

Source: SA5 (Telecom Management)
Title: 3 Rel-4/5/6 CR 32.403 (PM Performance measurements - UMTS and combined UMTS/GSM)
Document for: Decision
Agenda Item: 7.5.3

Doc-1st-	Spec	CR	R	Phas	Subject	Cat	Ver	Doc-2nd-	Workitem
SP-040269	32.403	036	-	Rel-4	Correction of "hard handover" measurement definitions	F	4.6.0	S5-048468	OAM-PM
SP-040269	32.403	037	-	Rel-5	Correction of "hard handover" measurement definitions	A	5.6.0	S5-048469	OAM-PM
SP-040269	32.403	038	-	Rel-6	Correction of "hard handover" measurement definitions	A	6.3.0	S5-048470	OAM-PM

CHANGE REQUEST

⌘ **32.403 CR 036** ⌘ rev - ⌘ Current version: **4.6.0** ⌘

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 "hard handover" measurement definitions		
Source:	⌘ SA5 (llrui@bupt.edu.cn , liyewen@chinamobile.com)		
Work item code:	⌘ OAM-PM	Date:	⌘ 14/05/2004
Category:	⌘ F	Release:	⌘ Rel-4
	<i>Use one of the following categories:</i> 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 .		<i>Use one of the following releases:</i> 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:	⌘ Currently, failed hard handover measurements only concern the case that SRNC receives the failure message and UE continues the original call, but ignore the case that SRNC cannot receive the failure message and a call-drop happens to UE. Consequently, not all failures are counted in failed hard handover measurements, and the "2 out of 3 approach" cannot be implemented. Furthermore, even if SRNC receives the failure message, UE may not return to the original physical channel but another physical channel through a cell update procedure or a cell reselection procedure.
Summary of change:	⌘ Modify the description of failed hard handover measurements, and add a "No Reply" cause in the condition of the failed hard handover measurements to indicate the call-drop case.
Consequences if not approved:	⌘ Wrong definition of measurement might lead to wrong implementation.

Clauses affected:	⌘ 4.9										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	⌘	Rel-5/6 32.403
Y	N										
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<input checked="" type="checkbox"/>	<input type="checkbox"/>										
Other comments:	⌘ Rel-5 Mirror CR 32.403 in S5-048469. Rel-6 Mirror CR 32.403 in S5-048470.										

4.9 Hard handover

4.9.1 Intra-cell hard handovers

The three measurement types defined in the subclause 4.9.1.n for intra-cell hard handovers are subject to the "2 out of 3 approach".

4.9.1.1 Attempted intra-cell hard handovers

- a) This measurement provides the number of attempted intra-cell hard handovers per cell.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an intra-cell hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.1.2 Successful intra-cell hard handovers

- a) This measurement provides the number of successful intra-cell hard handovers per cell.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful intra-cell hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.1.3 Failed intra-cell hard handovers

- a) This measurement provides the number of failed intra-cell hard handovers per cell per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed intra-cell hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailIntraCell.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.2 Outgoing intra-NodeB hard handovers

The three measurement types defined in the subclause 4.9.2.n for outgoing intra-NodeB hard handovers are subject to the "2 out of 3 approach".

4.9.2.1 Attempted outgoing intra-NodeB hard handovers

- a) This measurement provides the number of attempted outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing intra-NodeB hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.2.2 Successful outgoing intra-NodeB hard handovers

- a) This measurement provides the number of successful outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing intra-NodeB hard handover (see TS 25.331).
- d) A single integer value.

- e) HHO.SuccOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.2.3 Failed outgoing intra-NodeB hard handovers

- a) This measurement provides the number of failed outgoing intra-NodeB hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing intra-NodeB hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutIntraNodeB.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.3 Outgoing inter-NodeB, intra-RNC hard handovers

The three measurement types defined in the subclause 4.9.3.n for outgoing inter-NodeB, intra-RNC hard handovers are subject to the "2 out of 3 approach".

4.9.3.1 Attempted outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of attempted outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterNodeBIntraRNC.

- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.3.2 Successful outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of successful outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccOutInterNodeBIntraRNC.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.3.3 Failed outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of failed outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-NodeB, intra-RNC hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterNodeBIntraRNC.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.4 Outgoing inter-RNC hard handovers via Iur

The three measurement types defined in the subclause 4.9.4.n for outgoing inter-RNC hard handovers are subject to the "2 out of 3 approach".

4.9.4.1 Attempted outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-RNC hard handover via Iur (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.4.2 Successful outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-RNC hard handover via Iur (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.4.3 Failed outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers via Iur per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-RNC hard handover via Iur. Failure causes are defined within TS 25.331.

[Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL](#)

RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCIur.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.

4.9.5 Relocation preparation for outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.9.5.n for relocation preparation for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.9.5.1 Attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Transmission of a RANAP message RELOCATION REQUIRED from the source RNC to the CN (Source side), indicating an attempted relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.AttRelocPrepOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.5.2 Successful relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Receipt of a RANAP message RELOCATION COMMAND sent from the CN (Source side) to the source RNC, indicating a successful relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.SuccAttRelocPrepOutInterRNCCN.
- f) UtranRelation.

- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.5.3 Failed relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides number of failed relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation per cause.
- b) CC.
- c) Receipt of a RANAP message RELOCATION PREPARATION FAILURE sent from the CN (Source side) to the source RNC, indicating a failed relocation preparation for outgoing inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.413. The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.
- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailRelocPrepOutInterRNCCN.*Cause* where *Cause* identifies the name of the failure cause.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.6 Outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.9.6.n for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.9.6.1 Attempted outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an inter-RNC hard handover switching in the CN (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.6.2 Successful outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.
- b) CC.

- c) Receipt of a RANAP message Iu RELEASE COMMAND sent from the CN (Source side) to the source RNC, indicating a successful inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.SuccOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.9.6.3 Failed outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCCN.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

<p>End of Change in Clause 4.9 End of Document</p>
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Annex B (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Jun 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Approval.	1.0.2	4.0.0
Sep 2001	S_13	SP-010468	001	--	Corrections on UMTS and combined UMTS/GSM measurements: Addition of family name for CN measurements, addition of the list of families, addition of Annex A: "(n-1) out of n" examples, application of the "(n-1) out of n" approach to all relevant measurements, enhancement of per cause measurements	4.0.0	4.1.0
Mar 2002	S_15	SP-020026	002	--	Correction of the measured object class for some SGSN MM measurement definitions	4.1.0	4.2.0
Mai 2002	--	--	--	--	MCC clean-up (Cosmetics based on EditHelp)	4.2.0	4.2.1
Mar 2003	S_19	SP-030146	011	--	Correction of the subscriber number measurement definitions	4.2.1	4.3.0
Jun 2003	S_20	SP-030292	013	--	Correction of the definition of the successful GPRS attach counters	4.3.0	4.4.0
Sep 2003	S_21	SP-030431	018	--	Correction of collection method for SGSN measurements	4.4.0	4.5.0
Sep 2003	S_21	SP-030431	021	--	Correction of "outgoing intra-cell hard handovers measurements"	4.4.0	4.5.0
Mar 2004	S_23	SP-040134	026	--	Correction of "Radio link addition" measurements	4.5.0	4.6.0

CHANGE REQUEST

⌘ **32.403 CR 037** ⌘ rev - ⌘ Current version: **5.6.0** ⌘

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 "hard handover" measurement definitions		
Source:	⌘ SA5 (llrui@bupt.edu.cn , liyewen@chinamobile.com)		
Work item code:	⌘ OAM-PM	Date:	⌘ 14/05/2004
Category:	⌘ A	Release:	⌘ Rel-5
	Use <u>one</u> 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 <u>one</u> 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:	⌘ Currently, failed hard handover measurements only concern the case that SRNC receives the failure message and UE continues the original call, but ignore the case that SRNC cannot receive the failure message and a call-drop happens to UE. Consequently, not all failures are counted in failed hard handover measurements, and the "2 out of 3 approach" cannot be implemented. Furthermore, even if SRNC receives the failure message, UE may not return to the original physical channel but another physical channel through a cell update procedure or a cell reselection procedure.
Summary of change:	⌘ Modify the description of failed hard handover measurements, and add a "No Reply" cause in the condition of the failed hard handover measurements to indicate the call-drop case.
Consequences if not approved:	⌘ Wrong definition of measurement might lead to wrong implementation.

Clauses affected:	⌘ 4.10										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	⌘	Rel-6 32.403
Y	N										
<input type="checkbox"/>	<input checked="" type="checkbox"/>										
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<input checked="" type="checkbox"/>	<input type="checkbox"/>										
Other comments:	⌘ Rel-5 Mirror CR to S5-048468.										

4.10 Hard handover

4.10.1 Intra-cell hard handovers

The three measurement types defined in the subclause 4.10.1.n for intra-cell hard handovers are subject to the "2 out of 3 approach".

4.10.1.1 Attempted intra-cell hard handovers

- a) This measurement provides the number of attempted intra-cell hard handovers per cell.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an intra-cell hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.1.2 Successful intra-cell hard handovers

- a) This measurement provides the number of successful intra-cell hard handovers per cell .
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful intra-cell hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.1.3 Failed intra-cell hard handovers

- a) This measurement provides the number of failed intra-cell hard handovers per cell per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed intra-cell hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25.331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailIntraCell.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2 Outgoing intra-NodeB hard handovers

The three measurement types defined in the subclause 4.10.2.n for outgoing intra-NodeB hard handovers are subject to the "2 out of 3 approach".

4.10.2.1 Attempted outgoing intra-NodeB hard handovers

- a) This measurement provides the number of attempted outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing intra-NodeB hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2.2 Successful outgoing intra-NodeB hard handovers

- a) This measurement provides the number of successful outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing intra-NodeB hard handover (see TS 25.331).
- d) A single integer value.

- e) HHO.SuccOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2.3 Failed outgoing intra-NodeB hard handovers

- a) This measurement provides the number of failed outgoing intra-NodeB hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing intra-NodeB hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutIntraNodeB.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3 Outgoing inter-NodeB, intra-RNC hard handovers

The three measurement types defined in the subclause 4.10.3.n for outgoing inter-NodeB, intra-RNC hard handovers are subject to the "2 out of 3 approach".

4.10.3.1 Attempted outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of attempted outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterNodeBIntraRNC.

- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3.2 Successful outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of successful outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccOutInterNodeBIntraRNC.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3.3 Failed outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of failed outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-NodeB, intra-RNC hard handover. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterNodeBIntraRNC.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4 Outgoing inter-RNC hard handovers via Iur

The three measurement types defined in the subclause 4.10.4.n for outgoing inter-RNC hard handovers are subject to the "2 out of 3 approach".

4.10.4.1 Attempted outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-RNC hard handover via Iur (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4.2 Successful outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-RNC hard handover via Iur (see TS 25.331).
- d) A single integer value.
- e) HHO.SuccOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4.3 Failed outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers via Iur per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-RNC hard handover via Iur. Failure causes are defined within TS 25.331.

[Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL](#)

RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCIur.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.

4.10.5 Relocation preparation for outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.10.5.n for relocation preparation for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.10.5.1 Attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Transmission of a RANAP message RELOCATION REQUIRED from the source RNC to the CN (Source side), indicating an attempted relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.AttRelocPrepOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.5.2 Successful relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Receipt of a RANAP message RELOCATION COMMAND sent from the CN (Source side) to the source RNC, indicating a successful relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.SuccAttRelocPrepOutInterRNCCN.
- f) UtranRelation.

- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.5.3 Failed relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides number of failed relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation per cause.
- b) CC.
- c) Receipt of a RANAP message RELOCATION PREPARATION FAILURE sent from the CN (Source side) to the source RNC, indicating a failed relocation preparation for outgoing inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.413. The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.
- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailRelocPrepOutInterRNCCN.*Cause* where *Cause* identifies the name of the failure cause.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6 Outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.10.6.n for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.10.6.1 Attempted outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an inter-RNC hard handover switching in the CN (see TS 25.331).
- d) A single integer value.
- e) HHO.AttOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6.2 Successful outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.
- b) CC.

- c) Receipt of a RANAP message Iu RELEASE COMMAND sent from the CN (Source side) to the source RNC, indicating a successful inter-RNC hard handover switching in the CN (see TS 25.413).
- d) A single integer value.
- e) HHO.SuccOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6.3 Failed outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.331.

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum measurement subtype will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCCN.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

<p>End of Change in Clause 4.10 End of Document</p>

Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Jun 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Approval.	1.0.2	4.0.0
Sep 2001	S_13	SP-010468	001	--	Corrections on UMTS and combined UMTS/GSM measurements: Addition of family name for CN measurements, addition of the list of families, addition of Annex A: "(n-1) out of n" examples, application of the "(n-1) out of n" approach to all relevant measurements, enhancement of per cause measurements	4.0.0	4.1.0
Mar 2002	S_15	SP-020026	002	--	Correction of the measured object class for some SGSN MM measurement definitions	4.1.0	4.2.0
Mai 2002	--	--	--	--	MCC clean-up (Cosmetics based on EditHelp)	4.2.0	4.2.1
Jun 2002	S_16	SP-020291	003	2	Introduction of "Performance Measurements Definition Process" describing the repeatable, top-down process to define measurements for inclusion in future 3GPP Releases	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	004	--	Adding performance measurement definitions related to GGSN	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	005	--	Introduction of an optional "Purpose" clause in the measurement template	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	006	--	Addition of explanatory text for Radio Access Bearer (RAB) measurements	4.2.0	5.0.0
Sep 2002	S_17	SP-020609	009	--	Introduction of Service Based Performance Measurement Definitions	5.0.0	5.1.0
Sep 2002	S_17	SP-020609	010	--	Add flexibility in the measurement template for the Measured Object Class (MOC)	5.0.0	5.1.0
Mar 2003	S_19	SP-030146	012	-	Correction of the subscriber number measurement definitions	5.1.0	5.2.0
Jun 2003	S_20	SP-030292	014	--	Correction of the definition of the successful GPRS attach counters	5.2.0	5.3.0
Jun 2003	S_20	SP-030292	015	--	Deletion of dual clause 4.1.2	5.2.0	5.3.0
Sep 2003	S_21	SP-030431	019	--	Correction of collection method for SGSN measurements	5.3.0	5.4.0
Sep 2003	S_21	SP-030431	022	--	Correction of "outgoing intra-cell hard handovers measurements"	5.3.0	5.4.0
Dec 2003	S_22	SP-030645	024	--	Correction of terms used for subcounter definitions	5.4.0	5.5.0
Mar 2004	S_23	SP-040134	027	--	Correction of "Radio link addition" measurements	5.5.0	5.6.0

CHANGE REQUEST

⌘ **32.403 CR 038** ⌘ rev - ⌘ Current version: **6.3.0** ⌘

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 "hard handover" measurement definitions		
Source:	⌘ SA5 (llrui@bupt.edu.cn , liyewen@chinamobile.com)		
Work item code:	⌘ OAM-PM	Date:	⌘ 14/05/2004
Category:	⌘ A	Release:	⌘ Rel-6
	Use <u>one</u> 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 <u>one</u> 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:	⌘ Currently, failed hard handover measurements only concern the case that SRNC receives the failure message and UE continues the original call, but ignore the case that SRNC cannot receive the failure message and a call-drop happens to UE. Consequently, not all failures are counted in failed hard handover measurements, and the "2 out of 3 approach" cannot be implemented. Furthermore, even if SRNC receives the failure message, UE may not return to the original physical channel but another physical channel through a cell update procedure or a cell reselection procedure.
Summary of change:	⌘ Modify the description of failed hard handover measurements, and add a "No Reply" cause in the condition of the failed hard handover measurements to indicate the call-drop case.
Consequences if not approved:	⌘ Wrong definition of measurement might lead to wrong implementation.

Clauses affected:	⌘ 4.10						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N						
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	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘			
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘			
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
Other comments:	⌘ Rel-6 Mirror CR to S5-048468.						

4.10 Hard handover

4.10.1 Intra-cell hard handovers

The three measurement types defined in the subclause 4.10.1.n for intra-cell hard handovers are subject to the "2 out of 3 approach".

4.10.1.1 Attempted intra-cell hard handovers

- a) This measurement provides the number of attempted intra-cell hard handovers per cell.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an intra-cell hard handover (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.AttIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.1.2 Successful intra-cell hard handovers

- a) This measurement provides the number of successful intra-cell hard handovers per cell.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful intra-cell hard handover (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.SuccIntraCell.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.1.3 Failed intra-cell hard handovers

- a) This measurement provides the number of failed intra-cell hard handovers per cell per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed intra-cell hard handover. Failure causes are defined within TS 25.331 [4].

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25.331 [4]).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailIntraCell.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranCell.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2 Outgoing intra-NodeB hard handovers

The three measurement types defined in the subclause 4.10.2.n for outgoing intra-NodeB hard handovers are subject to the "2 out of 3 approach".

4.10.2.1 Attempted outgoing intra-NodeB hard handovers

- a) This measurement provides the number of attempted outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing intra-NodeB hard handover (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.AttOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2.2 Successful outgoing intra-NodeB hard handovers

- a) This measurement provides the number of successful outgoing intra-NodeB hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing intra-NodeB hard handover (see TS 25.331 [4]).
- d) A single integer value.

- e) HHO.SuccOutIntraNodeB.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.2.3 Failed outgoing intra-NodeB hard handovers

- a) This measurement provides the number of failed outgoing intra-NodeB hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing intra-NodeB hard handover. Failure causes are defined within TS 25.331 [4].

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331 [4]).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutIntraNodeB.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3 Outgoing inter-NodeB, intra-RNC hard handovers

The three measurement types defined in the subclause 4.10.3.n for outgoing inter-NodeB, intra-RNC hard handovers are subject to the "2 out of 3 approach".

4.10.3.1 Attempted outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of attempted outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.AttOutInterNodeBIntraRNC.

- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3.2 Successful outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of successful outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-NodeB, intra-RNC hard handover (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.SuccOutInterNodeBIntraRNC.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.3.3 Failed outgoing inter-NodeB, intra-RNC hard handovers

- a) This measurement provides the number of failed outgoing inter-NodeB, intra-RNC hard handovers per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-NodeB, intra-RNC hard handover. Failure causes are defined within TS 25.331 [4].

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331 [4]).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterNodeBIntraRNC.Cause where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4 Outgoing inter-RNC hard handovers via Iur

The three measurement types defined in the subclause 4.10.4.n for outgoing inter-RNC hard handovers are subject to the "2 out of 3 approach".

4.10.4.1 Attempted outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an outgoing inter-RNC hard handover via Iur (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.AttOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4.2 Successful outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers via Iur per neighbour cell relation.
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, or TRANSPORT CHANNEL RECONFIGURATION COMPLETE sent from the UE to the source RNC, indicating a successful outgoing inter-RNC hard handover via Iur (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.SuccOutInterRNCIur.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.4.3 Failed outgoing inter-RNC hard handovers via Iur

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers via Iur per neighbour cell relation per cause, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed outgoing inter-RNC hard handover via Iur. Failure causes are defined within TS 25.331 [4].

[Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE](#)

COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331 [4]).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCIur.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.

4.10.5 Relocation preparation for outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.10.5.n for relocation preparation for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.10.5.1 Attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted relocation preparation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Transmission of a RANAP message RELOCATION REQUIRED from the source RNC to the CN (Source side), indicating an attempted relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413 [5]).
- d) A single integer value.
- e) HHO.AttRelocPrepOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.5.2 Successful relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation.
- b) CC.
- c) Receipt of a RANAP message RELOCATION COMMAND sent from the CN (Source side) to the source RNC, indicating a successful relocation preparation of a outgoing inter-RNC hard handover switching in the CN (see TS 25.413 [5]).
- d) A single integer value.
- e) HHO.SuccAttRelocPrepOutInterRNCCN.

- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.5.3 Failed relocation preparation for outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides number of failed relocation for outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation per cause.
- b) CC.
- c) Receipt of a RANAP message RELOCATION PREPARATION FAILURE sent from the CN (Source side) to the source RNC, indicating a failed relocation preparation for outgoing inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.413 [5]. The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.
- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailRelocPrepOutInterRNCCN.*Cause* where *Cause* identifies the name of the failure cause.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6 Outgoing inter-RNC hard handovers switching in the CN

The three measurement types defined in the subclause 4.10.6.n for outgoing inter-RNC hard handovers switching in the CN are subject to the "2 out of 3 approach".

4.10.6.1 Attempted outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of attempted outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.
- b) CC.
- c) Transmission of a RRC message PHYSICAL CHANNEL RECONFIGURATION, RADIO BEARER SETUP, RADIO BEARER RECONFIGURATION, RADIO BEARER RELEASE, or TRANSPORT CHANNEL RECONFIGURATION from the source RNC to the UE, indicating the attempt of an inter-RNC hard handover switching in the CN (see TS 25.331 [4]).
- d) A single integer value.
- e) HHO.AttOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6.2 Successful outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of successful outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs.

- b) CC.
- c) Receipt of a RANAP message Iu RELEASE COMMAND sent from the CN (Source side) to the source RNC, indicating a successful inter-RNC hard handover switching in the CN (see TS 25.413 [5]).
- d) A single integer value.
- e) HHO.SuccOutInterRNCCN.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

4.10.6.3 Failed outgoing inter-RNC hard handovers switching in the CN

- a) This measurement provides the number of failed outgoing inter-RNC hard handovers switching in the CN per neighbour cell relation related to UEs, ~~where the UE returned to the original physical channel configuration.~~
- b) CC.
- c) Receipt of a RRC message PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE sent from the UE to the source RNC, indicating a failed inter-RNC hard handover switching in the CN. Failure causes are defined within TS 25.331 [4].

Each expected RRC message PHYSICAL CHANNEL RECONFIGURATION COMPLETE, RADIO BEARER SETUP COMPLETE, RADIO BEARER RECONFIGURATION COMPLETE, RADIO BEARER RELEASE COMPLETE, TRANSPORT CHANNEL RECONFIGURATION COMPLETE, PHYSICAL CHANNEL RECONFIGURATION FAILURE, RADIO BEARER SETUP FAILURE, RADIO BEARER RECONFIGURATION FAILURE, RADIO BEARER RELEASE FAILURE, or TRANSPORT CHANNEL RECONFIGURATION FAILURE not received by the source RNC is added to the measurement cause 'No Reply' (not specified in TS 25. 331 [4]).

The sum of all supported per cause measurements shall equal the total number of failed events. In case only a subset of per cause measurements is supported, a sum subcounter will be provided first.

- d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.
- e) The measurement name has the form HHO.FailOutInterRNCCN.*Cause* where *Cause* identifies the failure cause.
The cause 'No Reply' is identified by the *.NoReply* suffix.
- f) UtranRelation.
- g) Valid for circuit switched and packet switched traffic.
- h) UMTS.

<p>End of Change in Clause 4.10 End of Document</p>

Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Jun 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Approval.	1.0.2	4.0.0
Sep 2001	S_13	SP-010468	001	--	Corrections on UMTS and combined UMTS/GSM measurements: Addition of family name for CN measurements, addition of the list of families, addition of Annex A: "(n-1) out of n" examples, application of the "(n-1) out of n" approach to all relevant measurements, enhancement of per cause measurements	4.0.0	4.1.0
Mar 2002	S_15	SP-020026	002	--	Correction of the measured object class for some SGSN MM measurement definitions	4.1.0	4.2.0
Mai 2002	--	--	--	--	MCC clean-up (Cosmetics based on EditHelp)	4.2.0	4.2.1
Jun 2002	S_16	SP-020291	003	2	Introduction of "Performance Measurements Definition Process" describing the repeatable, top-down process to define measurements for inclusion in future 3GPP Releases	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	004	--	Adding performance measurement definitions related to GGSN	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	005	--	Introduction of an optional "Purpose" clause in the measurement template	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	006	--	Addition of explanatory text for Radio Access Bearer (RAB) measurements	4.2.0	5.0.0
Sep 2002	S_17	SP-020609	009	--	Introduction of Service Based Performance Measurement Definitions	5.0.0	5.1.0
Sep 2002	S_17	SP-020609	010	--	Add flexibility in the measurement template for the Measured Object Class (MOC)	5.0.0	5.1.0
Mar 2003	S_19	SP-030146	012	--	Correction of the subscriber number measurement definitions	5.1.0	5.2.0
Jun 2003	S_20	SP-030292	014	--	Correction of the definition of the successful GPRS attach counters	5.2.0	5.3.0
Jun 2003	S_20	SP-030292	015	--	Deletion of dual clause 4.1.2	5.2.0	5.3.0
Jun 2003	S_20	SP-030293	016	--	Addition of GPRS per cause measurement definitions	5.3.0	6.0.0
Jun 2003	S_20	SP-030293	017	--	Introduction of MMS Service Based Performance Measurement	5.3.0	6.0.0
Sep 2003	S_21	SP-030431	020	--	Correction of collection method for SGSN measurements	6.0.0	6.1.0
Sep 2003	S_21	SP-030431	023	--	Correction of "outgoing intra-cell hard handovers measurements"	6.0.0	6.1.0
Dec 2003	S_22	SP-030645	025	--	Correction of terms used for subcounter definitions	6.1.0	6.2.0
Mar 2004	S_23	SP-040134	028	--	Correction of "Radio link addition" measurements	6.2.0	6.3.0
Mar 2004	S_23	SP-040135	029	--	Add the measurements about lu connection release	6.2.0	6.3.0