3GPP TSG CN Plenary Meeting #23 **NP-040045**
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	A	4.7.0
29.010	099	1	N4-040258	Rel-5	Correction of inter system handover cause mapping	A	5.5.0
29.010	100	1	N4-040259	Rel-6	Correction of inter system handover cause mapping	A	6.1.0

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

N4-040256
revised N4-040148

CR-Form-v7

CHANGE REQUEST

⌘ **29.010** **CR** **097** ⌘ **rev** **1** ⌘ Current version: **3.11.0** ⌘

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

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

Title:	⌘	Correction of inter system handover cause mapping
Source:	⌘	CN4
Work item code:	⌘	Handover
Date:	⌘	04/02/2004
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change: ⌘

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 ~~one of~~ the BSSMAP cause~~s~~ 'uplink quality'., ~~'uplink strength', 'downlink quality' or 'downlink strength'. It is an implementation choice which of the 4 BSSMAP causes is sent to the target system.~~
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 not approved:	⌘	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:	⌘	4.6.6, 4.6.7			
		Y	**N**		
Other specs Affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	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 ⌘ 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	08.08	Notes
RELOCATION REQUIRED	HANDOVER REQUEST	
-Time critical relocation	-'uplink quality'	
~~Better cell~~		
-Resource optimisation	-Traffic~~~~	
~~1~~		
relocation		
-Relocation desirable for radio reasons	-Better cell	
-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	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		1
-Equipment failure	-Relocation failure in Target CN/RNC or target system	
-Invalid message contents	- Abstract Syntax Error	
-No radio resource available	-Relocation failure in Target CN/RNC or target system	
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel		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		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	
~~Time critical reloc.~~		
-Directed retry	-Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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):

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

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

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
RAB ASSIGNMENT RESPONSE	ASSIGNMENT FAILURE	
-Requested traffic class not available	–No radio resource available	
-Invalid RAB parameters value	–Invalid msg. contents	
-Requested max bit rate not available	–No radio resource available	
-Requested max bit rate for DL not available	–No radio resource available	
-Requested max bit rate for UL not available	–No radio resource available	
-Requested guaranteed bit rate not available	–No radio resource available	
-Requested guaranteed bit rate for DL not available	–No radio resource available	
-Requested guaranteed bit rate for UL not available	–No radio resource available	
-Requested transfer delay not achievable	–No radio resource available	
-Invalid RAB param. combination	–Invalid msg. contents	
-Condition violation for SDU parameters	–Invalid msg. contents	
-Condition violation for traffic handling priority	–Invalid msg. contents	
-Condition violation for guaranteed bit rate	–Invalid msg. contents	
-User plane not supported	–No radio resource available	
-Iu UP failure	–Equipment failure	
-Tqueuing expiry	–Radio interface message failure	
-Invalid RAB id	–Invalid msg. contents	
-Request superseeded	–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	
-User restriction start ind.	–O&M intervention	
-User restriction start ind.	–O&M intervention	
-Requested report type not supported		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

N4-040257
revised N4-040149

CR-Form-v7

CHANGE REQUEST

⌘ **29.010** **CR** **098** ⌘ **rev** **1** ⌘ Current version: **4.7.0** ⌘

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

Title:	⌘	Correction of inter system handover cause mapping
Source:	⌘	CN4
Work item code:	⌘	Handover
Date:	⌘	04/02/2004
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
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A *(corresponds to a correction in an earlier release)*
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R99 *(Release 1999)*
Rel-4 *(Release 4)*
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Rel-6 *(Release 6)*

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.
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Summary of change: ⌘

For Inter MSC UMTS to GSM Handover the RANAP cause 'time critical relocation' is mapped to ~~one of~~ the BSSMAP cause~~s~~ 'uplink quality.', ~~'uplink strength', 'downlink quality' or 'downlink strength'. It is an implementation choice which of the 4 BSSMAP causes is sent to the target system.~~
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For UMTS to GSM Handover, RANAP cause 'Resource Optimisation Relocation' is mapped to BSSMAP cause 'Traffic'

Consequences if not approved:	⌘	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:	⌘	4.6.6, 4.6.7			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	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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***** 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'	
~~Better cell~~		
-Resource optimisation	-Traffic	
~~1~~		
relocation		
-Relocation desirable for radio reasons	-Better cell	
-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	-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:

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		1
-Equipment failure	-Relocation failure in Target CN/RNC or target system	
-Invalid message contents	- Abstract Syntax Error	
-No radio resource available	-Relocation failure in Target CN/RNC or target system	
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel		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		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:

48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	-Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	- Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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		1
-Equipment failure	-Relocation cancelled	
-Invalid message contents	-Abstract Syntax Error	
-No radio resource available		2
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel	-Relocation cancelled	
-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		1
-Terrestrial circuit already allocated	-Relocation cancelled	
-Any other value	-Relocation cancelled	

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	48.008	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	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	–No radio resource available	
-Invalid RAB parameters value	–Invalid msg. contents	
-Requested max bit rate not available	–No radio resource available	
-Requested max bit rate for DL not available	–No radio resource available	
-Requested max bit rate for UL not available	–No radio resource available	
-Requested guaranteed bit rate not available	–No radio resource available	
-Requested guaranteed bit rate for DL not available	–No radio resource available	
-Requested guaranteed bit rate for UL not available	–No radio resource available	
-Requested transfer delay not achievable	–No radio resource available	
-Invalid RAB param. combination	–Invalid msg. contents	
-Condition violation for SDU parameters	–Invalid msg. contents	
-Condition violation for traffic handling priority	–Invalid msg. contents	
-Condition violation for guaranteed bit rate	–Invalid msg. contents	
-User plane not supported	–No radio resource available	
-Iu UP failure	–Equipment failure	
-Tqueuing expiry	–Radio interface message failure	
-Invalid RAB id	–Invalid msg. contents	
-Request superseeded	–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	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	
-User restriction start ind.	–O&M intervention	
-User restriction start ind.	–O&M intervention	
-Requested report type not supported		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

N4-040258
revised N4-040150

CR-Form-v7

CHANGE REQUEST

⌘ **29.010** **CR** **099** ⌘ **rev** **1** ⌘ Current version: **5.5.0** ⌘

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

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

Title:	⌘	Correction of inter system handover cause mapping
Source:	⌘	CN4
Work item code:	⌘	Handover
Date:	⌘	04/02/2004
Category:	⌘	**A**
Release:	⌘	Rel-5

Use one of the following categories:
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Rel-6	*(Release 6)*

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 ~~one of~~ the BSSMAP cause~~s~~ 'uplink quality'., ~~'uplink strength', 'downlink quality' or 'downlink strength'. It is an implementation choice which of the 4 BSSMAP causes is sent to the target system.~~
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 not approved:	⌘	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:	⌘	4.6.6, 4.6.7			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	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 ⌘ 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:

25.413	48.008	Notes
RELOCATION REQUIRED	HANDOVER REQUEST	
-Time critical relocation	-'uplink quality'	
~~Better cell~~		
-Resource optimisation	-Traffic	
~~1~~		
relocation		
-Relocation desirable for radio reasons	-Better cell	
-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	-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:

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		1
-Equipment failure	-Relocation failure in Target CN/RNC or target system	
-Invalid message contents	- Abstract Syntax Error	
-No radio resource available	-Relocation failure in Target CN/RNC or target system	
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel		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		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:

48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	-Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	- Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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		1
-Equipment failure	-Relocation cancelled	
-Invalid message contents	-Abstract Syntax Error	
-No radio resource available		2
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel	-Relocation cancelled	
-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		1
-Terrestrial circuit already allocated	-Relocation cancelled	
-Any other value	-Relocation cancelled	

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	48.008	Notes
RELOCATION FAILURE	HANDOVER FAILURE	
-GERAN Iu-mode failure	-GERAN Iu-mode failure	
-Any other value	-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	-GERAN Iu-mode failure	
-Incoming Relocation Not Supported Due To PUESBINE Feature	-Incoming Relocation Not Supported Due To PUESBINE Feature	
-Any other 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	–No radio resource available	
-Invalid RAB parameters value	–Invalid msg. contents	
-Requested max bit rate not available	–No radio resource available	
-Requested max bit rate for DL not available	–No radio resource available	
-Requested max bit rate for UL not available	–No radio resource available	
-Requested guaranteed bit rate not available	–No radio resource available	
-Requested guaranteed bit rate for DL not available	–No radio resource available	
-Requested guaranteed bit rate for UL not available	–No radio resource available	
-Requested transfer delay not achievable	–No radio resource available	
-Invalid RAB param. combination	–Invalid msg. contents	
-Condition violation for SDU parameters	–Invalid msg. contents	
-Condition violation for traffic handling priority	–Invalid msg. contents	
-Condition violation for guaranteed bit rate	–Invalid msg. contents	
-User plane not supported	–No radio resource available	
-Iu UP failure	–Equipment failure	
-Tqueuing expiry	–Radio interface message failure	
-Invalid RAB id	–Invalid msg. contents	
-Request superseeded	–No radio resource available	
-Relocation triggered	-Relocation triggered	
-GERAN Iu-mode failure	-GERAN Iu-mode failure	
-Any other value	–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 algorithms not supported	–Ciphering algorithm not supported	
-Failure in the radio interface procedure	–Radio interface message failure	
-Change of ciphering and/or integrity protection is not supported	-Invalid msg. contents	
-Relocation triggered	-Relocation triggered	
-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	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	
-User restriction start ind.	–O&M intervention	
-User restriction start ind.	–O&M intervention	
-Requested report type not supported		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

N4-040259
revised N4-040151

CR-Form-v7

CHANGE REQUEST

⌘ **29.010** **CR** **100** ⌘ **rev** **1** ⌘ Current version: **6.1.0** ⌘

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

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

Title:	⌘	Correction of inter system handover cause mapping
Source:	⌘	CN4
Work item code:	⌘	Handover
Date:	⌘	04/02/2004
Category:	⌘	**A**
Release:	⌘	Rel-6

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

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

Reason for change: ⌘

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.
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Summary of change: ⌘

For Inter MSC UMTS to GSM Handover the RANAP cause 'time critical relocation' is mapped to ~~one of~~ the BSSMAP cause~~s~~ 'uplink quality'., ~~'uplink strength', 'downlink quality' or 'downlink strength'. It is an implementation choice which of the 4 BSSMAP causes is sent to the target system.~~
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For UMTS to GSM Handover, RANAP cause 'Resource Optimisation Relocation' is mapped to BSSMAP cause 'Traffic'

Consequences if not approved:	⌘	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:	⌘	4.6.6, 4.6.7			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	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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-Time critical relocation	-'uplink quality'	
~~Better cell~~		
-Resource optimisation	-Traffic	
~~1~~		
relocation		
-Relocation desirable for radio reasons	-Better cell	
-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	-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:

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		1
-Equipment failure	-Relocation failure in Target CN/RNC or target system	
-Invalid message contents	- Abstract Syntax Error	
-No radio resource available	-Relocation failure in Target CN/RNC or target system	
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel		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		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:

48.008	25.413	Notes
HANDOVER REQUIRED	RELOCATION REQUEST	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	-Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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	
-Better Cell	-Relocation Desirable For Radio Reasons	
~~Time critical reloc.~~		
-Directed retry	- Directed retry	
-Distance	-Time critical reloc.	
-Downlink quality	-Time critical reloc.	
-Downlink strength	-Time critical reloc.	
-O and M intervention	-O and M intervention	
-Preemption	-RAB pre-empted	
-Response to MSC invocation	-Network Optimisation	
~~Time critical reloc.~~		
-Switch circuit pool		1
-Traffic	-Resource Optimisation Relocation	
~~Time critical reloc.~~		
-Uplink quality	-Time critical reloc.	
-Uplink strength	-Time critical reloc.	
-Any other value	-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		1
-Equipment failure	-Relocation cancelled	
-Invalid message contents	-Abstract Syntax Error	
-No radio resource available		2
-O and M intervention	-O and M intervention	
-Radio interface failure, reversion to old channel	-Relocation cancelled	
-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		1
-Terrestrial circuit already allocated	-Relocation cancelled	
-Any other value	-Relocation cancelled	

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	48.008	Notes
RELOCATION FAILURE	HANDOVER FAILURE	
-GERAN Iu-mode failure	-GERAN Iu-mode failure	
-Any other value	-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	-GERAN Iu-mode failure	
-Incoming Relocation Not Supported Due To PUESBINE Feature	-Incoming Relocation Not Supported Due To PUESBINE Feature	
-Any other 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	–No radio resource available	
-Invalid RAB parameters value	–Invalid msg. contents	
-Requested max bit rate not available	–No radio resource available	
-Requested max bit rate for DL not available	–No radio resource available	
-Requested max bit rate for UL not available	–No radio resource available	
-Requested guaranteed bit rate not available	–No radio resource available	
-Requested guaranteed bit rate for DL not available	–No radio resource available	
-Requested guaranteed bit rate for UL not available	–No radio resource available	
-Requested transfer delay not achievable	–No radio resource available	
-Invalid RAB param. combination	–Invalid msg. contents	
-Condition violation for SDU parameters	–Invalid msg. contents	
-Condition violation for traffic handling priority	–Invalid msg. contents	
-Condition violation for guaranteed bit rate	–Invalid msg. contents	
-User plane not supported	–No radio resource available	
-Iu UP failure	–Equipment failure	
-Tqueuing expiry	–Radio interface message failure	
-Invalid RAB id	–Invalid msg. contents	
-Request superseeded	–No radio resource available	
-Relocation triggered	-Relocation triggered	
-GERAN Iu-mode failure	-GERAN Iu-mode failure	
-Any other value	–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 algorithms not supported	–Ciphering algorithm not supported	
-Failure in the radio interface procedure	–Radio interface message failure	
-Change of ciphering and/or integrity protection is not supported	-Invalid msg. contents	
-Relocation triggered	-Relocation triggered	
-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	48.008	Notes
LOCATION REPORT	HANDOVER PERFORMED	
-User restriction start ind.	–O&M intervention	
-User restriction start ind.	–O&M intervention	
-Requested report type not supported		1
-Any other value	-Better cell	

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