3GPP TSG CN Plenary Meeting #23 10th – 12th March 2004 Phoenix, USA.

Source: TSG CN WG4

Title: Corrections on Handover

Agenda item: 7.5

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
29.010	097	1	N4-040256	R99	Correction of inter system handover cause mapping	F	3.11.0
29.010	098	1	N4-040257	Rel-4	Correction of inter system handover cause mapping	Α	4.7.0
29.010	099	1	N4-040258	Rel-5	Correction of inter system handover cause mapping	Α	5.5.0
29.010	100	1	N4-040259	Rel-6	Correction of inter system handover cause mapping	Α	6.1.0

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

With the current cause mapping the target radio system cannot distinguish

is mapped to BSSMAP cause 'Traffic'

Consequences if

between urgent and non-urgent inter system handovers and this can result in an increased call drop rate. Especially in high-load situations this can be a significant problem.

The cause mapping for the RANAP cause 'Resource Optimisation Relocation' remains undefined.

Clauses affected:	光 4.6.6, 4.7.6
Other specs Affected:	Y N X Other core specifications Test specifications O&M Specifications
Other comments:	The current 29.010 cause mapping was also seen as a problem in RAN3 (refer to the RAN3#38 report (R3-031753); discussion on Tdoc R3-031380).

How to create CRs using this form:

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

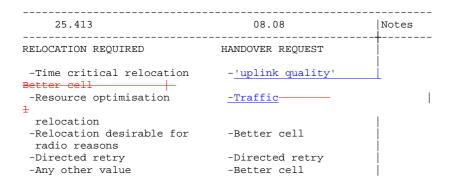
- 1) Fill out the above form. The symbols above marked \(\mathcal{H} \) contain pop-up help information about the field that they are closest to.
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- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First modified section ***

4.6.6 Cause Code Mapping

When a Mobile Station is handed over between UMTS and GSM, a mapping of the cause codes used in the RANAP and the BSSMAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in RANAP Relocation Required and the cause codes sent in BSSMAP Handover Request is as follows:



NOTE 1: Cause code not used at inter system handover.

The mapping between the cause codes received in RANAP Relocation Cancel and the cause codes sent in BSSMAP Clear Command is as follows:

25.413	08.08	Notes
RELOCATION CANCEL	CLEAR COMMAND	
-Trelocprepexpiry	-Radio interface failure, reversion to old channel	
-Interaction with other procedure	-Radio interface failure, reversion to old channel	
-Any other value	-Radio interface failure, reversion to old channel	

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Relocation Preparation Failure is as follows:

08.08	25.413	Notes
HANDOVER FAILURE	RELOCATION PREP. FAILURE	
-Ciphering algorithm not supported	-Requested ciphering and/or integrity protection is not supported	
-Circuit pool mismatch		j 1
-Equipment failure	-Relocation failure in Target CN/RNC or target system	
-Invalid message contents -No radio resource available	- Abstract Syntax Error -Relocation failure in Target CN/RNC or target system	
-O and M intervention -Radio interface failure, reversion to old channel	-O and M intervention	 2
-Radio interface message failure	-Relocation failure in Target CN/RNC or target system	
-Requested speech version unavailable	-Relocation failure in Target CN/RNC or target system	
-Requested terrestrial resource unavailable	-Relocation failure in Target CN/RNC or target system	
-Requested transcoding/rate adaption unavailable	-Relocation failure in Target CN/RNC or target system	
-Switch circuit pool	- ·	i 1
-Terrestrial circuit already allocated	-Relocation failure in Target CN/RNC or target system	
-Any other value	-Relocation failure in Target CN/RNC or target system	

NOTE 1: Cause code not used at inter-system handover.

NOTE 2: Cause code not applicable to this traffic case.

*** Next modified section ***

4.7.6 Cause Code Mapping

When a Mobile Station is handed over between GSM and UMTS, a mapping of the cause codes used in the BSSMAP and the RANAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in BSSMAP Handover Required and the cause codes sent in RANAP Relocation Request is as follows:

08.08	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	
-Better Cell	-Relocation Desirable for Radio Reasons	<u> </u>
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc. -Switch circuit pool	-Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Traffic	-Resource Optimisation Relocation	
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical relocTime critical relocRelocation Desirable for Radio Reasons	
Time Circical Peroc.		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Request and the cause codes sent in RANAP Relocation Request is as follows (the mapping is only used for the MAP-E interface):

08.08	25.413	Notes
HANDOVER REQUEST	RELOCATION REQUEST	
-Better Cell	-Relocation Desirable for Radio Reasons	1
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation	- Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
Time critical relocSwitch circuit pool -Traffic	-Resource Optimisation Relocation	1
Time critical reloc. -Uplink quality -Uplink strength -Any other value Time critical reloc.	-Time critical relocTime critical relocRelocation Desirable for Radio Reasons	-

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Iu Release Command is as follows:

08.08	25.413	Notes
HANDOVER FAILURE	IU RELEASE COMMAND	T
-Ciphering algorithm not supported		2
-Circuit pool mismatch		1
-Equipment failure -Invalid message contents	-Relocation cancelled -Abstract Syntax Error	
-No radio resource available -O and M intervention -Radio interface failure, reversion to old channel	-O and M intervention -Relocation cancelled	2
-Radio interface message failure	-Relocation cancelled	
-Requested speech version unavailable		2
-Requested terrestrial resource unavailable		2
-Requested transcoding/rate adaption unavailable		2
-Switch circuit pool -Terrestrial circuit already allocated	-Relocation cancelled	1
-Any other value	-Relocation cancelled	İ

NOTE 1: Cause code not used at inter-system handover.

NOTE 2: Cause code not applicable to this traffic case.

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	08.08	Notes
RELOCATION FAILURE	HANDOVER FAILURE	
-Any value	-No radio resource available	

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Request Reject is as follows:

25.413	08.08	Notes
RELOCATION FAILURE	HANDOVER REQUIRED REJECT	
-Any value	-No radio resource available	

The mapping between the RANAP and the BSSMAP assignment messages is used in the MAP-E interface. RANAP RAB Assignment Response with successful result is mapped to BSSMAP Assignment Complete; RANAP RAB Assignment Response with unsuccessful result is mapped to BSSMAP Assignment Failure. The mapping between the cause codes received in RANAP RAB Assignment Response and the cause codes sent in BSSMAP Assignment Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	08.08	Notes L
RAB ASSIGNMENT RESPONSE	ASSIGNMENT FAILURE	
-Requested traffic class not available -Invalid RAB parameters value -Requested max bit rate not available -Requested max bit rate for DL not available -Requested max bit rate for UL not available -Requested guaranteed bit rate not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for UL not available -Requested transfer delay not achievable -Invalid RAB param. combination	available -Invalid msg. contents -No radio resource available	
-Condition violation for SDU parameters	-Invalid msg. contents	<u> </u>
-Condition violation for traffic handling priority	-Invalid msg. contents	[[
-Condition violation for guaranteed bit rate	-Invalid msg. contents	<u> </u>
-User plane not supported	-No radio resource available	
-Iu UP failure -Tqueuing expiry	-Equipment failure -Radio interface message failure	
-Invalid RAB id -Request superseeded	-Invalid msg. contents -No radio resource available	
-Relocation triggered	-No radio resource available	
-Any other value	-Radio interface message failure	

The mapping between the cause codes received in RANAP Location Report and the cause codes sent in BSSMAP Handover Performed is as follows (this mapping is only used for the MAP-E interface):

25.413	08.08	Notes
LOCATION REPORT	HANDOVER PERFORMED	T
-User restriction start indUser restriction start indRequested report type not supported	-O&M intervention -O&M intervention	1
-Any other value	-Better cell	İ

NOTE 1: In this case, no Handover Performed is sent.

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CHANGE REQUEST								
ж 29	0.010 CR 098	жrev <mark>1</mark> ж	Current version:	4.7.0 [#]				
For HELP on using Proposed change affect	this form, see bottom of this	_	pop-up text ove					
Title: 第 Co	prrection of inter system hand	dover cause mappin	ng .					
Source: # Ch	N4							
Work item code: 第 Ha	andover		Date:	4/02/2004				
Deta	e one of the following categories F (correction) A (corresponds to a correction B (addition of feature), C (functional modification of fe D (editorial modification) ailed explanations of the above ound in 3GPP TR 21.900.	: n in an earlier release) eature)	2 (GS R96 (Rei R97 (Rei R98 (Rei R99 (Rei Rei-4 (Rei Rei-5 (Rei	el-4 following releases: SM Phase 2) lease 1996) lease 1997) lease 1998) lease 4) lease 5) lease 6)				
Reason for change: #	The handover/relocation of radio system indicates, be urgency of the handover/relocation' to indicate that bad radio conditions. The quality', 'uplink strength', 'This allows the target radio priority, if needed. E.g. if the urgent handovers but refuln the 29.010 cause mapped / relocation causes are mathis mapping important information in the sent by the Source RNC for this cause is missing. This is an essential correction of the control of the sent of the	esides the reason for elocation. The UTR a relocation is need a relocation is need BSS uses the BSSI downlink quality' or 'o system to handle the target radio system is each or inter system apped to 'non-urgen formation for the target use 'Resource Option UMTS to GSM hardstream in the control of the target and the control of the target is a system of target is a system of target is a system of target is a	r the handover/r AN uses RANAF ded to avoid call MAP causes 'dis downlink streng such a handove em is under high handovers som t' causes and vic get radio system misation Reloca	elocation, also the P cause 'time critical dropping due to stance', 'uplink ath' for this purpose. Er/relocation with a load, it can accept the 'urgent' handover ce versa. Due to a is suppressed.				
Summary of change: #	For Inter MSC UMTS to Grelocation' is mapped to the For Inter MSC GSM to UM 'uplink quality', 'uplink streem apped to RANAP cause For UMTS to GSM Hando is mapped to BSSMAP ca	ne BSSMAP cause ' MTS Handover only ongth', 'downlink qua outling critical relocationer, RANAP cause	uplink quality <u>.'</u> the BSSMAP ca .lity' or 'downlink ion'.	auses 'distance', s strength' are				

between urgent and non-urgent inter system handovers and this can result in an increased call drop rate. Especially in high-load situations this can be a significant problem.

The cause mapping for the RANAP cause 'Resource Optimisation Relocation' remains undefined.

Clauses affected:	第 4.6.6, 4.7.6
Other specs affected:	Y N X Other core specifications
Other comments:	# The current 29.010 cause mapping was also seen as a problem in RAN3 (refer to the RAN3#38 report (R3-031753); discussion on Tdoc R3-031380).

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4.6.6 Cause Code Mapping

When a Mobile Station is handed over between UMTS and GSM, a mapping of the cause codes used in the RANAP and the BSSMAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in RANAP Relocation Required and the cause codes sent in BSSMAP Handover Request is as follows:

```
25.413
                                        48.008
                                                               Notes
RELOCATION REQUIRED
                                  HANDOVER REQUEST
 -Time critical relocation
                                   - 'uplink quality'
 -Resource optimisation
                                   -Traffic-
  relocation
 -Relocation desirable for
                                   -Better cell
 radio reasons
-Directed retry
                                   -Directed retry
 -Any other value
                                    -Better cell
```

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in RANAP Relocation Cancel and the cause codes sent in BSSMAP Clear Command is as follows:

25.413	48.008	Notes
RELOCATION CANCEL	CLEAR COMMAND	
-Trelocprepexpiry -Interaction with other procedure -Any other value	-Radio interface failure, reversion to old channel -Radio interface failure, reversion to old channel -Radio interface failure, reversion to	
	old channel	

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Relocation Preparation Failure is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	RELOCATION PREP. FAILURE	
-Ciphering algorithm not supported	-Requested ciphering and/or integrity protection is not supported	-
-Circuit pool mismatch -Equipment failure	-Relocation failure in Target CN/RNC or	1
-Invalid message contents -No radio resource available	target system - Abstract Syntax Error -Relocation failure in Target CN/RNC or target system	
-O and M intervention -Radio interface failure, reversion to old channel -Radio interface message failure	-O and M intervention -Relocation failure in	2
-Requested speech version unavailable	Target CN/RNC or target system -Relocation failure in Target CN/RNC or	
-Requested terrestrial resource unavailable	target system -Relocation failure in Target CN/RNC or	
-Requested transcoding/rate adaption unavailable	target system -Relocation failure in Target CN/RNC or target system	
-Switch circuit pool -Terrestrial circuit already allocated	-Relocation failure in Target CN/RNC or target system	1
-Any other value	-Relocation failure in Target CN/RNC or target system	

NOTE 2: Cause code not applicable to this traffic case.

*** Next modified section ***

4.7.6 Cause Code Mapping

When a Mobile Station is handed over between GSM and UMTS, a mapping of the cause codes used in the BSSMAP and the RANAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in BSSMAP Handover Required and the cause codes sent in RANAP Relocation Request is as follows:

48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	†
-Better Cell	-Relocation Desirable For Radio Reasons	_
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc. -Switch circuit pool -Traffic	-Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation -Resource Optimisation -Relocation	1
Time critical reloc. -Uplink quality -Uplink strength -Any other value Reasons Time critical reloc.	-Time critical reloc. -Time critical reloc. -Relocation Desirable F	or Radio

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Request and the cause codes sent in RANAP Relocation Request is as follows (the mapping is only used for the MAP-E interface):

48.008	25.413	Notes
HANDOVER REQUEST	RELOCATION REQUEST	T
-Better Cell	-Relocation Desirable For Radio Reasons	<u> </u>
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc.	- Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Switch circuit pool -Traffic	-Resource Optimisation Relocation	+ +
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical reloc. -Time critical reloc. -Relocation Desirable For Radio Reasons	
Time critical reloc.		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Iu Release Command is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	IU RELEASE COMMAND	
-Ciphering algorithm not supported		2
-Circuit pool mismatch -Equipment failure	-Relocation cancelled	1
-Invalid message contents	-Abstract Syntax Error	2
-No radio resource available -O and M intervention -Radio interface failure,	-O and M intervention -Relocation cancelled	
reversion to old channel -Radio interface message	-Relocation cancelled	
failure -Requested speech version unavailable		2
-Requested terrestrial resource unavailable		2
-Requested transcoding/rate adaption unavailable		2
-Switch circuit pool -Terrestrial circuit already	-Relocation cancelled	1
allocated -Any other value	-Relocation cancelled	

NOTE 2: Cause code not applicable to this traffic case.

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER FAILURE	Ţ
-Any value	-No radio resource available	

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Request Reject is as follows:

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER REQUIRED REJECT	
-Any value	-No radio resource available	

The mapping between the RANAP and the BSSMAP assignment messages is used in the MAP-E interface. RANAP RAB Assignment Response with successful result is mapped to BSSMAP Assignment Complete; RANAP RAB Assignment Response with unsuccessful result is mapped to BSSMAP Assignment Failure. The mapping between the cause codes received in RANAP RAB Assignment Response and the cause codes sent in BSSMAP Assignment Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RAB ASSIGNMENT RESPONSE	ASSIGNMENT FAILURE	
-Requested traffic class not available -Invalid RAB parameters value -Requested max bit rate not available -Requested max bit rate for DL not available -Requested max bit rate for UL not available -Requested guaranteed bit rate not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for UL not available -Requested transfer delay not achievable -Invalid RAB param. combination -Condition violation for SDU parameters -Condition violation for traffic handling priority -Condition violation for guaranteed bit rate -User plane not supported -Iu UP failure -Tqueuing expiry	available -Invalid msg. contents -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents	
-Invalid RAB id -Request superseeded	failure -Invalid msg. contents -No radio resource	
-Relocation triggered	available -No radio resource	
-Any other value	available -Radio interface message failure	

The mapping between the cause codes received in RANAP Location Report and the cause codes sent in BSSMAP Handover Performed is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	
-User restriction start indUser restriction start indRequested report type not supported -Any other value	-O&M intervention -O&M intervention	1
-Any other value	-Better cell	1

NOTE 1: In this case, no Handover Performed is sent.

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				•								
CHANGE REQUEST								CR-Form-v7				
æ		29.010 C	CR	099	жr	ev	1	\mathfrak{H}	Current vers	sion:	5.5.0	æ
For <u>HELP</u> or												
Proposed chang	e a	arrects: OIC	JC a _l	pps#	IVI	E	Rac	IIO A	ccess Netwo	тк	Core	letwork X
Title:	\mathbb{H}	Correction o	of inte	er system har	ndove	r cau	se m	appi	ng			
Source:	¥	CN4		·								
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Reason for change: ₩ The handover/relocation cause exchanged between the source and the target radio system indicates, besides the reason for the handover/relocation, also the urgency of the handover/relocation. The UTRAN uses RANAP cause 'time critical relocation' to indicate that a relocation is needed to avoid call dropping due to bad radio conditions. The BSS uses the BSSMAP causes 'distance', 'uplink quality', 'uplink strength', 'downlink quality' or 'downlink strength' for this purpose. This allows the target radio system to handle such a handover/relocation with priority, if needed. E.g. if the target radio system is under high load, it can accept urgent handovers but refuse other handovers. In the 29.010 cause mapping for inter system handovers some 'urgent' handover / relocation causes are mapped to 'non-urgent' causes and vice versa. Due to this mapping important information for the target radio system is suppressed. In addition, the RANAP cause 'Resource Optimisation Relocation' may also be sent by the Source RNC for UMTS to GSM handover. The cause mapping for this cause is missing. This is an essential correction. Summary of change: ₩ For Inter MSC UMTS to GSM Handover the RANAP cause 'time critical relocation' is mapped to the BSSMAP cause 'uplink quality'. For Inter MSC GSM to UMTS Handover only the BSSMAP causes 'distance', 'uplink quality', 'uplink strength', 'downlink quality' or 'downlink strength' are

mapped to RANAP cause 'time critical relocation'.

CR page 1

is mapped to BSSMAP cause 'Traffic'

Consequences if

* With the current cause mapping the target radio system cannot distinguish

For UMTS to GSM Handover, RANAP cause 'Resource Optimisation Relocation'

between urgent and non-urgent inter system handovers and this can result in an increased call drop rate. Especially in high-load situations this can be a significant problem.

The cause mapping for the RANAP cause 'Resource Optimisation Relocation' remains undefined.

Clauses affected:	第 4.6.6, 4.7.6
Other specs affected:	Y N X Other core specifications 策 Test specifications O&M Specifications
Other comments:	# The current 29.010 cause mapping was also seen as a problem in RAN3 (refer to the RAN3#38 report (R3-031753); discussion on Tdoc R3-031380).

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The mapping between the cause codes received in RANAP Relocation Required and the cause codes sent in BSSMAP Handover Request is as follows:

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25.413
                                        48.008
                                                              Notes
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                                  HANDOVER REQUEST
 -Time critical relocation
                                   - 'uplink quality'
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  relocation
 -Relocation desirable for
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 radio reasons
-Directed retry
                                   -Directed retry
 -Any other value
                                    -Better cell
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NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in RANAP Relocation Cancel and the cause codes sent in BSSMAP Clear Command is as follows:

25.413	48.008	Notes
RELOCATION CANCEL	CLEAR COMMAND	
-Trelocprepexpiry -Interaction with other procedure	-Radio interface failure, reversion to old channel -Radio interface failure, reversion to old channel	
-Any other value	-Radio interface failure, reversion to old channel	

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Relocation Preparation Failure is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	RELOCATION PREP. FAILURE	
-Ciphering algorithm not supported	-Requested ciphering and/or integrity protection is not supported	
-Circuit pool mismatch -Equipment failure	-Relocation failure in Target CN/RNC or	1
-Invalid message contents -No radio resource available	target system - Abstract Syntax Error -Relocation failure in Target CN/RNC or target system	
-O and M intervention -Radio interface failure, reversion to old channel -Radio interface message	-O and M intervention -Relocation failure in	2
failure -Requested speech version unavailable	Target CN/RNC or target system -Relocation failure in Target CN/RNC or	
-Requested terrestrial resource unavailable	target system -Relocation failure in Target CN/RNC or	
-Requested transcoding/rate adaption unavailable	target system -Relocation failure in Target CN/RNC or target system	
-Switch circuit pool -Terrestrial circuit already allocated	-Relocation failure in Target CN/RNC or	1
-Any other value	target system -Relocation failure in Target CN/RNC or target system	

NOTE 2: Cause code not applicable to this traffic case.

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48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	T
-Better Cell	-Relocation Desirable For Radio Reasons	
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc.	-Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Switch circuit pool -Traffic	-Resource Optimisation Relocation	<u>1</u>
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical reloc. -Time critical reloc. -Relocation Desirable For Radio Reasons	_
Time critical reloc.		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Request and the cause codes sent in RANAP Relocation Request is as follows (the mapping is only used for the MAP-E interface):

48.008	25.413	Notes
HANDOVER REQUEST	RELOCATION REQUEST	T
-Better Cell	-Relocation Desirable For Radio Reasons	<u> </u>
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc.	- Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Switch circuit pool -Traffic	-Resource Optimisation Relocation	1
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical reloc. -Time critical reloc. -Relocation Desirable For Radio Reasons	1
Time critical reloc.		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Iu Release Command is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	IU RELEASE COMMAND	
-Ciphering algorithm not		2
supported -Circuit pool mismatch -Equipment failure	Dologation gangelled	1
-Invalid message contents	-Relocation cancelled -Abstract Syntax Error	2
-No radio resource available -O and M intervention -Radio interface failure, reversion to old channel	-O and M intervention -Relocation cancelled	2
-Radio interface message failure	-Relocation cancelled	
-Requested speech version unavailable		2
-Requested terrestrial resource unavailable		2
-Requested transcoding/rate		2
adaption unavailable -Switch circuit pool		1
-Terrestrial circuit already allocated		
-Any other value	-Relocation cancelled	

NOTE 2: Cause code not applicable to this traffic case.

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER FAILURE	
-GERAN Iu-mode failure -Any other value	-GERAN Iu-mode failure -No radio resource available	

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Required Reject is as follows:

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER REQUIRED REJECT	
-GERAN Iu-mode failure -Incoming Relocation Not Supported Due To PUESBINE Feature -Any other value	-GERAN Iu-mode failure -Incoming Relocation Not Supported Due To PUESBINE Feature -No radio resource available	

The mapping between the RANAP and the BSSMAP assignment messages is used in the MAP-E interface. RANAP RAB Assignment Response with successful result is mapped to BSSMAP Assignment Complete; RANAP RAB Assignment Response with unsuccessful result is mapped to BSSMAP Assignment Failure. The mapping between the cause codes received in RANAP RAB Assignment Response and the cause codes sent in BSSMAP Assignment Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RAB ASSIGNMENT RESPONSE	 ASSIGNMENT FAILURE	
-Requested traffic class not available -Invalid RAB parameters value -Requested max bit rate not available -Requested max bit rate for DL not available -Requested max bit rate for UL not available -Requested guaranteed bit rate not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for UL not available -Requested transfer delay not achievable -Invalid RAB param. combination -Condition violation for SDU parameters -Condition violation for traffic handling priority -Condition violation for guaranteed bit rate -User plane not supported -Iu UP failure -Tqueuing expiry -Invalid RAB id	-No radio resource available -Invalid msg. contents -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents	
	-No radio resource available	
-Relocation triggered -GERAN Iu-mode failure -Any other value	-Relocation triggered -GERAN Iu-mode failure -Radio interface message failure	

The mapping between the cause codes received in RANAP Security Mode Reject and the cause codes sent in BSSMAP Cipher Mode Reject is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
SECURITY MODE REJECT	CIPHER MODE REJECT	
-Requested ciphering and/or integrity protection	-Ciphering algorithm not supported	
algorithms not supported -Failure in the radio interface procedure -Change of ciphering and/or integrity protection is	-Radio interface message failure -Invalid msg. contents	
not supported -Relocation triggered -Any other value	-Relocation triggered -Radio interface message failure	

The mapping between the cause codes received in RANAP Location Report and the cause codes sent in BSSMAP Handover Performed is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	T
-User restriction start ind. -User restriction start ind. -Requested report type not supported -Any other value	-O&M intervention -O&M intervention	1
-Any other value	-Better cell	

NOTE 1: In this case, no Handover Performed is sent.

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

				-										
CHANGE REQUEST									CR-Form-v7					
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Reason for change: ₩ The handover/relocation cause exchanged between the source and the target radio system indicates, besides the reason for the handover/relocation, also the urgency of the handover/relocation. The UTRAN uses RANAP cause 'time critical relocation' to indicate that a relocation is needed to avoid call dropping due to bad radio conditions. The BSS uses the BSSMAP causes 'distance', 'uplink quality', 'uplink strength', 'downlink quality' or 'downlink strength' for this purpose. This allows the target radio system to handle such a handover/relocation with priority, if needed. E.g. if the target radio system is under high load, it can accept urgent handovers but refuse other handovers. In the 29.010 cause mapping for inter system handovers some 'urgent' handover / relocation causes are mapped to 'non-urgent' causes and vice versa. Due to this mapping important information for the target radio system is suppressed.

In addition, the RANAP cause 'Resource Optimisation Relocation' may also be sent by the Source RNC for UMTS to GSM handover. The cause mapping for this cause is missing.

This is an essential correction.

Summary of change: ₩ For Inter MSC UMTS to GSM Handover the RANAP cause 'time critical relocation' is mapped to the BSSMAP cause 'uplink quality'.

> For Inter MSC GSM to UMTS Handover only the BSSMAP causes 'distance', 'uplink quality', 'uplink strength', 'downlink quality' or 'downlink strength' are mapped to RANAP cause 'time critical relocation'.

For UMTS to GSM Handover, RANAP cause 'Resource Optimisation Relocation'

is mapped to BSSMAP cause 'Traffic'

Consequences if * With the current cause mapping the target radio system cannot distinguish between urgent and non-urgent inter system handovers and this can result in an increased call drop rate. Especially in high-load situations this can be a significant problem.

The cause mapping for the RANAP cause 'Resource Optimisation Relocation' remains undefined.

Clauses affected:	3.6.6 , 4.7.6
Other specs affected:	Y N X Other core specifications
Other comments:	The current 29.010 cause mapping was also seen as a problem in RAN3 (refer to the RAN3#38 report (R3-031753); discussion on Tdoc R3-031380).

How to create CRs using this form:

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

- 1) Fill out the above form. The symbols above marked \(\mathcal{H} \) contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First modified section ***

4.6.6 Cause Code Mapping

When a Mobile Station is handed over between UMTS and GSM, a mapping of the cause codes used in the RANAP and the BSSMAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in RANAP Relocation Required and the cause codes sent in BSSMAP Handover Request is as follows:

```
25.413
                                        48.008
                                                              Notes
RELOCATION REQUIRED
                                  HANDOVER REQUEST
 -Time critical relocation
                                   - 'uplink quality'
 -Resource optimisation
                                   -Traffic-
  relocation
 -Relocation desirable for
                                   -Better cell
 radio reasons
-Directed retry
                                   -Directed retry
 -Any other value
                                    -Better cell
```

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in RANAP Relocation Cancel and the cause codes sent in BSSMAP Clear Command is as follows:

25.413	48.008	Notes
RELOCATION CANCEL	CLEAR COMMAND	
-Trelocprepexpiry -Interaction with other procedure	-Radio interface failure, reversion to old channel -Radio interface failure, reversion to old channel	
-Any other value	-Radio interface failure, reversion to old channel	

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Relocation Preparation Failure is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	RELOCATION PREP. FAILURE	
-Ciphering algorithm not supported	-Requested ciphering and/or integrity protection is not supported	
-Circuit pool mismatch -Equipment failure	-Relocation failure in Target CN/RNC or	1
-Invalid message contents -No radio resource available	target system - Abstract Syntax Error -Relocation failure in Target CN/RNC or target system	
-O and M intervention -Radio interface failure, reversion to old channel -Radio interface message	-O and M intervention -Relocation failure in	2
failure -Requested speech version unavailable	Target CN/RNC or target system -Relocation failure in Target CN/RNC or	
-Requested terrestrial resource unavailable	target system -Relocation failure in Target CN/RNC or	
-Requested transcoding/rate adaption unavailable	target system -Relocation failure in Target CN/RNC or target system	
-Switch circuit pool -Terrestrial circuit already allocated	-Relocation failure in Target CN/RNC or	1
-Any other value	target system -Relocation failure in Target CN/RNC or target system	

NOTE 2: Cause code not applicable to this traffic case.

*** Next modified section ***

4.7.6 Cause Code Mapping

When a Mobile Station is handed over between GSM and UMTS, a mapping of the cause codes used in the BSSMAP and the RANAP protocols is needed. The mapping described here is applicable to the BSSMAP protocol even when used inside MAP in the E-interface.

The mapping between the cause codes received in BSSMAP Handover Required and the cause codes sent in RANAP Relocation Request is as follows:

48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	T
-Better Cell	-Relocation Desirable For Radio Reasons	
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc.	-Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Switch circuit pool -Traffic	-Resource Optimisation Relocation	<u>1</u>
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical reloc. -Time critical reloc. -Relocation Desirable For Radio Reasons	_
Time critical reloc.		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Request and the cause codes sent in RANAP Relocation Request is as follows (the mapping is only used for the MAP-E interface):

48.008	25.413	Notes
HANDOVER REQUEST	RELOCATION REQUEST	T
-Better Cell	-Relocation Desirable For Radio Reasons	<u> </u>
Time critical reloc. -Directed retry -Distance -Downlink quality -Downlink strength -O and M intervention -Preemption -Response to MSC invocation Time critical reloc.	- Directed retry -Time critical relocTime critical relocTime critical relocO and M intervention -RAB pre-empted -Network Optimisation	
-Switch circuit pool -Traffic	-Resource Optimisation Relocation	1
Time critical reloc. -Uplink quality -Uplink strength -Any other value	-Time critical reloc. -Time critical reloc. -Relocation Desirable For Radio Reasons	
Time critical reloc. 		

NOTE 1: Cause code not used at inter-system handover.

The mapping between the cause codes received in BSSMAP Handover Failure and the cause codes sent in RANAP Iu Release Command is as follows:

48.008	25.413	Notes
HANDOVER FAILURE	IU RELEASE COMMAND	
-Ciphering algorithm not		2
supported -Circuit pool mismatch -Equipment failure	Dologation gangelled	1
-Invalid message contents	-Relocation cancelled -Abstract Syntax Error	2
-No radio resource available -O and M intervention -Radio interface failure, reversion to old channel	-O and M intervention -Relocation cancelled	2
-Radio interface message failure	-Relocation cancelled	
-Requested speech version unavailable		2
-Requested terrestrial resource unavailable		2
-Requested transcoding/rate		2
adaption unavailable -Switch circuit pool		1
-Terrestrial circuit already allocated		
-Any other value	-Relocation cancelled	

NOTE 2: Cause code not applicable to this traffic case.

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER FAILURE	
-GERAN Iu-mode failure -Any other value	-GERAN Iu-mode failure -No radio resource available	

The mapping between the cause codes received in RANAP Relocation Failure and the cause codes sent in BSSMAP Handover Required Reject is as follows:

25.413	48.008	Notes
RELOCATION FAILURE	HANDOVER REQUIRED REJECT	
-GERAN Iu-mode failure -Incoming Relocation Not Supported Due To PUESBINE Feature -Any other value	-GERAN Iu-mode failure -Incoming Relocation Not Supported Due To PUESBINE Feature -No radio resource available	

The mapping between the RANAP and the BSSMAP assignment messages is used in the MAP-E interface. RANAP RAB Assignment Response with successful result is mapped to BSSMAP Assignment Complete; RANAP RAB Assignment Response with unsuccessful result is mapped to BSSMAP Assignment Failure. The mapping between the cause codes received in RANAP RAB Assignment Response and the cause codes sent in BSSMAP Assignment Failure is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
RAB ASSIGNMENT RESPONSE	 ASSIGNMENT FAILURE	
-Requested traffic class not available -Invalid RAB parameters value -Requested max bit rate not available -Requested max bit rate for DL not available -Requested max bit rate for UL not available -Requested guaranteed bit rate not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for DL not available -Requested guaranteed bit rate for UL not available -Requested transfer delay not achievable -Invalid RAB param. combination -Condition violation for SDU parameters -Condition violation for traffic handling priority -Condition violation for guaranteed bit rate -User plane not supported -Iu UP failure -Tqueuing expiry -Invalid RAB id	-No radio resource available -Invalid msg. contents -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -No radio resource available -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents -Invalid msg. contents	
	-No radio resource available	
-Relocation triggered -GERAN Iu-mode failure -Any other value	-Relocation triggered -GERAN Iu-mode failure -Radio interface message failure	

The mapping between the cause codes received in RANAP Security Mode Reject and the cause codes sent in BSSMAP Cipher Mode Reject is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
SECURITY MODE REJECT	CIPHER MODE REJECT	
-Requested ciphering and/or integrity protection	-Ciphering algorithm not supported	
algorithms not supported -Failure in the radio interface procedure -Change of ciphering and/or integrity protection is	-Radio interface message failure -Invalid msg. contents	
not supported -Relocation triggered -Any other value	-Relocation triggered -Radio interface message failure	

The mapping between the cause codes received in RANAP Location Report and the cause codes sent in BSSMAP Handover Performed is as follows (this mapping is only used for the MAP-E interface):

25.413	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	T
-User restriction start ind. -User restriction start ind. -Requested report type not supported -Any other value	-O&M intervention -O&M intervention	1
-Any other value	-Better cell	

NOTE 1: In this case, no Handover Performed is sent.