TSG-RAN Meeting #13 *RP-010538*
Beijing, China, 18 - 21 September 2001

Title: **Agreed CRs (Release ’99 and Rel-4 category A) to TS 25.303**

Source: **TSG-RAN WG2**

Agenda item: **8.2.3**

Doc-1st-	Status-	Spec	CR	Rev	Phase	Subject	Cat	Version	Versio
R2-011892	agreed	25.303	050		R99	SRNS relocation and header compression protocol	F	3.8.0	3.9.0
R2-012009	agreed	25.303	051		Rel-4	SRNS relocation and header compression protocol	A	4.1.0	4.2.0
R2-011948	agreed	25.303	052		R99	Correction of Active Set Update procedure	F	3.8.0	3.9.0
R2-012010	agreed	25.303	053		Rel-4	Correction of Active Set Update procedure	A	4.1.0	4.2.0
R2-012171	agreed	25.303	056	2	R99	Corrections to SRNS relocation	F	3.8.0	3.9.0
R2-012172	agreed	25.303	057		Rel-4	Corrections to SRNS relocation	A	4.1.0	4.2.0

3GPP TSG-RAN WG2 Meeting #23
Helsinki, Finland, 27-31 August 2001

Tdoc R2-011892

CR-Form-v4

CHANGE REQUEST

⌘ **25.303** **CR** **050** ⌘ rev **-** ⌘ Current version: **3.8.0** ⌘

*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 **X** Radio Access Network **X** Core Network ☐

Title:	⌘	SRNS relocation and header compression protocol
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	18th August 01
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change:	⌘	As described in Tdoc R2-010896 presented during RAN WG2#20, currently, the handling of PDCP Hearder Compression protocol during SRNS relocation is not described in the TS.
Summary of change:	⌘	A new parameter in the CPDCP-CONFIG primitive between PDCP and upper layers is proposed to be has been defined in a companion draft CR to 25.323 and is used to reinitialise the entire context at the decompressor during SRNS relocation when Header compression is used. This is applicable for lossless, lossy and seamless radio bearers. Isolated impact analysis: The CR contains a correction to a function where the specification was: • ambiguous or not sufficiently explicit. The proposed changes do not change the behaviour, since the inter-layer procedure examples in 25.303 are informative only.
Consequences if not approved:	⌘	Description of header compression reinitialisation during SRNS relocation will not be complete.

Clauses affected:	⌘	6.4.8, 6.4.8.1, 6.4.8.2, 6.4.8.3, 6.4.8.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.323 25.303 v4.1.0, CR 051
Other comments:	⌘			

How to create CRs using this form:
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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.

6.4.8 SRNS Relocation

The SRNS relocation procedure can be divided into two phases. The first phase is relocation preparation; where the resources are reserved, new RABs are established while the second phase is the transfer of the Serving RNS from source to target RNC.

There are three cases in which a~~n~~ SRNS relocation can be performed:

- Serving SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC.
- Combined Hard Handover and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a hard handover decided by the UTRAN.
- Combined Cell/URA update and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a cell re-selection in the UTRAN.

and these are described in subclause 6.4.8.1, 6.4.8.2 (for lossless radio bearers), 6.4.8.3, 6.4.8.4 (for seamless radio bearers), and in more detail in [6].

6.4.8.1 Combined Cell/URA Update and SRNS relocation (lossless radio bearers)

The procedure is initiated by the source RNC deciding to perform a SRNS relocation. Case I represents the situation when the UE is not involved and this is shown in Figure 34. Case II represents the situation when the UE is involved and a Combined Cell/URA update and SRNS relocation is performed, also shown in Figure 34.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7].

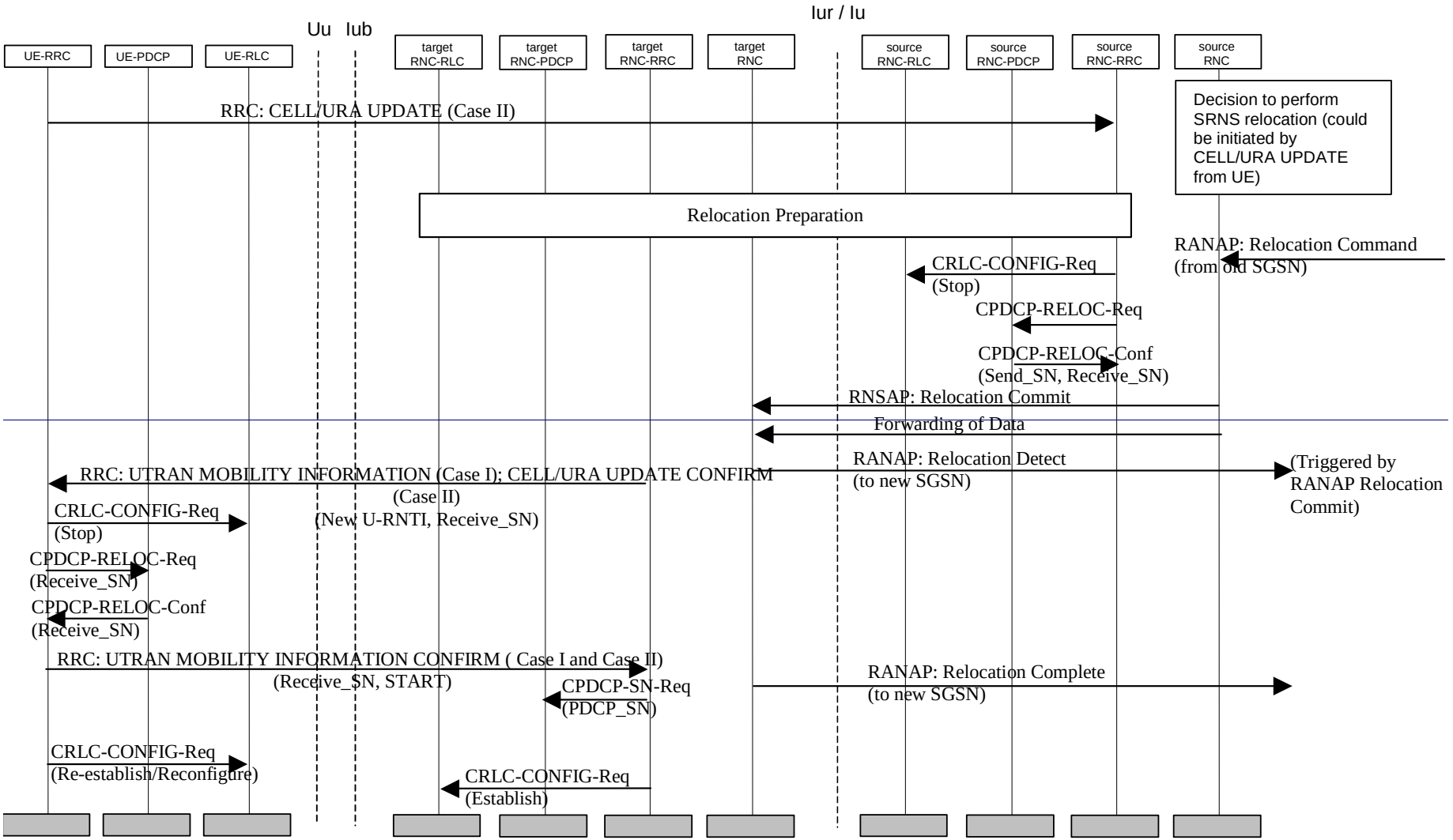
For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC. The PDCP send and receive sequence numbers are then transferred in the RNSAP Relocation Commit message from source to target RNC for RABs that support lossless SRNS relocation. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

The target RNC then sends a UTRAN MOBILITY INFORMATION (Case I) or a CELL/URA UPDATE CONFIRM (Case II); which configures the UE with the new U-RNTI and indicates the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. The UE compares the uplink receive PDCP sequence number with the UE uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE. The UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7].

If the UE has successfully configured itself, it shall send a UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II). These messages contain the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. The UTRAN initialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.

In case of failure~~,~~; the UE shall send a UTRAN MOBILITY INFORMATION FAILURE (Case I) or CELL/URA UPDATE FAILURE (Case II) message.

Upon reception of the UTRAN MOBILITY INFORMATION CONFIRM/FAILURE (Case I and Case II) or CELL/URA UPDATE COMPLETE/FAILURE (Case II) message, UTRAN shall start the PDCP entity and the relocation procedure ends.


Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf (Send_SN, Receive_SN)
RNSAP: Relocation Commit
Forwarding of Data
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI, Receive_SN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req (Receive_SN)
CPDCP-RELOC-Conf (Receive_SN)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (Receive_SN, START)
CPDCP-SN-Req (PDCP_SN)
RANAP: Relocation Complete (to new SGSN)
CRLC-CONFIG-Req (Re-establish/Reconfigure)
CRLC-CONFIG-Req (Establish)

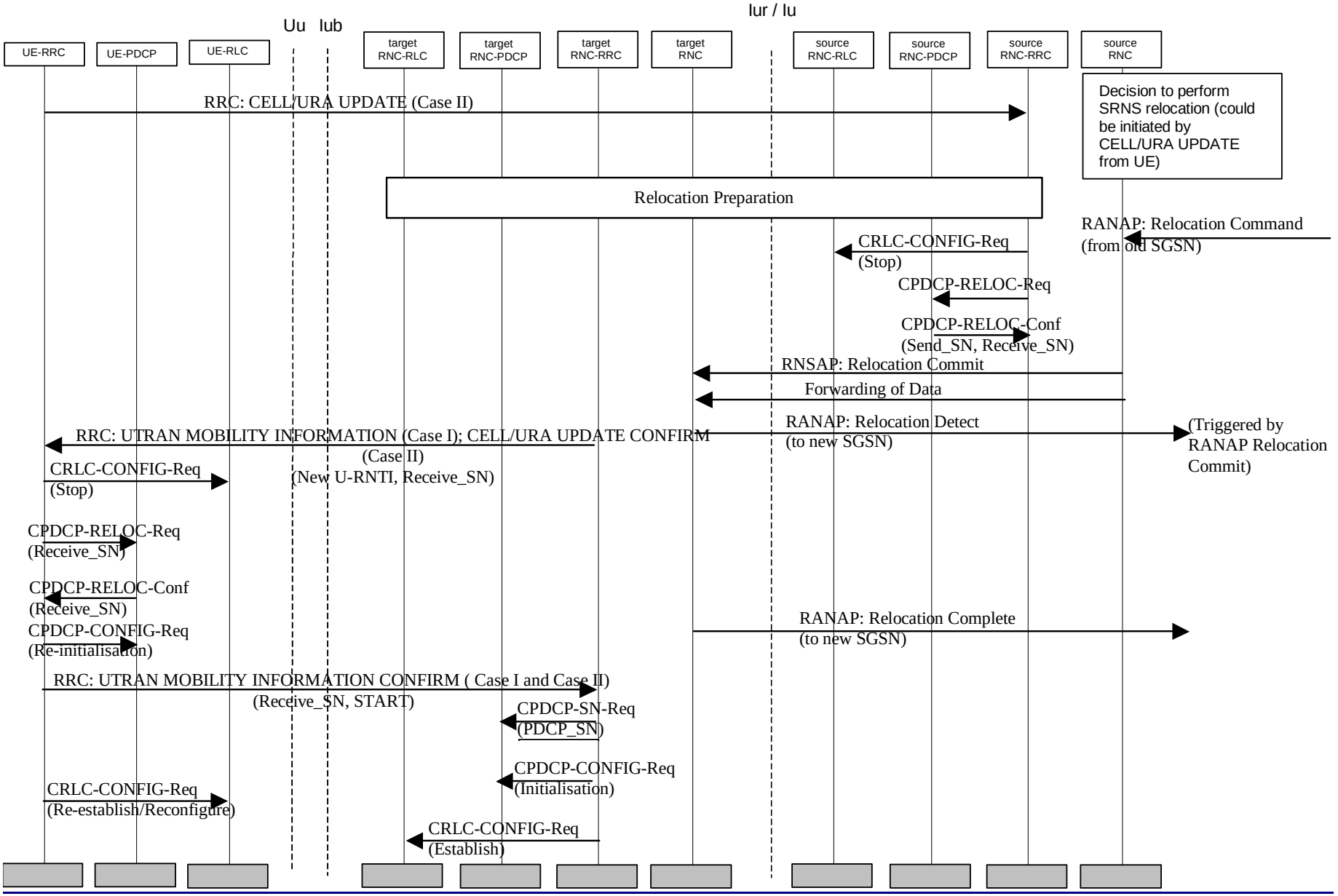

Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf (Send_SN, Receive_SN)
RNSAP: Relocation Commit
Forwarding of Data
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI, Receive_SN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req (Receive_SN)
CPDCP-RELOC-Conf (Receive_SN)
CPDCP-CONFIG-Req (Re-initialisation)
RANAP: Relocation Complete (to new SGSN)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (Receive_SN, START)
CPDCP-SN-Req (PDCP_SN)
CPDCP-CONFIG-Req (Initialisation)
CRLC-CONFIG-Req (Re-establish/Reconfigure)
CRLC-CONFIG-Req (Establish)

Figure 34: Combined Cell/URA Update and SRNS relocation (lossless radio bearers)

6.4.8.2 Combined Hard Handover and SRNS relocation (lossless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

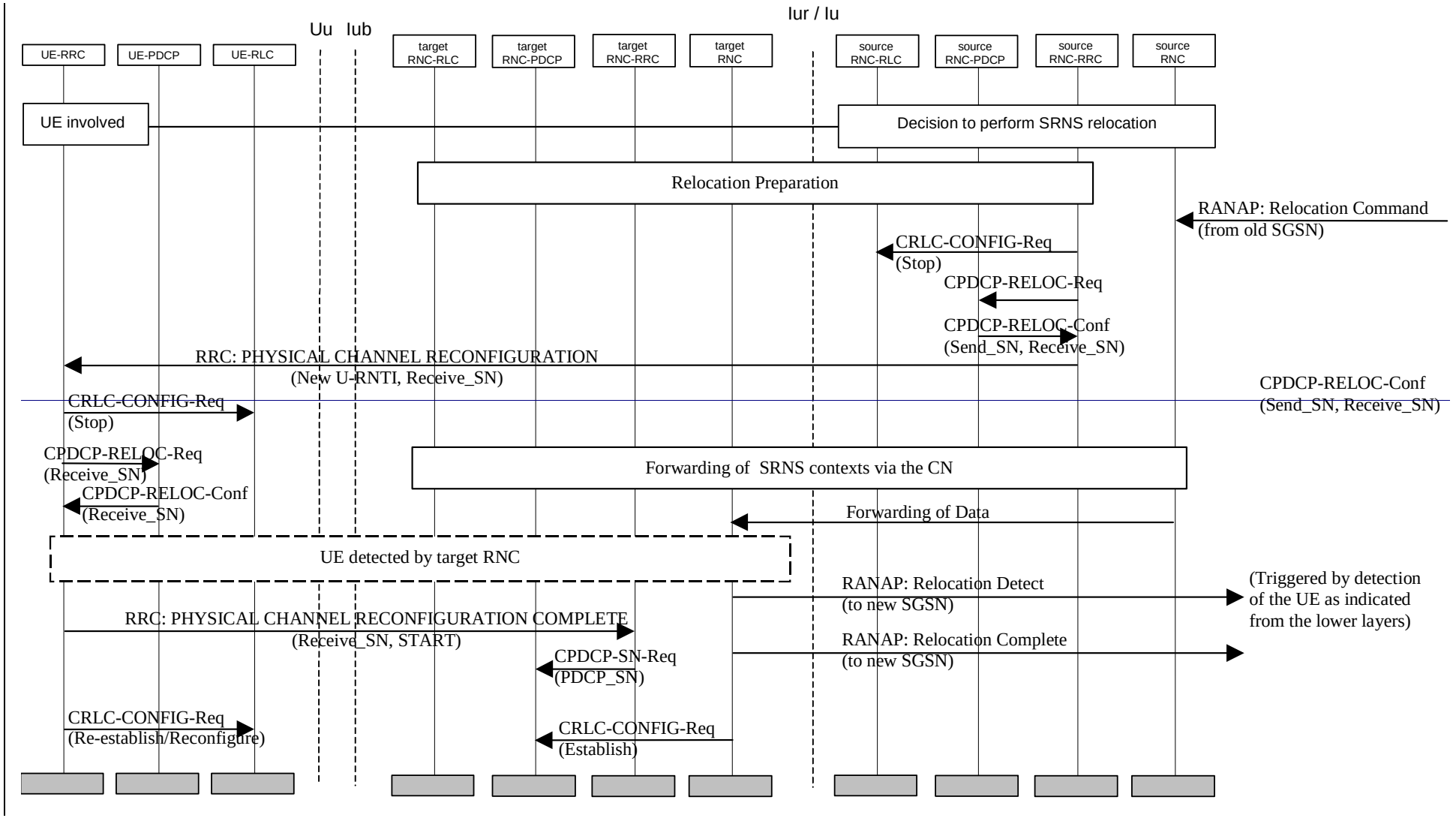
A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released, the Target RNC to Source RNC Transparent Container and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7].

The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending the RRC message to the UE. This message includes the new U-RNTI and the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE. The UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7].

For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC. The PDCP send and receive sequence numbers are then transferred during the forwarding of SRNS contexts via the CN phase from source to target RNC for RABs that support lossless SRNS relocation. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

If the UE has successfully configured itself, it shall send, in this case a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC. This message contains the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. The UTRAN initialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.

Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message, UTRAN shall start the PDCP entity and the relocation procedure ends.


Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
UE involved
Decision to perform SRNS relocation
Relocation Preparation
RANAP: Relocation Command
(from old SGSN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI, Receive_SN)
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
(Receive_SN)
Forwarding of SRNS contexts via the CN
CPDCP-RELOC-Conf
(Receive_SN)
Forwarding of Data
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
(Triggered by detection
of the UE as indicated
from the lower layers)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(Receive_SN, START)
RANAP: Relocation Complete
(to new SGSN)
CPDCP-SN-Req
(PDCP_SN)
CRLC-CONFIG-Req
(Re-establish/Reconfigure)
CRLC-CONFIG-Req
(Establish)

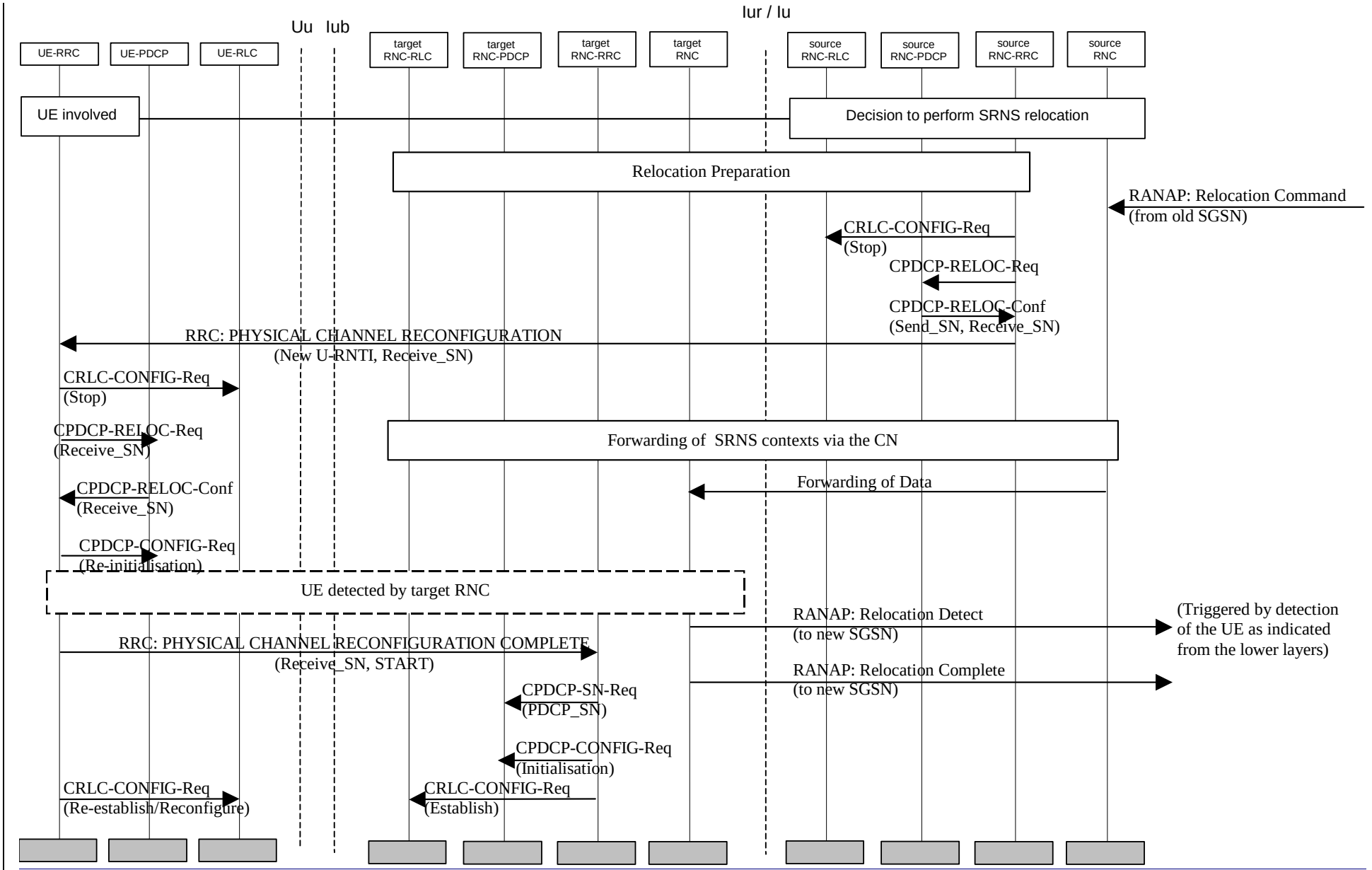

Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
UE involved
Decision to perform SRNS relocation
Relocation Preparation
RANAP: Relocation Command
(from old SGSN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI, Receive_SN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
(Receive_SN)
Forwarding of SRNS contexts via the CN
Forwarding of Data
CPDCP-RELOC-Conf
(Receive_SN)
CPDCP-CONFIG-Req
(Re-initialisation)
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
(Triggered by detection of the UE as indicated from the lower layers)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(Receive_SN, START)
RANAP: Relocation Complete
(to new SGSN)
CPDCP-SN-Req
(PDCP_SN)
CPDCP-CONFIG-Req
(Initialisation)
CRLC-CONFIG-Req
(Re-establish/Reconfigure)
CRLC-CONFIG-Req
(Establish)

Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)

6.4.8.3 Combined Cell/URA Update and SRNS relocation (seamless radio bearers)

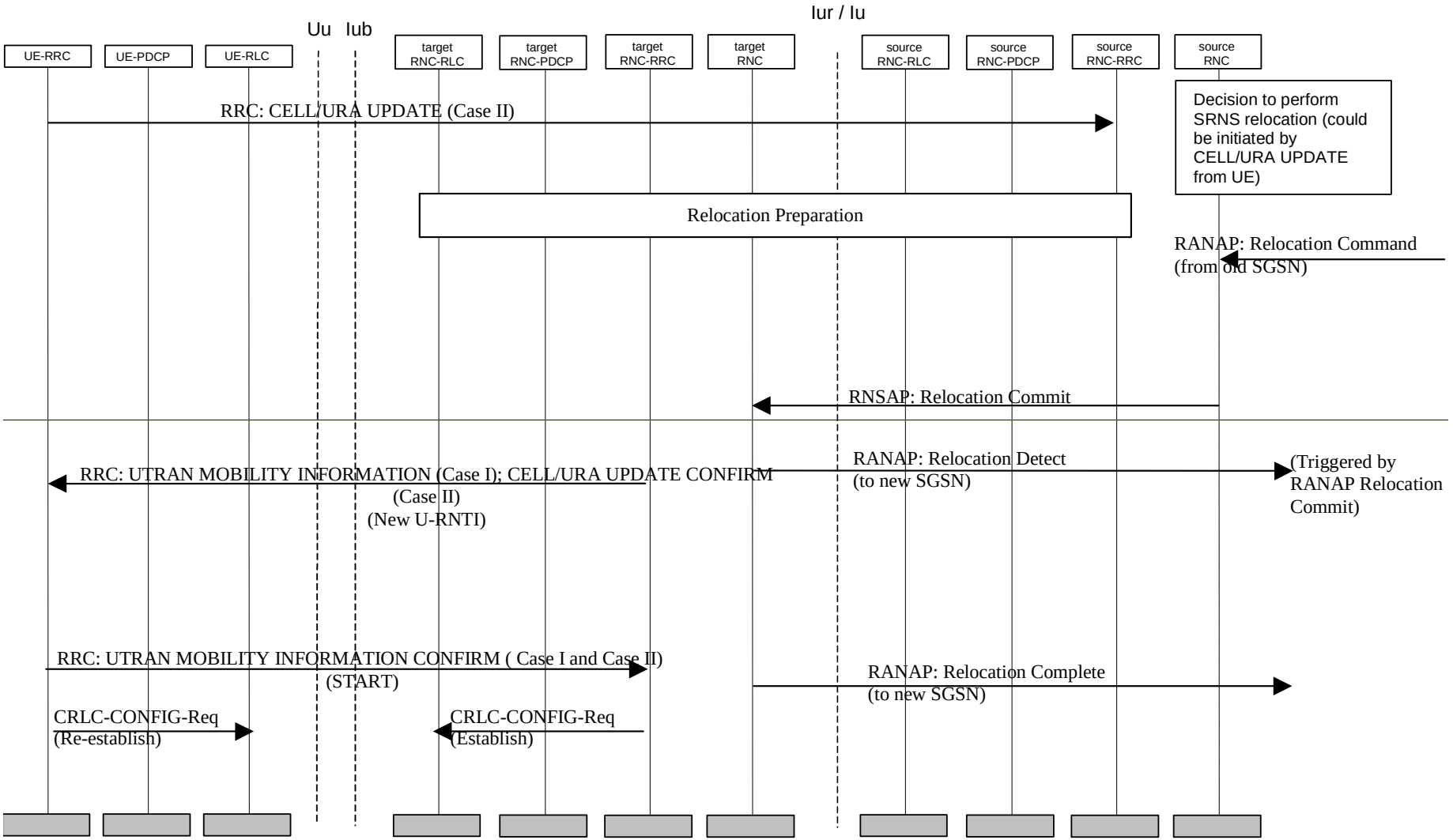
The procedure is initiated by the source RNC deciding to perform a SRNS relocation. Case I represents the situation when the UE is not involved and this is shown in Figure 36. Case II represents the situation when the UE is involved and a Combined Cell/URA update and SRNS relocation is performed, also shown in Figure 36.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

The target RNC sends a UTRAN MOBILITY INFORMATION (Case I) or a CELL/URA UPDATE CONFIRM (Case II); which configures the UE with the new U-RNTI.

If the UE has successfully configured itself, it shall send a UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II). These messages contain the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC). The UTRAN initialises and the UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration.

Upon reception of the UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) message in the UTRAN the relocation procedure ends.


Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
RNSAP: Relocation Commit
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI)
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (START)
RANAP: Relocation Complete (to new SGSN)
CRLC-CONFIG-Req (Re-establish)
CRLC-CONFIG-Req (Establish)

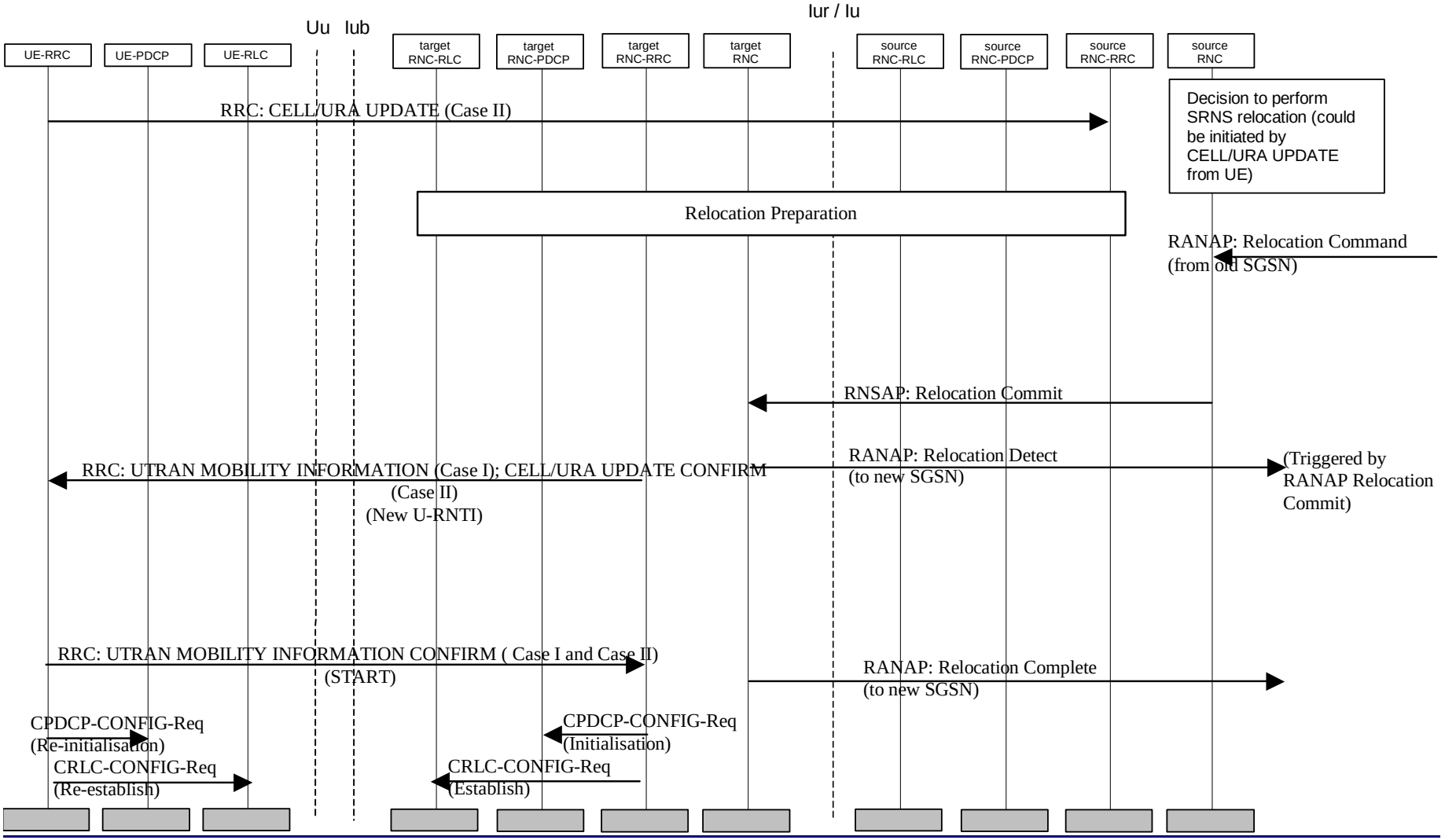


Figure 36: Combined Cell/URA Update and SRNS relocation (seamless radio bearers)

6.4.8.4 Combined Hard Handover and SRNS relocation (seamless radio bearers)

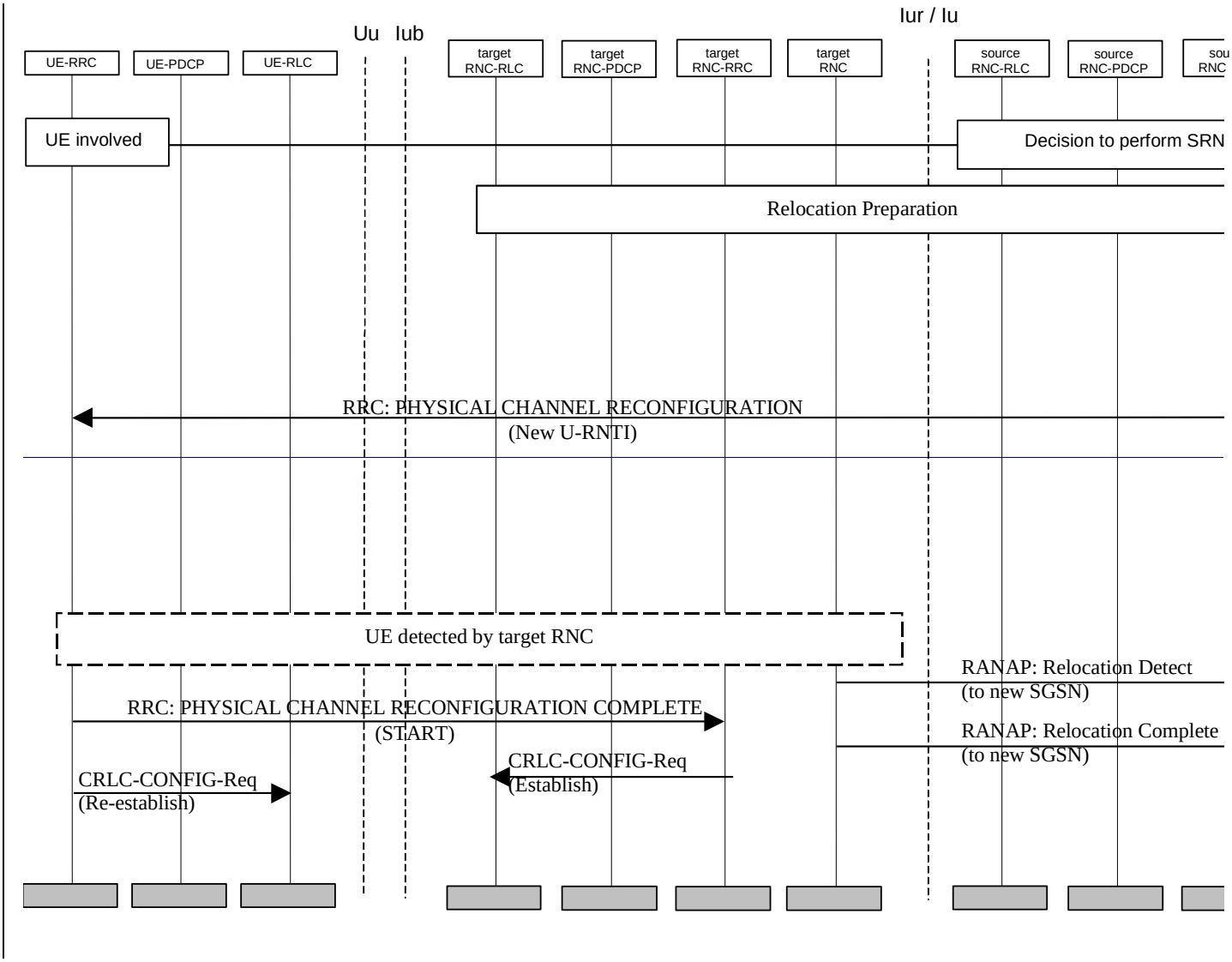
Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending RRC message to the UE. This message includes the new U-RNTI.

If the UE has successfully configured itself, it shall send a response message, in this case PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC. This message contains the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC). The UTRAN initialises and the UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration.

Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message in the UTRAN the relocation procedure ends.


Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
sou RNC
UE involved
Decision to perform SRN
Relocation Preparation
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI)
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(START)
RANAP: Relocation Complete
(to new SGSN)
CRLC-CONFIG-Req
(Establish)
CRLC-CONFIG-Req
(Re-establish)

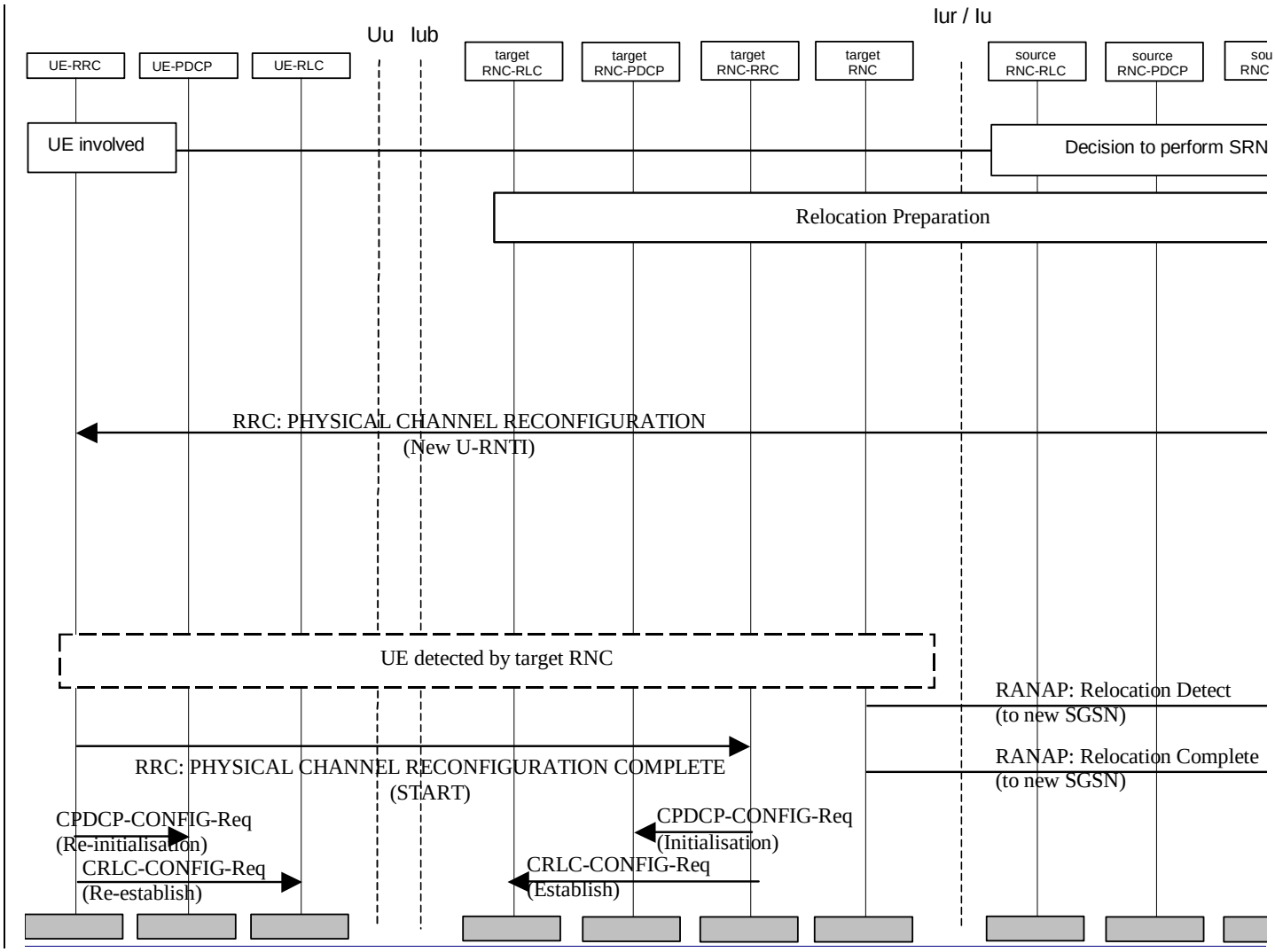


Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers)

3GPP TSG-RAN WG2 Meeting #23
Helsinki, Finland, 27-31 August 2001

Tdoc R2-012009

CR-Form-v4

CHANGE REQUEST

⌘ **25.303** **CR** **051** ⌘ rev **-** ⌘ Current version: **4.1.0** ⌘

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

Title:	⌘	SRNS relocation and header compression protocol
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	27th August 01
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
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R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Shadow CR to CR 050 on Rel-99. As described in Tdoc R2-010896 presented during RAN WG2#20, currently, the handling of PDCP Hearder Compression protocol during SRNS relocation is not described in the TS.
Summary of change:	⌘	A new parameter in the CPDCP-CONFIG primitive between PDCP and upper layers is proposed to be has been defined in a companion draft CR to 25.323 and is used to reinitialise the entire context at the decompressor during SRNS relocation when Header compression is used. This is applicable for lossless, lossy and seamless radio bearers.
Consequences if not approved:	⌘	Description of header compression reinitialisation during SRNS relocation will not be complete.

Clauses affected:	⌘	6.4.8, 6.4.8.1, 6.4.8.2, 6.4.8.3, 6.4.8.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	25.323 25.303 v3.8.0, CR 050
Other comments:	⌘			

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6.4.8 SRNS Relocation

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There are three cases in which ~~a~~n SRNS relocation can be performed:

- Serving SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC.
- Combined Hard Handover and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a hard handover decided by the UTRAN.
- Combined Cell/URA update and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a cell re-selection in the UTRAN.

and these are described in subclause 6.4.8.1, 6.4.8.2 (for lossless radio bearers), 6.4.8.3, 6.4.8.4 (for seamless radio bearers), and in more detail in [6].

6.4.8.1 Combined Cell/URA Update and SRNS relocation (lossless radio bearers)

The procedure is initiated by the source RNC deciding to perform a SRNS relocation. Case I represents the situation when the UE is not involved and this is shown in Figure 34. Case II represents the situation when the UE is involved and a Combined Cell/URA update and SRNS relocation is performed, also shown in Figure 34.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7].

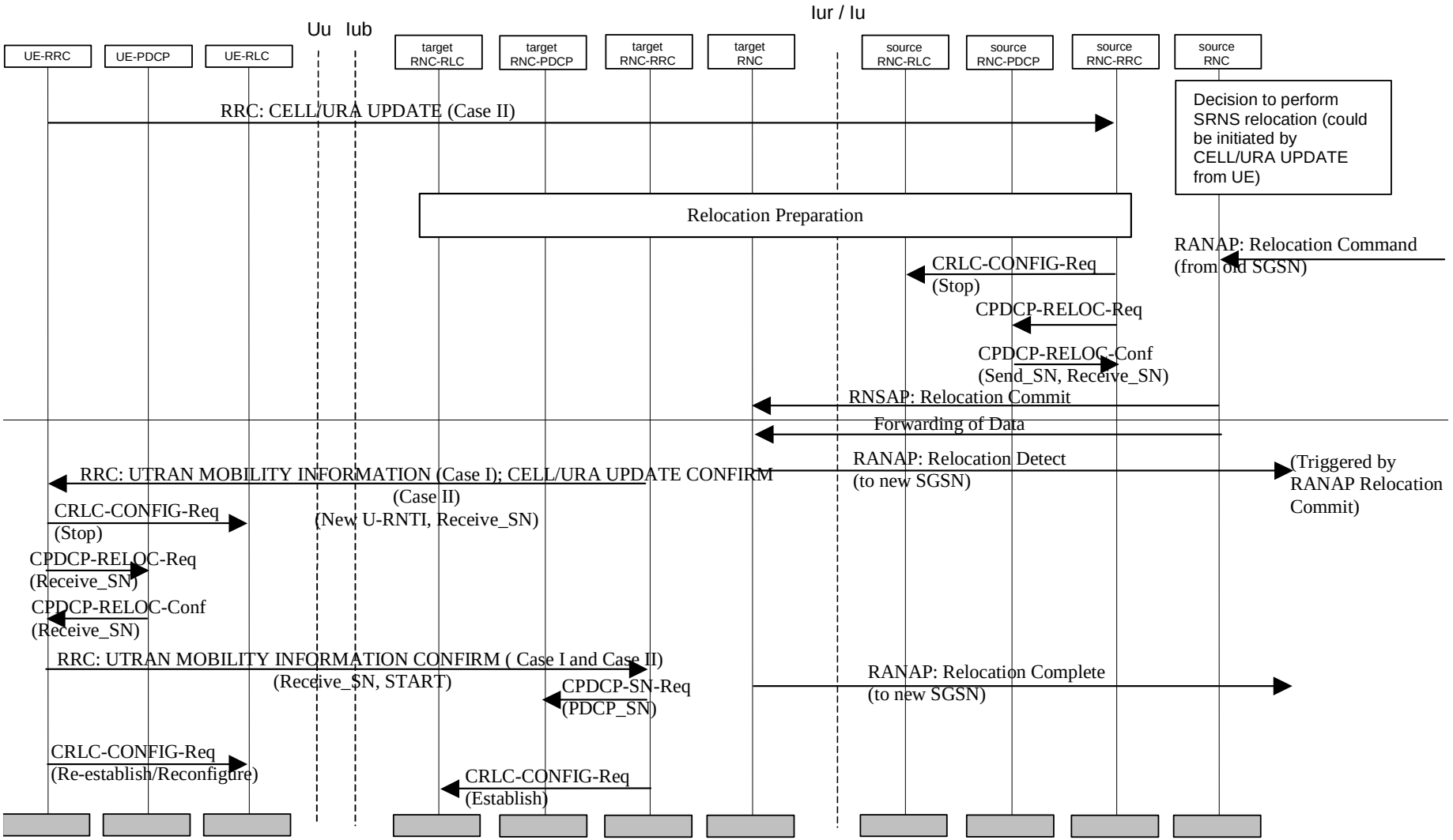
For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC. The PDCP send and receive sequence numbers are then transferred in the RNSAP Relocation Commit message from source to target RNC for RABs that support lossless SRNS relocation. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

The target RNC then sends a UTRAN MOBILITY INFORMATION (Case I) or a CELL/URA UPDATE CONFIRM (Case II); which configures the UE with the new U-RNTI and indicates the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. The UE compares the uplink receive PDCP sequence number with the UE uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE. The UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7].

If the UE has successfully configured itself, it shall send a UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II). These messages contain the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. The UTRAN initialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.

In case of failure~~,~~; the UE shall send a UTRAN MOBILITY INFORMATION FAILURE (Case I) or CELL/URA UPDATE FAILURE (Case II) message.

Upon reception of the UTRAN MOBILITY INFORMATION CONFIRM/FAILURE (Case I and Case II) or CELL/URA UPDATE COMPLETE/FAILURE (Case II) message, UTRAN shall start the PDCP entity and the relocation procedure ends.


Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf (Send_SN, Receive_SN)
RNSAP: Relocation Commit
Forwarding of Data
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI, Receive_SN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req (Receive_SN)
CPDCP-RELOC-Conf (Receive_SN)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (Receive_SN, START)
CPDCP-SN-Req (PDCP_SN)
RANAP: Relocation Complete (to new SGSN)
CRLC-CONFIG-Req (Re-establish/Reconfigure)
CRLC-CONFIG-Req (Establish)

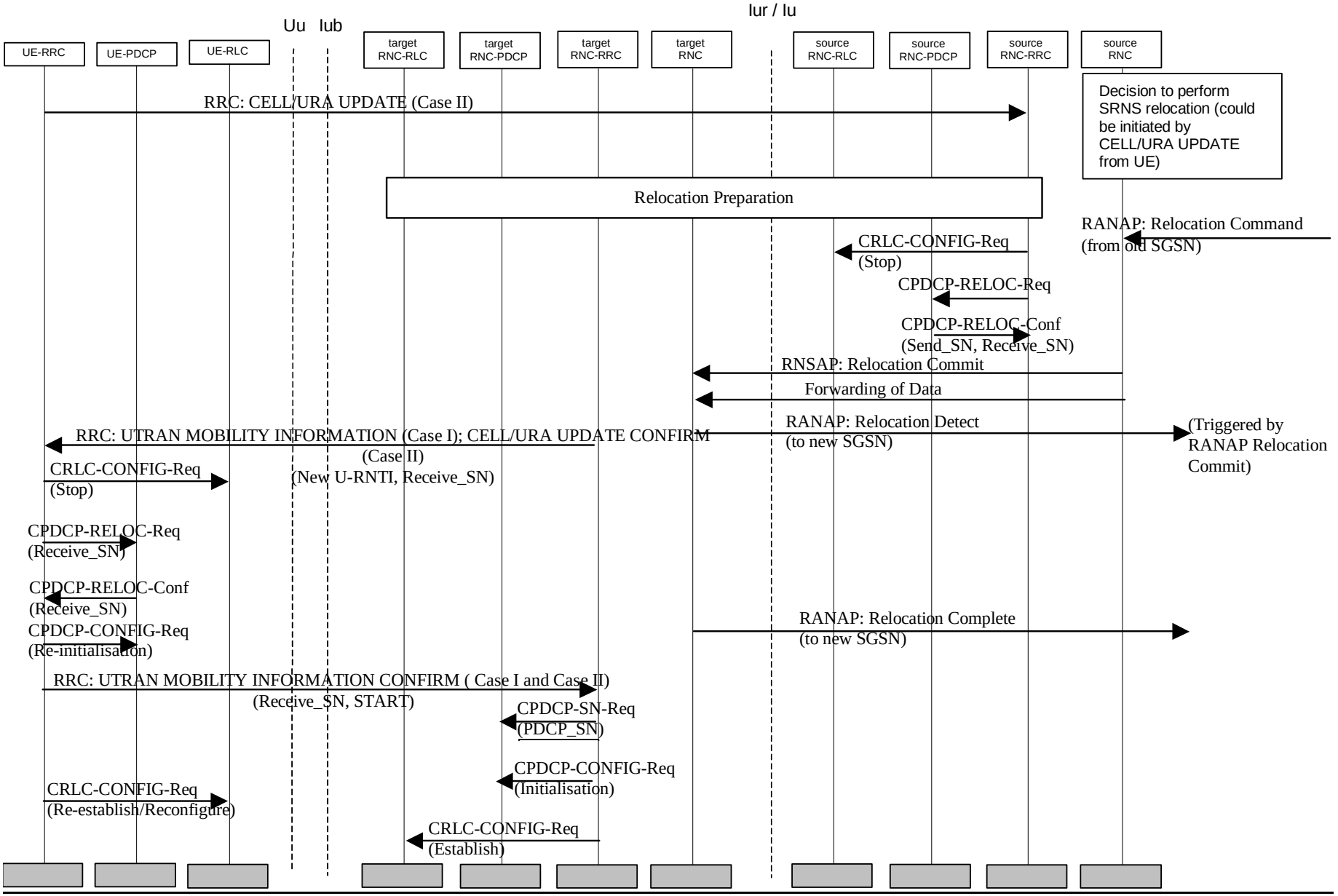

Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf (Send_SN, Receive_SN)
RNSAP: Relocation Commit
Forwarding of Data
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI, Receive_SN)
CRLC-CONFIG-Req (Stop)
CPDCP-RELOC-Req (Receive_SN)
CPDCP-RELOC-Conf (Receive_SN)
CPDCP-CONFIG-Req (Re-initialisation)
RANAP: Relocation Complete (to new SGSN)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (Receive_SN, START)
CPDCP-SN-Req (PDCP_SN)
CPDCP-CONFIG-Req (Initialisation)
CRLC-CONFIG-Req (Re-establish/Reconfigure)
CRLC-CONFIG-Req (Establish)

Figure 34: Combined Cell/URA Update and SRNS relocation (lossless radio bearers)

6.4.8.2 Combined Hard Handover and SRNS relocation (lossless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

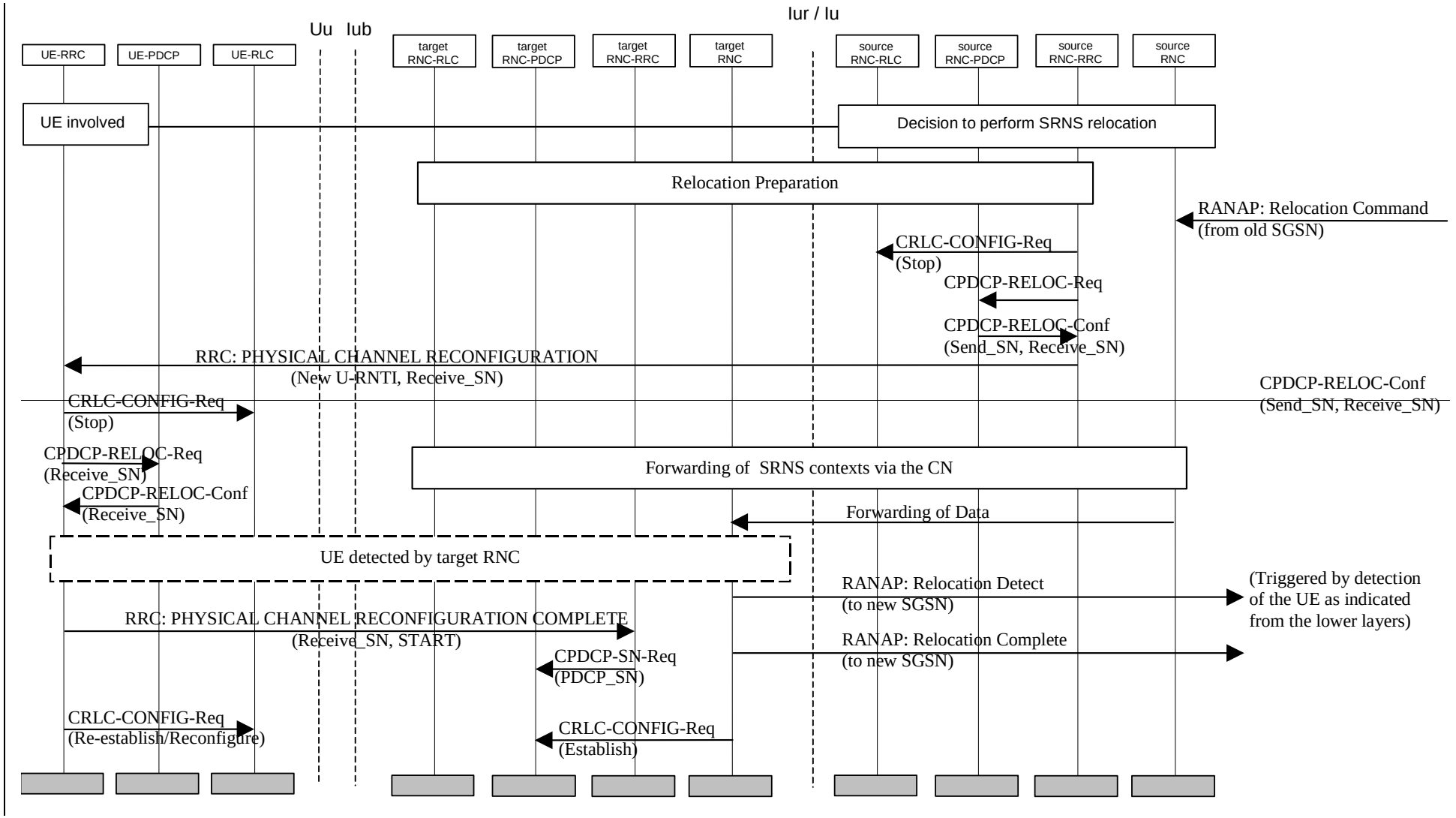
A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released, the Target RNC to Source RNC Transparent Container and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7].

The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending the RRC message to the UE. This message includes the new U-RNTI and the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE. The UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7].

For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC. The PDCP send and receive sequence numbers are then transferred during the forwarding of SRNS contexts via the CN phase from source to target RNC for RABs that support lossless SRNS relocation. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

If the UE has successfully configured itself, it shall send, in this case a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC. This message contains the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation. UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. The UTRAN initialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.

Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message, UTRAN shall start the PDCP entity and the relocation procedure ends.


Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
UE involved
Decision to perform SRNS relocation
Relocation Preparation
RANAP: Relocation Command
(from old SGSN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI, Receive_SN)
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
(Receive_SN)
Forwarding of SRNS contexts via the CN
CPDCP-RELOC-Conf
(Receive_SN)
Forwarding of Data
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
(Triggered by detection of the UE as indicated from the lower layers)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(Receive_SN, START)
RANAP: Relocation Complete
(to new SGSN)
CPDCP-SN-Req
(PDCP_SN)
CRLC-CONFIG-Req
(Re-establish/Reconfigure)
CRLC-CONFIG-Req
(Establish)

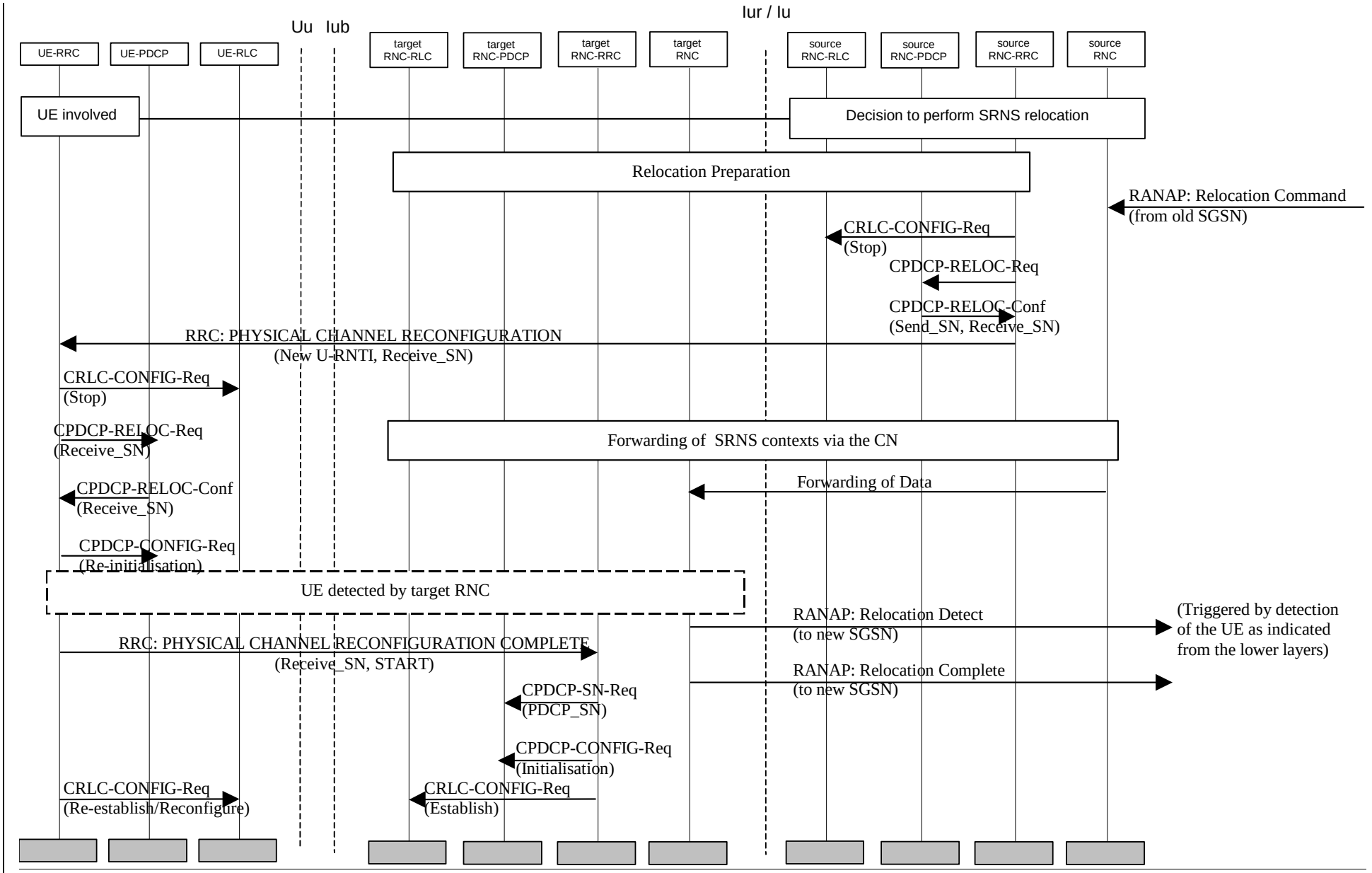

Uu
Iub
Iur / Iu
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
UE involved
Decision to perform SRNS relocation
Relocation Preparation
RANAP: Relocation Command
(from old SGSN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
CPDCP-RELOC-Conf
(Send_SN, Receive_SN)
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI, Receive_SN)
CRLC-CONFIG-Req
(Stop)
CPDCP-RELOC-Req
(Receive_SN)
Forwarding of SRNS contexts via the CN
Forwarding of Data
CPDCP-RELOC-Conf
(Receive_SN)
CPDCP-CONFIG-Req
(Re-initialisation)
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
(Triggered by detection of the UE as indicated from the lower layers)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(Receive_SN, START)
RANAP: Relocation Complete
(to new SGSN)
CPDCP-SN-Req
(PDCP_SN)
CPDCP-CONFIG-Req
(Initialisation)
CRLC-CONFIG-Req
(Re-establish/Reconfigure)
CRLC-CONFIG-Req
(Establish)

Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)

6.4.8.3 Combined Cell/URA Update and SRNS relocation (seamless radio bearers)

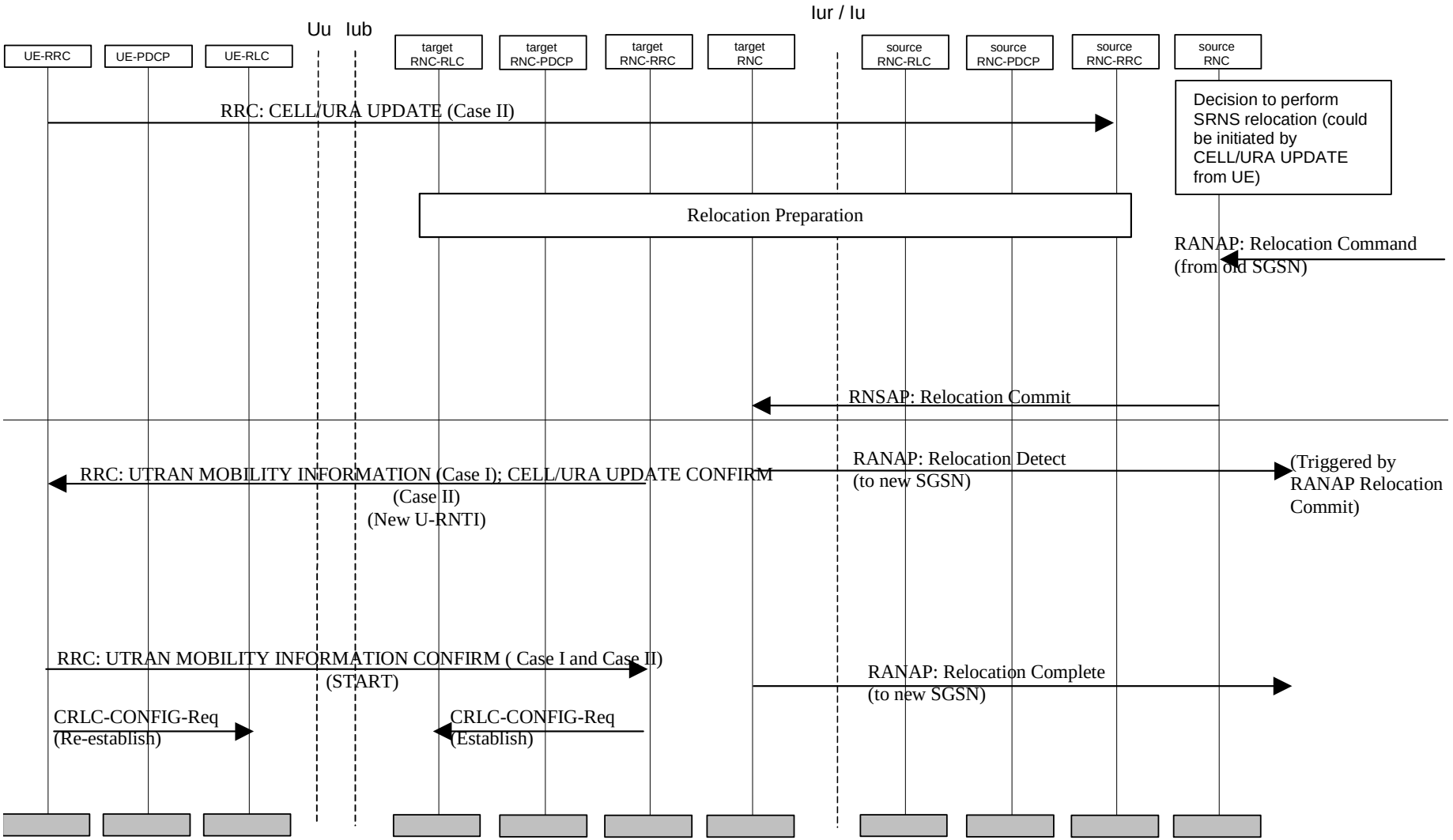
The procedure is initiated by the source RNC deciding to perform a SRNS relocation. Case I represents the situation when the UE is not involved and this is shown in Figure 36. Case II represents the situation when the UE is involved and a Combined Cell/URA update and SRNS relocation is performed, also shown in Figure 36.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

The target RNC sends a UTRAN MOBILITY INFORMATION (Case I) or a CELL/URA UPDATE CONFIRM (Case II); which configures the UE with the new U-RNTI.

If the UE has successfully configured itself, it shall send a UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II). These messages contain the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC). The UTRAN initialises and the UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration.

Upon reception of the UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) message in the UTRAN the relocation procedure ends.


Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
source RNC-RRC
source RNC
RRC: CELL/URA UPDATE (Case II)
Decision to perform SRNS relocation (could be initiated by CELL/URA UPDATE from UE)
Relocation Preparation
RANAP: Relocation Command (from old SGSN)
RNSAP: Relocation Commit
RRC: UTRAN MOBILITY INFORMATION (Case I); CELL/URA UPDATE CONFIRM (Case II) (New U-RNTI)
RANAP: Relocation Detect (to new SGSN)
(Triggered by RANAP Relocation Commit)
RRC: UTRAN MOBILITY INFORMATION CONFIRM (Case I and Case II) (START)
RANAP: Relocation Complete (to new SGSN)
CRLC-CONFIG-Req (Re-establish)
CRLC-CONFIG-Req (Establish)

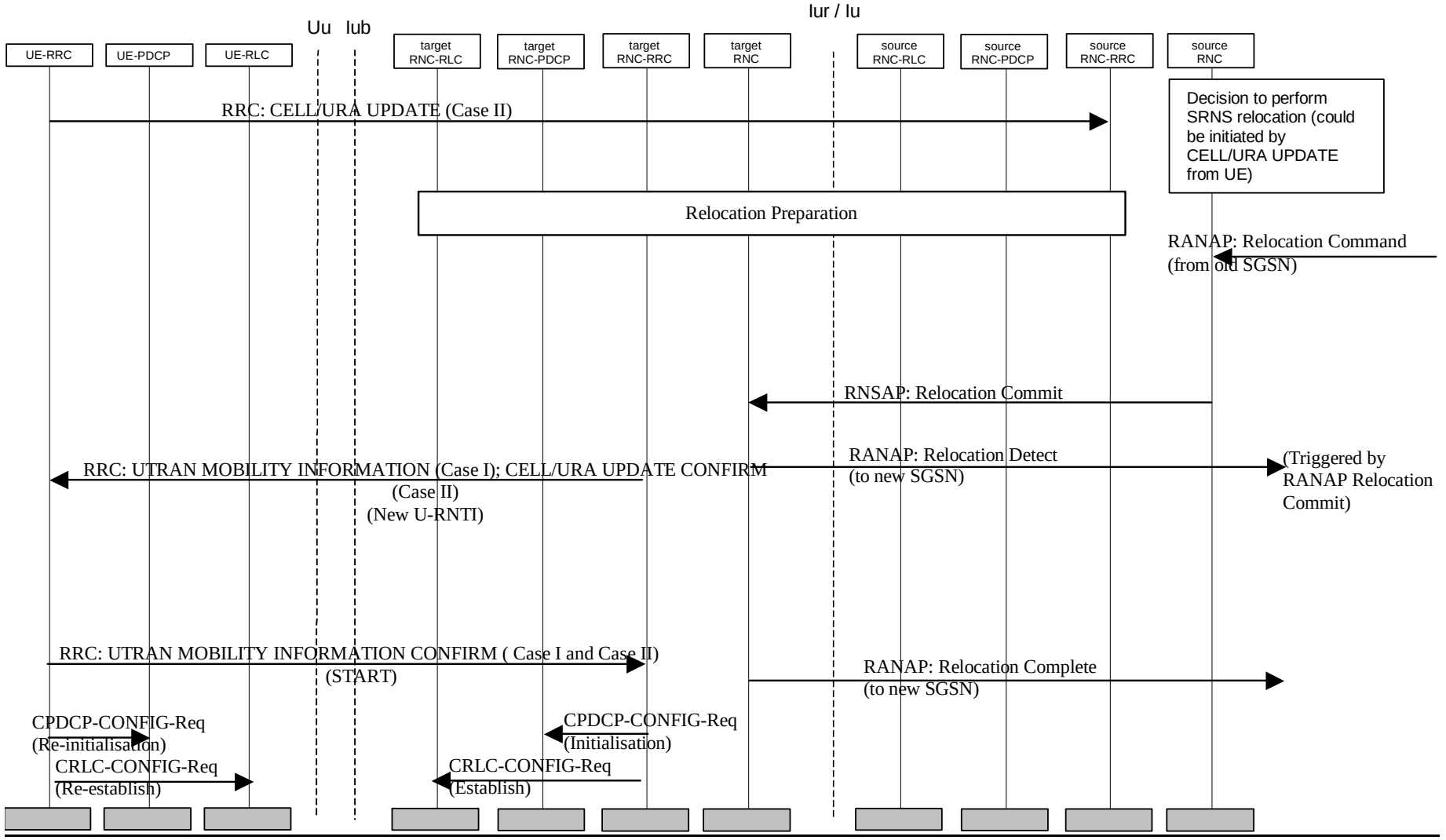


Figure 36: Combined Cell/URA Update and SRNS relocation (seamless radio bearers)

6.4.8.4 Combined Hard Handover and SRNS relocation (seamless radio bearers)

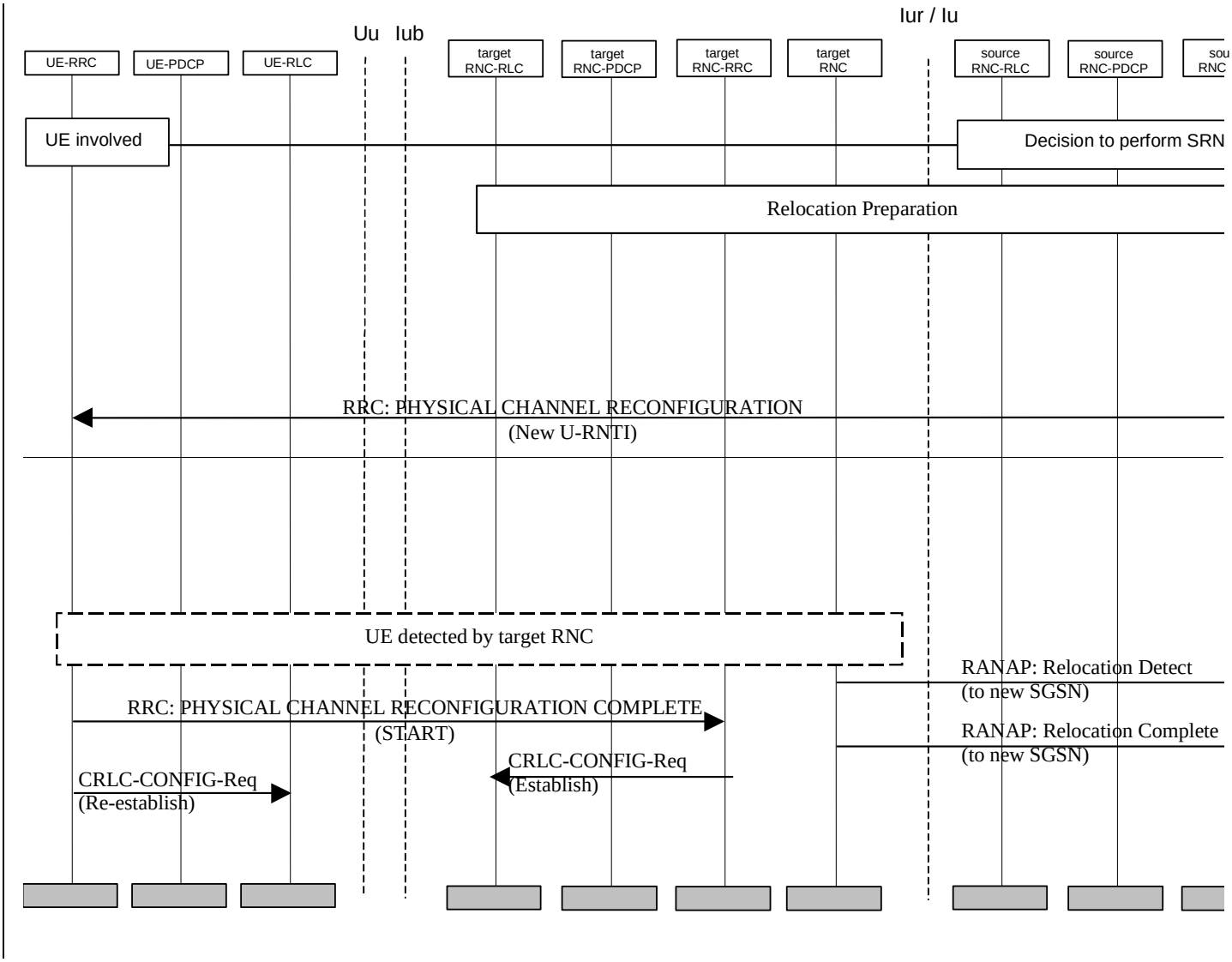
Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending RRC message to the UE. This message includes the new U-RNTI.

If the UE has successfully configured itself, it shall send a response message, in this case PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC. This message contains the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC). The UTRAN initialises and the UE reinitialises the PDCP header compression entities of the radio bearers configured to use a header compression protocol [7]. For the affected radio bearers, the RLC entity is re-established [2] with the current configuration.

Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message in the UTRAN the relocation procedure ends.


Iur / Iu
Uu
Iub
UE-RRC
UE-PDCP
UE-RLC
target RNC-RLC
target RNC-PDCP
target RNC-RRC
target RNC
source RNC-RLC
source RNC-PDCP
sou RNC
UE involved
Decision to perform SRN
Relocation Preparation
RRC: PHYSICAL CHANNEL RECONFIGURATION
(New U-RNTI)
UE detected by target RNC
RANAP: Relocation Detect
(to new SGSN)
RRC: PHYSICAL CHANNEL RECONFIGURATION COMPLETE
(START)
RANAP: Relocation Complete
(to new SGSN)
CRLC-CONFIG-Req
(Establish)
CRLC-CONFIG-Req
(Re-establish)

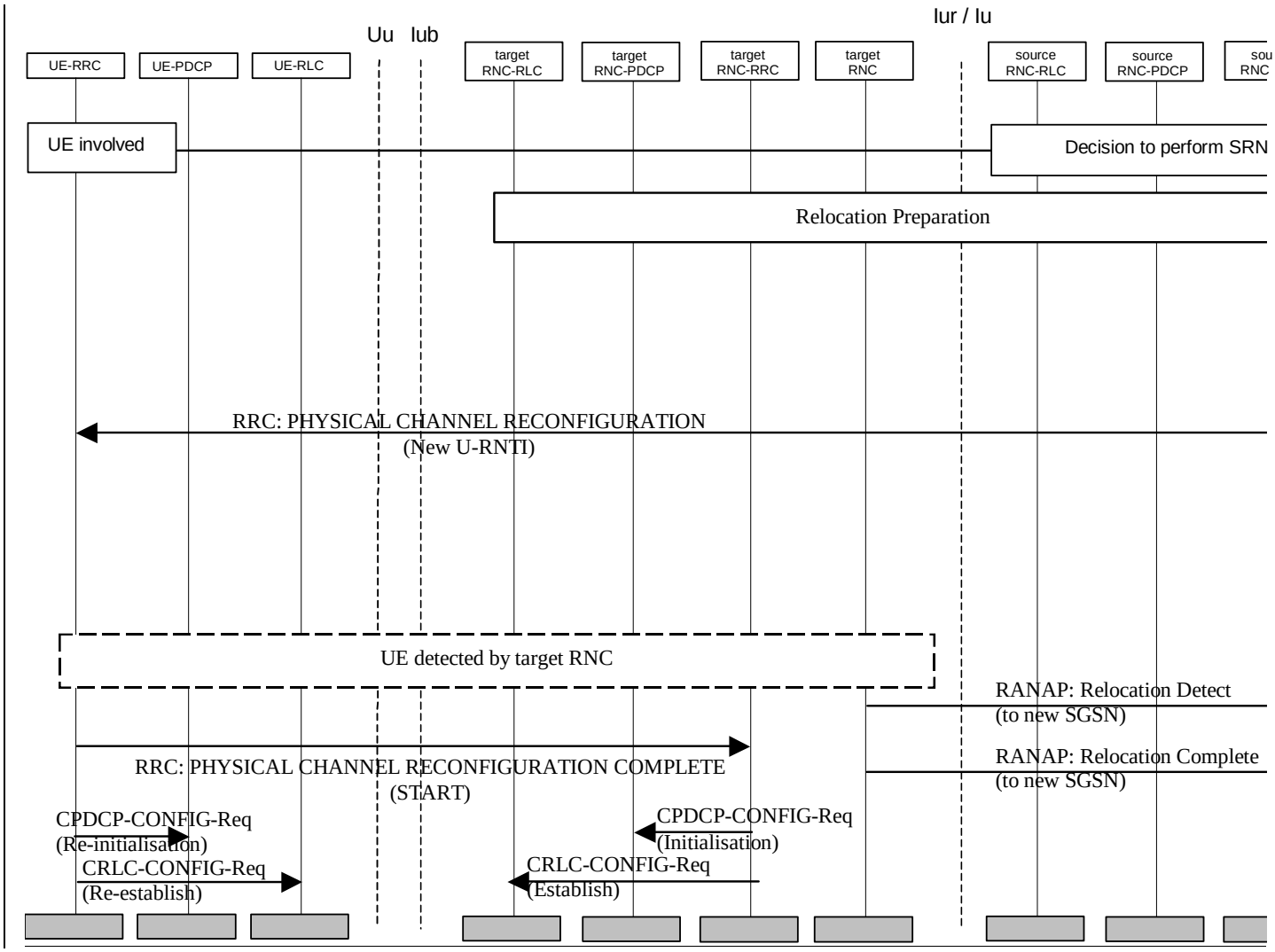


Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers)

3GPP TSG-RAN 2 Meeting #23
Helsinki, Finland, 27th - 31st August 2001

Tdoc R2-011948

CR-Form-v4

CHANGE REQUEST

⌘ **25.303** **CR** **052** ⌘ ev **-** ⌘ Current version: **3.8.0** ⌘

*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 **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction of Active Set Update procedure
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	21st August 2001
Category:	⌘	**F**
Release:	⌘	R99

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

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

Reason for change: ⌘ It is stated in section 8.3.4.3 of 25.331 that after receiving an ACTIVE SET UPDATE message the UE shall - 'transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;'

However in section 6.4.4 of 25.303 it states the UE shall wait for indication from the physical layer before sending the ACTIVE SET UPDATE COMPLETE message. This is wrong and is corrected.

Isolated impact analysis:

This correction is to a function where the specification was not sufficiently explicit. This would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality

Summary of change: ⌘ The UE does not need to await indication of layer 1 synchronisation before sending the ACTIVE SET UPDATE COMPLETE message to the UTRAN.

Consequences if not approved: ⌘ Increased delay in performing Active Set Update procedure

Clauses affected: ⌘ 6.4.4

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.303 v4.1.0, CR 053
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

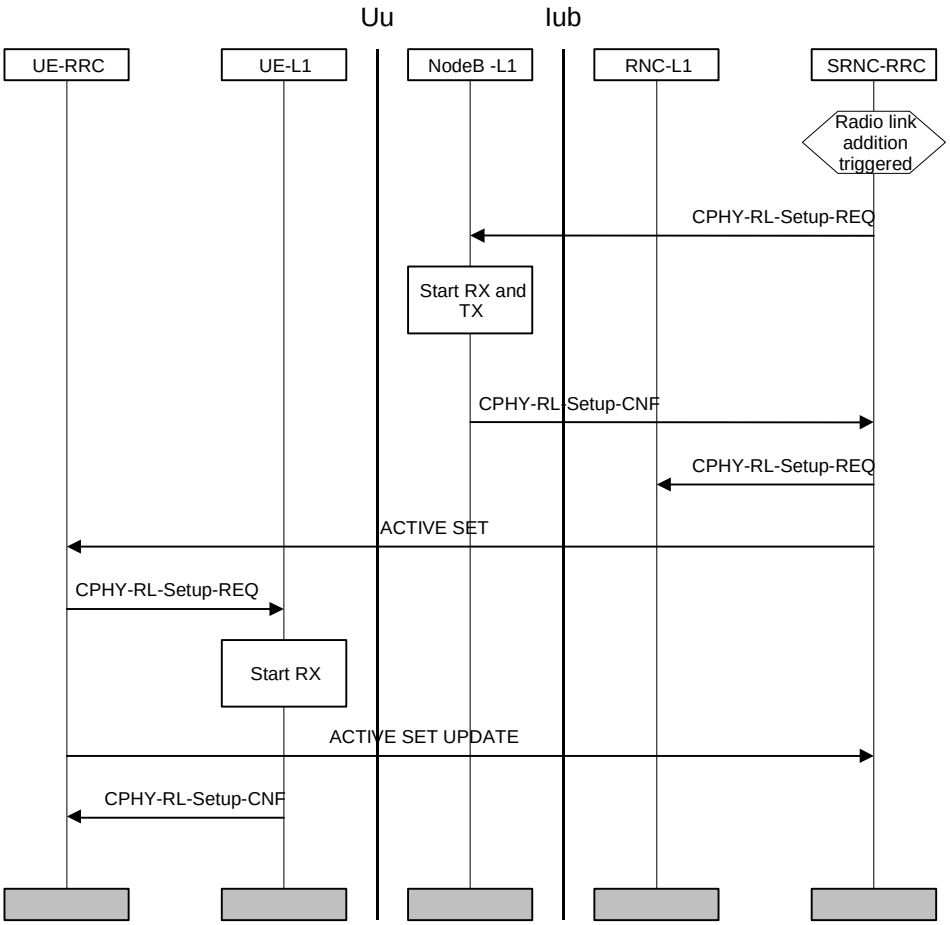
How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm.
Below is a brief summary:

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.

6.4.4 Radio Link Addition (FDD)


Uu
Iub
UE-RRC
UE-L1
NodeB -L1
RNC-L1
SRNC-RRC
Radio link addition triggered
CPHY-RL-Setup-REQ
Start RX and TX
CPHY-RL-Setup-CNF
CPHY-RL-Setup-REQ
ACTIVE SET
CPHY-RL-Setup-REQ
Start RX
ACTIVE SET UPDATE
CPHY-RL-Setup-CNF

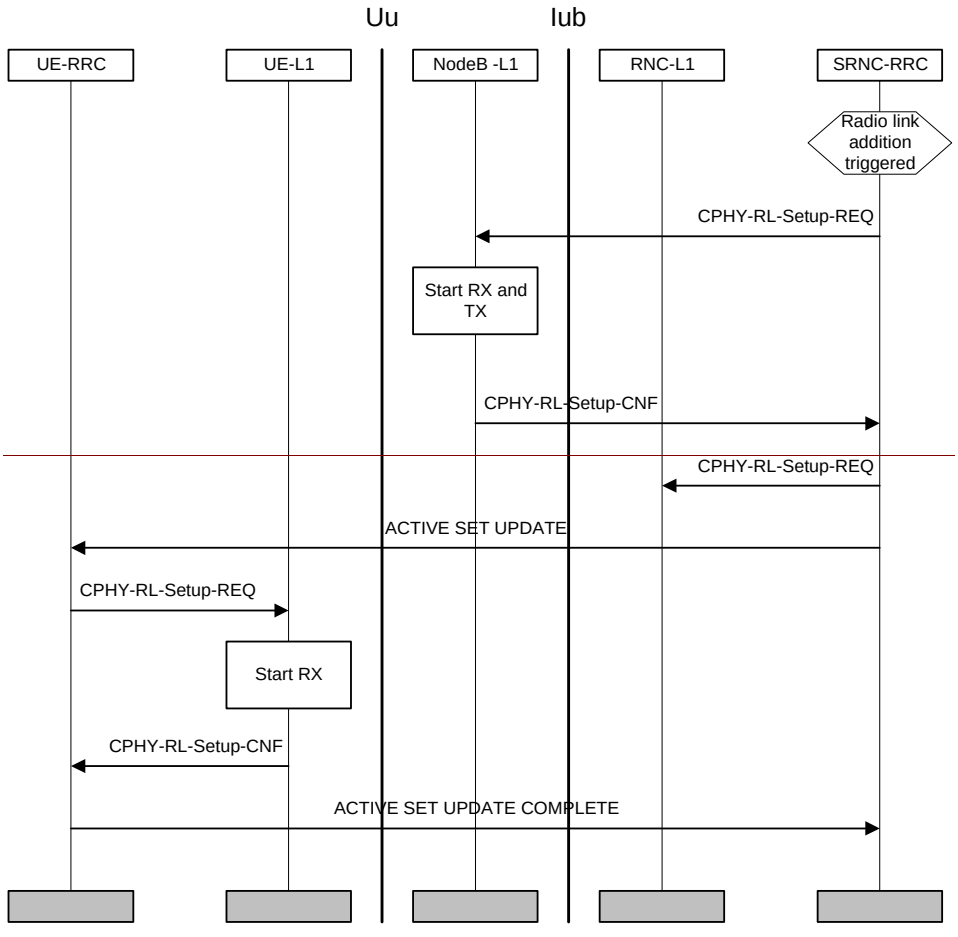

Uu
Iub
UE-RRC
UE-L1
NodeB -L1
RNC-L1
SRNC-RRC
Radio link addition triggered
CPHY-RL-Setup-REQ
Start RX and TX
CPHY-RL-Setup-CNF
CPHY-RL-Setup-REQ
ACTIVE SET UPDATE
CPHY-RL-Setup-REQ
Start RX
CPHY-RL-Setup-CNF
ACTIVE SET UPDATE COMPLETE

Figure 30: Radio Link Addition

Figure 30 illustrates a radio link addition procedure. Radio link addition is triggered in the network RRC layer by measurement reports sent by the UE. The NW RRC first configures the new radio link on the physical layer in Node B. Transmission and reception begins immediately. The NW RRC then sends an RRC ACTIVE SET UPDATE message to the UE RRC. The UE RRC configures layer 1 to begin reception.

~~After confirmation from the physical layer in~~The UE shall send an ACTIVE SET UPDATE COMPLETE message ~~is sent~~ to the RNC-RRC without waiting for an indication of synchronisation from the UE physical layer~~.~~

3GPP TSG-RAN 2 Meeting #23
Helsinki, Finland, 27th - 31st August 2001

Tdoc R2-012010

CR-Form-v4

CHANGE REQUEST

⌘ **25.303 CR 053** ⌘ ev **-** ⌘ 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 **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction of Active Set Update procedure
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	21st August 2001
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: ⌘ It is stated in section 8.3.4.3 of 25.331 that after receiving an ACTIVE SET UPDATE message the UE shall - 'transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC without waiting for the Physical Layer synchronization;'

However in section 6.4.4 of 25.303 it states the UE shall wait for indication from the physical layer before sending the ACTIVE SET UPDATE COMPLETE message. This is wrong and is corrected.

Isolated impact analysis:

This correction is to a function where the specification was not sufficiently explicit. This would not affect implementations behaving like indicated in the CR, but would affect implementations supporting the corrected functionality

Summary of change: ⌘ The UE does not need to await indication of layer 1 synchronisation before sending the ACTIVE SET UPDATE COMPLETE message to the UTRAN.

Consequences if not approved: ⌘ Increased delay in performing Active Set Update procedure

Clauses affected: ⌘ 6.4.4

Other specs affected: ⌘
☐ Other core specifications ⌘ 25.303 v3.8.0, CR 052
☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

How to create CRs using this form:
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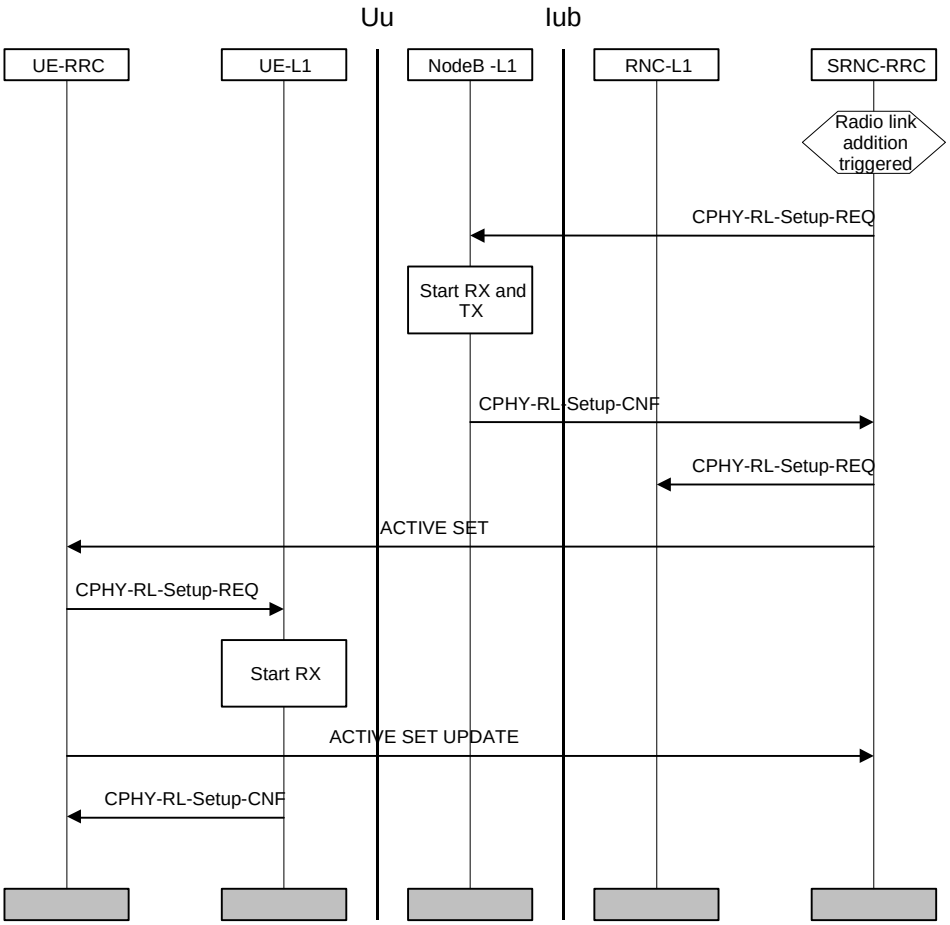
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.4.4 Radio Link Addition (FDD)


Uu
Iub
UE-RRC
UE-L1
NodeB -L1
RNC-L1
SRNC-RRC
Radio link addition triggered
CPHY-RL-Setup-REQ
Start RX and TX
CPHY-RL-Setup-CNF
CPHY-RL-Setup-REQ
ACTIVE SET
CPHY-RL-Setup-REQ
Start RX
ACTIVE SET UPDATE
CPHY-RL-Setup-CNF

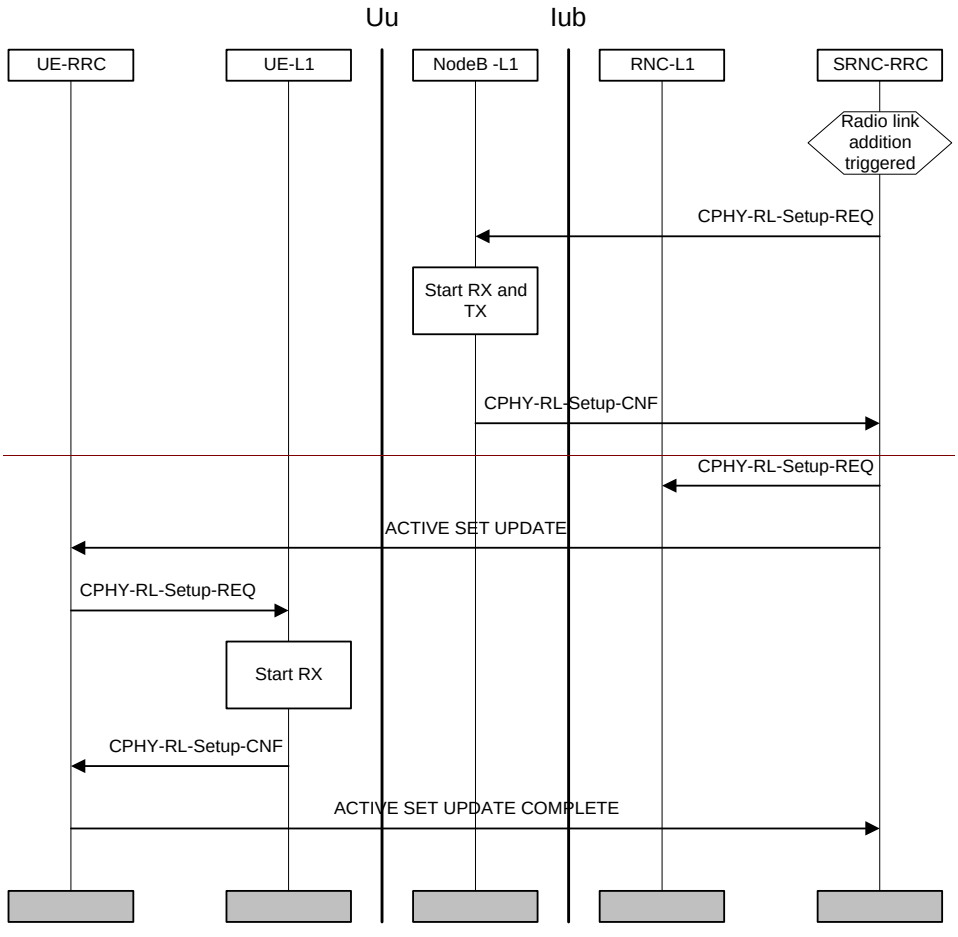

Uu
Iub
UE-RRC
UE-L1
NodeB -L1
RNC-L1
SRNC-RRC
Radio link addition triggered
CPHY-RL-Setup-REQ
Start RX and TX
CPHY-RL-Setup-CNF
CPHY-RL-Setup-REQ
ACTIVE SET UPDATE
CPHY-RL-Setup-REQ
Start RX
CPHY-RL-Setup-CNF
ACTIVE SET UPDATE COMPLETE

Figure 30: Radio Link Addition

Figure 30 illustrates a radio link addition procedure. Radio link addition is triggered in the network RRC layer by measurement reports sent by the UE. The NW RRC first configures the new radio link on the physical layer in Node B. Transmission and reception begins immediately. The NW RRC then sends an RRC ACTIVE SET UPDATE message to the UE RRC. The UE RRC configures layer 1 to begin reception.

~~After confirmation from the physical layer in~~The UE shall send an ACTIVE SET UPDATE COMPLETE message ~~is sent~~ to the RNC-RRC without waiting for an indication of synchronisation from the UE physical layer~~.~~

TSG-RAN Working Group 2 #23
Helsinky, Finland, 26 - 31 August 2001

Tdoc R2-012171

CR-Form-v3

CHANGE REQUEST

⌘ **25.303** **CR** **056** ⌘ rev **r2** ⌘ Current version: **3.8.0** ⌘

*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 [X] Radio Access Network [ ] Core Network [ ]

Title:	⌘	Correction to SRNS relocation
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22-05-2001
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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:	⌘	In the way the current description is specified, it is not possible for the target RNC to receive the uplink response from the UE since the RLC state was lost during SRNS relocation. For this message to go through, at least the RB on which the message needs to be re-established using a START value that is known both at the UE and in UTRAN.
Summary of change:	⌘	It is suggested to perform RLC re-establishment of SRB2 before transmitting the response on the uplink. Then, after the response message is transmitted, to use the START value transmitted in this message to re-establish the rest of the RBs and SRBs. This change affects lossless and seamless SRNS relocation in CELL_DCH. **The CR has isolated impact** and should be seen as a correction.
Consequences if not approved:	⌘	SRNS relocation, lossless or seamless will not work in dedicated mode.

Clauses affected:	⌘	6.4.8, 6.4.8.2, 6.4.8.4		
Other specs affected:	⌘	[ ] Other core specifications [X] Test specifications [ ] O&M Specifications	⌘	25.303 v4.1.0, CR 057
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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

6.4.8 SRNS Relocation

The SRNS relocation procedure can be divided into two phases. The first phase is relocation preparation; where the resources are reserved, new RABs are established while the second phase is the transfer of the Serving RNS from source to target RNC.

In what follows, lossless radio bearers are RBs using AM and configured to support lossless SRNS relocation. Seamless radio bearers are RBs using UM or AM not configured to support lossless SRNS relocation.

There are three cases in which an SRNS relocation can be performed:

- Serving SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC.

- Combined Hard Handover and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a hard handover decided by the UTRAN.

- Combined Cell/URA update and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a cell re-selection in the UTRAN.

and these are described in subclause 6.4.8.1, 6.4.8.2 (for lossless radio bearers), 6.4.8.3, 6.4.8.4 (for seamless radio bearers), and in more detail in [6].

6.4.8.2 Combined Hard Handover and SRNS relocation (lossless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released, the Target RNC to Source RNC Transparent Container and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7]. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover.

Upon reception of the RANAP Relocation Command, the RRC entity in the source RNC stops the RLC entities for the affected radio bearers and retrieves the PDCP sequence numbers. It then triggers the execution of the relocation of SRNS by sending the RRC message to the UE using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message includes the new U-RNTI (from the target RNC) and the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation (from the source RNC). ~~The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE.~~

~~For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC.~~ The PDCP send and receive sequence numbers and the ~~last START~~current downlink and uplink HFN values ~~received from the mobile~~ are then transferred via the CN during the forwarding of SRNS contexts, ~~via the CN phase~~ from source to target RNC ~~for RABs that support lossless SRNS relocation~~. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

Upon reception and acknowledgment by the UE of the message, the RLC ~~entities~~entity for the acknowledged mode dedicated signalling radio bearer (SRB #2) is re-established, both on the UTRAN and UE sides~~, are re-established~~ and their HFN values are set to the current downlink and uplink HFN ~~known START~~ values incremented by one. Care should be taken by UTRAN in timing the SRNS relocation so that there is no risk of a SN rollover on SRB #2 during this procedure.

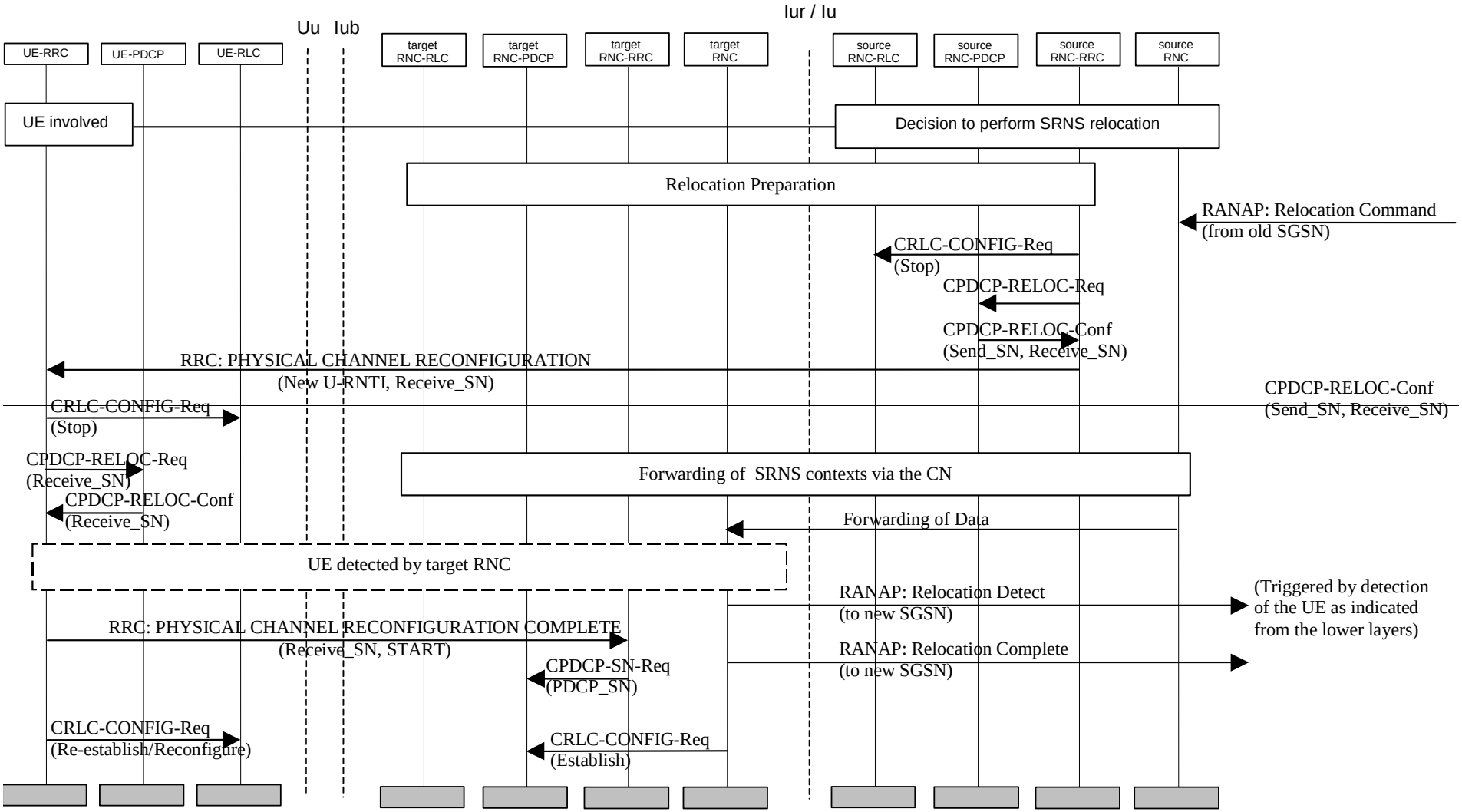
The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE.

If the UE has successfully configured itself, it ~~shall~~ sends a response message, in this case a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message contains the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation.

Upon acknowledgement of the message, the RLC entities for affected radio bearers are re-established both on the UTRAN and UE side. The HFN values for each RB are set to the START value in the message for the corresponding CN domain.

UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. ~~For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.~~

~~Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message,~~ The UTRAN and the UE ~~shall~~ ~~start~~continue the RLC and PDCP entities of the affected RBs~~y~~ and the relocation procedure ends.



~~Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)~~

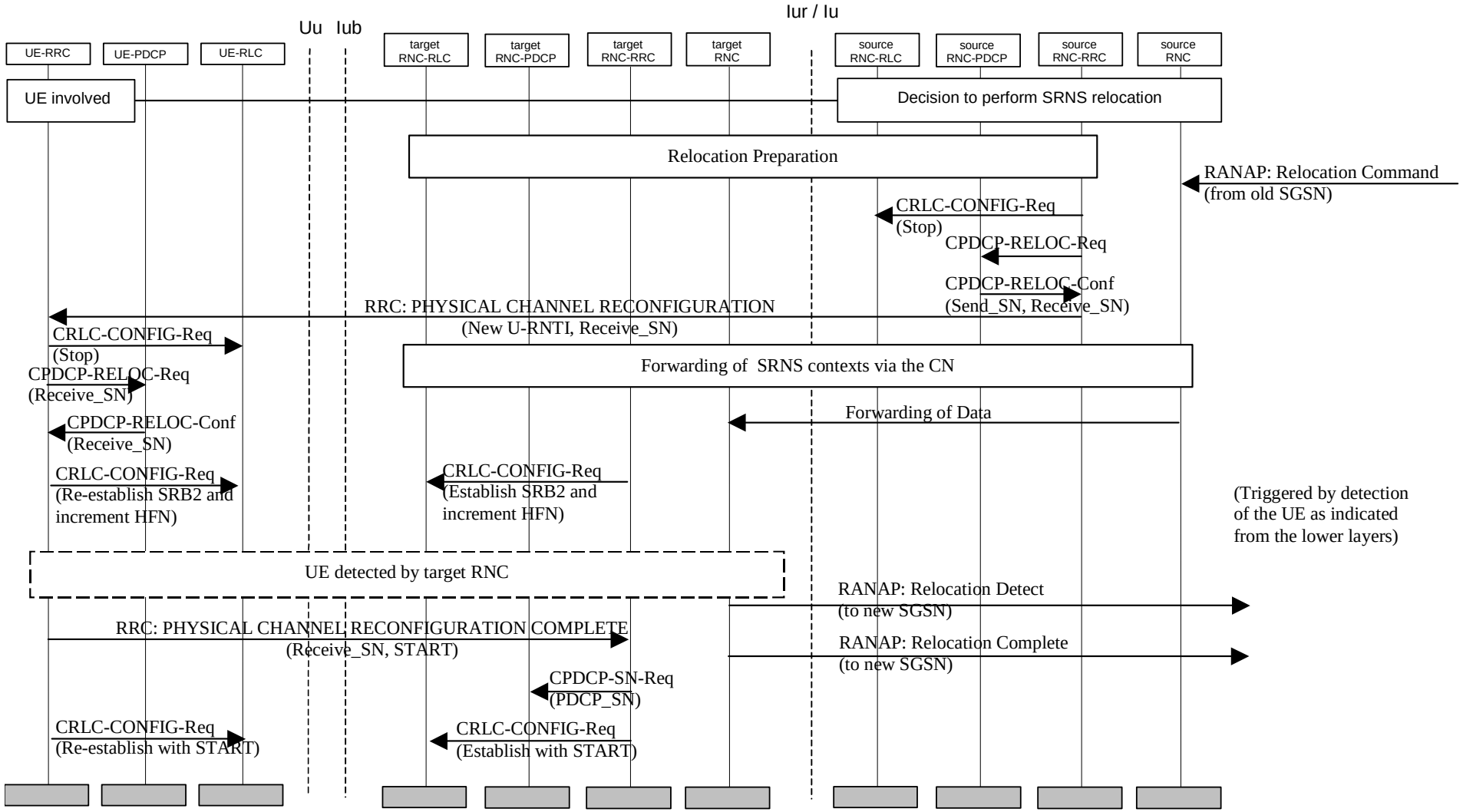


Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)

6.4.8.4 Combined Hard Handover and SRNS relocation (seamless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. This message includes the new U-RNTI.

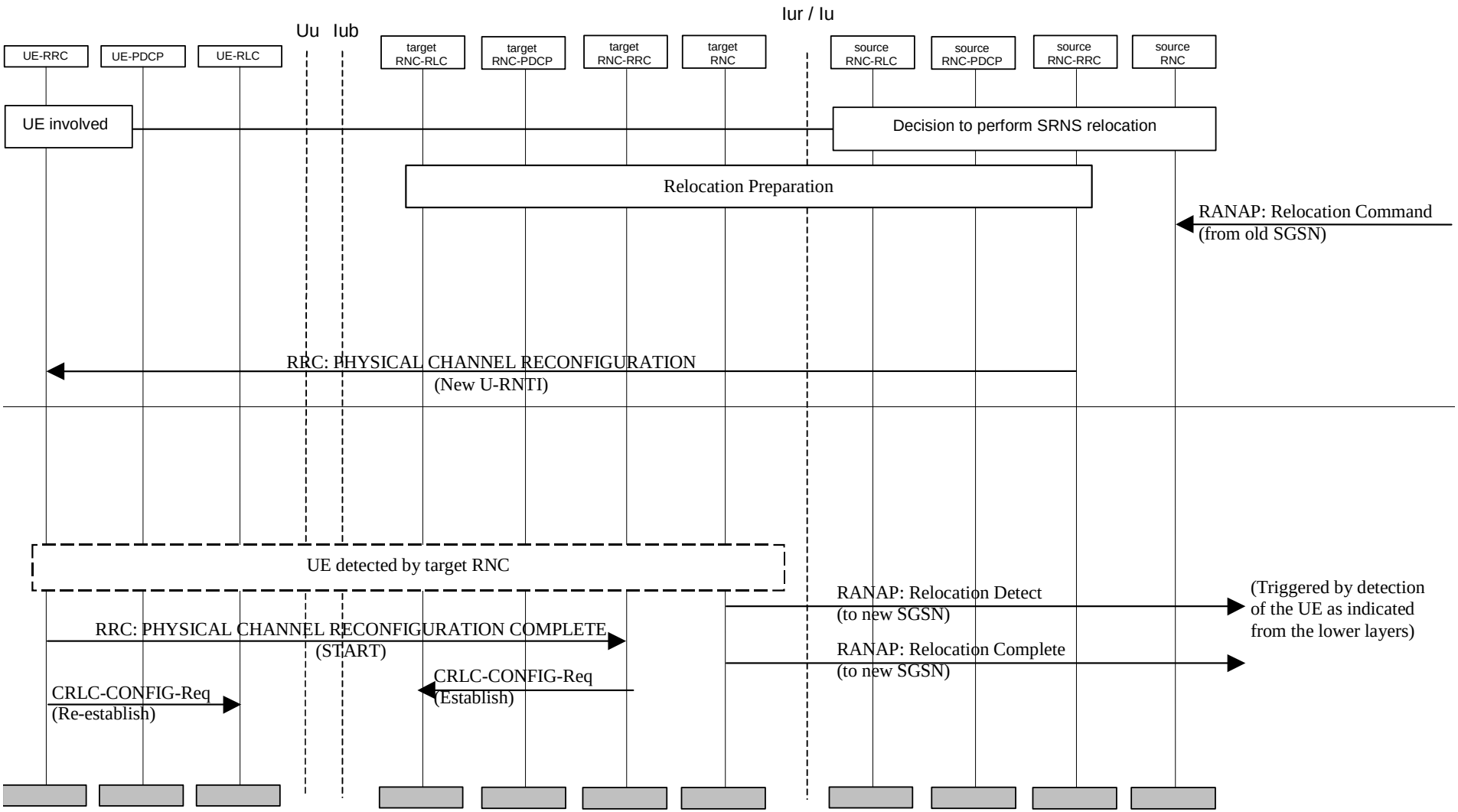
Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending the RRC message to the UE using the acknowledged mode dedicated signalling radio bearer. ~~This message includes the new U-RNTI.~~ The ~~last START~~current downlink and uplink HFN values for this signalling radio bearerare ~~sent by the mobile on the uplink is~~ then transferred from source to target RNC during the "forwarding of SRNS contexts via the CN" phase. ~~from source to target RNC.~~

Upon reception and acknowledgment by the UE of the PHYSICAL CHANNEL RECONFIGURATION message, the RLC entity for the acknowledged mode dedicated signalling radio bearer (SRB #2) is re-establish~~ed~~es, both on the UTRAN (target SRNC) and UE sides, ~~are re-established~~ and their HFN values are set to the ~~known~~current downlink and uplink HFN ~~START~~ values incremented by one. Care should be taken by UTRAN in timing the SRNS relocation so that there is no risk of a SN rollover on SRB #2 during this procedure.

If the UE has successfully configured itself, it ~~shall~~ send~~s~~ a response message, in this case PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message ~~will be~~is transmitted based on the new RLC context and~~.~~ contains the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC).

Upon acknowledgement of the message, the RLC entities for the rest of the affected radio bearers are re-established~~For the affected radio bearers, the RLC entity is re-established [2]~~ both on the UTRAN and UE side. The HFN values for each RB are set to the START value in the message for the corresponding CN domain. ~~with the current configuration.~~ The HFN values for each remaining signalling radio bearers (other than SRB #2) are set to the START value in the message for the last configured CN domain.

~~Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message in the UTRAN,~~ ~~t~~The relocation procedure ends.



~~Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers)~~

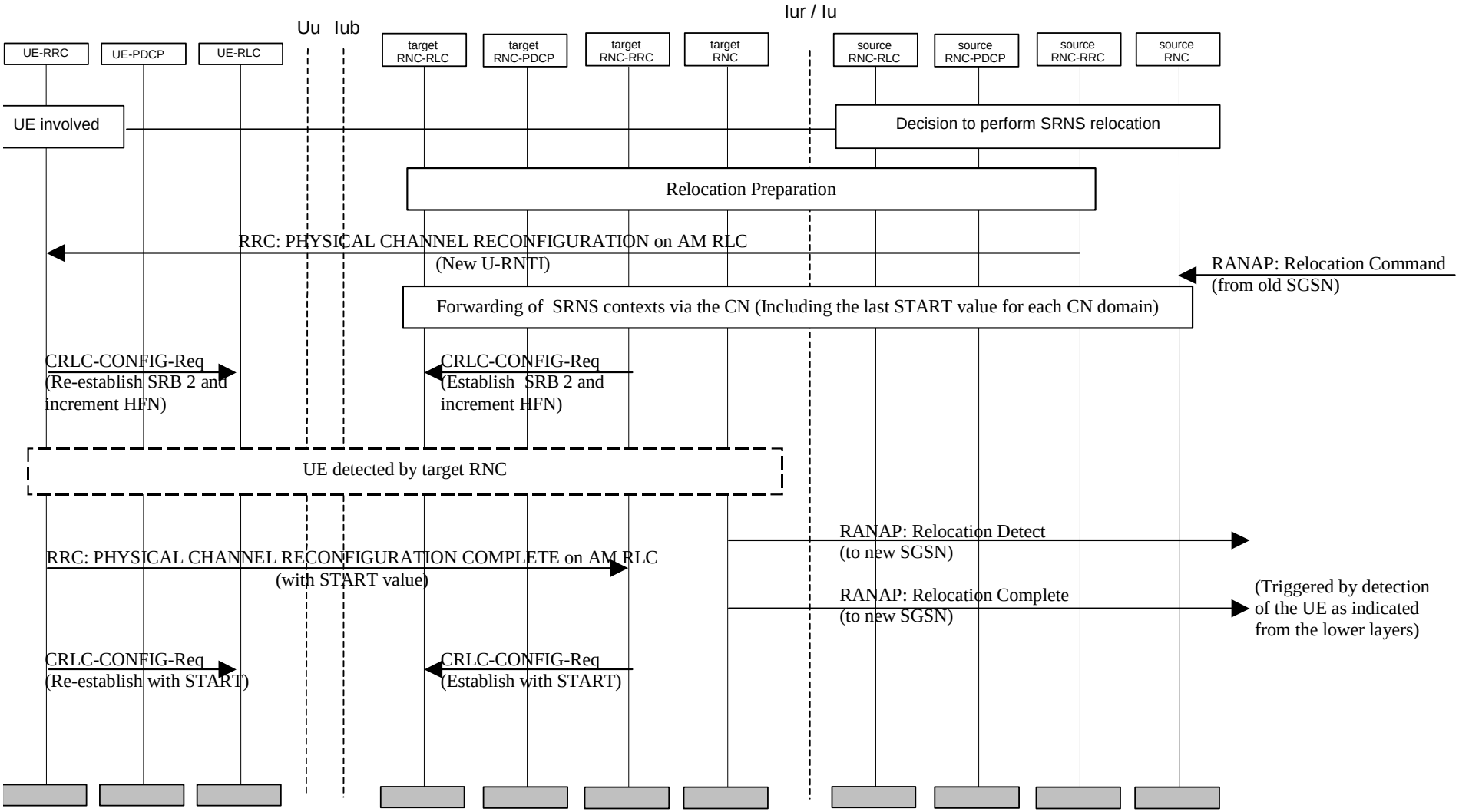


Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers

TSG-RAN Working Group 2 #23
Helsinky, Finland, 26 - 31 August 2001

Tdoc R2-012172

CR-Form-v3

CHANGE REQUEST

⌘ **25.303** **CR** **057** ⌘ 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 ☐ Core Network ☐

Title:	⌘	Correction to SRNS relocation
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	22-05-2001
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
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Use one of the following releases:
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R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	In the way the current description is specified, it is not possible for the target RNC to receive the uplink response from the UE since the RLC state was lost during SRNS relocation. For this message to go through, at least the RB on which the message needs to be re-established using a START value that is known both at the UE and in UTRAN.
Summary of change:	⌘	It is suggested to perform RLC re-establishment of SRB2 before transmitting the response on the uplink. Then, after the response message is transmitted, to use the START value transmitted in this message to re-establish the rest of the RBs and SRBs. This change affects lossless and seamless SRNS relocation in CELL_DCH.
Consequences if not approved:	⌘	SRNS relocation, lossless or seamless will not work in dedicated mode.

Clauses affected:	⌘	6.4.8, 6.4.8.2, 6.4.8.4		
Other specs affected:	⌘	☐ Other core specifications ☒ Test specifications ☐ O&M Specifications	⌘	25.303 v3.8.0, CR 056R2
Other comments:	⌘			

How to create CRs using this form:
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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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

6.4.8 SRNS Relocation

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There are three cases in which an SRNS relocation can be performed:

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- Combined Hard Handover and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a hard handover decided by the UTRAN.

- Combined Cell/URA update and SRNS relocation: This is used to move the UTRAN to CN connection point at the UTRAN side from the source SRNC to the target RNC, while performing a cell re-selection in the UTRAN.

and these are described in subclause 6.4.8.1, 6.4.8.2 (for lossless radio bearers), 6.4.8.3, 6.4.8.4 (for seamless radio bearers), and in more detail in [6].

6.4.8.2 Combined Hard Handover and SRNS relocation (lossless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released, the Target RNC to Source RNC Transparent Container and the RABs that are subject to data forwarding. Lossless SRNS relocation is always, and only, configured for RABs that are subject to data forwarding. The PDCP layer shall support PDCP sequence numbering when lossless SRNS relocation is supported [7]. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover.

Upon reception of the RANAP Relocation Command, the RRC entity in the source RNC stops the RLC entities for the affected radio bearers and retrieves the PDCP sequence numbers. It then triggers the execution of the relocation of SRNS by sending the RRC message to the UE using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message includes the new U-RNTI (from the target RNC) and the uplink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation (from the source RNC). ~~The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE.~~

~~For the affected radio bearers, the RLC entity is stopped and the PDCP sequence numbers are retrieved by RRC.~~ The PDCP send and receive sequence numbers and the ~~last START~~current downlink and uplink HFN values ~~received from the mobile~~ are then transferred via the CN during the forwarding of SRNS contexts, ~~via the CN phase~~ from source to target RNC ~~for RABs that support lossless SRNS relocation~~. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

Upon reception and acknowledgment by the UE of the message, the RLC ~~entities~~entity for the acknowledged mode dedicated signalling radio bearer (SRB #2) is re-established, both on the UTRAN and UE sides~~, are re-established~~ and their HFN values are set to the current downlink and uplink HFN ~~known START~~ values incremented by one. Care should be taken by UTRAN in timing the SRNS relocation so that there is no risk of a SN rollover on SRB #2 during this procedure.

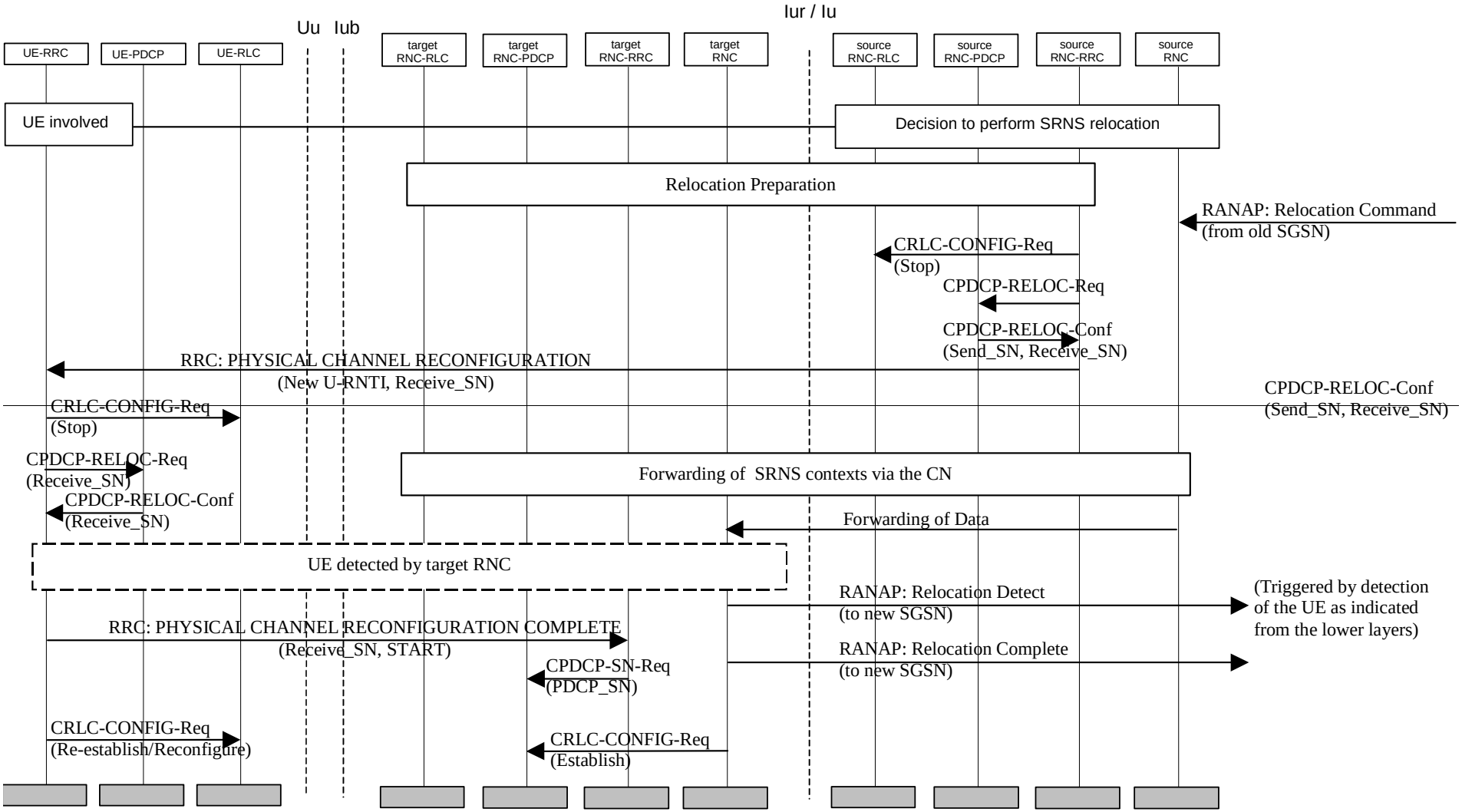
The UE compares the uplink receive PDCP sequence number with the uplink send PDCP sequence number. If this confirms PDCP SDUs successfully transferred before the start of relocation i.e. already received by the source RNC then these are discarded by the UE.

If the UE has successfully configured itself, it ~~shall~~ sends a response message, in this case a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message contains the START values and the downlink receive PDCP sequence number for each radio bearer configured to support lossless SRNS relocation.

Upon acknowledgement of the message, the RLC entities for affected radio bearers are re-established both on the UTRAN and UE side. The HFN values for each RB are set to the START value in the message for the corresponding CN domain.

UTRAN compares the downlink receive PDCP sequence number with the downlink send PDCP sequence number. ~~For the affected radio bearers, the RLC entity is re-established [2] with the current configuration and in the UE RLC all the data buffers are flushed.~~

~~Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message,~~ The UTRAN and the UE ~~shall~~ ~~start~~continue the RLC and PDCP entities of the affected RBs~~y~~ and the relocation procedure ends.



~~Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)~~

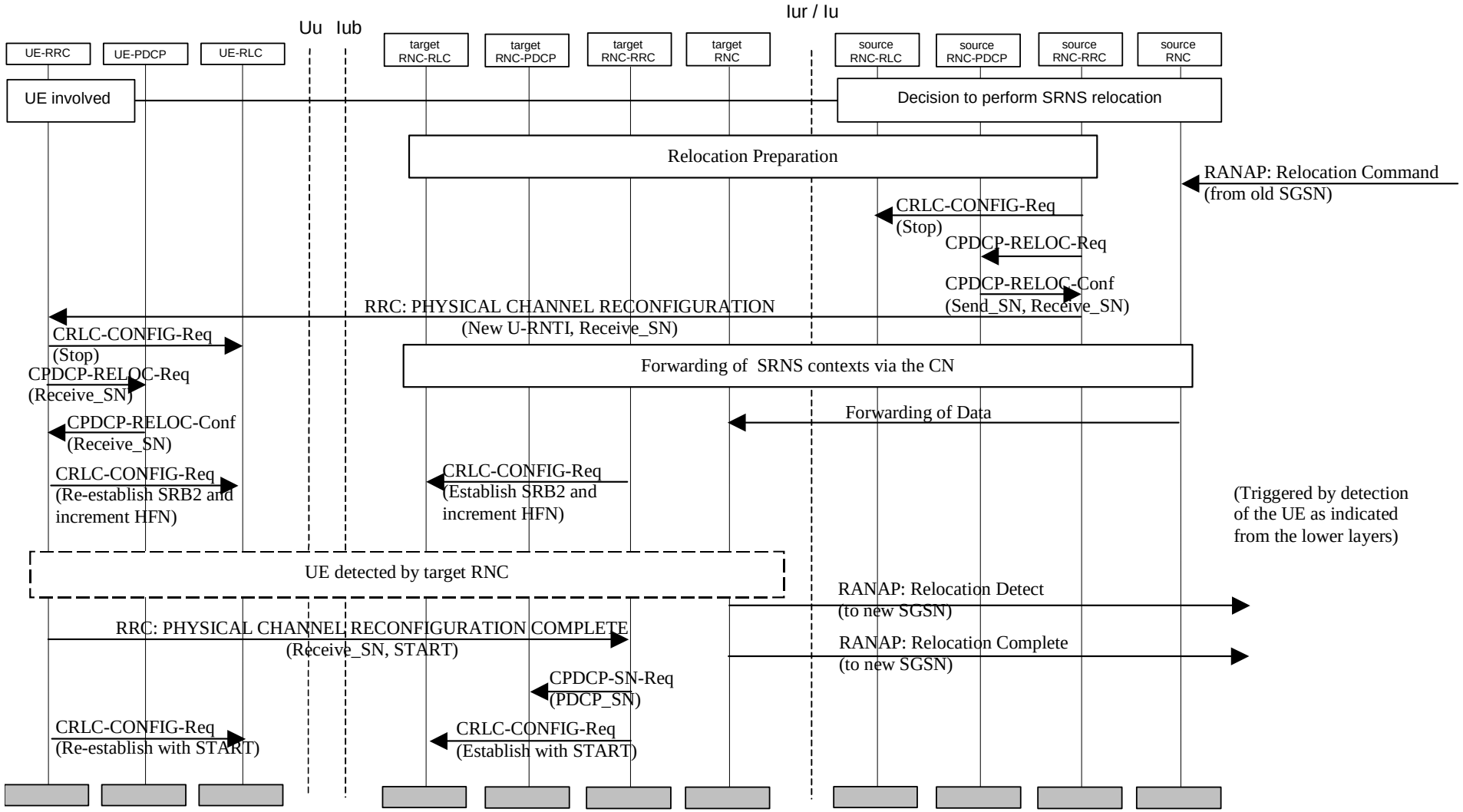


Figure 35: Combined Hard Handover and SRNS relocation (lossless radio bearers)

6.4.8.4 Combined Hard Handover and SRNS relocation (seamless radio bearers)

Based on measurement results and knowledge of the UTRAN topology, the source SRNC decides to initiate a combined hard handover and SRNS relocation. The UE is still under control of the SRNC but is moving to a location controlled by the target RNC.

The source RNC continues the downlink data transmission on radio bearers supporting seamless SRNS relocation until the target RNC becomes the serving RNC. The target RNC becomes the serving RNC when the RANAP Relocation Detect message is sent.

A RANAP Relocation Command is received by the source RNC from the CN, indicating the RABs to be released. The Target RNC to Source RNC Transparent Container includes the RRC message (e.g. PHYSICAL CHANNEL RECONFIGURATION) for hard handover. This message includes the new U-RNTI.

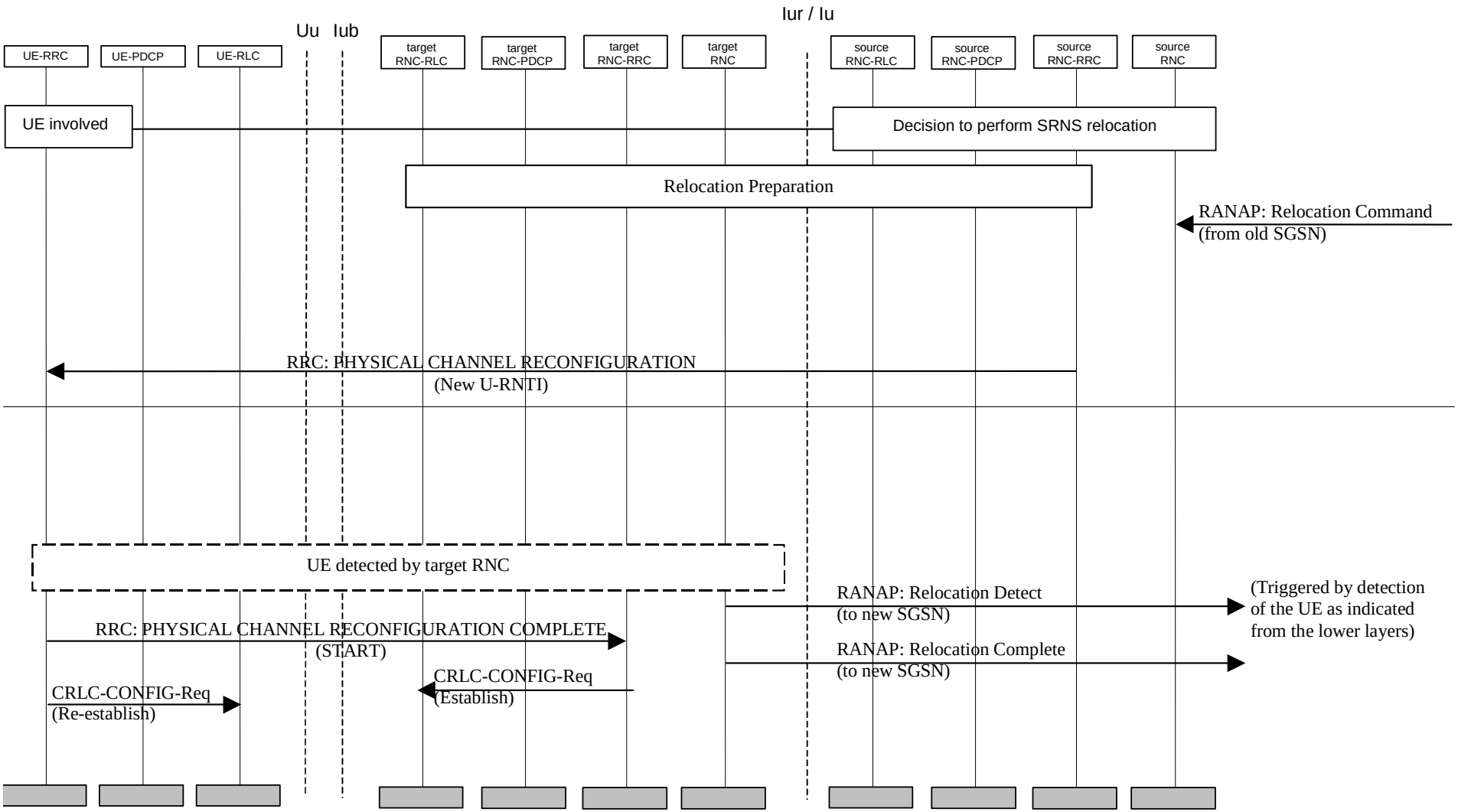
Upon reception of the RANAP Relocation Command, the source RNC triggers the execution of the relocation of SRNS by sending the RRC message to the UE using the acknowledged mode dedicated signalling radio bearer. ~~This message includes the new U-RNTI.~~ The ~~last START~~current downlink and uplink HFN values for this signalling radio bearerare ~~sent by the mobile on the uplink is~~ then transferred from source to target RNC during the "forwarding of SRNS contexts via the CN" phase. ~~from source to target RNC.~~

Upon reception and acknowledgment by the UE of the PHYSICAL CHANNEL RECONFIGURATION message, the RLC entity for the acknowledged mode dedicated signalling radio bearer (SRB #2) is re-establish~~ed~~es, both on the UTRAN (target SRNC) and UE sides, ~~are re-established~~ and their HFN values are set to the ~~known~~current downlink and uplink HFN ~~START~~ values incremented by one. Care should be taken by UTRAN in timing the SRNS relocation so that there is no risk of a SN rollover on SRB #2 during this procedure.

If the UE has successfully configured itself, it ~~shall~~ send~~s~~ a response message, in this case PHYSICAL CHANNEL RECONFIGURATION COMPLETE message to the target RNC using the acknowledged mode dedicated signalling radio bearer (SRB #2). This message ~~will be~~is transmitted based on the new RLC context and~~.~~ contains the START values (to be used in integrity protection and in ciphering on radio bearers using UM and AM RLC).

Upon acknowledgement of the message, the RLC entities for the rest of the affected radio bearers are re-established~~For the affected radio bearers, the RLC entity is re-established [2]~~ both on the UTRAN and UE side. The HFN values for each RB are set to the START value in the message for the corresponding CN domain. ~~with the current configuration.~~ The HFN values for each remaining signalling radio bearers (other than SRB #2) are set to the START value in the message for the last configured CN domain.

~~Upon reception of the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message in the UTRAN,~~ ~~t~~The relocation procedure ends.



~~Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers)~~

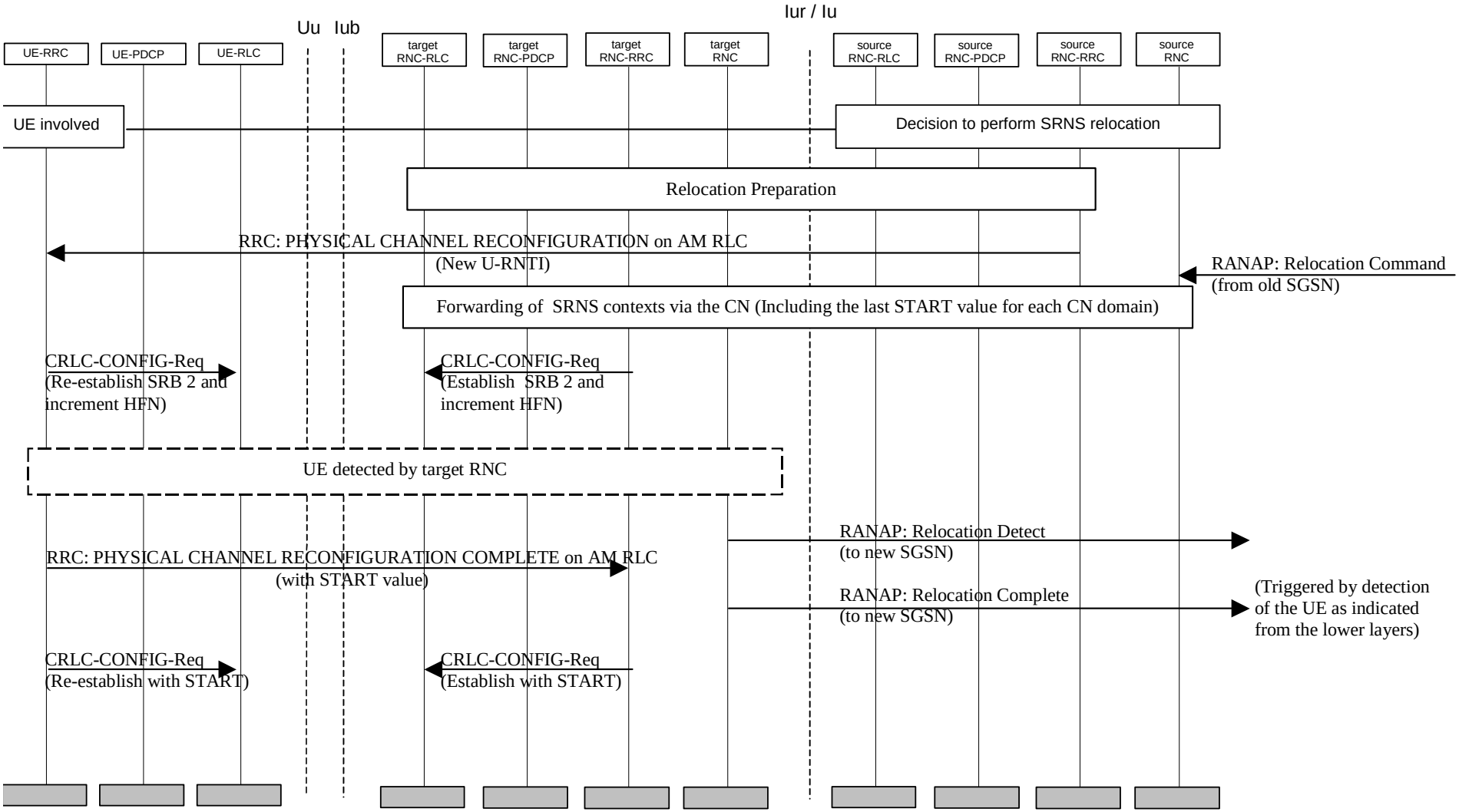


Figure 37: Combined Hard Handover and SRNS relocation (seamless radio bearers