TSG-RAN Meeting #15 ***RP-020076***
Jeju-do, Korea, 5 - 8 March 2002

Title: **Agreed CRs (Release '99 and Rel-4 category A) to TR 25.922**

Source: **TSG-RAN WG2**

Agenda item: **7.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio
R2-020308	agreed	25.922	019		R99	Clarification regarding the transfer of RRC information across interfaces other than Uu	F	3.6.0	3.7.0
R2-020526	agreed	25.922	020		Rel-4	Clarification regarding the transfer of RRC information across interfaces other than Uu	A	4.1.0	4.2.0
R2-020346	agreed	25.922	021		R99	Correction to TDD DCA Description	F	3.6.0	3.7.0
R2-020527	agreed	25.922	022		Rel-4	Correction to TDD DCA Description	A	4.1.0	4.2.0

3GPP TSG-RAN WG2, Meeting #27
Orlando, USA, 18th – 22nd February, 2002

Tdoc R2-020308

CR-Form-v5

CHANGE REQUEST

⌘ **25.922**	**CR 019**	⌘ **rev**	**-**	⌘ Current version:	**3.6.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [X]

Title:	⌘ Clarification regarding the transfer of RRC information across interfaces other than Uu		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	***Date:*** ⌘	13-02-2002
Category:	⌘ **F** *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.	***Release:*** ⌘	R99 *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)*

Reason for change: ⌘	The changes included in this CR are proposed for the following reasons: • It is not fully specified how the different RRC information container should be used e.g. across which interfaces and in which scenario
Summary of change: ⌘	The original revision of this CR introduces the following changes • Clarification is provided concerning which RRC information container should be used across each which interfaces and for each scenario **Impact analysis:** Impacted functionality: the transfer of RRC information between network nodes, as used during inter RAT handover and SRNS relocation Correction type: Clarification of a function where the specification is incomplete. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise Interoperability: • Isolated impact: the impact is isolated; only the corrected functionality is affected • The CR does not introduce changes; it only provides additional clarification
Consequences if not approved: ⌘	How the different RRC information container should be used e.g. across which interfaces and in which scenario remains somewhat unclear

Clauses affected:	⌘ 5.1.7 (new), 5.1.7.1 (new), 5.1.7.2 (new), 5.1.7.3 (new)	
Other specs	⌘ [ ] Other core specifications	⌘ 25.922 v4.1.0, CR 020

affected:		☐ Test specifications ☐ O&M Specifications	
Other comments:	⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

5.1.7 Transfer of RRC information across interfaces other than Uu

5.1.7.1 Introduction and general principles

During several procedures e.g. handover to UTRAN, handover from UTRAN, SRNC relocation RRC information may need to be transferred across interfaces other than the UTRA air interface (Uu) e.g. Iu-, A-, Um interface. In order maintain independence between the different protocols, to facilitate transparent handling by intermediate network nodes and to ease future extension, the preference is to use RRC information containers across such interfaces. In some cases however RRC messages may be used e.g. for historical reasons.

An RRC information container is an extensible self contained information unit that can be decoded without requiring information about the context e.g. in which interface message it was included. In general an RRC information container is defined for each node that terminates/ receives RRC information e.g. the source RAT, target RNC. By definition, an RRC information container includes a choice facilitating the transfer of different of RRC information.

In the following a typical example of an RRC information container is provided:

```
-- ***************************************************
--
-- RRC information, to target RNC
--
-- ***************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT

ToTargetRNC-Container ::= CHOICE {
 InterRAThandover                    InterRATHandoverInfoWithInterRATCapabilities,
 srncRelocation                      SRNC-RelocationInfo,
 extension                           NULL
}
```

The term RRC message is used for the RRC information identified by a choice value e.g. HANDOVER TO UTRAN COMMAND, INTER RAT HANDOVER INFO. The characteristics and handling defined for these RRC messages to a large extend resembles the RRC messages transferred across the Uu interface. The specification focuses on UE requirements. Hence, RRC messages that originate from/ terminate in the UE/ MS are treated in the main chapters (ch. 8, 9, 10) while the other RRC messages are specified in ch. 14 of TS 25.331.

As stated before, RRC information containers have been defined to limit the impact of transferring RRC information across other interfaces. Intermediate nodes transparently pass the information carried in such containers; only the originating and terminating entities process the information. This **transparency** makes the protocols independent. In case there is RRC information on which intermediate nodes need to act, the information elements should be introduced in the corresponding interface protocols. If the information is to be passed on to another target node also, this may result in duplication of information. For RRC information containers the same extension mechanism as defined for RRC messages applies; both critical and non-critical extensions may be added. If the extension would not be defined at RRC information container level, other interface specification would be affected whenever the RRC information would be extended

In some cases information in containers is exchanged by peer entities that do not speak the same (protocol) language e.g. a GSM BSC may have to exchange information with a UTRA RNC. For such cases, it has been agreed that the **source**/ sender of the information **adapts to the target**/ receiver e.g. upon handover to UTRAN the BSS provides RANAP information within a Source to Target RNC transparent container.

Note The handover to UTRAN info is not only transferred from UE, via BSS to target RNC but may also be returned to another BSS, to be forwarded later on to another RNC. To simplify the handling of RRC information in network nodes, it is therefore desirable to align the format of the RRC information used in both directions. The alignment of formats used in the different directions is not considered to violate these general principles, since for this information that is moved forwards and backwards it is difficult to speak of source and target anyhow.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages. A network node receiving an invalid RRC information container (unknown, unforeseen or erroneous container) from another network node should return an RRC INFORMATION FAILURE message and include an appropriate cause value within IE "Protocol error cause". Although the return of a failure container is considered desirable, no compelling need has been identified to introduce support for transferring this failure container in R99 for all concerned interface protocols. In case the interface protocols do not support the failure procedure, the failure may instead be indicated by means of a cause value that is already defined within the interface protocol.

5.1.7.2 Message sequence diagrams

As stated before, most RRC information is carried by means of containers across interfaces other than Uu. The following sequence diagrams illustrate which RRC messages should be included within these RRC information containers used across the different network interfaces. Concerning the contents of RRC messages i.e. when optional IEs should be included, requirements are specified in TS 25.331 only for the RRC messages originated/ terminated in the UE, since the RRC specification focuses on UE requirements.

Note In order to maintain independence between protocols, no requirement are included in the interface protocols that are used to transfer the RRC information.

Fr each of the different message sequences not only the details on the RRC information transferred are provided, but also deviations from the general principles described in the previous are highlighted. One common deviation from the general principles is that containers are not used for any RRC information transferred across the GSM air interface; in all these cases RRC messages are used instead (mainly for historical reasons).

The following figure illustrates the message sequence for the handover to UTRAN procedure:

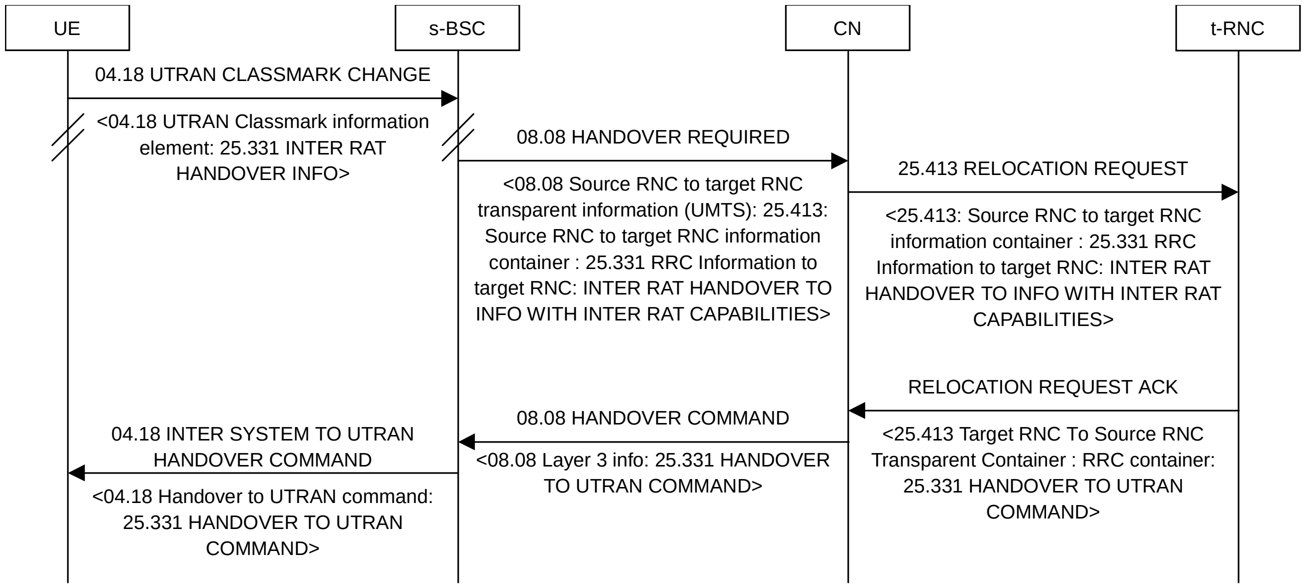

Figure 1: Handover to UTRAN, normal flow

As can be seen in the previous figure, the RRC information transfer within the handover to UTRAN procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the HANDOVER TO UTRAN COMMAND message across the Iu and the A-interface

The following figure illustrates the message sequence for the handover from UTRAN procedure:

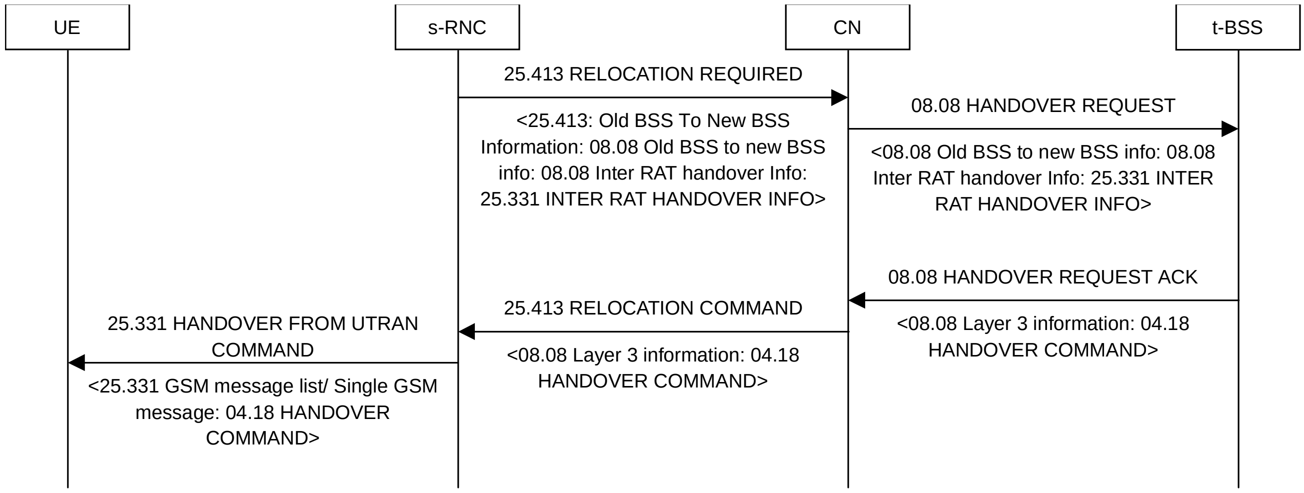

Figure 2: Handover from UTRAN, normal flow

As can be seen in the previous figure, the RRC information transfer within the handover from UTRAN procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the INTER RAT HANDOVER INFO message across the Iu and the A-interface

The following figure illustrates the message sequence for the SRNS relocation procedure:

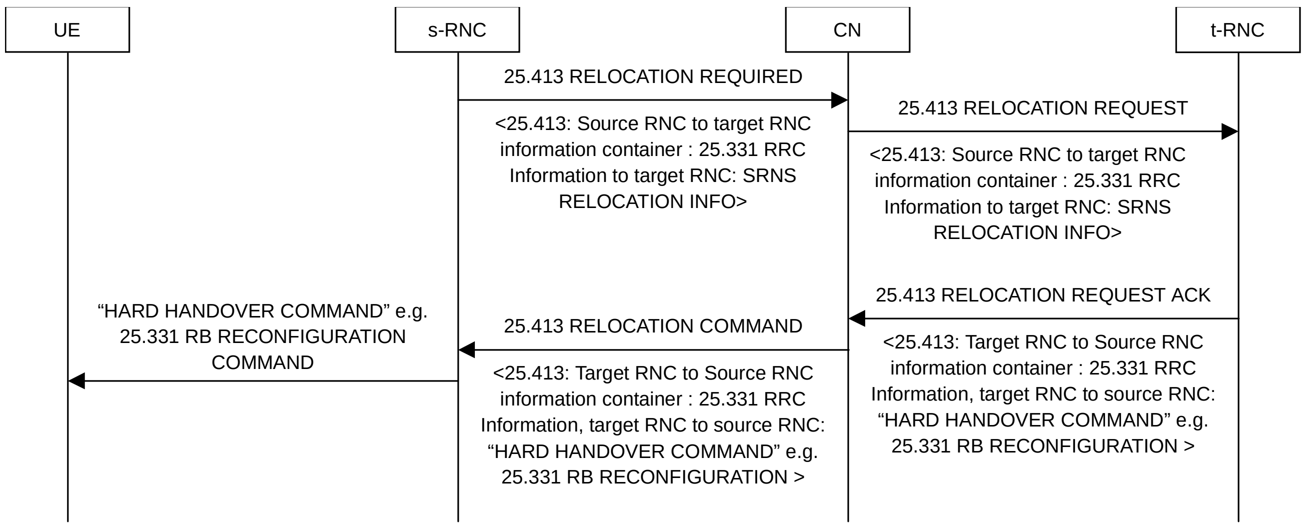

Figure 3: SRNS relocation, normal flow

As can be seen in the previous figure, the RRC information transfer within the SRNS relocation procedure does not deviate from the common principles.

The following figure, showing the message sequence for the inter BSC handover, is provided for completeness.

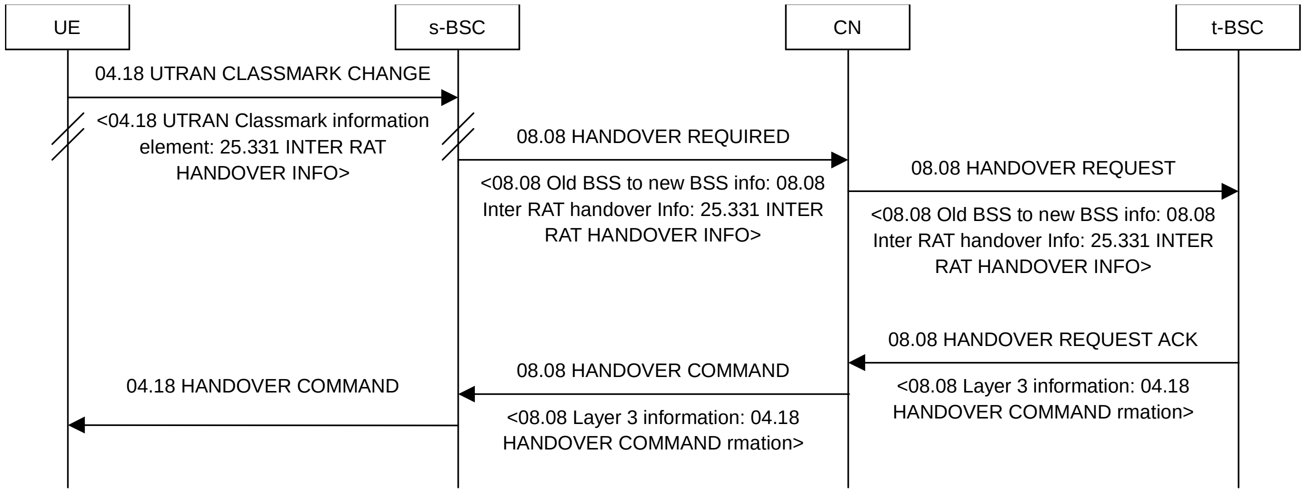

Figure 4: Inter BSC handover, normal flow

As can be seen in the previous figure, the RRC information transfer within the inter BSC handover procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the INTER RAT HANDOVER INFO message across the A- interface

5.1.7.3 General error handling for RRC containers

As indicated in the previous sections, the characteristics and the handling of RRC messages transferred across other interfaces than Uu is the same as that of regular RRC messages. This equally applies for the extension of such messages as well as for the related general error handling. In this section three generic error handling cases are distinguished that have distinct characteristics that are specific to RRC containers.

RRC message sent by UE via another RAT

As for regular messages, only non- critical extensions apply in uplink. Upon not comprehending a non- critical extension, the receiver just ignores this information and process the other parts as if the not comprehended extension was absent. Hence, it is not applicable to use a RRC FAILURE INFO message in the reverse direction

For the HANDOVER TO UTRAN INFO message, the BSS not only transparently passing the information received from the UE, but also adds information and includes it in an RRC container to be forwarded to the target RNC. For information originated and terminated in a network nodes both critical and non- critical extensions apply. Since critical extensions applies for the information inserted by the BSS, they also apply for the HANDOVER TO UTRAN INFO WITH INTER RAT CAPABILITIES message that includes them. The corresponding RRC FAILURE INFO message would be terminated in the BSS.

RRC container information terminated in UE (HANDOVER TO UTRAN COMMAND)

In case of a not comprehended critical extension, the UE shall reject the handover and return a failure message towards the BSC. The RRC procedure also states that a RRC FAILURE INFO message should be included, depending on system specific procedures. The (network) interface signalling procedures do not support the transfer of this RRC message which is not a problem since the extension mechanism does not require it. Instead a cause value may be returned.

If the INTER SYSTEM TO UTRAN HANDOVER FAILURE message used across the GSM air interface would support the transfer of the RRC FAILURE INFO message, the RRC message would not be passed beyond the source BSC since there are no further signalling procedures. However, when needed, this failure information may be transferred to the t-RNC in a subsequent attempt to perform handover for the same UE and to the same RNC. To accommodate this, the HANDOVER TO UTRAN INFO message may include the failure information. This is illustrated in the following figure:

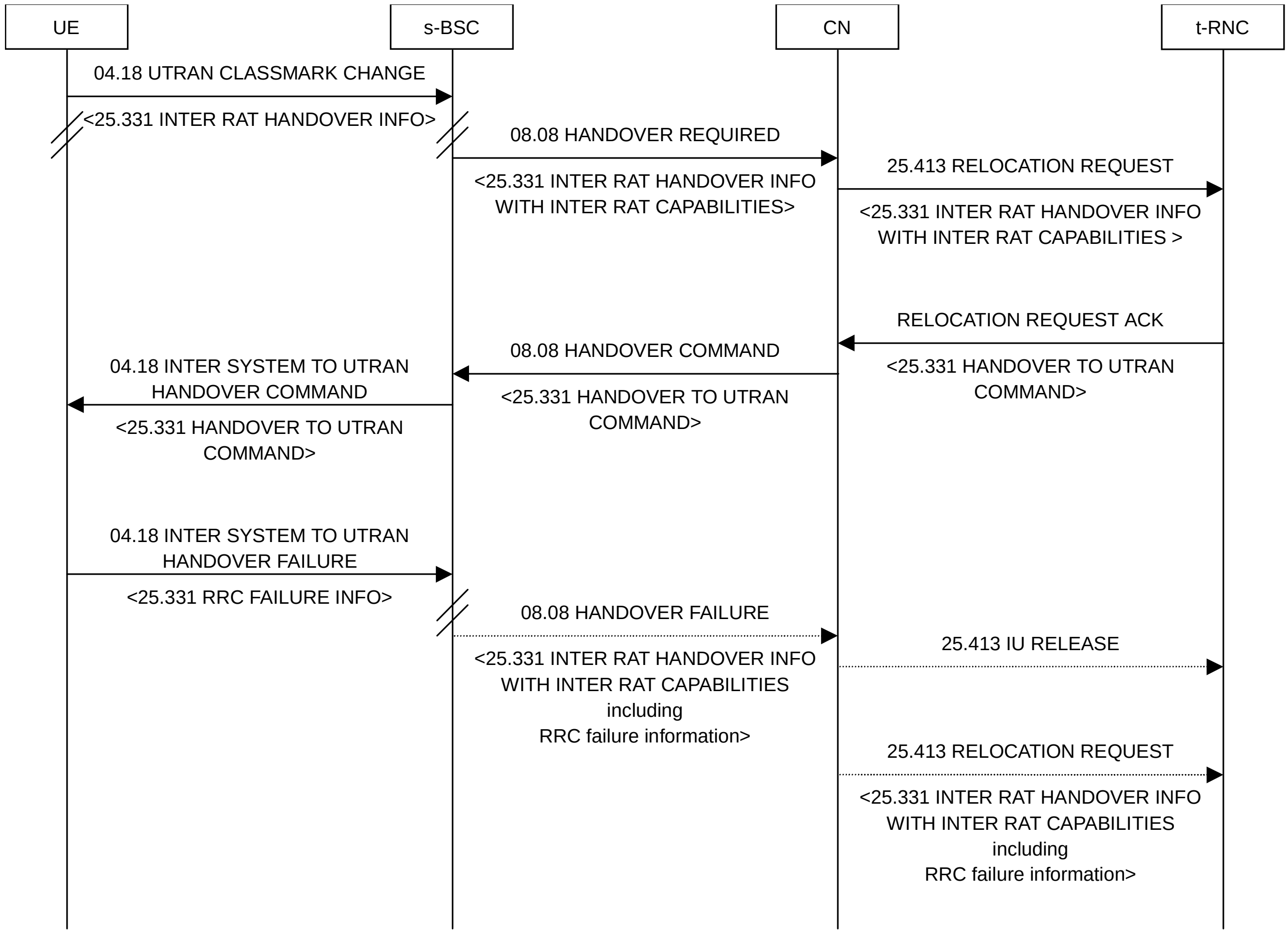

Figure 5: Handover to UTRAN, failure due to critical extension not supported by UE

RRC container information terminated in network (SRNS relocation info & commands)

This case is basically the same as for the handover to UTRAN command, although in this case the container is really terminated by the s-RNC. Nevertheless, in case the hard handover command includes a critical extension that the UE does not comprehend, it will notify the s-RNC by means of the applicable failure message including IE "Protocol error cause" set to "Message extension not comprehended". If a failure notification is desired towards the t-RNC upon a subsequent attempt to perform the handover, the s-RNC has to generate this based on the received protocol error information.

3GPP TSG-RAN WG2 Meeting #27
Orlando, USA, February 18 – 22, 2002

R2-020527

CR-Form-v5

CHANGE REQUEST

⌘ 25.922	CR 022	⌘ rev - ⌘	Current version: 4.1.0 ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘ Correction to TDD DCA Description		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	***Date:*** ⌘	2/18/2002
Category:	⌘ **A** *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.	***Release:*** ⌘	REL-4 *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)*

Reason for change: ⌘	Currently, TS25.123 contains section 6 on DCA. However, there is currently no explicit requirement on DCA in WG4 specifications and it is anticipated that no such explicit requirement will be proposed. As the implementation of the DCA functionality is vendor-specific, only "implicit" requirements on UE and UTRAN measurements and reporting, signalling procedures and so on need to be specified for supporting of DCA. It is therefore proposed to move the current introduction of sections 6.1 and 6.2 in TS25.123 on DCA general system aspects into section 8.2 of TR25.922 in order to keep the informative text.
Summary of change: ⌘	Add introductory text on scope and goal of DCA in TDD.
Consequences if not approved: ⌘	DCA (TDD) sections of TR25.922 do not sufficiently reflect goal, scope and general systems aspects of DCA operation and could therefore be misleading. This CR is a correction to a function, Support for DCA, where the specification is ambiguous or not sufficiently explicit. It would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Clauses affected: ⌘	8.2	
Other specs affected: ⌘	[-] Other core specifications ⌘ [-] Test specifications [-] O&M Specifications	25.922 v3.6.0, CR 021
Other comments: ⌘	-	

8.2 DCA (TDD)

The purpose of DCA is on one side the limitation of the interference (keeping required QoS) and on the other side to maximise the system capacity due to minimising reuse distance.

In order to save battery life time, a UE in idle mode does not perform and report measurements for DCA. ISCP measurements can be started at call establishment. UE TS ISCP measurements are reportable in CELL_DCH state and limited to the current serving cell also in CELL_FACH state.

The channel allocation algorithm will be a distributed, interference adapted approach implemented on network side in the RNC base on local signal strength measurements performed in the UE and the Node B. A priori knowledge about other used channels in the vicinity can be implicitly used without additional signalling traffic.

8.2.1 Channel Allocation

For the UTRA-TDD mode a physical channel is characterised by a combination of its carrier frequency, time slot, and spreading code as explained in the clause on the physical channel structure.

Channel allocation covers both:

- resource allocation to cells (slow DCA);
- resource allocation to bearer services (fast DCA).

8.2.1.1 Resource allocation to cells (slow DCA)

Channel allocation to cells follows the rules below:

- A reuse one cluster is used in the frequency domain. In terms of an interference-free DCA strategy a timeslot-to-cell assignment is performed, resulting in a time slot clustering. A reuse one cluster in frequency domain does not need frequency planning. If there is more than one carrier available for a single operator also other frequency reuse patters >1 are possible.
- Any specific time slot within the TDD frame is available either for uplink or downlink transmission. UL/DL resources allocation is thus able to adapt itself to time varying asymmetric traffic.
- In order to accommodate the traffic load in the various cells the assignment of the timeslots (both UL and DL) to the cells is dynamically (on a coarse time scale) rearranged (slow DCA) taking into account that strongly interfering cells use different timeslots. Thus resources allocated to adjacent cells may also overlap depending on the interference situation.
- Due to idle periods between successive received and transmitted bursts, UEs can provide the network with interference measurements in time slots different from the one currently used. The availability of such information enables the operator to implement the DCA algorithm suited to the network.
- For instance, the prioritised assignment of time slots based on interference measurements results in a clustering in the time domain and in parallel takes into account the demands on locally different traffic loads within the network.

8.2.1.2 Resource allocation to bearer services (fast DCA)

Fast channel allocation refers to the allocation of one or multiple physical channels to any bearer service Resource units (RUs) are acquired (and released) according to a cell-related preference list derived from the slow DCA scheme.

1. The following principles hold for fast channel allocation: The basic RU used for channel allocation is one code / timeslot / (frequency).

2. Multirate services are achieved by pooling of resource units. This can be made both in the code domain (pooling of multiple codes within one timeslot = **multicode** operation) and time domain (pooling of multiple timeslots within one frame = **multislot** operation). Additionally, any combination of both is possible. Simulation results reported in Appendix A, recommend that the DCA prefers code pooling, over time slot pooling, for UDD packet data; the use of code pooling in fact results in lower number of unsatisfied users.

3. Since the maximal number of codes per time slot in UL/DL depends on several physical circumstances like, channel characteristics, environments, etc. (see description of physical layer) and whether additional techniques to further enhance capacity are applied (for example smart antennas),. the DCA algorithm has to be independent of this number. Additionally, time-hopping can be used to average inter-cell interference in case of low-medium bit rate users.

4. Channel allocation differentiates between RT and NRT bearer services:

   - RT services: Channels remain allocated for the whole duration the bearer service is established. The allocated resources may change because of a channel reallocation procedure (e.g. VBR).

   - NRT services: Channels are allocated for the period of the transmission of a dedicated data packet only UDD channel allocation is performed using 'best effort strategy', i.e. resources available for NRT services are distributed to all admitted NRT services with pending transmission requests. The number of channels allocated for any NRT service is variable and depends at least on the number of current available resources and the number of NRT services attempting for packet transmission simultaneously. Additionally, prioritisation of admitted NRT services is possible.

5. Channel reallocation procedures (intra-cell handover) can be triggered for many reasons:

   - To cope with varying interference conditions.

   - In case of high rate RT services (i.e. services requiring multiple resource units) a 'channel reshuffling procedure' is required to prevent a fragmentation of the allocated codes over to many timeslots. This is achieved by freeing the least loaded timeslots (timeslots with minimum used codes) by performing a channel reallocation procedure.

   - When using smart antennas, channel reallocation is useful to keep spatially separated the different users in the same timeslot.

8.2.2 Measurements Reports from UE to the UTRAN

While in active mode the DCA needs measurements for the reshuffling procedure (intra-cell handover). The specification of the measurements to be performed is contained in Section 7.4 in [3]. In this subclause the relevant measurement reports are presented:

- Pathloss of a sub-set of cells (pathloss is quantified in N_{PL} [e.g. 128] intervals ; [max. number of cells is 30].

- Inter-cell interference measurements of all DL time slots requested by the UTRAN (interference is quantified in N_{ICI} [e.g. 32] intervals, due to asymmetry up to 14 time slots are possible).

- BER of serving link (quantified in N_{BER} [e.g. 16] intervals).

- Transmission power of the UE on serving link (separated in N_{TX} [e.g. 64] intervals).

- DTX flag link.

Further measurements and reports can be requested by the UTRAN.

The RLC informs the DCA about transmission errors. The interaction between DCA and RLC depends on the RLC operation mode.

R2-020346

CR-Form-v5

CHANGE REQUEST

⌘	**25.922**	**CR**	**021**	⌘ **rev**	**-**	⌘	Current version:	**3.6.0** ⌘

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Proposed change affects: ⌘ (U)SIM [ ] ME/UE [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘ Correction to TDD DCA Description		
Source:	⌘ TSG-RAN WG2		
Work item code:	⌘ TEI	***Date:***	⌘ 07/01/2002
Category:	⌘ **F**	***Release:***	⌘ R99
	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)*

Reason for change:	⌘ Currently, TS25.123 contains section 6 on DCA. However, there is currently no explicit requirement on DCA in WG4 specifications and it is anticipated that no such explicit requirement will be proposed. As the implementation of the DCA functionality is vendor-specific, only “implicit” requirements on UE and UTRAN measurements and reporting, signalling procedures and so on need to be specified for supporting of DCA. It is therefore proposed to move the current introduction of sections 6.1 and 6.2 in TS25.123 on DCA general system aspects into section 8.2 of TR25.922 in order to keep the informative text.
Summary of change:	⌘ Add introductory text on scope and goal of DCA in TDD.
Consequences if not approved:	⌘ DCA (TDD) sections of TR25.922 do not sufficiently reflect goal, scope and general systems aspects of DCA operation and could therefore be misleading. This CR is a correction to a function, Support for DCA, where the specification is ambiguous or not sufficiently explicit. It would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise.

Clauses affected:	⌘ 8.2	
Other specs affected:	⌘ [-] Other core specifications [-] Test specifications [-] O&M Specifications	⌘ 25.922 v4.1.0, CR 022
Other comments:	⌘ -	

8.2 DCA (TDD)

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In order to save battery life time, a UE in idle mode does not perform and report measurements for DCA. ISCP measurements can be started at call establishment. UE TS ISCP measurements are reportable in CELL_DCH state and limited to the current serving cell also in CELL_FACH state.

The channel allocation algorithm will be a distributed, interference adapted approach implemented on network side in the RNC base on local signal strength measurements performed in the UE and the Node B. A priori knowledge about other used channels in the vicinity can be implicitly used without additional signalling traffic.

8.2.1 Channel Allocation

For the UTRA-TDD mode a physical channel is characterised by a combination of its carrier frequency, time slot, and spreading code as explained in the clause on the physical channel structure.

Channel allocation covers both:

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- resource allocation to bearer services (fast DCA).

8.2.1.1 Resource allocation to cells (slow DCA)

Channel allocation to cells follows the rules below:

- A reuse one cluster is used in the frequency domain. In terms of an interference-free DCA strategy a timeslot-to-cell assignment is performed, resulting in a time slot clustering. A reuse one cluster in frequency domain does not need frequency planning. If there is more than one carrier available for a single operator also other frequency reuse patters >1 are possible.
- Any specific time slot within the TDD frame is available either for uplink or downlink transmission. UL/DL resources allocation is thus able to adapt itself to time varying asymmetric traffic.
- In order to accommodate the traffic load in the various cells the assignment of the timeslots (both UL and DL) to the cells is dynamically (on a coarse time scale) rearranged (slow DCA) taking into account that strongly interfering cells use different timeslots. Thus resources allocated to adjacent cells may also overlap depending on the interference situation.
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Fast channel allocation refers to the allocation of one or multiple physical channels to any bearer service Resource units (RUs) are acquired (and released) according to a cell-related preference list derived from the slow DCA scheme.

1. The following principles hold for fast channel allocation: The basic RU used for channel allocation is one code / timeslot / (frequency).
2. Multirate services are achieved by pooling of resource units. This can be made both in the code domain (pooling of multiple codes within one timeslot = **multicode** operation) and time domain (pooling of multiple timeslots within one frame = **multislot** operation). Additionally, any combination of both is possible. Simulation results reported in Appendix A, recommend that the DCA prefers code pooling, over time slot pooling, for UDD packet data; the use of code pooling in fact results in lower number of unsatisfied users.

3. Since the maximal number of codes per time slot in UL/DL depends on several physical circumstances like, channel characteristics, environments, etc. (see description of physical layer) and whether additional techniques to further enhance capacity are applied (for example smart antennas),. the DCA algorithm has to be independent of this number. Additionally, time-hopping can be used to average inter-cell interference in case of low-medium bit rate users.

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   - In case of high rate RT services (i.e. services requiring multiple resource units) a 'channel reshuffling procedure' is required to prevent a fragmentation of the allocated codes over to many timeslots. This is achieved by freeing the least loaded timeslots (timeslots with minimum used codes) by performing a channel reallocation procedure.

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- Inter-cell interference measurements of all DL time slots requested by the UTRAN (interference is quantified in N_{ICI} [e.g. 32] intervals, due to asymmetry up to 14 time slots are possible).

- BER of serving link (quantified in N_{BER} [e.g. 16] intervals).

- Transmission power of the UE on serving link (separated in N_{TX} [e.g. 64] intervals).

- DTX flag link.

Further measurements and reports can be requested by the UTRAN.

The RLC informs the DCA about transmission errors. The interaction between DCA and RLC depends on the RLC operation mode.

3GPP TSG-RAN WG2, Meeting #27 ***Tdoc R2-020526***
Orlando, USA, 18th – 22nd February, 2002

CR-Form-v5

CHANGE REQUEST

⌘	**25.922**	**CR**	**020**	⌘ **rev**	**-**	⌘	Current version:	**4.1.0**	⌘

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

Proposed change affects: ⌘ (U)SIM [ ] ME/UE [ ] Radio Access Network [X] Core Network [X]

Title:	⌘	Clarification regarding the transfer of RRC information across interfaces other than Uu		
Source:	⌘	TSG-RAN WG2		
Work item code:	⌘	TEI	***Date:*** ⌘	23-02-2002
Category:	⌘	**A**	***Release:*** ⌘	REL-4
		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)*

Reason for change:	⌘	The changes included in this CR are proposed for the following reasons: • It is not fully specified how the different RRC information container should be used e.g. across which interfaces and in which scenario
Summary of change:	⌘	The original revision of this CR introduces the following changes • Clarification is provided concerning which RRC information container should be used across each which interfaces and for each scenario **Impact analysis:** Impacted functionality: the transfer of RRC information between network nodes, as used during inter RAT handover and SRNS relocation Correction type: Clarification of a function where the specification is incomplete. Would not affect implementations behaving like indicated in the CR, would affect implementations supporting the corrected functionality otherwise Interoperability: • Isolated impact: the impact is isolated; only the corrected functionality is affected • The CR does not introduce changes; it only provides additional clarification
Consequences if not approved:	⌘	How the different RRC information container should be used e.g. across which interfaces and in which scenario remains somewhat unclear

Clauses affected:	⌘	5.1.7 (new), 5.1.7.1 (new), 5.1.7.2 (new), 5.1.7.3 (new)		
Other specs	⌘	[ ] Other core specifications	⌘	25.922 v3.6.0, CR 019

affected:		Test specifications	
		O&M Specifications	
Other comments:	⌘		

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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.

5.1.7 Transfer of RRC information across interfaces other than Uu

5.1.7.1 Introduction and general principles

During several procedures e.g. handover to UTRAN, handover from UTRAN, SRNC relocation RRC information may need to be transferred across interfaces other than the UTRA air interface (Uu) e.g. Iu-, A-, Um interface. In order maintain independence between the different protocols, to facilitate transparent handling by intermediate network nodes and to ease future extension, the preference is to use RRC information containers across such interfaces. In some cases however RRC messages may be used e.g. for historical reasons.

An RRC information container is an extensible self contained information unit that can be decoded without requiring information about the context e.g. in which interface message it was included. In general an RRC information container is defined for each node that terminates/ receives RRC information e.g. the source RAT, target RNC. By definition, an RRC information container includes a choice facilitating the transfer of different of RRC information.

In the following a typical example of an RRC information container is provided:

```
-- ***************************************************
--
-- RRC information, to target RNC
--
-- ***************************************************
-- RRC Information to target RNC sent either from source RNC or from another RAT

ToTargetRNC-Container ::= CHOICE {
 InterRAThandover                    InterRATHandoverInfoWithInterRATCapabilities,
 srncRelocation                      SRNC-RelocationInfo,
 extension                           NULL
}
```

The term RRC message is used for the RRC information identified by a choice value e.g. HANDOVER TO UTRAN COMMAND, INTER RAT HANDOVER INFO. The characteristics and handling defined for these RRC messages to a large extend resembles the RRC messages transferred across the Uu interface. The specification focuses on UE requirements. Hence, RRC messages that originate from/ terminate in the UE/ MS are treated in the main chapters (ch. 8, 9, 10) while the other RRC messages are specified in ch. 14 of TS 25.331.

As stated before, RRC information containers have been defined to limit the impact of transferring RRC information across other interfaces. Intermediate nodes transparently pass the information carried in such containers; only the originating and terminating entities process the information. This **transparency** makes the protocols independent. In case there is RRC information on which intermediate nodes need to act, the information elements should be introduced in the corresponding interface protocols. If the information is to be passed on to another target node also, this may result in duplication of information. For RRC information containers the same extension mechanism as defined for RRC messages applies; both critical and non-critical extensions may be added. If the extension would not be defined at RRC information container level, other interface specification would be affected whenever the RRC information would be extended

In some cases information in containers is exchanged by peer entities that do not speak the same (protocol) language e.g. a GSM BSC may have to exchange information with a UTRA RNC. For such cases, it has been agreed that the **source**/ sender of the information **adapts to the target**/ receiver e.g. upon handover to UTRAN the BSS provides RANAP information within a Source to Target RNC transparent container.

Note The handover to UTRAN info is not only transferred from UE, via BSS to target RNC but may also be returned to another BSS, to be forwarded later on to another RNC. To simplify the handling of RRC information in network nodes, it is therefore desirable to align the format of the RRC information used in both directions. The alignment of formats used in the different directions is not considered to violate these general principles, since for this information that is moved forwards and backwards it is difficult to speak of source and target anyhow.

The error handling for RRC information containers that are terminated in network nodes applies the same principles as defined for RRC messages. A network node receiving an invalid RRC information container (unknown, unforeseen or erroneous container) from another network node should return an RRC INFORMATION FAILURE message and include an appropriate cause value within IE "Protocol error cause". Although the return of a failure container is considered desirable, no compelling need has been identified to introduce support for transferring this failure container in R99 for all concerned interface protocols. In case the interface protocols do not support the failure procedure, the failure may instead be indicated by means of a cause value that is already defined within the interface protocol.

5.1.7.2 Message sequence diagrams

As stated before, most RRC information is carried by means of containers across interfaces other than Uu. The following sequence diagrams illustrate which RRC messages should be included within these RRC information containers used across the different network interfaces. Concerning the contents of RRC messages i.e. when optional IEs should be included, requirements are specified in TS 25.331 only for the RRC messages originated/ terminated in the UE, since the RRC specification focuses on UE requirements.

Note In order to maintain independence between protocols, no requirement are included in the interface protocols that are used to transfer the RRC information.

Fr each of the different message sequences not only the details on the RRC information transferred are provided, but also deviations from the general principles described in the previous are highlighted. One common deviation from the general principles is that containers are not used for any RRC information transferred across the GSM air interface; in all these cases RRC messages are used instead (mainly for historical reasons).

The following figure illustrates the message sequence for the handover to UTRAN procedure:

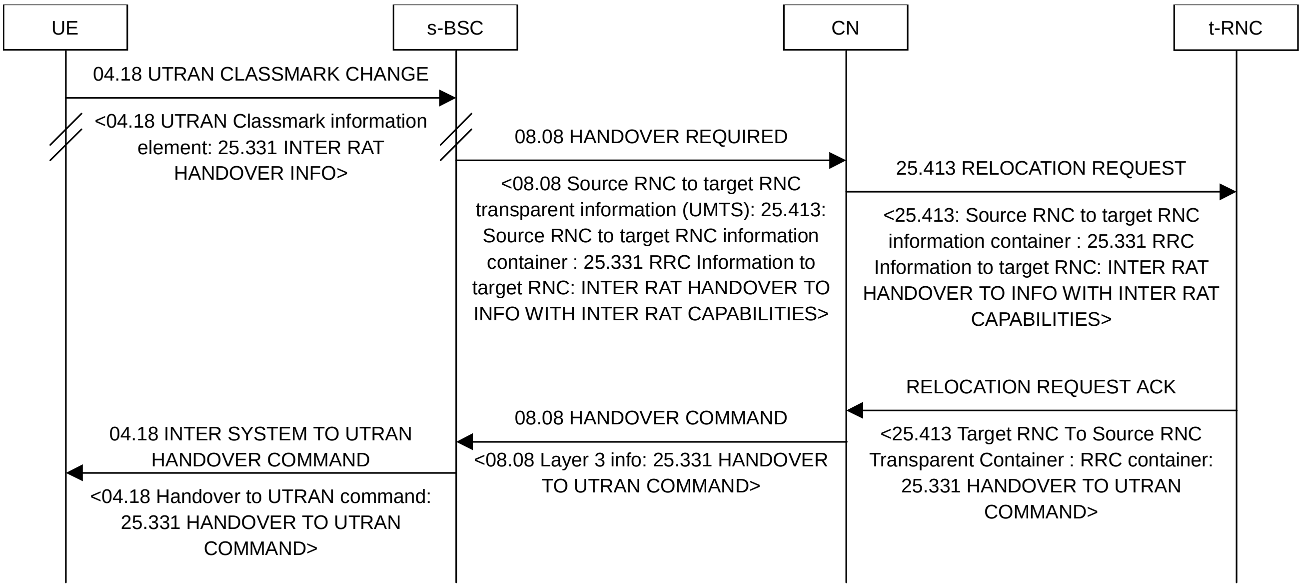

Figure 1: Handover to UTRAN, normal flow

As can be seen in the previous figure, the RRC information transfer within the handover to UTRAN procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the HANDOVER TO UTRAN COMMAND message across the Iu and the A-interface

The following figure illustrates the message sequence for the handover from UTRAN procedure:

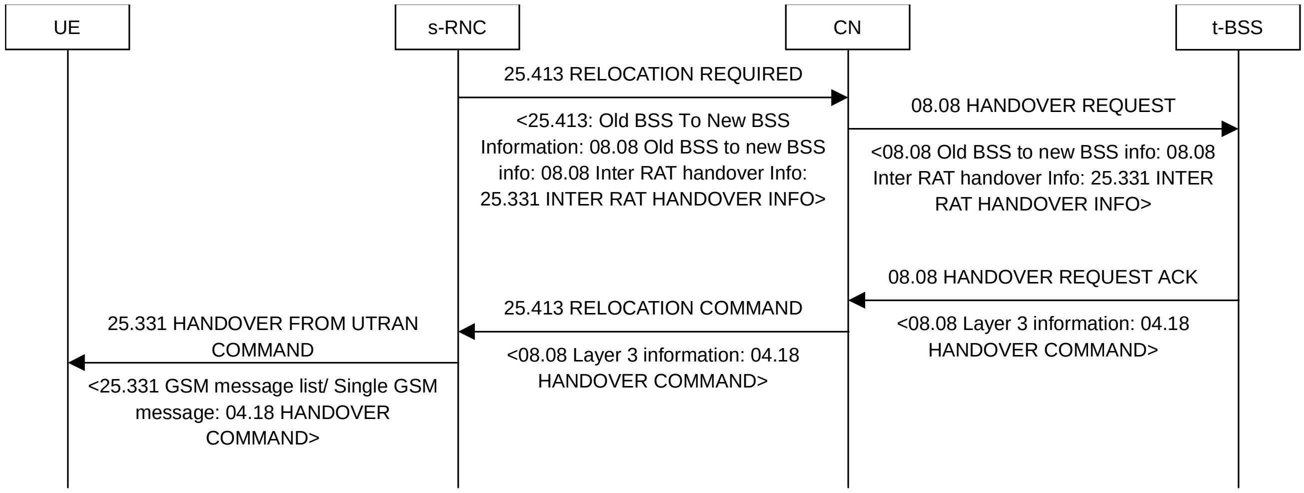

Figure 2: Handover from UTRAN, normal flow

As can be seen in the previous figure, the RRC information transfer within the handover from UTRAN procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the INTER RAT HANDOVER INFO message across the Iu and the A-interface

The following figure illustrates the message sequence for the SRNS relocation procedure:

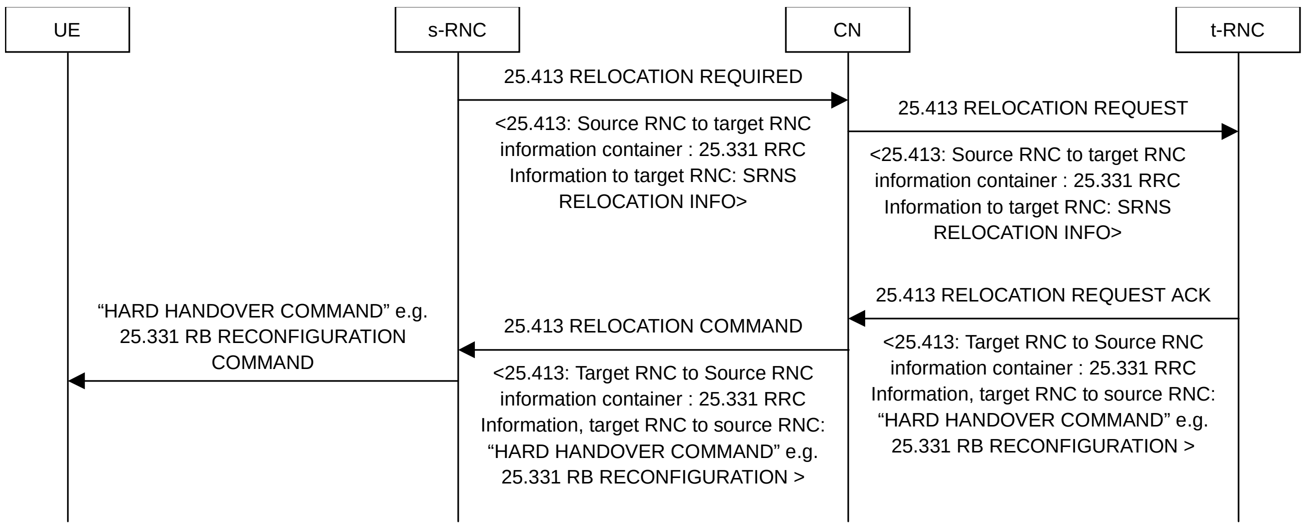

Figure 3: SRNS relocation, normal flow

As can be seen in the previous figure, the RRC information transfer within the SRNS relocation procedure does not deviate from the common principles.

The following figure, showing the message sequence for the inter BSC handover, is provided for completeness.

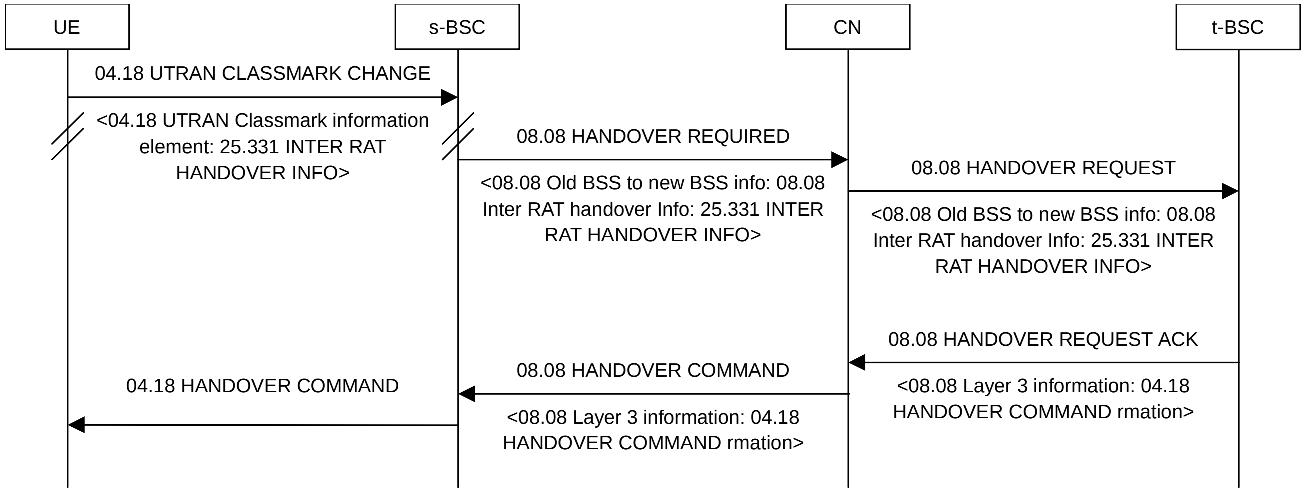

Figure 4: Inter BSC handover, normal flow

As can be seen in the previous figure, the RRC information transfer within the inter BSC handover procedure deviates from the common principles in the following areas:

- Containers are not used to transfer the INTER RAT HANDOVER INFO message across the A- interface

5.1.7.3 General error handling for RRC containers

As indicated in the previous sections, the characteristics and the handling of RRC messages transferred across other interfaces than Uu is the same as that of regular RRC messages. This equally applies for the extension of such messages as well as for the related general error handling. In this section three generic error handling cases are distinguished that have distinct characteristics that are specific to RRC containers.

RRC message sent by UE via another RAT

As for regular messages, only non- critical extensions apply in uplink. Upon not comprehending a non- critical extension, the receiver just ignores this information and process the other parts as if the not comprehended extension was absent. Hence, it is not applicable to use a RRC FAILURE INFO message in the reverse direction

For the HANDOVER TO UTRAN INFO message, the BSS not only transparently passing the information received from the UE, but also adds information and includes it in an RRC container to be forwarded to the target RNC. For information originated and terminated in a network nodes both critical and non- critical extensions apply. Since critical extensions applies for the information inserted by the BSS, they also apply for the HANDOVER TO UTRAN INFO WITH INTER RAT CAPABILITIES message that includes them. The corresponding RRC FAILURE INFO message would be terminated in the BSS.

RRC container information terminated in UE (HANDOVER TO UTRAN COMMAND)

In case of a not comprehended critical extension, the UE shall reject the handover and return a failure message towards the BSC. The RRC procedure also states that a RRC FAILURE INFO message should be included, depending on system specific procedures. The (network) interface signalling procedures do not support the transfer of this RRC message which is not a problem since the extension mechanism does not require it. Instead a cause value may be returned.

If the INTER SYSTEM TO UTRAN HANDOVER FAILURE message used across the GSM air interface would support the transfer of the RRC FAILURE INFO message, the RRC message would not be passed beyond the source BSC since there are no further signalling procedures. However, when needed, this failure information may be transferred to the t-RNC in a subsequent attempt to perform handover for the same UE and to the same RNC. To accommodate this, the HANDOVER TO UTRAN INFO message may include the failure information. This is illustrated in the following figure:

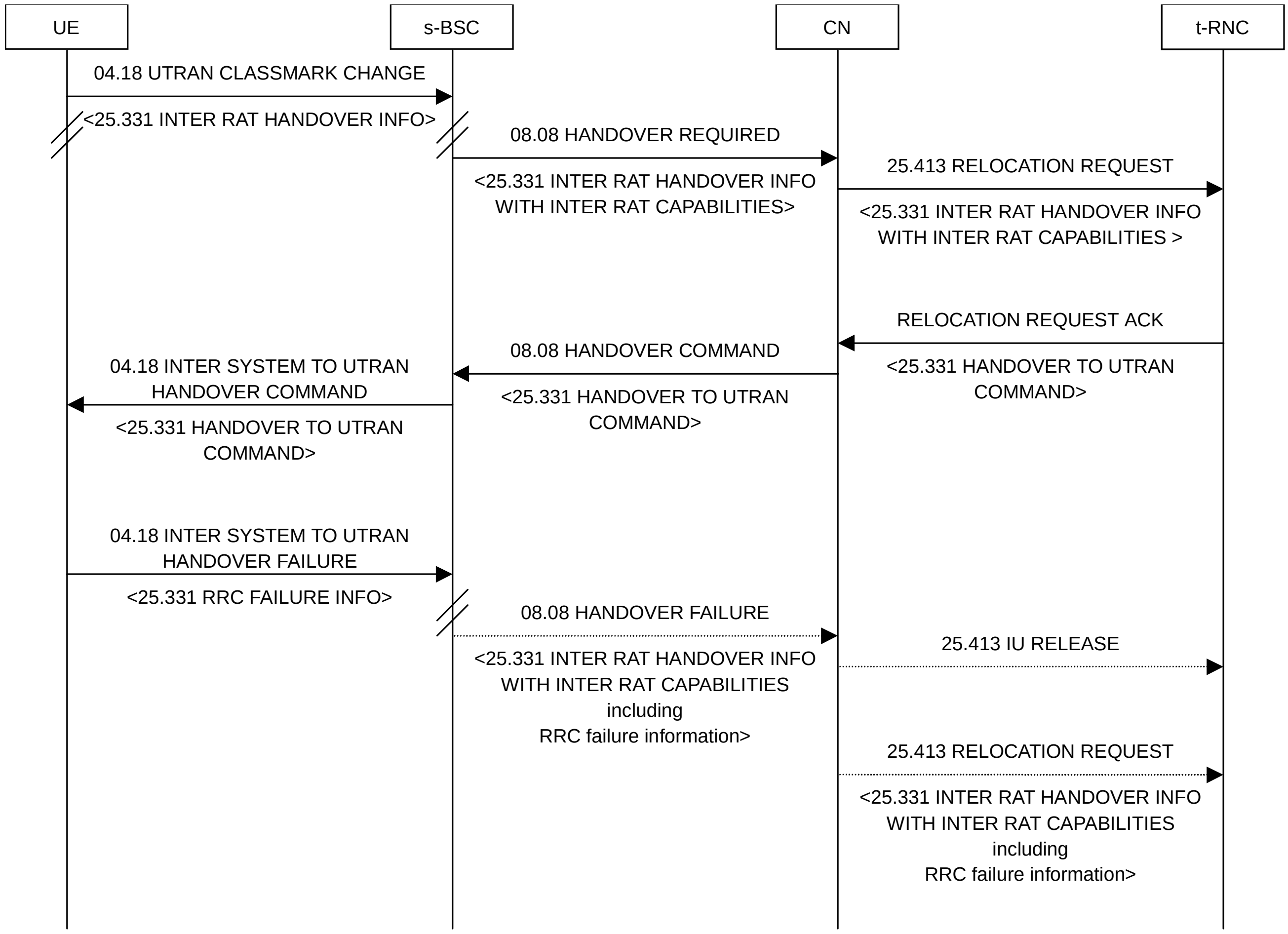

Figure 5: Handover to UTRAN, failure due to critical extension not supported by UE

RRC container information terminated in network (SRNS relocation info & commands)

This case is basically the same as for the handover to UTRAN command, although in this case the container is really terminated by the s-RNC. Nevertheless, in case the hard handover command includes a critical extension that the UE does not comprehend, it will notify the s-RNC by means of the applicable failure message including IE "Protocol error cause" set to "Message extension not comprehended". If a failure notification is desired towards the t-RNC upon a subsequent attempt to perform the handover, the s-RNC has to generate this based on the received protocol error information.