specified in 3G TS 23.018 [6].



### Figure 10a: Procedure OR\_HLR\_CF (sheet 1)

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Figure 10b: Procedure OR\_HLR\_CF (sheet 2)

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				REQ	UEST			
			29.002	CR	179r1	Current Vers	ion: 3.5.1	
For submission to:       TSG CN#09       for approval for approval for information       X       strategic         for information       non-strategic       X								
Proposed change affects: (U)SIM ME UTRAN / Radio Core Network X								
Source:		N4				Date:	31 <sup>st</sup> August 2000	
Subject:		Correction 1	to MSC-A handove	er SDLs	8			
Work item:		TEI						
<u>Category:</u>	F A B C D	Correction Correspond Addition of Functional Editorial mo	ds to a correction i feature modification of fea odification	in an ea ature	rlier release	Release:       X	Phase 2 Release 96 Release 97 Release 98 Release 99 <b>X</b> Release 00	
<u>Reason for</u> <u>change:</u>		<ul> <li>Figure and Figure 1</li> <li>Figure 1</li> <li>Figure 1</li> </ul>	19.2.2/1 (Sheet 4) Jure 19.2.2/1 (Sheet 9.2.2/1 (Sheet 8 of 9.2.2/1 (Sheet 9 of	of 13) a et 5 of 1 13) and 13) from	nd Figure 19.2 13) from the C Figure 19.2.2/1 1 the CR 143 is	2.2/1 (Sheet 5 of 1 R 143 is missing (Sheet 9 of 13)are missing	3)are duplicated, duplicated, and	
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<u>Other</u> comments:								

### 19.2.2.5 SDL Diagrams

The SDL diagrams on the following pages describe the user processes in MSC-A for the procedures described in this subclause.

The services used are defined in subclause 8.4.

NOTE: The message primitives HO\_CA\_MESSAGE used in the SDL-Diagrams are used to show the internal coordination between the MAP application and the Handover Control Application. For a detailed description of the co-ordination between the applications for the handover or relocation procedure, see 3G TS 23.009.

Note that in case of reception of errors from the MSCs (see the Handover error handling macro), the MAP user reports them to the Handover Control Application and does not take any action except in cases explicitly mentioned in the SDL diagrams.



Figure 19.2.2/1 (sheet 1 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 2 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 3 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 4 of 13): Process MSC\_A\_HO





Figure 19.2.2/1 (sheet 5 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 6 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 7 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 8 of 13): Process MSC\_A\_HO





Figure 19.2.2/1 (sheet 9 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 10 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 11 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 12 of 13): Process MSC\_A\_HO



Figure 19.2.2/1 (sheet 13 of 13): Process MSC\_A\_HO

### 3GPP TSG-N4 #4 Seattle, USA, 28 Aug - 01 Sep 2000

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Source:		N4						Date:	31 <sup>th</sup> August 2	2000
Subject:		Corrections	and upd	<mark>ates to a</mark>	<mark>lign with</mark>	current	R99 spe	CS		
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<u>Reason for</u> <u>change:</u>		29.010 cont particular, ti been added parameters this CR. In addition a	tains main he RANA to 29.01 that do r that do r a few cla	ny messa P param 0. Howe not match	ages use leters ar ver in 29 In the cur is have b	ed on var nd the M/ 9.010 v3. rrent spe een adde	ious inte AP paran 2.0 there cification ed to the	rfaces for hand neters introduce are a number s. These have text.	dovers. In ced for UMTS h r of these been updated	nave in
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# 1 Scope

The scope of the present document is:

- i) to provide a detailed specification for the interworking between information elements contained in layer 3 messages sent on the MS-MSC interface (Call Control and Mobility Management parts of GSM 04.08) and parameters contained in MAP services sent over the MSC-VLR interface (GSM 09.02) where the MSC acts as a transparent relay of information;
- ii) to provide a detailed specification for the interworking between information elements contained in BSSMAP messages sent on the BSC-MSC interface (GSM 08.08) and parameters contained in MAP services sent over the MSC-VLR interface (GSM 09.02) where the MSC acts as a transparent relay of information;
- iii) to provide a detailed specification for the interworking as in i) and ii) above when the MSC also processes the information.

Interworking for supplementary services is given in GSM 09.11. Interworking for the short message service is given in GSM 03.40 and GSM 04.11. Interworking between the call control signalling of GSM 04.08 and the PSTN/ISDN is given in GSM 09.03, GSM 09.07 and GSM 09.08. Interworking between the 'A' and 'E' interfaces for inter-MSC handover signalling is given in GSM 09.07 and 09.08.

## 1.1 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.
- [1] 3G TS 21.905: "3G Vocabulary".
- [2] 3G TS°23.009: "Handover procedures".
- [3] 3G TS°23.040: "Technical realization of the Short Message Service (SMS) Point to Point (PP)".
- [4] 3G TS°24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols-Stage 3".
- [5] 3G TS°24.010: "Mobile radio interface layer 3 Supplementary services specification General aspects".
- [6] 3G TS°24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [7] 3G TS°25.413: "Iu interface RANAP signalling".
- [8] 3G TS°29.002: "Mobile Application Part (MAP) specification".
- [9] 3G TS°29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".
- [10] 3G TS°29.011: "Digital cellular telecommunications system (Phase 2+); Signalling interworking for supplementary services".
- [11] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[12]	GSM 09.03: "Digital cellular telecommunications system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".
[13]	GSM 09.08: "Digital cellular telecommunications system (Phase 2+); Application of the Base Station System Application Part (BSSAP) on the E-interface".
[14]	3G TS°29.108: "Application of the Radio Access Network Application Part (RANAP) on the E- interface"

# 1.2 Abbreviations

Abbreviations used in the present document are listed in 3G TS 21.905.

# **NEXT MODIFIED SECTION**

# 4.6 Inter-MSC Handover (UMTS to GSM)

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

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

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

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

### 4.6.1 Basic Inter-MSC Handover

When a Mobile Station is handed over between two MSCs, the establishment of a connection between them (described in 3G TS 23.009) requires interworking between A-Interface and E-Interface.

The signalling at initiation, execution, completion of the Basic Inter-MSC handover procedure is shown in figures 21 to 26 with both possible positive or negative outcomes.

Additionally figure 21b shows the possible interworking when the trace related message is transparently transferred on the E-Interface at Basic Inter-MSC Handover initiation.

F	RNS-A	3G-	-MSC-A		MŞC	С-В
	RELOCATION REQUIRED	>	MAP PREPARE request	HANDOVER	->	Possible Alloc. of a handover no. in the VLR-B
						BSS-B
					I	HANDOVER REQUEST

Figure 21a: Signalling for Basic Inter-MSC Handover initiation (no trace related messages transferred)



# Figure 21b: Signalling for Basic Inter-MSC Handover initiation (MSC invoke trace message transferred)

(\*): Tracing invocation has been received from VLR.

- (\*\*): In that case, HANDOVER REQUEST and MSC INVOKE TRACE messages are included within the BSS-apdu parameter.
- (\*\*\*): MSC INVOKE TRACE is forwarded to BSS-B if supported by MSC-B.

Possible Positive outcomes:

a) successful radio resources allocation and handover number allocation (if performed):



b) radio resources allocation queued and successful handover number allocation (if performed). Later successful radio resources allocation indication:

RNS-A 3	G-MSC-A	MŞC-B BS	ЗŞ-В
	MAP PREPARE HANDOVER	QUEUING INDICATION	-
	response	HANDOVER REQUEST	-
	MAP PROCESS ACCESS		
RELOCATION CO	OMMAND SIGNALLING reques		

#### Figure 22: Signalling for Basic Inter-MSC Handover execution (Positive outcomes)

Possible Negative outcomes:

c) user error detected, or handover number allocation unsuccessful (if performed), or component rejection or dialogue abortion performed by MSC-B:



d) radio resources allocation failure:

RNS	S-A 3G-	MSC-A	MS	ŞС-В		BSS	5-в
		MAP PREPARE H < response	IANDOVER	HANDOVER <	FAILURE		
RE  <-  F#	LOCATION PREI	PARATION					

e) radio resources allocation queued and successful handover number allocation (if performed). Later unsuccessful radio resources allocation:

RNS-A 30	-MSC-A	MŞC-B	BSŞ-B
	MAP PREPARE HANDOVER < response	QUEUING IN	DICATION
	MAP PROCESS ACCESS <	HANDOVER F	AILURE 
RELOCATION PRES	PARATION		

f) unsuccessful handover execution (Reversion to the old radio resources):



#### Figure 23: Signalling for Basic Inter-MSC Handover execution (Negative outcomes)

NOTE 1: Possible rejection of the handover because of the negative outcome of MAP or RANAP procedure.



Figure 24: Signalling for Basic Inter-MSC Handover completion

Positive outcome:

RNS-A	3G-MSC-A	MŞC-B	BSŞ-B
	MAP SEND END SIG	NAL	
	response	CLEAR COMMA	ND
		(Note 2)	

#### Figure 25: Signalling for Basic Inter-MSC Handover completion (Positive outcome)

Negative outcome:

RNS-A	3G-MSC-A	MS <sub>I</sub> C-B	BSS-B
	MAP U/P -ABORT	>	>

#### Figure 26: Signalling for Basic Inter-MSC Handover completion (Negative outcome)

NOTE <u>2</u>: From interworking between MAP and BSSMAP point of view, when the call is released.

The handover 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 handover procedure is performed and controlled by 3G-MSC-A. The sending of the MAP Prepare-Handover request to MSC-B is triggered in 3G-MSC-A upon receipt of the RELOCATION REQUIRED message. For compatibility reason, the cell identity of the cell where the call is to be handed over in MSC-B area, provided in the RELOCATION REQUIRED message, is mapped into targetCellId MAP parameter and the HANDOVER REQUEST message is encapsulated in the bss-APDU MAP parameter of the Prepare-Handover MAP request. MSC-B can invoke another operation towards the VLR-B (allocation of the handover number described in 3G TS 29.002).

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

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

	25.413	29.002	Notes
Forward message	RELOCATION REQUIRED MAP PR	EPARE HANDOVER request	
	BSSMAP_RANAP information elements	-ho-NumberNotRequired -targetCellId -bss-APDU( HANDOVER REQUEST,	1   2
	MSC INVOKE TRACE)		L
Positive result	RELOCATION CMD MAP PRE	PARE HANDOVER response	3
	-handover number -bss-APDU( QUEUING INDICATION or HANDOVER REQUEST ACKNOWLEDGE)		
Negative result Failure	RELOCATION PREP FAILURE	MAP PREPARE HANDOVER	4
	equipment failureRelocatio	<u>n failure in</u>	System
	target RNC/CN or target sy equipment failure" equipment failure" equipment failure" equipment failure" equipment failure"	stem - No Handover Number available UnexpectedDataValue Data Missing MAP CLOSE MAP U/P -ABORT	

NOTE 1: The BSSMAP 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 MSC-B. No handover number shall be present in the positive result. Any negative response from MSC-B shall not be due to handover number allocation problem.

- NOTE 2: The process performed on the RANPAP information elements received in the RELOCATION REQUIRED message is described in the 3G TS 25.413.
  - NOTE 3: The response to the Prepare-Handover request can include in its bss-APDU parameter, identifying the GSM 08.06 protocol, either a BSSMAP QUEUING INDICATION, or a BSSMAP HANDOVER REQUEST ACKNOWLEDGE.

In the first case, 3G-MSC-A shall wait for the radio resources allocation response from MSC-B, transmitted to 3G-MSC-A as described in subclause 4.5.4.

In the second case, the positive result triggers in 3G-MSC-A the sending on Iu-Interface of the RELOCATION CMD.

In the third case, the positive result triggers in 3G-MSC-A.

NOTE 4: The possible sending of the RELOCATION PREP FAILURE message is described in the 3G 25.413.

(The possible sending of the RELOCATION PREP FAILURE message upon receipt of the HANDOVER FAILURE is out of the scope of the 3G TS 29.010 and lies in the 3G TS 25.413).

The interworking between Send End Signal and HANDOVER COMPLETE in MSC-B is as follows:

	08.08 29.002	Notes
Forward message	HANDOVER COMPLETE MAP SEND END SIGNAL request	
	-DSS-APDU( HANDOVER COMPLETE)	
Positive result	CLEAR COMMAND MAP SEND END SIGNAL response -Call Control release	1
Negative result	CLEAR COMMAND -Call Control release MAP CLOSE -Call Control release MAP U/P -ABORT	2

- NOTE 1: The positive empty result triggers the clearing of the Radio Resources on the A-Interface and the release of the SCCP connection between MSC-B and BSS-B. If a circuit connection is used between 3G\_MSC-A and MSC-B, the 'Call Control release' clearing cause shall only be given to BSS-B when MSC-B has received a clearing indication on its circuit connection with 3G\_MSC-A.
- NOTE 2: The abortion of the dialogue or the rejection of the component triggers in MSC-B the clearing of its circuit connection with 3G\_MSC-A, if any, of the Radio Resources on the A-Interface and the release of the SCCP connection between MSC-B and BSS-B.

The interworking between Send End Signal and IU RELEASE COMMAND in 3G\_MSC-A is as follows:

	29.002		25.413	Notes
Forward message	MAP SEND response	END SIGNAL	IU RELEASE COMMAND	T
		-bss-APDU( HANDOVER COMPLETE)	- <del>Handover</del> Successful <u>Re</u>	location
Positive result				
Negative result				

The interworking between RELOCATION CANCEL in case of reversion to old channel of the UE and User Abort in 3G-MSC-A is as follows:

	25.413	29.002	Notes
Forward message	RELOCATION CANCEL - <del>Reversion to old</del>	MAP U -ABORT	
	<u> </u>	<u>elled</u>	I
Positive result	RELOCATION CANCEL ACKNOWI	EDGEMENT	
Negative result			

## 4.6.2 Subsequent Inter-MSC Handover from 3G-MSC-B back to MSC-A

When a Mobile Station is being handed over back to MSC-A, the procedure (described in TS 23.009) requires interworking between A-Interface, Iu-interface and E-Interface.

The signalling at initiation, execution and completion of the Subsequent Inter-MSC handover procedure is shown in figures 27 to 31.


Figure 27: Signalling for Subsequent Inter-MSC Handover back to MSC-A initiation

Possible Positive outcomes:

a) successful radio resources allocation:

b) radio resources allocation queued. Later successful radio resources allocation indication:



## Figure 28: Signalling for Subsequent Inter-MSC Handover back to MSC-A execution (Positive outcome)

Possible Negative outcomes:

c) user error detected, or component rejection or dialogue abortion performed by MSC-A:



d) component rejection or dialogue abortion performed by MSC-A:

e) radio resources allocation failure:



f) radio resources allocation queued. Later unsuccessful radio resources allocation:



## Figure 29: Signalling for Subsequent Inter-MSC Handover back to MSC-A execution (Negative outcome)

NOTE 1: 1	Possible rejectio	n of the handover	because of the	e negative outcome	of MAP or	BSSMAP	procedure.
	5			0			4

BSS-B MS	Ç-A	3G-MŞC-В	RNS-A
HANDOVER > COMPLETE	MAP SEND END SIGNAL response	>	COMMAND

### Figure 30: Signalling for Subsequent Inter-MSC Handover back to MSC-A completion (Successful completion of the procedure)

NOTE: Positive outcome case shown in figure 9.

E	3SS-B	MSC	Г-А	3G-MS	SC-B	RNS-	A
	HANDOVER COMPLETE	>	MAP SEND END SIGNAL response MAP U/P -ABORT	>			
			<		Iu RELEASE COMMA (Note 1)	ND >	

### Figure 31: Signalling for Subsequent Inter-MSC Handover back to MSC-A completion (Unsuccessful completion of the procedure)

NOTE 1: Abnormal end of the procedure which 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 message	REL. REQUIRED MAP	PREPARE SUBSEQUENT HANDOVER request	
		-target MSC number -targetCellId	
		-bss-APDU( HANDOVER REQUEST)	
	RANAP information elements:	BSSMAP information elements:	
	MS Classmark 2 Source Id Target Id Cause MS Classmark 3	CM2 Cell Id (serving) Cell Id (target) Cause CM3	1
		info stored/generated in/by 3G-MSC-B: Message Type Channel Type Speech version Priority Interference Band to be used	
Positive result	RELOCATION CMD. MAP	PREPARE SUBSEQUENT HANDOVER response -bss-APDU( QUEUING INDICATION or HANDOVER REQUEST ACKNOWLEDGE or HANDOVER FAILURE)	2
	RANAP information elements: L3 information	BSSMAP information elements: L3 information	
Negative result	REL. PREP. FAILURE	MAP PREPARE SUBSEQUENT HANDOVER response	3
Target Cl	<del>equipment failure</del> N/RNC or Target SystemU	Relocation Failure i Inknown MSC   Relocation Failure i	in In
<u>Target</u> Cl	V/RNC or Target System	Subsequent Handover] Failure	<u></u>
Target Cl	e <del>quipment failure</del> N/RNC or Target System	Relocation Failure	ln
Unexpecte	edDataValue    <del>equipment failure</del>		in
Target Cl	V/RNC or Taerget System	Data Missing	
	IU RELEASE COMMAND		1
CLOSE	equipment failure	Relocation Ceancelle	ea MAP
U/P -ABO	<del>equipment failure</del> RT	Relocation Cancelled	<u>а</u> мар
	l		

NOTE 1: The mapping of cause code values between BSSMAP and RANAP is FFS.

1

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

In the first case, 3G-MSC-B shall wait for the radio resources allocation response from MSC-A, transmitted to 3G-MSC-B as described in subclause 4.5.4.

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

In the third case, the positive result triggers in 3G-MSC-B the sending of the RELOCATION PREPARATION FAILURE.

NOTE 3: The possible sending of the RELOCATION PREPARATION FAILURE message is described in 3G TS 25.413.

The interworking between Send End Signal Result and HANDOVER COMPLETE in MSC-A is as follows:

	08.08			29.002	Notes
Forward message	HANDOVER	COMPLETE	MAP SEND	END SIGNAL response	
Positive result					
Negative result			MAP	U/P -ABORT	 1

NOTE: The abortion of the dialogue ends the handover procedure with 3G-MSC-B.

### 4.6.3 Subsequent Inter-MSC Handover to third MSC

When a Mobile Station is being handed over to a third MSC, the procedure (described in 3G TS 23.009) does require one specific interworking case in MSC-A between E-Interface from 3G-MSC-B and E-Interface from MSC-B' other than the combination of the ones described in subclauses 4.6.1 and 4.6.2.



#### Figure 32: Signalling for Subsequent Inter-MSC Handover to third MSC (MSC-B') initiation

Possible Positive outcomes:

a) successful radio resources allocation:



b) radio resources allocation queued and successful handover number allocation, if performed. Later successful radio resources allocation indication:

RNS-A	3G-MS	ŞC-В	MSQ	<u>7</u> −A	MSC	[−В'
						BSS-B
						QUEUING < INDICAT.
				MAP PREPARE	HAND	VER
		MAP PREPARE SUBSEQUE	ENT	response		
		TANDOVER TESPONSE			7	HANDOVER < REQUEST CKNOWLEDGE
				MAP PROCESS	ACCES	s
RELOCAT	LION	MAP FORWARD ACCESS < SIGNALLING request		SIGNALLING r	eques	st
COMMANI	 )					

## Figure 33: Signalling for Subsequent Inter-MSC Handover to third MSC (MSC-B') execution (Positive outcome)

Possible Negative outcomes:

c) user error detected, or component rejection or dialogue abortion performed by MSC-B':

F	RNS-A 3G	-MSC-B	MSG	2-A	MSC	с−в'		
	RELOCATION < PREPARATION FAILURE	MAP PREPARE SUBSEQUE 	NT  gat	MAP resp MAP MAP	PREPARE HANDO ponse negative CLOSE U/P -ABORT	OVER e res	BSS-B sult	
	(Note 1)							

d) radio resources allocation failure:



e) radio resources allocation queued and successful handover number allocation (if performed). Later unsuccessful radio resources allocation:

RNS-A	3G-	MSC-B	MSC	Ç−A	MSC	С-В'
						BSS-B
						QUEUING < INDICAT.
		MAP PREPARE SUBSEQUE < HANDOVER response	ENT 	MAP PREPARE < response	HAND(	VER
						HANDOVER < FAILURE
	NT.	MAP FORWARD ACCESS < SIGNALLING request		MAP PROCESS	ACCES	ss st
RELOCATIO PREPARATI FAILURE (Note 1)	ON ON					

Figure 34: Signalling for Subsequent Inter-MSC Handover to third MSC (MSC-B') execution (Negative outcome)

NOTE 1: Possible rejection of the handover because of the negative outcome of MAP or BSSMAP procedure.





Figure 35: Signalling for Subsequent Inter-MSC Handover to third MSC (MSC-B') completion (Successful completion of the procedure)

Negative outcome:



### Figure 36: Signalling for Subsequent Inter-MSC Handover to third MSC (MSC-B') completion (Unsuccessful completion of the procedure)

NOTE 1: Specific interworking case detailed below.

The specific interworking case in MSC-A compared to the subclauses 4.5.1 and 4.5.2 occurs between HANDOVER FAILURE encapsulated in a Process Signalling from 3G-MSC-B and the abortion of the dialogue with MSC-B' in the case of a reversion to old channel of the MS:

	29.002	29.002	Notes
Forward message	MAP PROCESS-SIGNALLING request		
	-bss-APDU( HANDOVER FAILURE)	MAP U -ABORT	1
Positive result			
Negative result		MAP U/P -ABORT	2

NOTE 1: The abortion of the dialogue triggers in MSC-B' the clearing of the circuit connection with MSC-A, if any, and of the Resources between MSC-B' and BSS-B'.The abortion of the dialogue ends the handover procedure with MSC-B'.

NOTE 2: The abortion of the dialogue ends the handover procedure with 3G-MSC-B.

### 4.6.4 BSSAP Messages transfer on E-Interface

The handling is described in chapter 4.5.4.

### 4.7 Inter-MSC Handover (GSM to UMTS)

The general principles of the handover procedures are given in 3G TS 23.009. 3G TS 29.010 gives the necessary information for interworking between the 3G TS 25.413 RANAP protocol, GSM handover procedures and the 3G 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

When a Mobile Station is handed over between two MSCs, the establishment of a connection between them (described in 3G TS 23.009) requires interworking between A-Interface, Iu-Interface and E-Interface.

The signalling at initiation, execution and completion of the Basic Inter-MSC handover procedure is shown in figures 37 to 42 with both possible positive or negative outcomes.

Additionally figure 37b shows the possible interworking when the trace related message is transparently transferred on the E-Interface at Basic Inter-MSC Handover initiation.



Figure 37a: Signalling for Basic Inter-MSC Handover initiation (no trace related messages transferred)



#### Figure 37b: Signalling for Basic Inter-MSC Handover initiation (CN invoke trace message transferred)

- (\*): Tracing invocation has been received from VLR.
- (\*\*): In that case, HANDOVER REQUEST and MSC INVOKE TRACE messages are included within the ANapdu parameter.
- (\*\*\*): CN INVOKE TRACE is forwarded to RNS-B if supported by 3G\_MSC-B.

Possible Positive outcomes: successful radio resources allocation and handover number allocation (if performed):



#### Figure 38: Signalling for Basic Inter-MSC Handover execution (Positive outcome)

Possible Negative outcomes:

a) user error detected, or handover number allocation unsuccessful (if performed), or component rejection or dialogue abortion performed by 3G\_MSC-B:

ł	3SS-A	MS	Ç-A	3G-MS	ŞС-В	RNS	3-B
			MAP PREPARE HANDOVER negative result, MAP < MAP U/P-ABORT	respo CLOSI	onse E		
	HANDOVER REQU REJECT (Note	JIRI 1)	3D				

b) radio resources allocation failure:

]	BSS-A	MSQ	2-A			3G-MS	ŞC-В	RNS	Ş-В
			MAP PI	REPARE  onse	HANDOVER		RELOCATION	FAILURE	
	HANDOVER REQU  REJECT (Note	IRE  1)	!D						

c) unsuccessful handover execution (Reversion to the old radio resources):



#### Figure 39: Signalling for Basic Inter-MSC Handover execution (Negative outcomes)

NOTE 1: Possible rejection of the handover because of the negative outcome of MAP or RANAP procedure.

ł	3SS-A M	SÇ-A				3G-MS	ŞC-В	RNS	Ş-В
		MAP	SEND	END	SIGNAL	reques	RELOCATION <	COMPLETE	
	CLEAR COMMAND	-							

#### Figure 40: Signalling for Basic Inter-MSC Handover completion

Positive outcome:

BSS-A	MSC	Ç−A				3G-MS	ŞС-В	RNS	Ş-B
		MAP S	END	END	SIGNAL	>			
		resp	onse	2			IU RELEASE	COMMAND	
							(Note 2)		



Negative outcome:

BSS-A	MSÇ-A	3G-МŞС-В	rnş-b
	MAP U/P -ABORT	> IU RELEAS	E_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.

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. For compatibility reason, the cell identity of the cell where the call is to be handed over in 3G\_MSC-B area, provided in the HANDOVER REQUIRED message, is mapped into targetCellId MAP parameter and the 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 3G 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	MAI	P PREPARE	HANDOVER request	T
	licssage	BSSMAP informatic	n	-ho-l -targ -IMS	NumberNotRequired getCellId	. 1
				-Inte	egrity protection	<u>2</u>
				-Enci -an-A HANDO	ryption info APDU( OVER REOUEST.	<u>3</u> 2
l				MSC	INVOKE ŤRAČE)	43
I	Positive result		MAP	PREPARE I	HANDOVER response	54
				-har -an- HAI ACI HAI	ndover number -APDU( NDOVER REQUEST KNOWLEDGE or NDOVER FAILURE)	
I	Negative	HANDOVER REQUIRED	REJEC	CT MAP	PREPARE HANDOVER	<u>6</u> 5
	IESUIC	equipment failure equipment failure		Sy: No	stem Failure Handover Number	
		equipment failure equipment failure		Une Dat	expectedDataValue ta Missing	
		equipment failure equipment failure		MAI MAI	P CLOSE P U/P -ABORT	
						1

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 <u>3</u>2: The process performed on the BSSMAP information elements received in the HANDOVER REQUIRED message is described in the GSM Recommendation 08.08.

- NOTE <u>43</u>: The process performed on the BSSMAP information elements received in the MSC INVOKE TRACE message is described in subclause 4.5.5.6.
- NOTE <u>5</u>4: 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 3G TS 29.010 and lies in GSM 08.08).

NOTE <u>65</u>: 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				
I	Forward message	MAP PREPARE HANDOVER request -ho-NumberNotRequired -targetCellId -IMSI -Integrity protection i: -Encryption info -an-APDU( HANDOVER REQUEST, MSC INVOKE TRACE)	RELOCATION REQUEST	<u>1</u>				
		BSSMAP information elements:	RANAP information elements:					
		Channel Type Cause sRNC to tRNC containe:	RAB parameters Cause r sRNC to tRNC container					
			info stored/generated in/by 3G_MSC-B: CN domain indicator					
	Positive result	MAP PREPARE HANDOVER response -an-APDU( HANDOVER REQUEST ACK)	RELOCATION REQUEST ACK	+				
		BSSMAP information elements:	RANAP information elements:					
		Layer 3 info	tRNC to sRNC container					
I	Negative result	MAP PREPARE HANDOVER response -an-APDU( HANDOVER FAILURE)	RELOCATION FAILURE	<b>+</b>				
	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							
	e	al 1101.						

The interworking between Send End Signal and RELOCATION COMPLETE in 3G\_MSC-B is as follows:

	25.413	29.002	Notes
Forward	RELOCATION COMPLETE	MAP SEND END SIGNAL request	
lilessage		-an-APDU( HANDOVER COMPLETE)	
Positive result	IU RELEASE COMMAND -Normal release	MAP SEND END SIGNAL response	1
Negative result	IU RELEASE COMMAND -Normal release -Normal release	MAP CLOSE MAP U/P -ABORT	2

- NOTE 1: The positive empty result triggers the clearing of the Radio Resources on the Iu-Interface and the release of the SCCP connection between 3G\_MSC-B and RNS-B. If a circuit connection is used between MSC-A and 3G\_MSC-B, the 'Normal release' clearing cause shall only be given to RNS-B when 3G\_MSC-B has received a clearing indication on its circuit connection with MSC-A.
- NOTE 2: The abortion of the dialogue or the rejection of the component triggers in 3G\_MSC-B the clearing of its circuit connection with MSC-A, if any, of the Radio Resources on the Iu-Interface and the release of the SCCP connection between 3G\_MSC-B and RNS-B.

The interworking between Send End Signal and CLEAR COMMAND in MSC-A is as follows:

	29.002		08.08	Notes
Forward message	MAP SEND	END SIGNAL	CLEAR COMMAND	<b>T</b>
	request	-an-APDU( HANDOVER COMPLETE)	- Handover Successful	
Positive result				
Negative result				

The interworking between HANDOVER FAILURE in case of reversion to old channel of the MS and User Abort in MSC-A is as follows:

	08.08	29.002	Notes
Forward message	HANDOVER FAILURE	MAP U -ABORT	T
	- Reversion to old channel		
Positive result			
Negative result			

### **NEXT MODIFIED SECTION**

### 4.8 **SInter-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 3G TS 29.108.

### 4.8.1 Basic Inter-MSC Relocation

When a Mobile Station is relocated between two MSCs, the establishment of a connection between them (described in TS 23.009) requires interworking between Iu-Interface and E-Interface.

The signalling at initiation, execution and completion of the Basic Inter-MSC relocation procedure is shown in figures 50 to 54 with both possible positive or negative outcomes.

Additionally figure 50b shows the possible interworking when trace related messages are transparently transferred on the E-Interface at Basic Inter-MSC Relocation initiation.



## Figure 50a: Signalling for Basic Inter-MSC Relocation initiation (no trace related messages transferred)

RNS-A	3G-I	MSC-A	3G−I	ISC-B
RELOCATION REQUIRED	>	MAP PREPARE HANDOVER request (**)	>	Possible Alloc. of a relocation no. in the VLR-B
				RNS-B
				RELOCATION REQUEST
				CN INVOKE TRACE

## Figure 50b: Signalling for Basic Inter-MSC Relocation initiation (CN invoke trace message transferred)

- (\*): Tracing invocation has been received from VLR.
- (\*\*): In that case, RELOCATION REQUEST and CN INVOKE TRACE messages are included within the ANapdu parameter.
- (\*\*\*): CN INVOKE TRACE is forwarded to RNS-B if supported by 3G\_MSC-B.

Possible Positive outcomes: successful radio resources allocation and relocation numbers allocation (if performed):



Possible Negative outcomes:

a) user error detected, or relocation numbers allocation unsuccessful (if performed), or component rejection or dialogue abortion performed by 3G\_MSC-B:



b) radio resources allocation failure:



c) radio resources allocation partial failure (3G\_MSC-A decides to reject the relocation):

ŖI	NS-A	3G-MS	SC-A			3G-1	MSC-B	RNS	-B
							RELOCATION	REQUEST	
			MAP <	PREPARE	HANDOVER		ACK		
I I	RELOCATION < FAILURE	PREPZ	res ARAT	sponse ION					

d) unsuccessful relocation execution (relocation cancelled):



#### Figure 51: Signalling for Basic Inter-MSC Relocation execution (Negative outcomes)



#### Figure 52: Signalling for Basic Inter-MSC Relocation completion

Positive outcome

RNS-A	3G-MŞC-A		3G-MSC-B	RNS-B
	MAP SI	END END SIGNAL		
	respo	onse	IU RELEASE	E COMMAND
			(Note 1)	/

#### Figure 53: Signalling for Basic Inter-MSC Relocation completion (Positive outcome)

NOTE: From interworking between MAP and RANAP point of view.

Negative outcome:

RNS-A	3G-MS	SC-A	3G-№	ISC-B	RNS-B
		MAP U/P -ABORT	>	IU RELEASE COMM	AND >

#### 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 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 3G 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	RELOCATION REQUIRED MAP	PREPARE HANDOVER request	
Info	RANAP information	-ho-NumberNotRequired <del>-Channel Type</del> Radio Res	1 source
<u>11110</u>	elements	-an-APDU( RELOCATION REQUEST, CN INVOKE TRACE)	2
Positive	MAP PREPARE HANDOVE	R response	
TESUIC	RELOCATION COMMAND RELOCATION PREP FAILURE	-relocation numbers -an-APDU( RELOCATION REQUEST ACKNOWLEDGE or RELOCATION FAILURE)	C
Negative	RELOCATION PREP FAILURE	MAP PREPARE HANDOVER	
result	Unspecified failure Unspecified failure	System Failure No Handover Number	
	Unspecified failure Unspecified failure	UnexpectedDataValue Data Missing	
	Unspecified failure Unspecified failure	MAP CLOSE 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 3G TS 25.413.
- NOTE 3: The response to the Prepare-Handover request can include in its an-APDU parameter, identifying the 3G 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.

The interworking between Send End Signal and RELOCATION COMPLETE in 3G\_MSC-B is as follows:

	25.413	29.002	Notes
Forward message	RELOCATION COMPLETE MA	AP SEND END SIGNAL request -an-APDU( RELOCATION COMPL)	
Positive result	IU RELEASE COMMAND MA -Normal release	AP SEND END SIGNAL response	1
Negative result	IU RELEASE COMMAND -Normal release -Normal release	MAP CLOSE MAP U/P -ABORT	2

- NOTE 1: The positive empty result triggers the clearing of the Radio Resources on the Iu-Interface and the release of the SCCP connection between 3G\_MSC-B and RNS-B. If a circuit connection is used between 3G\_MSC-A and 3G\_MSC-B, the 'Normal release' clearing cause shall only be given to RNS-B when 3G\_MSC-B has received a clearing indication on its circuit connection with 3G\_MSC-A.
- NOTE 2: The abortion of the dialogue or the rejection of the component triggers in 3G\_MSC-B the clearing of its circuit connection with 3G\_MSC-A, if any, of the Radio Resources on the Iu-Interface and the release of the SCCP connection between 3G\_MSC-B and RNS-B.

The interworking between Send End Signal and IU RELEASE COMMAND in 3G\_MSC-A is as follows:

	29.002		25.413	Notes
Forward	MAP SEND	END SIGNAL	IU RELEASE COMMAND	
lilessage	request	-an-APDU( RELOCATION	- Successful COMPLETE) Relocation	
Positive result				
Negative result				

The interworking between RELOCATION CANCEL in case of relocation cancelled and User Abort in 3G-MSC-A is as follows:

	25.413	29.002	Notes
Forward	RELOCATION CANCEL	MAP U -ABORT	
liiessage	- Relocation cancelled		
Positive result	RELOCATION CANCEL	ACKNOWLEDGEMENT	
Negative result			

### 4.8.2 Subsequent Inter-MSC Relocation back to 3G\_MSC-A

When a Mobile Station is being relocated back to 3G\_MSC-A, the procedure (described in TS 23.009) requires interworking between Iu-Interface and E-Interface.

The signalling at initiation, execution and completion of the Subsequent Inter-MSC relocation procedure is shown in figures 55 to 59.



#### Figure 55: Signalling for Subsequent Inter-MSC Relocation back to 3G\_MSC-A initiation

Possible Positive outcomes: successful radio resources allocation:



## Figure 56: Signalling for Subsequent Inter-MSC Relocation back to 3G\_MSC-A execution (Positive outcome)

Possible Negative outcomes:

a) user error detected, or component rejection or dialogue abortion performed by 3G\_MSC-A:

b) component rejection or dialogue abortion performed by 3G\_MSC-A:



c) radio resources allocation failure:



d) radio resources allocation partial failure (3G\_MSC-A decides to reject the relocation):



e) unsuccessful relocation execution (relocation cancelled):

RNS-A  RELOCATION	3G-MSC-В	3G-M	SC-A	RNS-B
CANCEL	>   MAP PROCES	S ACCESS		
	SIGNALL	ING request	IU RELEASE	COMMAND
			IU RELEASE	COMPLETE
	MAP FORWAR	ACCESS		
RELOCATION	SIGNALL	ING request		
CANCEL ACK				

## Figure 57: Signalling for Subsequent Inter-MSC Relocation back to 3G\_MSC-A execution (Negative outcome)

RNS-A	3G-MS	ŞС-В			3G-MS	ŞC-A	RNS-E
IU RELEASE	CMD	MAP SEN < respon	D END  se	SIGNAL		RELOCATION < COMPLETE	

## Figure 58: Signalling for Subsequent Inter-MSC Relocation back to 3G\_MSC-A completion (Successful completion of the procedure)

NOTE: Positive outcome case shown in figure 53.

RNS-A	3G-MS	ŞС-В	3G-MS	ŞC-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 message	REL. REQUIRED MAP	PREPARE SUBSEQUENT HANDOVER request	
	RANAP information elements	-target MSC number -an-APDU( RELOCATION REQ)	1
Positive result	MAP RELOCATION CMD. RELOCATION PREP FAILU	PREPARE SUBSEQUENT HANDOVER response -an-APDU( RELOCATION REQUEST ACKNOWLEDGE or RE RELOCATION FAILURE)	2
Negative result	REL. PREP. FAILURE Unspecified failure Unspecified failure Unspecified failure Unspecified failure Iu RELEASE COMMAND Unspecified failure Unspecified failure	MAP PREPARE SUBSEQUENT HANDOVER response Unknown MSC Subsequent Handover Failure UnexpectedDataValue Data Missing MAP CLOSE MAP U/P -ABORT	

- 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 3G 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.

The interworking between RELOCATION CANCEL and MAP Process Signalling Request in 3G\_MSC-A is as follows:

	29.002	25.413	Notes
Forward message	MAP PROCESS-SIGNALLING request -an-APDU( RELOCATION CANCEL)	IU RELEASE COMMAND	
Positive result	MAP FORWARD-SIGNALLING request -an-APDU( RELOCATION CANCEL ACK)	IU RELEASE COMPLETE	
Negative result			

The interworking between RELOCATION CANCEL and MAP Process Signalling Request in 3G\_MSC-B is as follows:

	25.413	29.002	Notes
Forward message	RELOCATION CANCEL	MAP PROCESS-SIGNALLING request -an-APDU( RELOCATION CANCEL)	
Positive result	RELOCATION CANCEL ACK	MAP FORWARD-SIGNALLING request -an-APDU( RELOCATION CANCEL ACK)	
Negative result			

The interworking between Send End Signal Result and RELOCATION COMPLETE in 3G\_MSC-A is as follows:

	25.413				29.002	 Notes
Forward message	RELOCATION	COMPLETE	MAP	SEND	END SIGNAL response	
Positive result						 
Negative result				MAP (	J/P -ABORT	

NOTE: The abortion of the dialogue ends the relocation procedure with 3G\_MSC-B.

### 4.8.3 Subsequent Inter-MSC Relocation to third MSC

When a Mobile Station is being relocated to a third MSC, the procedure (described in 3G TS 23.009) does require one specific interworking case in 3G\_MSC-A (figure 64) between E-Interface from 3G\_MSC-B and E-Interface from 3G\_MSC-B' other than the combination of the ones described in the subclause 4.8.1 and 4.8.2.

ŖŇ	IS-A	3G-1	ISC-B	3G-1	ASC-A	7		3G-N	ISC-B'
	ELOCATIC	DN >	MAP PREPARE SUBSEQU HANDOVER request	JENT	MAP HANI	PREPA	ARE requ	> est	Possib. Alloc. of relo number VLR-B TRNS-B RELOCATION REQUEST

Figure 60: Signalling for Subsequent Inter-MSC Relocation to third MSC (3G\_MSC-B') initiation

Possible Positive outcomes: successful radio resources allocation:



## Figure 61: Signalling for Subsequent Inter-MSC Relocation to third MSC (3G\_MSC-B') execution (Positive outcome)

Possible Negative outcomes:

a) user error detected, or component rejection or dialogue abortion performed by 3G\_MSC-B':

F	RNS-A 3G-	MSC-B	3G-1	ISC-I	ł	3G-1	MSC-I	3'	
	RELOCATION < PREPARATION FAILURE	MAP PREPARE S 	SUBSEQUENT	MAP resp MAP MAP	PREF Oonse CLOS U/P	PARE HAND negativ E  -ABORT	OVER e re:	RNS-1	3

b) radio resources allocation failure:



c) radio resources allocation partial failure (3G\_MSC-A decides to reject the relocation):



## Figure 62: Signalling for Subsequent Inter-MSC Relocation to third MSC (3G\_MSC-B') execution (Negative outcome)

Positive outcome:



## Figure 63: Signalling for Subsequent Inter-MSC Relocation to third MSC (3G\_MSC-B') completion (Successful completion of the procedure)

Negative outcome:

F	RNS-A	3G-N	ISC-B	3G-1	ISC-A		3G-N	ISC-B'	
	RELOCATIO	) N						RNS-B	'
	CANCEL	>	MAP PROCESS ACCESS						
			SIGNALLING request	> (Not	e 1)				
					MAP U	-ABORT			
			MAP FORWARD ACCESS				>	IU RELEAS	Ļ
	RELOCATIO	ON	SIGNALLING reques	t				COMMAND	
	CANCEL AC	CK							

## Figure 64: Signalling for Subsequent Inter-MSC Relocation to third MSC (3G\_MSC-B') completion (Unsuccessful completion of the procedure)

NOTE: Specific interworking case detailed below.

The specific interworking case in 3G\_MSC-A compared to the subclauses 4.8.1 and 4.8.2 occurs between RELOCATION FAILURE encapsulated in a Process Access Signalling from 3G\_MSC-B and the abortion of the dialogue with 3G\_MSC-B' in the case of relocation cancelled:

	29.002	29.002	Notes
Forward message	MAP PROCESS-SIGNALLING request		
	-an-APDU( RELOCATION CANCEL)	MAP U -ABORT	1
Positive result	MAP FORWARD-SIGNALLING request -an-APDU( RELOCATION CANCEL ACK)		
Negative result		MAP U/P -ABORT	2

NOTE 1: The abortion of the dialogue triggers in 3G\_MSC-B' the clearing of the circuit connection with 3G\_MSC-A, if any, and of the Resources between 3G\_MSC-B' and RNS-B'. The abortion of the dialogue ends the relocation procedure with 3G\_MSC-B'.

NOTE 2: The abortion of the dialogue ends the relocation procedure with 3G\_MSC-B.

### 4.8.4 RANAP Messages transfer on E-Interface

The following mapping applies to the encapsulation performed in 3G\_MSC-A.

	25.413	29.002	Notes
Forward message	RANAP messages	MAP FORWARD ACCESS SIGNALLING request	1
		-an-APDU (RANAP messages)	
Positive result			2
Negative result		MAP CLOSE MAP U/P -ABORT	

- NOTE 1: Complete RANAP messages to be sent on 3G\_MSC-B RNS-B interface are embedded into the an-APDU parameter.
- NOTE 2: The Return Result does not apply. If 3G\_MSC-B returns a message, this message will arrive in an Invoke: Process Access Signalling.

The following mapping applies to the encapsulation performed in 3G\_MSC-B.

	25.413	29.002	Notes
Forward message	RANAP messages	MAP PROCESS ACCESS SIGNALLING request	1
		-an-APDU (RANAP messages)	
Positive result			2
Negative result	IU RELEASE COMMAND	MAP CLOSE	
	Unspecified failure	MAP U/P -ABORT	3

- NOTE 1: Complete RANAP messages to be sent to 3G\_MSC-A are embedded into the an-APDU parameter.
- NOTE 2: The Return Result does not apply. If 3G\_MSC-A returns a message, this message will arrive in an Invoke: Forward Access Signalling.
- NOTE 3: The abortion of the dialogue triggers the clearing of the circuit connection with 3G\_MSC-A, if any, of the Radio Resources on the Iu-Interface and the release of the SCCP connection between 3G\_MSC-B and RNS-B. The clearing of the Radio Resources (the clearing indication received from RNS-B is transmitted to 3G\_MSC-A) or the loss of the SCCP connection between 3G\_MSC-B and RNS-B, triggers in 3G\_MSC-B the abortion of the dialogue on the E-Interface and the clearing of the circuit connection with 3G\_MSC-A, if any.

### 4.8.5 Processing in 3G\_MSC-B, and information transfer on E-interface

The following parameters require processing (e.g. to store the parameter, to internally generate the parameter) in 3G\_MSC-B. The relevant RANAP procedures are mentioned to ease the comprehension, their detailed description is the scope of the TS 25.413. Each RANAP message being transferred on E-interface shall use the mechanisms given in subclause 4.8.4 and is described in TS 25.413.

#### 4.8.5.1 Integrity Protection Information

A sequence of possible integrity protection algorithms can be sent to an RNS in Security Mode Command or Relocation Request. The RNS chooses one of the listed algorithms and reports this back to the 3G\_MSC in Security Mode Complete or Relocation Request Acknowledge respectively.

The list of algorithms, the integrity protection key and the chosen algorithm shall be stored by 3G\_MSC-B.

Transfer of Information:

If integrity protection has not been performed before Inter-MSC Relocation, this will be controlled by 3G\_MSC-A after the completion of Inter-MSC Relocation.

Integrity protection control towards 3G\_MSC-B:

If Integrity protection has been performed before Inter-MSC Relocation:

- in the Relocation Request RANAP message (information included).

The Relocation Request Acknowledge should in this case contain the indication of the chosen algorithm.

If Integrity protection has NOT been performed before Inter-MSC Relocation:

- in the Security Mode Command procedure between 3G\_MSC-A and 3G\_MSC-B.

#### 4.8.5.2 Encryption Information

A sequence of possible encryption algorithms can be sent to an RNS in Security Mode Command or Relocation Request. The RNS chooses one of the listed algorithms and reports this back to the 3G\_MSC in Security Mode Complete or Relocation Request Acknowledge respectively.

The list of algorithms, the ciphering key and the chosen algorithm shall be stored by 3G\_MSC-B, and the chosen value sent to 3G\_MSC-A.

Transfer of Information:

If ciphering has not been performed before Inter-MSC Relocation, this will be controlled by 3G\_MSC-A after the completion of Inter-MSC Relocation.

Ciphering control towards 3G\_MSC-B:

If Ciphering has been performed before Inter-MSC Relocation:

- in the Relocation Request RANAP message (information included).

The Relocation Request Acknowledge should in this case contain the indication of the chosen algorithm.

If Ciphering has NOT been performed before Inter-MSC Relocation:

- in the Security Mode Command procedure between 3G\_MSC-A and 3G\_MSC-B.

#### 4.8.5.3 RAB Parameters

The parameters shall be stored by 3G\_MSC-B to be used at internal Relocation in 3G\_MSC-B.

Transfer of information:

Received by 3G\_MSC-B from 3G\_MSC-A in:

- The Relocation Request RANAP message.

If a new type of resource is to be assigned after Inter-MSC Relocation, this can be made with:

- The RAB Assignment Request RANAP message.

### 4.8.5.4 Channel Type

The parameter shall be stored by 3G\_MSC-B and used for intra-MSC UMTS to GSM handover.

Transfer of information:

Received by 3G\_MSC-B from 3G\_MSC-A in:

- The Prepare Handover Request MAP message.

# 4.8.6 Overview of the Technical Specifications 3GPP interworking for the Inter-MSC Relocation



### Annex A: Change history

Change history						
TSG CN#	Spec	Version	CR	<phase></phase>	New Version	Subject/Comment
Sept 1999	GSM 09.10	7.0.0				Transferred to 3GPP CN
CN#04	29.010			R99	3.0.0	Approved by mail exploder at CN#04
CN#06	29.010	3.0.0	001	R99	3.1.0	UMTS / GSM Interworking
CN#06	29.010	3.0.0	002	R99	3.1.0	Addition of LSA Information message
CN#07	29.010	3.1.0	003r1	R99	3.2.0	UMTS / GSM Interworking
CN#07	29.010	3.1.0	004r1	R99	3.2.0	GSM / UMTS Interworking
CN#07	29.010	3.1.0	005	R99	3.2.0	UMTS/UMTS Handover

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