

Agenda Item: 5

Source: Rapporteur (Ericsson)

Title: **Report from e-mail discussion on RRC procedures**

Document for: Decision

1 Introduction

This contribution contains the results on the RAN2 e-mail discussion on RRC procedure modifications. The purpose of this e-mail discussion was to specify the RRC procedures in TS 25.331 using text according to the principles outlined in Tdoc R2-99809 [1].

2 Summary

A number of contributions have been prepared by individual companies and been discussed on the RAN2 e-mail reflector. In the table below the results of the discussion on each contribution is summarised. All of the the procedures were agreed after the end of discussions.

Title	Source	Results
Specification of RRC timers	Ericsson	New timer T309 added. Other minor changes and corrections.
Specification of RRC procedure: Radio bearer establishment	Ericsson	.
Specification of RRC procedure: Radio bearer release	Ericsson	.
Specification of RRC procedure: Paging	Ericsson	
Specification of RRC procedure: Broadcast of system information	Ericsson	Minor changes done
Specification of RRC procedure: RRC connection release	Ericsson	Minor changes done
Measurement procedures	Ericsson	
Specification of RRC procedure: Inter system handover from UMTS	Ericsson	
Specification of RRC procedure: Inter system handover to UMTS	Ericsson	
Specification of RRC procedure: Inter system cell reselection from UMTS	Ericsson	
Specification of RRC procedure: Inter system cell reselection to UMTS	Ericsson	
Proposal for improved structure	Ericsson	
Specification of RRC procedure: Hard handover	NTT DoCoMo	Minor changes done..
Specification of RRC procedure: Notification	NTT DoCoMo	Procedure proposed to be removed.
Specification of RRC procedure: RRC connection re-establishment	NTT DoCoMo	Minor changes done.
Specification of RRC procedure: Active set update	NTT DoCoMo	. Physical channel failure removed.
Specification of RRC procedure: Cell update	NTT DoCoMo	Based on 25.331. UL data transmission added as trigger in the DoCoMo proposal. Minor changes done on the proposal. Measurement report in the

Title	Source	Results
		CELL UPDATE message during discussion.. Paging response added as trigger.
Specification of RRC procedure: URA update	NTT DoCoMo	Minor changes done. Clarification on using URA id added.
Transmission of UE capability information procedure and UE Capability enquiry procedure	Nokia	Some changes on the triggering of the UE CAPABILITY INFORMATION. Other minor changes.
RRC Direct Transfer	Nokia	Measurement report only in CELL_FACH state. Possibility added to use it for signalling connection release.
RRC status procedure	Nokia	The procedure is proposed to be merged with the Direct Transfer procedure.
Radio bearer reconfiguration procedure	Nokia	Changes are co-ordinated with results of the discussion on the Physical channel reconfiguration procedure
Physical channel reconfiguration procedure	Nokia	Transition to URA_PCH and CELL_PCH specified also.
Transport channel reconfiguration procedure	Nokia	Changes are co-ordinated with results of the discussion on the Physical channel reconfiguration procedure
Transport format combination control procedure	Nokia	

Two procedures, whose textual specification was included on the last RAN2 meeting, have not been changed during this e-mail discussion, except for editorial changes:

- RRC connection establishment
- RNTI re-allocation

Still, there are two new procedures included at the last RAN2 meeting, which have not been specified yet:

- Downlink outer loop power control
- Security Mode Control

(Contributions to specify those two procedures in more detail are invited.)

3 Proposal

It is proposed that:

- The text in chapter 8 of this contribution replaces the current chapter 8 and 9 in TS 25.331, except for:
 - Security mode control and Downlink power control: the text in TS 25.331 is kept, but put under the headings according to chapter 8 of this contribution
- The procedures Notification and RRC status are removed
- The title of chapter 8 in TS 25.331 is changed to "RRC procedures"
- The contents of current chapter 14, "Protocol timers, counters and other parameters" is replaced with the contents of chapter 14 of this contribution.
- The chapter 13, "protocol states" in TS 25.331 is moved to chapter 9 (between "RRC procedures" and "Message and information element functional definition and content")

4 References

- [1] R2-99809, Principles for specification of RRC procedures, source: Ericsson
[2] TS 25.331, v1.3.0, RRC protocol specification, source: editor

8 RRC procedures

8.1 RRC Connection Management Procedures

8.1.1 Broadcast of system information

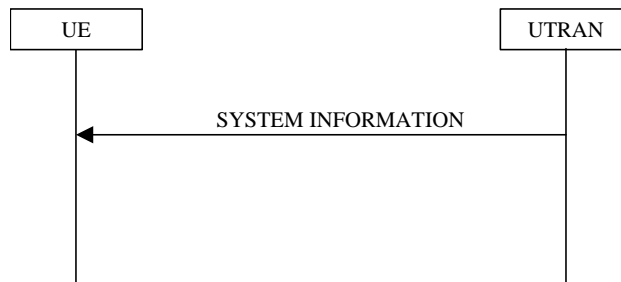


Figure 1. Broadcast of system information

8.1.1.1 General

The purpose of this procedure is to broadcast system information from the network to idle mode- and connected mode UEs in a cell.

8.1.1.1.1 System information structure

The system information elements are broadcast in *system information blocks*. A system information block groups together system information elements of the same nature. Different system information blocks may have different characteristics, e.g. regarding their repetition rate and the requirements on UEs to re-read the system information blocks.

The system information is organised as a tree. A *master information block* gives references to a number of system information blocks in a cell, including scheduling information for those system information blocks. The system information blocks contain the actual system information and/or references to other system information blocks including scheduling information for those system information blocks.

Figure 2 illustrates the relationship between the master information block and the system information blocks in a cell.

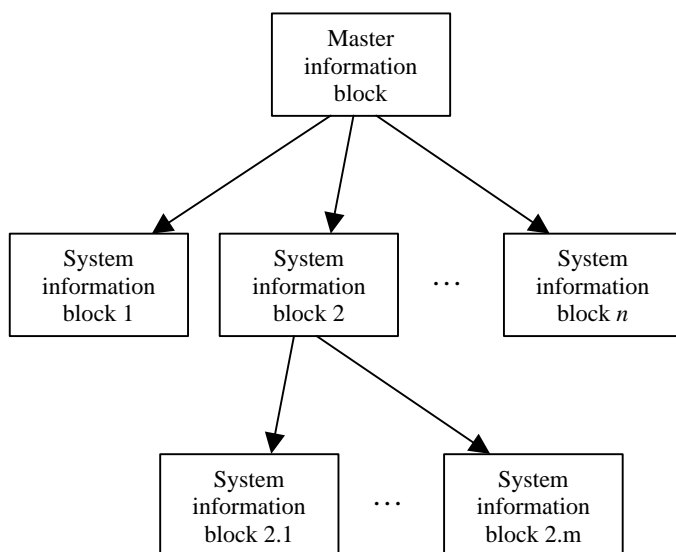


Figure 2. The overall structure of system information.

8.1.1.1.2 Acquisition of system information blocks

[The specification and usage of different system information blocks is FFS]

8.1.1.1.3 Scheduling of system information

All system information blocks are broadcast on the BCCH using transparent mode. A given BCCH may be mapped onto either a BCH transport channel or a FACH transport channel.

The RRC layer in UTRAN shall perform segmentation of system information blocks. The segments shall fit the size of a transport block. The RRC layer in the UE shall perform re-assembly of segments. To allow the mixing of system information blocks with short repetition period and system information blocks with segmentation over many frames, UTRAN may multiplex segments from different system information blocks. Multiplexing and de-multiplexing shall be performed by the RRC layer.

UTRAN shall define the following parameters for each system information segment broadcast on a BCH transport channel:

- the repetition period (SIB_REP)
- the position (phase) within the repetition period (SIB_POS)

The scheduling is based on the Cell System Frame number (SFN). The frame at which a particular system information segment occurs is defined as follows:

$$\text{SFN mod SIB_REP} = \text{SIB_POS}$$

The master information block is scheduled with a fixed pre-defined repetition rate and a fixed pre-defined position. The length of the master information block shall not exceed the size of a transport block.

8.1.1.2 Initiation

The UTRAN shall repeat the system information on a regular basis using the repetition period defined for each system information block.

8.1.1.3 Reception of SYSTEM INFORMATION by the UE

The UE shall be able to receive SYSTEM INFORMATION broadcast on a BCH transport channel in idle mode as well as in states CELL_FACH, CELL_PCH and URA_PCH. Further, the UE shall be able to receive SYSTEM INFORMATION broadcast on a FACH transport channel in states CELL_FACH and CELL_DCH.

Idle mode- and connected mode UEs may acquire different combinations of system information blocks. Before each acquisition, the UE should identify which system information blocks that are needed.

8.1.1.3.1 Reception of SYSTEM INFORMATION broadcast on a BCH transport channel

The UE may use the pre-defined scheduling information to locate the master information block in the cell.

At reception of the master information block, the UE shall

- check the IE PLMN identity in the master information block, If the PLMN identity is different from the stored PLMN identity, the UE shall store that PLMN identity, clear the value tag for the master information block as well as all value tags for all system information blocks and forward that PLMN identity to upper layers.
- store the value tag of the master information block.
- check the IE value tag for all system information blocks which are to be used by the UE. If the value tag has been changed or if the system information block has not been read before, the UE shall store the scheduling information (SIB_REP and SIB_POS) valid for that system information block.

The SIB_REP and SIB_POS given by the master information block may be used by the UE to find the location of each system information block that will be acquired.

At reception of a system information block, the UE shall

- store the IE value tag (if that IE is present) or start a timer set to the value indicated in the IE expiration time (if that IE is present).
- store the remaining IEs in the system information block
- forward non-access stratum system information to upper layers

8.1.1.3.2 Reception of SYSTEM INFORMATION broadcast on a FACH transport channel

[The reception of system information blocks transmitted on a FACH transport channel is FFS.]

8.1.1.4 Modification of system information

The UE and UTRAN may use different mechanisms to update system information blocks. If the system information block contains a value tag, UTRAN shall indicate when any of the information elements are modified. If the system information block contains an expiration time, the UE is responsible for the re-reading of system information when the timer expires.

8.1.1.4.1 Modification of system information blocks using a value tag

When system information is modified, UTRAN shall perform the following actions:

- update the actual system information in the corresponding system information block.
- update the 'value tag' in the system information block.
- start to repeat the updated system information block on the BCCH mapped on BCH or FACH instead of the old system information block.
- update the master information block. Both the 'value tag' of the modified system information block and the 'value tag' of the master information block need to be updated.
- send the new master information block on the BCCH mapped on FACH in order to reach all UEs in state CELL_FACH. UTRAN may repeat the new master information block on the FACH to increase the probability of proper reception in all UEs needing the information.
- send the new master information block on the BCCH mapped on BCH instead of the old master information block.
- send the message PAGING TYPE 1 on the PCCH in order to reach idle mode UEs as well as connected mode UEs in state CELL_PCH and URA_PCH. In the IE 'BCCH Modification Information', UTRAN shall indicate the new value tag for the master information block. The PAGING TYPE 1 message shall be sent in all paging occasions.

At reception of the PAGING TYPE 1 message, the UE shall

- check the 'value tag' of the master information block indicated in the IE 'BCCH Modification information'. If the value tag has been changed, the UE shall read the new master information block using the pre-defined scheduling information.

At reception of the new master information block (received on the BCCH mapped on BCH or FACH), the UE shall:

- store the new 'value tag' of the master information block.
- check the IE 'value tag' for all system information blocks which are used by the UE. If any of the value tags have been changed, the UE shall store the scheduling information valid for those system information blocks. Using the scheduling information, the UE is able to locate the modified system information block(s) and retrieve the new information.

8.1.1.4.2 Modification of system information blocks containing an expiration time

When the UE has acquired a system information block containing the IE 'expiration time', a timer shall be started using the value indicated in that IE. When the timer expires, the information carried in the system information block is considered to be old and the UE shall acquire new information before the values of the included system information elements can be used again.

8.1.2 Paging

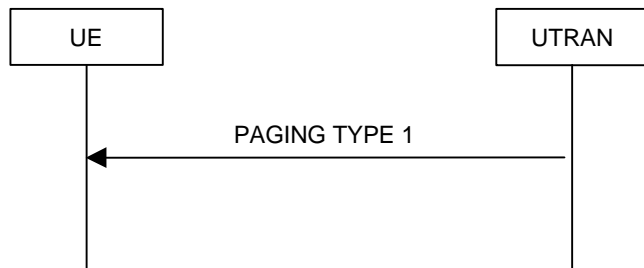


Figure 3. Paging

8.1.2.1 General

This procedure is used to transmit paging information to selected UEs in idle mode, CELL_PACH or URA_PCH state using the paging control channel (PCCH). Upper layers in the network may request paging, to e.g. establish a signalling connection. UTRAN may initiate paging in CELL_PCH or URA_PCH state, to trigger a UE state transition or reading of updated system information.

8.1.2.2 Initiation

Upper layers in the network may request paging of a UE. UTRAN initiates the paging procedure by broadcasting a PAGING TYPE 1 message on an appropriate paging occasion on the PCCH.

UTRAN may repeat paging of a UE in several paging occasions to increase the probability of proper reception of a page. This is a UTRAN option.

8.1.2.2.1 Message PAGING TYPE 1 contents to set

UTRAN may page several UEs in the same paging occasion by including one IE *Paging record* for each UE in the PAGING TYPE 1 message. The identity shall be set according to the following:

- For an idle mode UE the identity shall be set to a CN UE identity given by the non-access stratum.
- For an UE in connected mode (CELL_PCH or URA_PCH state) the identity shall be set to a SRNC identity plus S-RNTI.

UTRAN may also indicate updated system information, by including the value tag of the master information block in the IE *BCCH modification information* in the PAGING TYPE 1 message.

8.1.2.3 Reception of message PAGING TYPE 1 by the UE

The UE shall in idle mode, CELL_PCH state and URA_PCH state receive the paging information for all its monitored paging occasions. The paging occasions an idle mode UE shall monitor are specified in TS 25.304. For an UE in CELL_PCH state and URA_PCH state the paging occasions are specified in subclause TBD.

When the UE receives a PAGING TYPE 1 message as paging information, it shall check each occurrence of the IE *Paging record* and perform the actions as specified in section 8.1.2.3.1.

8.1.2.3.1 Message PAGING TYPE 1 contents to use

For each included paging record the UE shall compare the included identity with the identity of the UE according to the following:

- An idle mode UE shall compare the included identities of type CN UE identity with all of its allocated CN UE identities. For each match the UE shall forward the identity and paging cause to the upper layer entity indicated by the CN domain identity.
- A connected mode UE shall compare the included identities of type *Connected mode identity* with its allocated SRNC identity plus S-SRNTI. If there is a match, the UE shall check the *Paging originator* and perform the following:
 - If *paging originator* is CN, the UE shall forward the identity and paging cause to the upper layer entity indicated by CN domain identity.
 - If *paging originator* is UTRAN, the UE shall enter CELL_FACH state and perform a cell update procedure with cause *paging response* as specified in subclause 8.3.1.2.4.
- When there is no match the UE shall ignore that paging record.

If the IE **BCCH modification info**'s included, the UE shall check the included value tag of the master information block and, if necessary, read system information on the BCCH as specified in subclause 8.1.1.

8.1.3 RRC connection establishment

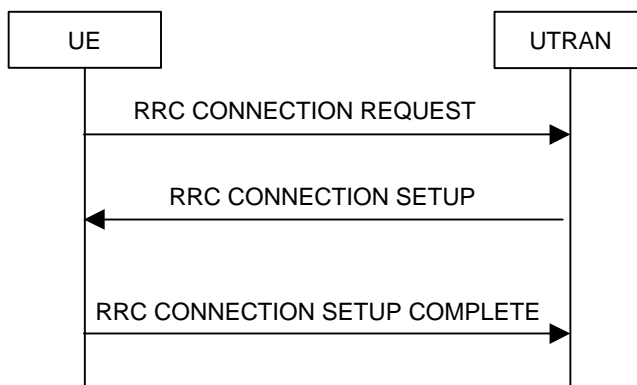


Figure 4) RRC Connection Establishment, network accepts RRC connection

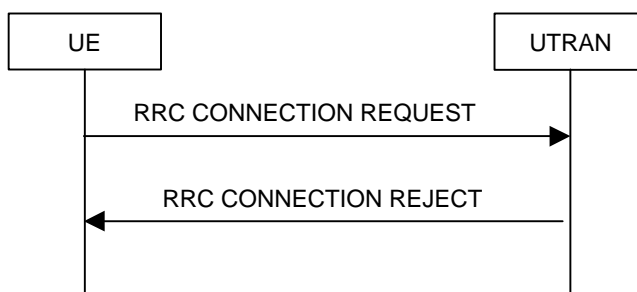


Figure 5) RRC Connection Establishment, network rejects RRC connection

8.1.3.1 General

The purpose with this procedure is to establish an RRC connection.

8.1.3.2 Initiation

The non-access stratum in the UE may request establishment of an RRC connection.

The UE shall transmit an RRC CONNECTION REQUEST message on the uplink CCCH, reset counter V300, and start timer T300.

8.1.3.2.1 Message RRC CONNECTION REQUEST contents to set

The UE may set the IE **Establishment cause**'according to indications from the non-access stratum.

The UE shall set the IE **Initial UE identity**'according to subclause 8.5.1.

The UE shall indicate its capability in the IE **Initial UE capability**'.

The UE shall include an intra-frequency measurement report, as instructed to do so in the system information.

8.1.3.3 Reception of RRC CONNECTION REQUEST by the UTRAN

UTRAN shall either

- start timer T350 and transmit an RRC CONNECTION SETUP on the downlink CCCH or
- transmit an RRC CONNECTION REJECT on the downlink CCCH. On the UTRAN side, the procedure ends and all context information for this UE may be deleted in UTRAN.

8.1.3.3.1 Message RRC CONNECTION SETUP contents to set

The IE **Initial UE identity**'shall be set to the same value as in the received message RRC CONNECTION REQUEST.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.1.3.3.2 Message RRC CONNECTION REJECT contents to set

The IE Initial UE identity shall be set to the same value as in the received message RRC CONNECTION REQUEST.

8.1.3.4 Reception of RRC CONNECTION SETUP by the UE

The UE shall compare the value of the IE Initial UE identity in the received RRC CONNECTION SETUP message with the value of the IE Initial UE identity in the most recent RRC CONNECTION REQUEST message sent by the UE.

- If the values are identical, the UE shall stop timer T300, perform the actions according to 8.1.3.4.1 and transmit an RRC CONNECTION SETUP COMPLETE message on the uplink DCCH. When the RRC CONNECTION SETUP message has been successfully transmitted the procedure ends.
- If the values are different, the UE shall ignore the rest of the message

8.1.3.4.1 Message RRC CONNECTION SETUP contents to use

The UE shall

- store the values of the IEs S-RNTI and SRNC identity and
- initiate the signalling link parameters according to the IEs Signalling link type and RAB multiplexing info

If the IE C-RNTI is included, the UE shall

- use that C-RNTI on common transport channels in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- let the physical channel of type PRACH that is given in system information to be the default in uplink for RACH

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- start to receive the physical channel of type Secondary CCPCH that is given in system information to be used as default by FACH, and enter the CELL_FACH state.

Actions that shall be performed by the UE for other IEs are specified in subclause 8.5.7.

8.1.3.4.2 Message RRC CONNECTION SETUP COMPLETE contents to set

The UE shall include its capabilities in the RRC CONNECTION SETUP COMPLETE message, according to instructions in the system information.

8.1.3.5 Abnormal cases: Physical channel failure or T300 timeout

- Upon expiry of timer T300, or
- if the UE failed to establish the physical channel(s) indicated in the message RRC CONNECTION SETUP

the UE shall check the value of V300, and

- if V300 is smaller or equal than N300, the UE shall transmit a new RRC CONNECTION REQUEST message on the uplink CCCH, restart timer T300 and increase counter V300. The UE shall set the IEs in the RRC CONNECTION REQUEST message according to subclause 8.1.3.2.1.
- If V300 is greater than N300, the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.1.3.6 Reception of RRC CONNECTION REJECT by the UE

When the UE receives an RRC CONNECTION REJECT message on the downlink CCCH, it shall compare the value of the IE Initial UE identity in the received RRC CONNECTION SETUP message with the value of the IE Initial UE identity in the last RRC CONNECTION REQUEST message sent by the UE.

- If the values are identical, the UE shall stop timer T300 and perform the actions in subclause 8.1.3.6.1.
- If the values are different, the UE shall ignore the rest of the message

8.1.3.6.1 Message RRC CONNECTION REJECT contents to use

If the IE 'wait time' is present, and

- if V300 is smaller or equal than N300, the UE shall wait at least the time stated in the IE 'wait time,' transmit a new RRC CONNECTION REQUEST message on the uplink CCCH, restart timer T300 and increase counter V300. UE shall set the IEs in the RRC CONNECTION REQUEST message according to subclause 8.1.3.2.1.
- If V300 is greater than N300 the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

If the IE 'wait time' is not present the UE shall

- enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.1.3.7 Reception of RRC CONNECTION SETUP COMPLETE by the UTRAN

When UTRAN has received the RRC CONNECTION SETUP COMPLETE message, the procedure ends on the UTRAN side, and timer T350 shall be stopped.

8.1.3.8 Abnormal case: T350 timeout

Upon expiry of timer T350, the procedure ends on the UTRAN side, and all context information for this UE may be deleted in UTRAN.

8.1.4 RRC connection release

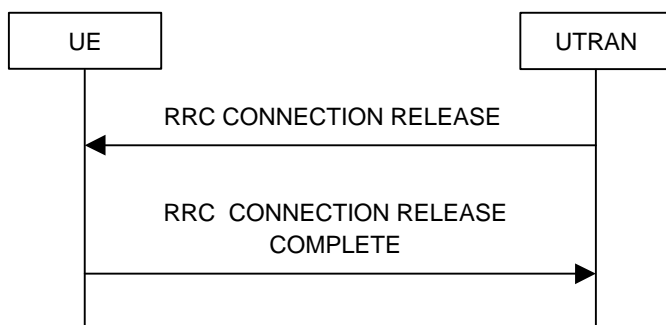


Figure 6. RRC Connection Release procedure

8.1.4.1 General

The purpose with this procedure is to release the RRC connection including the signalling link and all radio bearers between the UE and the UTRAN.

8.1.4.2 Initiation

When the UE is in state Cell_DCH or Cell_FACH, the UTRAN can anytime initiate a RRC connection release by transmitting an RRC CONNECTION RELEASE message using unacknowledged mode.

8.1.4.2.1 Retransmission of message RRC CONNECTION RELEASE

UTRAN may transmit several RRC CONNECTION RELEASE messages to increase the probability of proper reception of the message by the UE. The number of repeated messages and the interval between the messages is a network option.

8.1.4.3 Reception of RRC CONNECTION RELEASE by the UE

The UE shall be able to receive and act on RRC CONNECTION RELEASE in states Cell_DCH and Cell_FACH. Furthermore this procedure can interrupt any ongoing procedures with the UE in the above listed states.

When the UE receives the first RRC CONNECTION RELEASE message, it shall

- When in state CELL_DCH, transmit an RRC CONNECTION RELEASE COMPLETE message using unacknowledged mode to the UTRAN and start timer T308.

- When in state CELL_FACH, transmit an RRC CONNECTION RELEASE COMPLETE message using acknowledged mode to the UTRAN

Any succeeding RRC CONNECTION RELEASE messages that are received by the UE shall be ignored.

A release indication should be given to the non-access stratum.

8.1.4.3.1 Message RRC CONNECTION RELEASE contents to use

The IE Number of Quick Repeat indicates the number of times to send the message RRC CONNECTION RELEASE COMPLETE and the UE shall initialise the counter V308 with the value of this IE when in CELL_DCH state.

8.1.4.4 CELL_DCH: Expiry of timer T308

When in state CELL_DCH and the timer T308 expires, the UE shall decrease V308 by one. If V308 is greater than zero, the UE shall repeat the RRC CONNECTION RELEASE COMPLETE message. If V308 is equal to zero, the UE shall release all its radio resources, enter idle mode and the procedure ends on the UE side. Actions the UE shall perform when entering idle mode are given in subclause 8.5.2.

8.1.4.5 CELL_FACH: Successful transmission of RRC CONNECTION RELEASE COMPLETE

When the UE is in state CELL_FACH and has successfully transmitted the RRC CONNECTION RELEASE COMPLETE message it shall release all its radio resources, enter idle mode and the procedure ends on the UE side. Actions the UE shall perform when entering idle mode are given in subclause 8.5.2.

8.1.4.6 Reception of RRC CONNECTION RELEASE COMPLETE by UTRAN

When UTRAN receives a RRC CONNECTION RELEASE COMPLETE message from the UE, it should release all UE dedicated resources and the procedure ends on the UTRAN side.

8.1.4.7 CELL_FACH abnormal case: unsuccessful transmission of RRC CONNECTION RELEASE COMPLETE

When the UE is in state CELL_FACH and does not succeed to transmit the RRC CONNECTION RELEASE COMPLETE message, it shall release all its radio resources, enter idle mode and the procedure ends on the UE side. Actions the UE shall perform when entering idle mode are given in subclause 8.5.2.

8.1.4.8 CELL_DCH abnormal case: detection of dedicated physical channel release by UTRAN

If the release is performed from the state CELL_DCH, and UTRAN detects loss of a the dedicated physical channel according to subclause 8.5.6, UTRAN may release all UE dedicated resources, even if no RRC CONNECTION RELEASE COMPLETE message has been received.

8.1.4.9 Abnormal case: no reception of RRC CONNECTION RELEASE COMPLETE by UTRAN

If UTRAN does not receive any RRC CONNECTION RELEASE COMPLETE message, it should release all UE dedicated resources.

8.1.5 RRC connection re-establishment

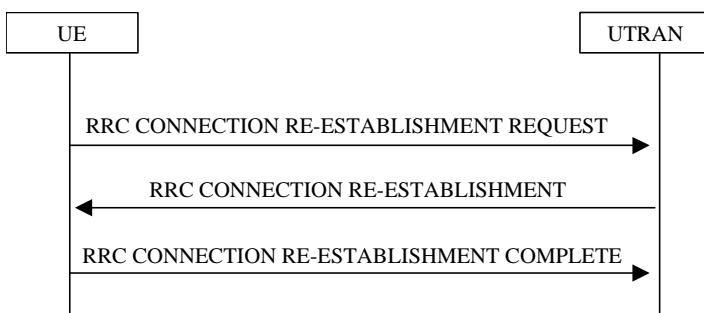


Figure 7. RRC Connection Re-establishment, successful case

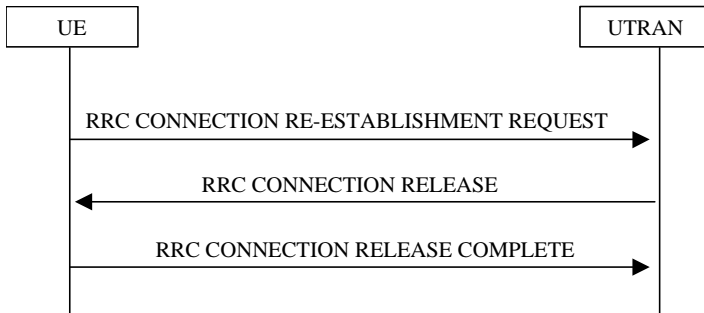


Figure 8. RRC Connection Re-establishment, failure case

8.1.5.1 General

The purpose with this procedure is to re-establish an RRC connection.

8.1.5.2 Initiation

When a UE loses the radio connection due to e.g. radio link failure in CELL_DCH state, the UE may initiate a new cell selection by transiting to CELL_FACH state and request re-establishment of an RRC connection.

The UE shall transmit an RRC CONNECTION RE-ESTABLISHMENT REQUEST message on the uplink CCCH, reset counter V301, and start timer T301.

8.1.5.2.1 Message RRC CONNECTION RE-ESTABLISHMENT REQUEST contents to set

The UE shall

- Set the IE SRNC Identity'and S-RNTI,'which the UE has in itself.
- Include an intra-frequency measurement report, as instructed to do so in the system information.

8.1.5.3 Reception of RRC CONNECTION RE-ESTABLISHMENT REQUEST by the UTRAN

UTRAN shall either

- start timer T352 and transmit an RRC CONNECTION RE-ESTABLISHMENT on the downlink DCCH or
- initiate RRC Connection Release procedure when the UTRAN cannot accept RRC Connection Re-establishment from the UE.

8.1.5.3.1 Message RRC CONNECTION RE-ESTABLISHMENT contents to set

The UTRAN shall

- FFS.

8.1.5.3.2 Message RRC CONNECTION RELEASE contents to set

The UTRAN shall

- set IE Release Cause,'according to the condition in UTRAN.

8.1.5.4 Reception of RRC CONNECTION RE-ESTABLISHMENT by the UE

The UE shall

- Re-establish the RRC Connection according to the IEs included in the RRC CONNECTION RE-ESTABLISHMENT message.

8.1.5.4.1 Message RRC CONNECTION RE-ESTABLISHMENT contents to use

The UE shall

- FFS.

8.1.5.4.2 Message RRC CONNECTION RE-ESTABLISHMENT COMPLETE contents to set

The UE shall

- FFS.

8.1.5.5 Abnormal cases: T301 timeout or DPCH failure

- Upon expiry of timer T301, or
- if the UE failed to re-establish the RRC Connection indicated in the message RRC CONNECTION RE-ESTABLISHMENT

the UE shall check the value of V301, and

- if V301 is smaller or equal than N301, the UE shall transmit a new RRC CONNECTION RE-ESTABLISHMENT REQUEST message on the uplink CCCH, restart timer T301 and increase counter V301. The UE shall set the IEs in the RRC CONNECTION RE-ESTABLISHMENT REQUEST message according to subclause 8.1.5.2.1.
- If V301 is greater than N301, the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.1.5.6 Reception of RRC CONNECTION RE-ESTABLISHMENT COMPLETE by the UTRAN

When UTRAN has received the RRC CONNECTION RE-ESTABLISHMENT COMPLETE message, the procedure ends on the UTRAN side, and timer T352 shall be stopped.

8.1.5.7 Abnormal case: T352 timeout

Upon expiry of timer T352, the procedure ends on the UTRAN side, and all context information for this UE may be deleted in UTRAN.

8.1.6 Transmission of UE capability information

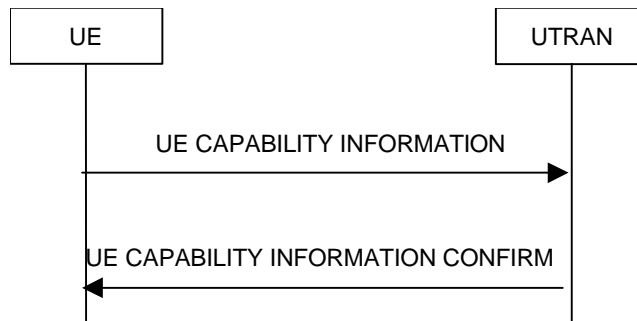


Figure 9. Transmission of UE capability information, normal flow

8.1.6.1 General

The UE capability update procedure is used by the UE to convey UE specific capability information to the UTRAN.

8.1.6.2 Initiation

The UE shall initiate the UE capability update procedure in the following situations:

- Upon capability enquiry from the UTRAN, after the UE has received a UE CAPABILITY ENQUIRY message from the UTRAN.
- After having performed cell reselection to a cell, where the "capability update requirement" indicates the necessity to transmit capability information which has not been previously sent.
- If UE capabilities change during the RRC connection. (E.g. change of power class)

The UE transmits the UE CAPABILITY INFORMATION message on the uplink DCCH using AM or UM RLC, starts timer T304 and resets counter V3xx.

8.1.6.2.1 Message UE CAPABILITY INFORMATION contents to set

If the UE CAPABILITY INFORMATION is sent upon establishment of an RRC connection, the UE shall

- shall set CN specific capability information into the "NAS message" IE and UTRAN specific capability information to the corresponding information elements according to information stored in the UE.
- include one or more inter-system classmarks into "inter-system message" IEs, according to the requirement given in the "Capability update requirement" IE in the SYSTEM INFORMATION message

If the UE CAPABILITY INFORMATION is sent in response to a UE CAPABILITY ENQUIRY message, the UE shall

- include the UMTS specific UE capability information elements if requested in the "Capability update requirement" IE in the UE CAPABILITY ENQUIRY message.
- include one or more inter-system classmarks into "inter-system message" IEs, according to the requirement given in the "Capability update requirement" IE in the UE CAPABILITY ENQUIRY message

8.1.6.3 Reception of UE CAPABILITY INFORMATION by the UTRAN

Upon reception of a UE CAPABILITY INFORMATION message, the UTRAN shall transmit a UE CAPABILITY INFORMATION CONFIRM message on the downlink DCCH using UM or AM RLC. After the UE CAPABILITY INFORMATION CONFIRM message has been sent, the procedure is complete.

8.1.6.3.1 Message UE CAPABILITY INFORMATION contents to use

- The UTRAN shall store the capability information received from the UE.
- The UTRAN specific capability information elements are stored to be further used for the configuration of UTRAN specific services for the UE.
- The "NAS message" including CN specific capability information is forwarded to the CN.
- The "inter-system message" including the inter-system classmark is stored to be further used for configuration of inter-system measurements and in the execution of inter-system handover.

8.1.6.3.2 Message UE CAPABILITY INFORMATION CONFIRM contents to set

[Editor's note: Currently only a message type IE is included in this message.]

8.1.6.4 Reception of UE CAPABILITY INFORMATION CONFIRM by the UE

Upon reception of a UE CAPABILITY INFORMATION CONFIRM message, the UE shall stop timer T304. It shall then update its register on which UE capabilities it has transmitted to the UTRAN during the current RRC connection.

8.1.6.5 Abnormal case: T304 timeout

Upon expiry of timer T304 and no UE CAPABILITY INFORMATION CONFIRM message has been received, the UE shall check the value of V304 and

- If V304 is smaller or equal than N304, the UE shall retransmit a UE CAPABILITY INFORMATION message, restart timer T3xx and increase counter V304.
- If V304 is greater than N304, the UE shall assume that radio link failure has occurred and initiate the RRC connection re-establishment procedure

8.1.7 UE capability enquiry

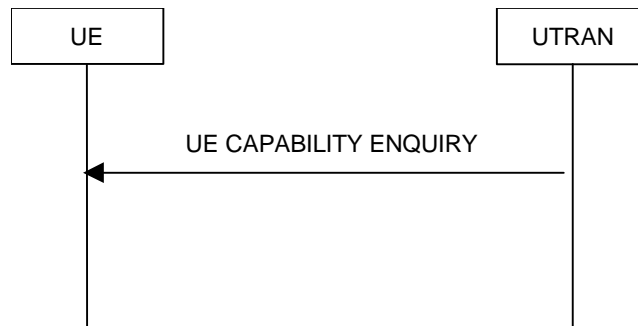


Figure 10. UE capability enquiry procedure, normal flow

8.1.7.1 General

The UE capability enquiry can be used to request the UE to transmit its capability information related to any radio access network that is supported by the UE. In particular, it can be used by the UTRAN to request an update of inter-system capability information from a dual mode terminal.

8.1.7.2 Initiation

The UTRAN initiates the UE capability enquiry procedure, if it needs an update of the UE's UMTS capability information or of its inter-system classmark.

The UTRAN shall transmit the UE CAPABILITY ENQUIRY message on the DCCH using the UM or AM SAP.

8.1.7.2.1 Message UE CAPABILITY ENQUIRY contents to set

The UTRAN shall indicate in the "Capability update requirement" IE, which inter-system classmarks, if any, should be updated, and if it also needs an update of UMTS capability information.

8.1.7.3 Reception of message UE CAPABILITY ENQUIRY by the UE

Upon reception of UE CAPABILITY ENQUIRY, the UE shall initiate the transmission of UE capability information, which is specified in clause 8.1.6.

8.1.7.4 Abnormal case

[Editor's question: Is it useful to specify the UTRAN behaviour in detail for this procedure? This may be covered by the more general rules of handling radio link failure in connected mode.]

8.1.8 Direct transfer

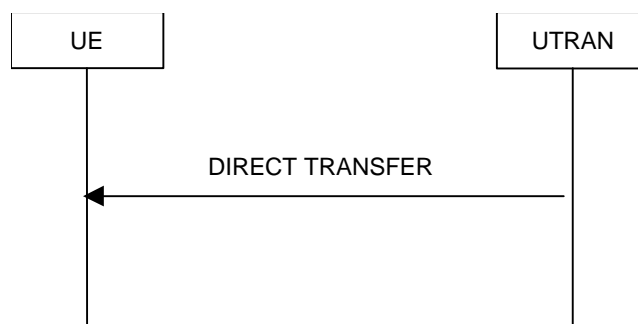


Figure 11. Direct transfer in the downlink, normal flow

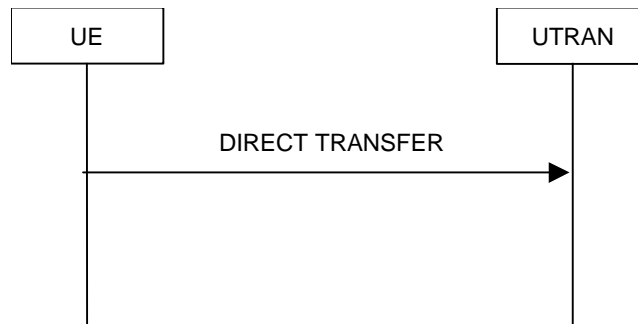


Figure 12. Direct transfer in the uplink, normal flow

8.1.8.1 General

The direct transfer procedure is used in both downlink and uplink to carry all higher layer (NAS) messages over the radio interface. It can also be used to establish and release signalling connections.

8.1.8.2 Initiation of direct transfer procedure in the UE

In the UE, the direct transfer procedure shall be initiated, when the upper layers request a transfer of a NAS message. The UE shall transmit the DIRECT TRANSFER message on the uplink DCCH using AM or UM RLC.

8.1.8.2.1 Message DIRECT TRANSFER (uplink) contents to set

The UE shall set "CN domain identifier" to indicate, which CN node the NAS message is destined to.

In, CELL_FACH state, The UE shall include "Measured results" into the DIRECT TRANSFER message, if the message is sent to establish a signalling connection and if RACH measurement reporting has been requested in the SYSTEM INFORMATION message.

8.1.8.3 Initiation of direct transfer procedure in the UTRAN

In the UTRAN, the direct transfer procedure shall be initiated, when the upper layers request the transfer of a NAS message or the release of a signalling connection.. The UE shall transmit the DIRECT TRANSFER message on the downlink DCCH using AM or UM RLC.

8.1.8.3.1 Message DIRECT TRANSFER (downlink) contents to set

The UTRAN sets "CN domain identifier" to indicate, which CN domain the NAS message is originated from.

8.1.8.4 Reception of DIRECT TRANSFER in the UTRAN

Upon reception of the DIRECT TRANSFER message the NAS message shall be routed to the correct CN domain.

8.1.8.4.1 Message DIRECT TRANSFER (uplink) contents to use

The UTRAN routes the contents of the "NAS message" IE to the correct CN domain using the "CN domain identifier" IE.

If the "measured results" IE is present in the message, the UTRAN shall extract the contents to be used for radio resource control.

8.1.8.5 Reception of DIRECT TRANSFER by the UE

Upon reception of the DIRECT TRANSFER message, the UE RRC shall

- route the contents of the higher layer PDU, if any, to the correct higher layer entity.
- route the signalling connection release indication, if any, to the correct higher layer entity.

8.1.8.5.1 Message DIRECT TRANSFER (downlink) contents to use

The UE RRC routes the contents of the "NAS message" IE to the correct higher layer entity using the "CN domain identifier" IE.

8.1.8.6 Abnormal cases

[Delivery of DIRECT TRANSFER messages is guaranteed by the the higher layers and, optionally, the acknowledged service in the RLC layer.]

8.1.9 Connected mode paging on DCCH

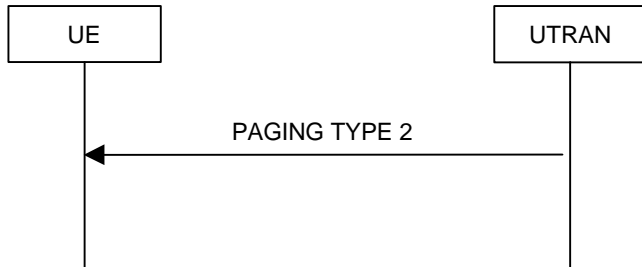


Figure 13. Connected mode paging on DCCH

8.1.9.1 General

This procedure is used to transmit paging information to selected UEs in connected mode in states CELL_DCH and CELL_FACH. Upper layers in the network may request paging, to e.g. establish a signalling connection.

8.1.9.2 Initiation

Upper layers in the network may request paging of an UE. For an UE in states CELL_DCH or CELL_FACH, UTRAN initiates the procedure by transmitting a PAGING TYPE 2 message on the DCCH.

8.1.9.2.1 Message PAGING TYPE 2 contents to set

The IE Paging cause shall be set according to indications from the upper layers.

8.1.9.3 Reception of message PAGING TYPE 2 by the UE

The UE shall indicate paging and forward the paging cause to the upper layer entity indicated by the CN domain identity.

8.1.10 Security mode control

<current description in 25.331 remains>

8.2 Radio Bearer control procedures

8.2.1 Radio bearer establishment

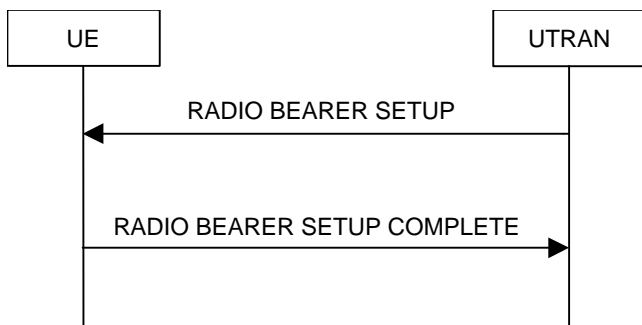


Figure 14. Radio Bearer Establishment, normal case

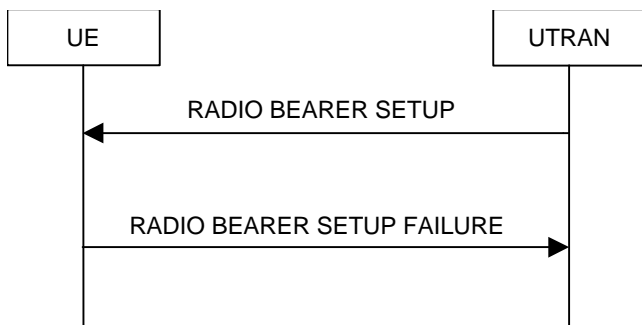


Figure 15. Radio Bearer Establishment, UE reverts to old configuration

8.2.1.1 General

The purpose with this procedure is to establish new radio bearer(s).

8.2.1.2 Initiation

The upper layer in the network may request an establishment of radio bearer(s).

UTRAN shall transmit a RADIO BEARER SETUP message on the downlink DCCH using AM or UM RLC, and start timer T353.

8.2.1.2.1 Message RADIO BEARER SETUP contents to set

If transport channels are added, reconfigured or deleted in uplink and/or downlink, UTRAN shall

- Set TFCS according to the new transport channel(s)

If activation time is used this time shall not be set to a larger value than T353.

UTRAN should take the UE capabilities into account when setting the new configuration.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.2.1.3 Reception of RADIO BEARER SETUP by the UE

Upon reception of a RADIO BEARER SETUP message the UE shall perform actions according to 8.2.1.3.1 and transmit a RADIO BEARER SETUP COMPLETE message on the uplink DCCH using AM RLC. When the RADIO BEARER SETUP COMPLETE message is sent the procedure ends.

8.2.1.3.1 Message RADIO BEARER SETUP contents to use

The UE shall

- For the new radio bearer(s), use the multiplexing option applicable for the transport channels used according to the IE RB multiplexing info”
- For radio bearer(s) existing prior to the message, use the multiplexing option applicable for the transport channels used, according to their IE RB multiplexing info”or their previously stored multiplexing options.
- Configure MAC multiplexing if that is needed in order to use said transport channel(s).
- Use MAC logical channel priority when selecting TFC in MAC.

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common transport channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info”nor Uplink DPCH info”is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info”nor Downlink DPCH info”is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS”is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.1.3.2 Message RADIO BEARER SETUP COMPLETE contents to set FFS

8.2.1.4 Abnormal case: Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall

- Transmit a RADIO BEARER SETUP FAILURE message on the DCCH using AM RLC.

8.2.1.4.1 Message RADIO BEARER SETUP FAILURE contents to set

The UE shall set the cause value in IE failure cause”to ‘configuration unacceptable’”

8.2.1.5 Abnormal cases: Physical channel failure

If the UE failed to establish the physical channel(s) indicated in the message RADIO BEARER SETUP the UE shall

- Revert to the configuration prior to the reception of the RADIO BEARER SETUP message (old configuration) and transmit a RADIO BEARER SETUP FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no radio bearer establishment attempt had occurred.

Criteria to be fulfilled for having a physical channel established are described in subclause 8.5.4.

If the UE is unable to revert to the old configuration or if used, the activation time has expired, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.2.1.5.1 Message RADIO BEARER SETUP FAILURE contents to set

The UE shall set the cause value in IE failure cause”to ‘physical channel failure’”

8.2.1.6 Reception of RADIO BEARER SETUP COMPLETE by the UTRAN

When UTRAN has received the RADIO BEARER SETUP COMPLETE message, UTRAN may delete any old configuration. Timer T353 is stopped and the procedure ends on the UTRAN side.

8.2.1.7 Reception of RADIO BEARER SETUP FAILURE by the UTRAN

When UTRAN has received the RADIO BEARER SETUP FAILURE message, UTRAN may delete the new configuration. Timer T353 is stopped and the procedure ends on the UTRAN side. Upper layers should be notified of the failure.

8.2.1.8 Abnormal case: T353 timeout

Upon expiry of timer T353 and no RADIO BEARER SETUP COMPLETE or RADIO BEARER SETUP FAILURE message has been received, the UTRAN may delete the old and new configuration. All UE dedicated resources may then be cleared, unless the UE requests a re-establishment of the RRC connection.

8.2.2 Radio bearer reconfiguration

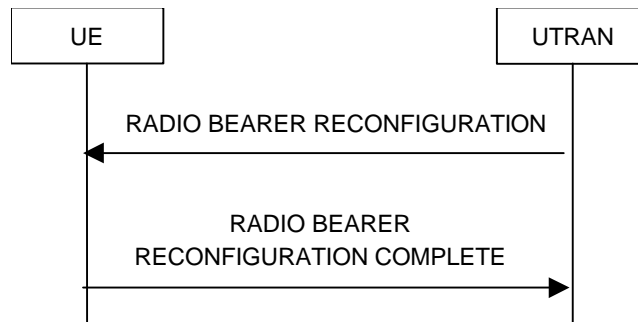


Figure 16. Radio bearer reconfiguration, normal flow

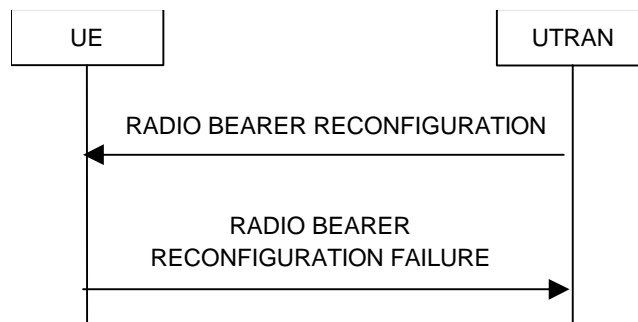


Figure 17. Radio bearer reconfiguration, failure case

8.2.2.1 General

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer or the signalling link to reflect a change in QoS.

8.2.2.2 Initiation

The UTRAN shall transmit a RADIO BEARER RECONFIGURATION message on the downlink DCCH using AM or UM RLC, and start timer T355.

8.2.2.2.1 Message RADIO BEARER RECONFIGURATION contents to set

If transport channels are added, reconfigured or deleted in uplink and/or downlink, the UTRAN shall

- Set TFCS according to the new transport channel(s)

If activation time is used this time shall not be set to a larger value than T355.

UTRAN should take the UE capabilities into account when setting the new configuration.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.2.2.3 Reception of RADIO BEARER RECONFIGURATION by the UE in CELL_DCH state

Upon reception of a RADIO BEARER RECONFIGURATION message in CELL_DCH state, the UE shall perform actions according to 8.2.2.3.1 and transmit a RADIO BEARER RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the RADIO BEARER RECONFIGURATION COMPLETE message is sent, the procedure ends.

8.2.2.3.1 Message RADIO BEARER RECONFIGURATION contents to use in CELL_DCH state

The UE shall

- For each reconfigured radio bearer or signalling link, use the multiplexing option applicable for the transport channels used according to the IE RB multiplexing info"
- Configure MAC multiplexing if that is needed in order to use said transport channel(s).
- Use MAC logical channel priority when selecting TFC in MAC.

If neither the IEs PRACH info"nor Uplink DPCH info" is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info"nor Downlink DPCH info" is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS" is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.2.3.2 Message RADIO BEARER RECONFIGURATION COMPLETE contents to set in CELL_DCH state

FFS.

8.2.2.4 Reception of RADIO BEARER RECONFIGURATION by the UE in CELL_FACH state

Upon reception of a RADIO BEARER RECONFIGURATION message in CELL_DCH state, the UE shall perform actions according to 8.2.2.4.1 and transmit a RADIO BEARER RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the RADIO BEARER RECONFIGURATION COMPLETE message is sent, the procedure ends.

8.2.2.4.1 Message RADIO BEARER RECONFIGURATION contents to use in CELL_FACH state.

The UE shall

- For each reconfigured radio bearer or signalling link, use the multiplexing option applicable for the transport channels used according to the IE RB multiplexing info"
- Configure MAC multiplexing if that is needed in order to use said transport channel(s).
- Use MAC logical channel priority when selecting TFC in MAC.

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common transport channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info"nor Uplink DPCH info" is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink

If neither the IEs Secondary CCPCH info"nor Downlink DPCH info" is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS" is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.2.4.2 Message RADIO BEARER RECONFIGURATION COMPLETE contents to set in CELL_FACH state

FFS.

8.2.2.5 Reception of RADIO BEARER RECONFIGURATION COMPLETE by the UTRAN

When UTRAN has received the RADIO BEARER RECONFIGURATION COMPLETE message, UTRAN may delete the old configuration. Timer T355 is stopped and the procedure ends on the UTRAN side.

8.2.2.6 Abnormal case: Unsupported configuration in the UE

If the UE instructs the UE to use a configuration which it does not support, the UE shall

- transmit a RADIO BEARER RECONFIGURATION FAILURE message on the DCCH using AM RLC.

8.2.2.6.1 Message RADIO BEARER RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "configuration unacceptable".

8.2.2.7 Abnormal case: Physical channel failure

If the UE failed to establish the physical channel(s) indicated in the message RADIO BEARER RECONFIGURATION the UE shall

- Revert to the configuration prior to the reception of the RADIO BEARER RECONFIGURATION message (old configuration) and transmit a RADIO BEARER RECONFIGURATION FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no radio bearer reconfiguration attempt had occurred.

Criteria to be fulfilled for having a physical channel established are described in subclause 8.5.4.

If the UE is unable to revert to the old configuration or if used, the activation time has expired, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.2.2.7.1 Message RADIO BEARER RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "physical channel failure".

8.2.2.8 Reception of RADIO BEARER RECONFIGURATION FAILURE by the UTRAN

When UTRAN has received the RADIO BEARER RECONFIGURATION FAILURE message, UTRAN may delete the new configuration. Timer T355 is stopped and the procedure ends on the UTRAN side. Upper layers should be notified of the failure.

8.2.2.9 Abnormal case: T355 timeout in CELL_DCH_state

Upon expiry of timer T355 in CELL_DCH state and no RADIO BEARER RECONFIGURATION COMPLETE or RADIO BEARER RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE requests a re-establishment of the RRC connection, before all UE dedicated resources have been cleared, the new configuration may be re-assigned in the re-establishment procedure.

8.2.2.10 Abnormal case: T355 timeout in CELL_FACH state

Upon expiry of timer T355 and no RADIO BEARER RECONFIGURATION COMPLETE or RADIO BEARER RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE makes a cell update before all UE dedicated resources have been cleared, the configuration procedure can be restarted.

8.2.3 Radio bearer release

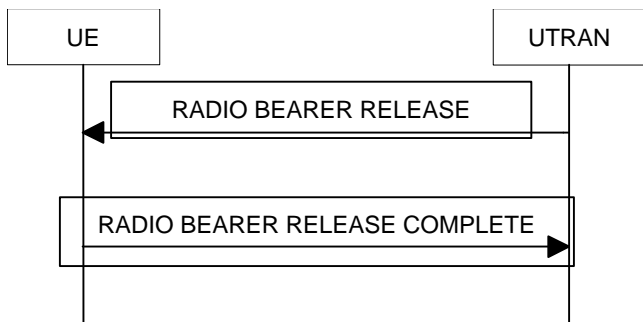


Figure 18. Radio Bearer Release, normal case

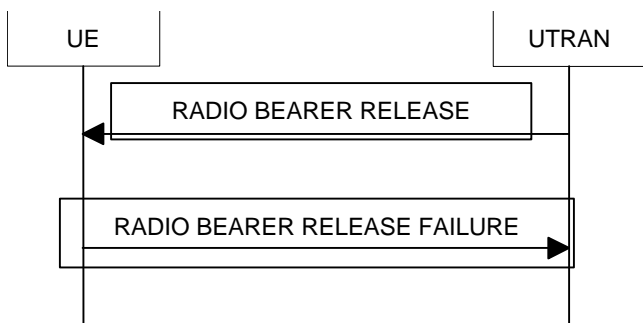


Figure 19. Radio Bearer Release, UE reverts to old configuration

8.2.3.1 Purpose

The purpose with this procedure is to release existing radio bearer(s).

8.2.3.2 Initiation

The upper layer in the network may request a release of radio bearer(s).

UTRAN shall transmit a RADIO BEARER RELEASE message on the downlink DCCH using AM or UM RLC, and start timer T354.

8.2.3.2.1 Message RADIO BEARER RELEASE contents to set

If transport channels are added, reconfigured or deleted in uplink and/or downlink, UTRAN shall

- Set TFCS according to the new transport channel(s)

If activation time is used this time shall not be set to a larger value than T354.

UTRAN should take the UE capabilities into account when setting the new configuration.

[Editor’s note: Other IEs are included and set according to selection by the UTRAN.]

8.2.3.3 Reception of RADIO BEARER RELEASE by the UE

Upon reception of a RADIO BEARER RELEASE message the UE shall perform actions according to 8.2.3.3.1 and transmit a RADIO BEARER RELEASE COMPLETE message on the uplink DCCH using AM RLC. When the RADIO BEARER RELEASE COMPLETE message is sent the procedure ends.

8.2.3.3.1 Message RADIO BEARER RELEASE contents to use

The UE shall

- For the released radio bearer(s), delete all stored multiplexing options
- For all remaining radio bearer(s), use the multiplexing option applicable for the transport channels used according to their IE RB multiplexing info or their previously stored multiplexing options.

- Configure MAC multiplexing if that is needed in order to use said transport channel(s).
- Use MAC logical channel priority when selecting TFC in MAC.

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common transport channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.3.3.2 Message RADIO BEARER RELEASE COMPLETE contents to set FFS

8.2.3.4 Abnormal case: Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall

- Transmit a RADIO BEARER RELEASE FAILURE message on the DCCH using AM RLC.

8.2.3.4.1 Message RADIO BEARER RELEASE FAILURE contents to set

The UE shall set the cause value in IE failure cause to 'configuration unacceptable'.

8.2.3.5 Abnormal cases: Physical channel failure

If the UE failed to establish the physical channel(s) indicated in the message RADIO BEARER RELEASE the UE shall

- Revert to the configuration prior to the reception of the RADIO BEARER RELEASE message (old configuration) and transmit a RADIO BEARER RELEASE FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no radio bearer release attempt had occurred.

Criteria to be fulfilled for having a physical channel established are described in subclause 8.5.4.

If the UE is unable to revert to the old configuration or if used, the activation time has expired, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.2.3.5.1 Message RADIO BEARER RELEASE FAILURE contents to set

The UE shall set the cause value in IE failure cause to 'DPCH establishment failure'.

8.2.3.6 Reception of RADIO BEARER RELEASE COMPLETE by the UTRAN

When UTRAN has received the RADIO BEARER RELEASE COMPLETE message, UTRAN may delete any old configuration. Timer T354 is stopped and the procedure ends on the UTRAN side.

8.2.3.7 Reception of RADIO BEARER RELEASE FAILURE by the UTRAN

When UTRAN has received the RADIO BEARER RELEASE FAILURE message, UTRAN may delete the new configuration. Timer T354 is stopped and the procedure ends on the UTRAN side. Upper layers should be notified of the failure.

8.2.3.8 Abnormal case: T354 timeout

Upon expiry of timer T354 and no RADIO BEARER RELEASE COMPLETE or RADIO BEARER RELEASE FAILURE message has been received, the UTRAN may delete the old and new configuration. All UE dedicated resources may then be cleared, unless the UE requests a re-establishment of the RRC connection.

8.2.4 Transport channel reconfiguration

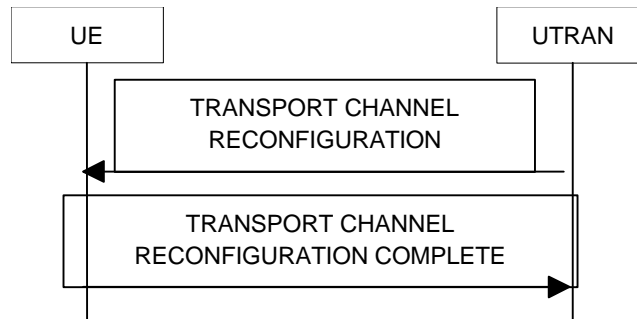


Figure 20. Transport channel reconfiguration, normal flow

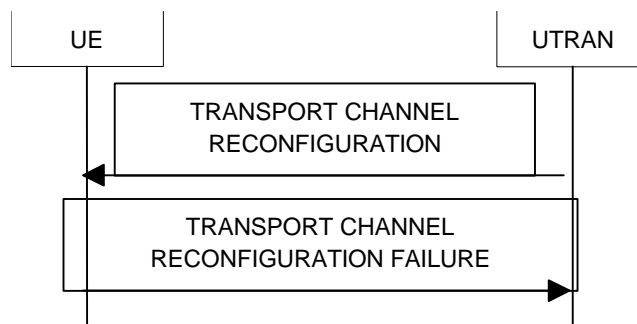


Figure 21. Transport channel reconfiguration, failure case

8.2.4.1 General

The transport channel reconfiguration procedure is used to reconfigure transport channel parameters.

8.2.4.2 Initiation

The UTRAN shall transmit a TRANSPORT CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC, and start timer T356.

8.2.4.2.1 Message TRANSPORT CHANNEL RECONFIGURATION contents to set

If transport channels are added, reconfigured or deleted in uplink and/or downlink, the UTRAN shall

- Set TFCS according to the new transport channel(s)

If activation time is used this time shall not be set to a larger value than T356.

UTRAN should take the UE capabilities into account when setting the new configuration.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.2.4.3 Reception of TRANSPORT CHANNEL RECONFIGURATION by the UE in CELL_DCH state

Upon reception of a TRANSPORT CHANNEL RECONFIGURATION message in CELL_DCH state, the UE shall perform actions according to 8.2.4.3.1 and transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message is sent, the procedure ends.

8.2.4.3.1 Message TRANSPORT CHANNEL RECONFIGURATION contents to use in CELL_DCH state

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.4.3.2 Message TRANSPORT CHANNEL RECONFIGURATION COMPLETE contents to set in CELL_DCH state

FFS.

8.2.4.4 Reception of TRANSPORT CHANNEL RECONFIGURATION by the UE in CELL_FACH state

Upon reception of a TRANSPORT CHANNEL RECONFIGURATION message in CELL_FACH state, the UE shall perform actions according to 8.2.4.4.1 and transmit a TRANSPORT CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message is sent, the procedure ends.

8.2.4.4.1 Message TRANSPORT CHANNEL RECONFIGURATION contents to use in CELL_FACH state

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common transport channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.4.4.2 Message TRANSPORT CHANNEL RECONFIGURATION COMPLETE contents to set in CELL_FACH state

FFS.

8.2.4.5 Reception of TRANSPORT CHANNEL RECONFIGURATION COMPLETE by the UTRAN

When UTRAN has received the TRANSPORT CHANNEL RECONFIGURATION COMPLETE message, UTRAN may delete any old configuration. Timer T356 is stopped and the procedure ends on the UTRAN side.

UTRAN may delete the C-RNTI of the UE if the procedure caused the UE to leave the CELL_FACH state.

8.2.4.6 Abnormal case: Unsupported configuration in the UE

If the UE instructs the UE to use a configuration which it does not support, the UE shall

- transmit a TRANSPORT CHANNEL RECONFIGURATION FAILURE message on the DCCH using AM RLC.

8.2.4.6.1 Message TRANSPORT CHANNEL RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "configuration unacceptable".

8.2.4.7 Abnormal case: Physical channel failure

If the UE failed to establish the physical channel(s) indicated in the message TRANSPORT CHANNEL RECONFIGURATION the UE shall

- Revert to the configuration prior to the reception of the TRANSPORT CHANNEL RECONFIGURATION message (old configuration) and transmit a TRANSPORT CHANNEL RECONFIGURATION FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no transport channel reconfiguration attempt had occurred.

Criteria to be fulfilled for having a physical channel established are described in subclause 8.5.4.

If the UE is unable to revert to the old configuration or if used, the activation time has expired, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.2.4.7.1 Message TRANSPORT CHANNEL RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "physical channel failure".

8.2.4.8 Reception of TRANSPORT CHANNEL RECONFIGURATION FAILURE by the UTRAN

When UTRAN has received the RADIO BEARER RECONFIGURATION FAILURE message, UTRAN may delete the new configuration. Timer T356 is stopped and the procedure ends on the UTRAN side. Upper layers should be notified of the failure.

8.2.4.9 Abnormal case: T356 timeout in CELL_DCH state

Upon expiry of timer T356 and no TRANSPORT CHANNEL RECONFIGURATION COMPLETE or TRANSPORT CHANNEL RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE requests a re-establishment of the RRC connection, before all UE dedicated resources have been cleared, the new configuration may be re-assigned in the re-establishment procedure.

8.2.4.10 Abnormal case: T356 timeout in CELL_FACH state

Upon expiry of timer T356 and no TRANSPORT CHANNEL RECONFIGURATION COMPLETE or TRANSPORT CHANNEL RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE makes a cell update before all UE dedicated resources have been cleared, the configuration procedure can be restarted.

8.2.5 Transport format combination control

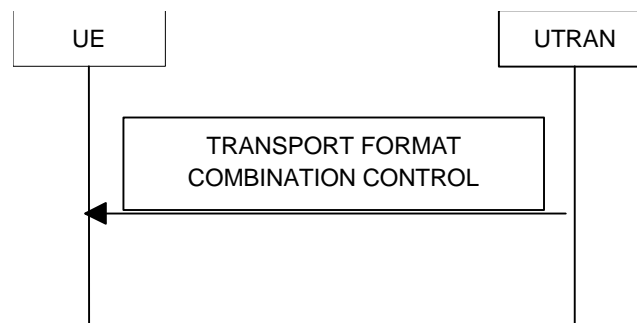


Figure 22. Transport format combination control, normal flow

8.2.5.1 General

The transport format combination control procedure is used to control the allowed uplink transport format combinations within the transport format combination set.

8.2.5.2 Initiation

The UTRAN shall transmit the TRANSPORT FORMAT COMBINATION CONTROL message on the downlink DCCH using AM or UM RLC.

8.2.5.2.1 Message TRANSPORT CHANNEL COMBINATION CONTROL contents to set

To restrict allowed transport format combinations, the UTRAN shall set the allowed TFCs in the "TFC subset" IE.

To remove previous restrictions of allowed transport format combination, the UTRAN shall set "full transport format combination set" in the "TFC subset" IE.

8.2.5.3 Reception of TRANSPORT CHANNEL COMBINATION CONTROL by the UE

Upon reception of the TRANSPORT CHANNEL COMBINATION CONTROL message, the UE shall configure the allowed transport format combinations as defined in chapter 8.5.7.5.3.

8.2.6 Physical channel reconfiguration

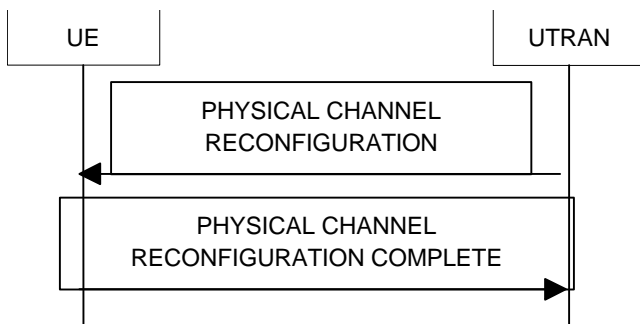


Figure 23. Physical channel reconfiguration, normal flow

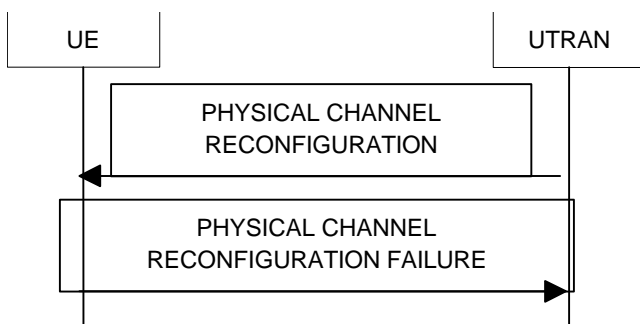


Figure 24. Physical channel reconfiguration, failure case

8.2.6.1 General

The physical channel reconfiguration procedure is used to establish, reconfigure and release physical channels.

8.2.6.2 Initiation

The UTRAN shall transmit a PHYSICAL CHANNEL RECONFIGURATION message on the downlink DCCH using AM or UM RLC, and start timer T357.

8.2.6.2.1 Message PHYSICAL CHANNEL RECONFIGURATION contents to set

If activation time is used this time shall not be set to a larger value than T357.

UTRAN should take the UE capabilities into account when setting the new configuration.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.2.6.3 Reception of PHYSICAL CHANNEL RECONFIGURATION by the UE in CELL_DCH state

Upon reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall perform actions according to 8.2.6.3.1 and transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message is sent, the procedure ends.

8.2.6.3.1 Message PHYSICAL CHANNEL RECONFIGURATION contents to use in CELL_DCH state

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common physical channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the physical channel(s) applicable for the physical channel types that is used. If neither the IE TFS is included or previously stored in the UE for that physical channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.6.4 Reception of PHYSICAL CHANNEL RECONFIGURATION by the UE in CELL_FACH state

Upon reception of a PHYSICAL CHANNEL RECONFIGURATION message, the UE shall read the IE URA update

If the IE URA update indicator is set to True, the UE shall

- Perform actions according to 8.2.6.4.1
- Transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC
- When the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message has been successfully transmitted, the UE shall delete its C-RNTI, move to URA_PCH state and perform actions according to X.X.X [Editor's note: where is this reference?] and start updating its location on the URA level. This ends the procedure.

If the IE URA update indicator is set to False, the UE shall

- Perform actions according to 8.2.6.4.1 and transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH using AM RLC. When the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message is sent, the procedure ends.

[Editor's note: There is a need to distinguish between transition to CELL_PCH and URA_PCH. In the text above only the URA_PCH is covered.]

8.2.6.4.1 Message PHYSICAL CHANNEL RECONFIGURATION contents to use in CELL_FACH state

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common physical channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the physical channel(s) applicable for the physical channel types that is used. If neither the IE TFS is included or previously stored in the UE for that physical channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.2.6.4.2 Message PHYSICAL CHANNEL RECONFIGURATION COMPLETE contents to set FFS.

8.2.6.5 Reception of PHYSICAL CHANNEL RECONFIGURATION COMPLETE by the UTRAN

When UTRAN has received the PHYSICAL CHANNEL RECONFIGURATION COMPLETE message, UTRAN may delete any old configuration. Timer T357 is stopped and the procedure ends on the UTRAN side.

UTRAN may delete the C-RNTI of the UE if the procedure caused the UE to leave the CELL_FACH state.

8.2.6.6 Abnormal case: Unsupported configuration in the UE

If the UE instructs the UE to use a configuration which it does not support, the UE shall

- transmit a PHYSICAL CHANNEL RECONFIGURATION FAILURE message on the DCCH using AM RLC.

8.2.6.6.1 Message PHYSICAL CHANNEL RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "configuration unacceptable".

8.2.6.7 Abnormal case: Physical channel failure

If the UE failed to establish the physical channel(s) indicated in the message PHYSICAL CHANNEL RECONFIGURATION the UE shall

- Revert to the configuration prior to the reception of the PHYSICAL CHANNEL RECONFIGURATION message (old configuration) and transmit a PHYSICAL CHANNEL RECONFIGURATION FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no physical channel reconfiguration attempt had occurred.

Criteria to be fulfilled for having a physical channel established are described in subclause 8.5.4.

If the UE is unable to revert to the old configuration or if used, the activation time has expired, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.2.6.7.1 Message PHYSICAL CHANNEL RECONFIGURATION FAILURE contents to set

The UE shall set the cause value in IE "failure cause" to "physical channel failure".

8.2.6.8 Reception of PHYSICAL CHANNEL RECONFIGURATION FAILURE by the UTRAN

When UTRAN has received the RADIO BEARER RECONFIGURATION FAILURE message, UTRAN may delete the new configuration. Timer T357 is stopped and the procedure ends on the UTRAN side. Upper layers should be notified of the failure.

8.2.6.9 Abnormal case: T357 timeout in CELL_DCH state

Upon expiry of timer T357 and no PHYSICAL CHANNEL RECONFIGURATION COMPLETE or PHYSICAL CHANNEL RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE requests a re-establishment of the RRC connection, before all UE dedicated resources have been cleared, the new configuration may be re-assigned in the re-establishment procedure.

8.2.6.10 Abnormal case: T357 timeout in CELL_FACH state

Upon expiry of timer T357 and no PHYSICAL CHANNEL RECONFIGURATION COMPLETE or PHYSICAL CHANNEL RECONFIGURATION FAILURE message has been received, the UTRAN may delete the old and new configuration. If the UE makes a cell update before all UE dedicated resources have been cleared, the configuration procedure can be restarted.

8.2.7 Downlink power control

<Note: the current description in 25.331 is kept>

8.3 RRC connection mobility procedures

8.3.1 Cell update

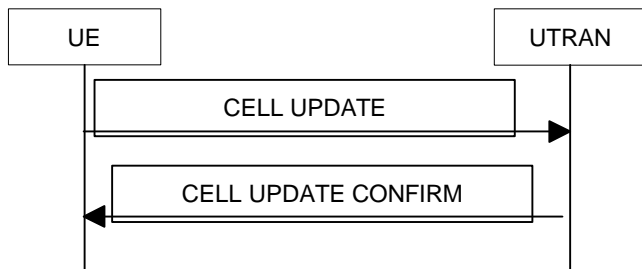


Figure 25. Cell update procedure, basic flow

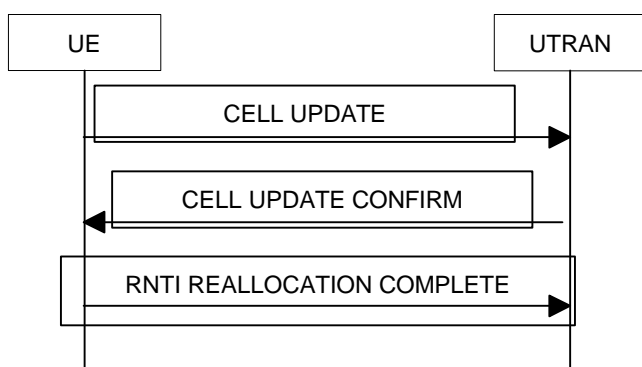


Figure 26. Cell update procedure with RNTI reallocation

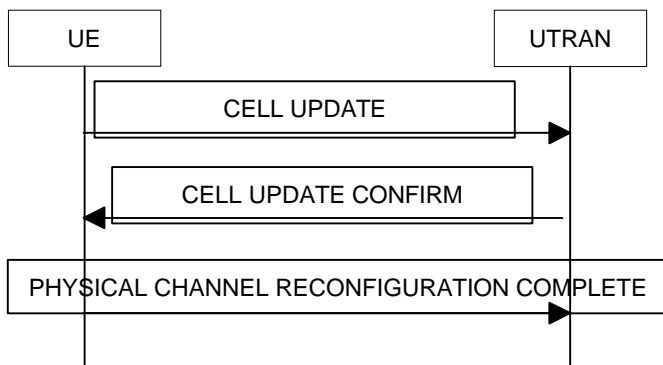


Figure 27. Cell update procedure with physical channel reconfiguration

8.3.1.1 General

The main purpose of the cell update procedure is to update UTRAN with the current cell of the UE after cell reselection in CELL_FACH or CELL_PCH state. It may also be used for supervision of the RRC connection, even if no cell reselection takes place. The cell update procedure can also be used to re-configure the c-plane AM_RLC. UE can use CELL UPDATE message to notify the unrecoverable error in AM_RLC on c-plane [Note 1].

[Editor's note: Physical channel reconfiguration complete is only used when common channels are configured (doesn't apply to dedicated channels)]

8.3.1.2 Initiation

8.3.1.2.1 Cell update due to cell reselection

When the UE is in CELL_FACH or CELL_PCH state and originates from an UTRA cell and makes a successful reselection of another UTRA cell, it shall

- move to CELL_FACH state, if not already in that state
- transmit a CELL UPDATE message on the uplink CCCH,
- start timer T302 and reset counter V302

The IE 'cell update cause' shall be set to 'cell reselection.'

8.3.1.2.2 Cell update due to periodical cell update

When the UE is in CELL_FACH or CELL_PCH state, the UE shall perform periodic cell updating according to the system information. The timer T305 shall be reset when entering CELL_FACH or CELL_PCH state and after the completion of the Cell Update Procedure in CELL_FACH or CELL_PCH state.

Upon expiry of timer T305 and the UE detects that it is in the service area, the UE shall

- move to CELL_FACH state, if not already in that state
- transmit a CELL UPDATE message on the uplink CCCH,
- start timer T302 and reset counter V302

The IE 'Cell update cause' shall be set to 'periodic cell update.'

8.3.1.2.3 Cell update due to UL data transmission

When the UE is in CELL_PCH or URA_PCH state, the UE shall perform cell updating if the UE wants to transmit UL data. The timer T305 shall be reset after the completion of the Cell Update Procedure in CELL_FACH state.

The UE shall

- move to CELL_FACH state, if not already in that state
- transmit a CELL UPDATE message on the uplink CCCH,
- start timer T302 and reset counter V302

The IE 'Cell update cause' shall be set to 'UL data transmission.'

8.3.1.2.4 Cell update due to paging response

When the UE is in CELL_PCH and URA_PCH state, the UE shall perform a cell update procedure, when receiving a PAGING TYPE 1 message as in subclause 8.1.2.3. The timer T305 shall be reset after the completion of the Cell Update Procedure in CELL_FACH state.

The UE shall

- move to CELL_FACH state
- transmit a CELL UPDATE message on the uplink CCCH,
- start timer T302 and reset counter V302

The IE 'Cell update cause' shall be set to 'paging response.'

8.3.1.3 Abnormal cases: T305 expiry and the UE detects that it is out of service area

When the T305 expires and the UE detects that it is out of service area which is specified in subclause 8.5.5, the UE shall

- start timer T307
- search for cell to camp

8.3.1.3.1 Re-entering of service area

When the UE detects that it is no longer out of service area before the expiry of T307, the UE shall

- transmit Cell Update message on the uplink CCCH

8.3.1.3.2 Expiry of timer T307

- When the T307 expires, the UE shall move to idle mode. UE shall release all dedicated resources and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.3.1.3.3 Message CELL UPDATE contents to set

The IE Cell update cause shall be set to the event causing the transmission of the CELL UPDATE message, see subclauses 8.3.1.2.1, 8.3.1.2.2, 8.3.1.2.3 and 8.3.1.2.4.

The IE AM_RLC error indication shall be set when the UE detects unrecoverable error in AM_RLC error on c-plane.

The UE shall include an intra-frequency measurement report in the CELL UPDATE message, when instructed to do so in the system information.

8.3.1.4 Reception of CELL UPDATE by the UTRAN

When the UTRAN receives a CELL UPDATE message, it shall transmit a CELL UPDATE CONFIRM message on the downlink DCCH.

When the UTRAN detects AM_RLC error, it waits for CELL UPDATE message from the UE and when the UTRAN receives it, UTRAN commands the UE to re-configure AM_RLC by sending CELL UPDATE CONFIRM message. This procedure can be used not only in the case of AM_RLC error but also in the case that UTRAN wants to re-configure AM_RLC for other reasons such as in the case when SRNC Relocation is initiated without keeping RLC status (current counters) from old SRNC to new SRNC.

When the UTRAN receives an IE Cell update cause which is set to UL data transmission or paging response, the UE and the UTRAN states shall be transit to CELL_FACH state.

When the UTRAN detects the frequent Cell Updating with no data transmission on UL and DL, the UE and the UTRAN states may be transit to URA_PCH state.

8.3.1.4.1 Message CELL UPDATE CONFIRM contents to set

UTRAN shall use the same S-RNTI and SRNC identity for the transmission of CELL UPDATE CONFIRM as the values of the IEs S-RNTI and SRNC identity in the received message CELL UPDATE.

UTRAN may allocate a new C-RNTI and/or a new S-RNTI plus SRNC identity for the UE. In that case UTRAN shall include those new identities in the IEs new C-RNTI, new S-RNTI and new SRNC identity, and start timer T361.

UTRAN may allocate new PRACH and/or Secondary CCPCH for FACH to the UE. In that case UTRAN shall include the IEs PRACH info and/or Secondary CCPCH info. UTRAN shall start timer T357. When the UTRAN receives an IE Cell update cause which is set to UL data transmission, the UTRAN shall include these parameters.

UTRAN may set URA update indicator and optionally URA Id when the UTRAN orders the UE to change its state to URA_PCH state.

8.3.1.5 Reception of CELL UPDATE CONFIRM by the UE

- When the UE receives a CELL UPDATE CONFIRM message on the downlink DCCH, it shall stop timer T302 and restart timer T305

8.3.1.5.1 Message CELL UPDATE CONFIRM contents to use

If the CELL UPDATE CONFIRM message includes the IEs new C-RNTI and optionally new S-RNTI and new SRNC

- update its identities and transmit an RNTI REALLOCATION COMPLETE message on the uplink DCCH. The procedure ends when the UE has transmitted that message and the UE shall go back to CELL_PCH state and delete its C-RNTI if the cell update procedure was initiated from that state and the IE Cell update cause in CELL UPDATE message was not set to UL data transmission nor paging response. The UE shall transit to CELL_FACH state if the IE Cell update cause in CELL UPDATE message was set to UL data transmission or paging response.

If the CELL UPDATE CONFIRM message includes the IE URA update indicator, the UE shall

- enter URA_PCH state, after all other possible actions. If the CELL UPDATE CONFIRM message also includes the IE URA-Id the UE shall store this URA identity.

If the CELL UPDATE CONFIRM message includes the IEs PRACH info and/or Secondary CCPCH info, but not the IEs new C-RNTI, new S-RNTI nor new SRNC identity, the UE shall

- Perform the actions stated in subclauses 8.5.7.6.2 and 8.5.7.6.3.

- transmit a PHYSICAL CHANNEL RECONFIGURATION COMPLETE message on the uplink DCCH. The procedure ends when the UE has transmitted that message and the UE shall go back to CELL_PCH state and delete its C-RNTI if the cell update procedure was initiated from that state and the IE Cell update cause in CELL UPDATE message was not set to UL data transmission or paging response. The UE shall transit to CELL_FACH state if the IE Cell update cause in CELL UPDATE message was set to UL data transmission or paging response.

If the CELL UPDATE CONFIRM message includes the IEs PRACH info and/or Secondary CCPCH info, and at least one of the IEs new C-RNTI, new S-RNTI or new SRNC identity, the UE shall

- Perform the applicable actions stated in subclause 8.5.7.

If the CELL UPDATE CONFIRM message includes the IEs CN domain identity and NAS system information, the UE shall forward the content of the IE to the non-access stratum entity of the UE indicated by the IE CN domain identity.

If the CELL UPDATE CONFIRM message includes neither the IEs PRACH info, Secondary CCPCH info, new C-RNTI, new S-RNTI nor new SRNC identity, the procedure ends and the UE shall go back to CELL_PCH state and delete its C-RNTI if the cell update procedure was initiated from that state.

8.3.1.6 Abnormal cases: T302 expiry or cell reselection

- Upon expiry of timer T302, and/or
 - upon reselection of another UTRA cell when waiting for the CELL UPDATE CONFIRM message,
- the UE shall check the value of V302 and
- If V302 is smaller or equal than N302, the UE shall retransmit a CELL UPDATE message on the uplink CCCH, restart timer T302 and increase counter V302. The IE Cell update cause shall be set to the event causing the transmission of the CELL UPDATE message, see subclauses 8.3.1.2.1, 8.3.1.2.2, 8.3.1.2.3 and 8.3.1.2.4.
 - If V302 is greater than N302, the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.3.1.7 Reception of RNTI REALLOCATION COMPLETE by the UTRAN

See subclause 8.3.3.4.

8.3.1.8 Reception of PHYSICAL CHANNEL RECONFIGURATION COMPLETE by the UTRAN

FFS

8.3.1.9 Abnormal case: T357 expiry

FFS

8.3.2 URA update

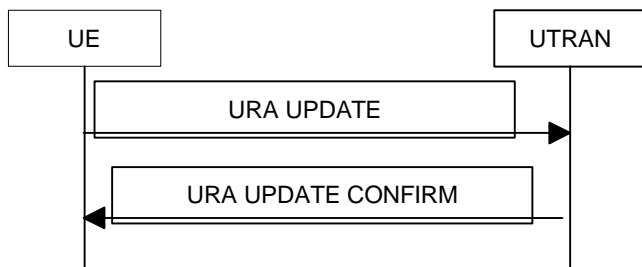


Figure 28. URA update procedure, basic flow

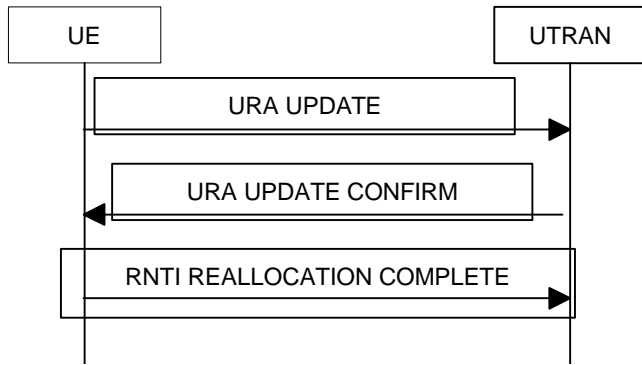


Figure 29. URA update procedure with RNTI reallocation

8.3.2.1 General

The main purpose of the URA update procedure is to update UTRAN with the current URA of the UE after URA reselection in URA_PCH state. It may also be used for supervision of the RRC connection, even if no URA reselection takes place. UTRAN registration areas may be hierarchical to avoid excessive signalling. This means that several URA identifiers may be broadcast in one cell and that different UEs in one cell may reside in different URAs. A UE in URA_PCH state shall always have one and only one valid URA. The URA UPDATE CONFIRM message may also contain new NAS system information.

8.3.2.2 Initiation

8.3.2.2.1 URA update due to URA reselection

When the UE is in URA_PCH state and the current URA assigned to the UE is not present in the list of URA IDs broadcast in a cell,

, it shall

- temporarily store the list of URA IDs broadcasted in a cell
- move to CELL_FACH state
- transmit a URA UPDATE message on the uplink CCCH,
- start timer T303 and reset counter V303

The IE URA update cause shall be set to URA reselection.”

8.3.2.2.2 URA update due to periodical URA update

When the UE is in URA_PCH state, the UE shall perform periodic URA updating according to the system information. The timer T306 shall be reset when entering URA_PCH state and after the completion of the URA Update Procedure.

Upon expiry of timer T306 and the UE detects that it is in the service area, which is specified in subclause 8.5.4, the UE shall

- move to CELL_FACH state
- transmit a URA UPDATE message on the uplink CCCH,
- start timer T303 and reset counter V303

The IE URA update cause shall be set to periodic URA update.”

8.3.2.3 Abnormal cases: T306 expiry and the UE detects that it is out of service area

When the T306 expires and the UE detects that it is out of service area, which is specified in subclause 8.5.4, the UE shall

- start timer T307
- search for cell to camp

When the UE detects that it is no longer out of service area before the expiry of T307, the UE shall

- transmit URA Update message on the uplink CCCH

When the T307 expires

- the UE shall move to idle state.

8.3.2.4 Message URA UPDATE contents to set

The IE URA update cause"shall be set to the event causing the transmission of the URA UPDATE message, see subclauses 8.3.2.2.1 and 8.3.2.2.2.

8.3.2.5 Reception of URA UPDATE by the UTRAN

When the UTRAN receives a URA UPDATE message, it shall transmit a URA UPDATE CONFIRM message on the downlink CCCH or DCCH.

8.3.2.5.1 Message URA UPDATE CONFIRM contents to set

UTRAN may allocate a new C-RNTI and/or a new S-RNTI plus SRNC identity for the UE. In that case UTRAN shall include those new identities in the IEs "new C-RNTI,""new S-RNTI"and "new SRNC identity,"

The UTRAN shall assign the URA ID to the UE in the URA UPDATE CONFIRM message in a cell where multiple URAs are valid.

8.3.2.6 Reception of URA UPDATE CONFIRM by the UE

- When the UE receives a URA UPDATE CONFIRM message on the downlink CCCH or DCCH, it shall stop timer T303 and restart timer T306.

8.3.2.6.1 Message URA UPDATE CONFIRM contents to use

If the URA UPDATE CONFIRM message includes the IEs "new C-RNTI"and optionally "new S-RNTI"and "new SRNC

- update its identities and transmit an RNTI REALLOCATION COMPLETE message on the uplink DCCH.

If the URA UPDATE CONFIRM message includes the IE "URA ID,"the UE shall

- confirm whether indicated URA ID is in the list of URA IDs which is temporarily stored in the UE
- update URA ID and store in itself.

If the URA UPDATE CONFIRM message does not include the IE "URA ID,"the UE shall

- confirm whether only one URA ID exists in the list of URA IDs which is temporarily stored in the UE
- update URA ID and stored in itself.

If the URA UPDATE CONFIRM message includes the IEs "CN domain identity"and "NAS system information,"the UE shall

- forward the content of the IE to the non-access stratum entity of the UE indicated by the IE "CN domain identity,"

In all cases the UE shall, after other possible actions:

- retrieve secondary CCPCH info (for PCH) from the SYSTEM INFORMATION broadcasted from the new cell
- delete its C-RNTI and
- transit to URA_PCH state. The procedure ends.

8.3.2.7 Abnormal cases: Confirmation error of URA ID list

- When indicated URA ID is not included in the list of URA IDs or
- when the URA ID is not indicated and the list of URA IDs includes more than one URA ID,

the UE shall check the value of V303 and

- If V303 is smaller or equal than N303, the UE shall retransmit a URA UPDATE message on the uplink CCCH, restart timer T303 and increase counter V303. The UE shall set the IEs in the URA UPDATE message according to subclause 8.3.2.2.1 and 8.3.2.2.2.

- If V303 is greater than N303, the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.3.2.8 Abnormal cases: T303 expiry or URA reselection

- Upon expiry of timer T303, and/or
 - upon reselection of another UTRA cell when waiting for the URA UPDATE CONFIRM message,
- the UE shall check the value of V303 and
- If V303 is smaller or equal than N303, the UE shall retransmit a URA UPDATE message on the uplink CCCH, restart timer T303 and increase counter V303. The UE shall set the IEs in the URA UPDATE message according to subclause 8.3.2.2.1 and 8.3.2.2.2.
 - If V303 is greater than N303, the UE shall enter idle mode. The procedure ends and a connection failure may be indicated to the non-access stratum. Other actions the UE shall perform when entering idle mode from connected mode are specified in subclause 8.5.2.

8.3.2.9 Reception of RNTI REALLOCATION COMPLETE by the UTRAN

See subclause 8.3.3.4.

8.3.3 RNTI reallocation

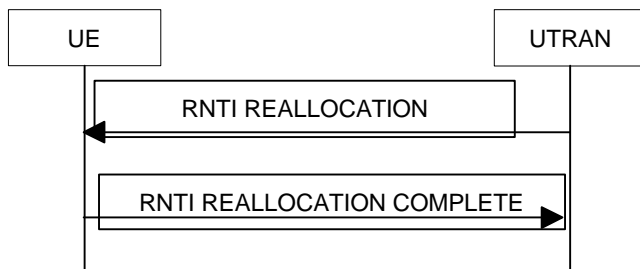


Figure 30) RNTI reallocation procedure, normal flow

8.3.3.1 Purpose

The purpose with this procedure is to allocate a new C-RNTI and/or S-RNTI plus SRNC identity to an UE in connected mode.

8.3.3.2 Initiation

The UTRAN shall transmit an RNTI reallocation message to the UE on the downlink DCCH.

8.3.3.3 Reception of RNTI REALLOCATION by the UE

When the UE receives an RNTI REALLOCATION message, it shall take the actions in subclause 8.1.4.3.1 and then transmit an RNTI REALLOCATION COMPLETE message on the uplink DCCH. The procedure ends.

8.3.3.3.1 Message RNTI REALLOCATION contents to use

If the IEs *new S-RNTI* and *new SRNC identity* are present, the UE shall store and start to use the values of these IEs as the current S-SRNTI and SRNC-identity.

If the IE *new C-RNTI* is present, the UE shall store and start to use the value of this IE.

If the IEs *CN domain identity* and *NAS system information* are included, the UE shall forward the content of the IE to the non-access stratum entity of the UE indicated by the IE *CN domain identity*.

8.3.3.4 Reception of RNTI REALLOCATION COMPLETE by the UTRAN

When the network receives RNTI REALLOCATION COMPLETE, UTRAN shall delete any old C-RNTI and S-RNTI and SRNC identity. The procedure ends.

8.3.4 Active set update in soft handover

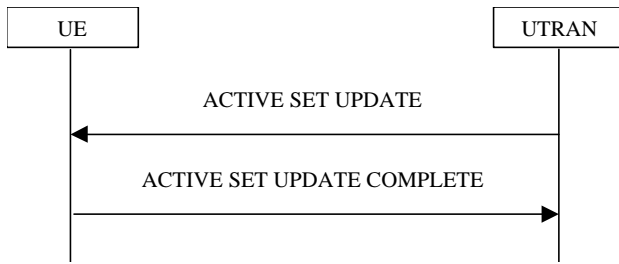


Figure 31. Active Set Update procedure, successful case

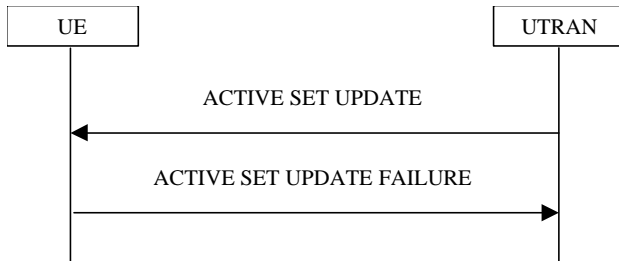


Figure 32. Active Set Update procedure, failure case

The purpose of the active set update procedure is to update the active set of the connection between the UE and UTRAN. This procedure shall be used in CELL_DCH state. The UE should keep on using the old RLs while allocating the new RLs. Also the UE should keep on using the transmitter during the reallocation process.

8.3.4.1 Initiation

The procedure is initiated when UTRAN orders a UE in CELL_DCH state, to make the following modifications of the active set of the connection.

- a) Radio link addition
- b) Radio link removal
- c) Combined radio link addition and removal

In case a) and c), UTRAN shall

- prepare new additional radio link(s) in the UTRAN prior to the command to the UE.

In all cases, UTRAN shall

- send an ACTIVE SET UPDATE message on downlink DCCH using AM or UM RLC.
- Start timer T360.

8.3.4.1.1 Message ACTIVE SET UPDATE contents to set

UTRAN shall include the following information:

- IE **Radio Link Addition Information**: Downlink DPCH information and other optional parameters relevant for the additional radio links with Primary CCPCH info used for the reference ID to indicate which radio link to add. This IE is need in case a) and c).
- IE **Radio Link Removal Information**: Primary CCPCH info used for the reference ID to indicate which radio link to remove. This IE is need in case b) and c).

8.3.4.2 Reception of message ACTIVE SET UPDATE by the UE

The UE shall take the following actions:

- Upon reception of a ACTIVE SET UPDATE message the UE shall perform actions according to 8.3.4.2.1 and transmit an ACTIVE SET UPDATE COMPLETE message on the uplink DCCH using AM RLC. When the ACTIVE SET UPDATE COMPLETE message is sent the procedure ends.

8.3.4.2.1 Message ACTIVE SET UPDATE contents to use

The UE shall

- at first, add the RLS indicated in the IE Radio Link Addition Information”
- remove the RLS indicated in the IE Radio Link Removal Information”.

If the UE active set is full or becomes full, an RL, which is indicated to remove, shall be removed before adding RL, which is indicated to add.

8.3.4.2.2 Message ACTIVE SET UPDATE COMPLETE contents to set

UE shall include the following information:

- IE physical CH information elements” optional parameters relevant for the new active set.

8.3.4.3 Abnormal case: Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall

- Transmit a ACTIVE SET UPDATE FAILURE message on the DCCH using AM RLC.

8.3.4.3.1 Message ACTIVE SET UPDATE FAILURE contents to set

UE shall include the following information:

- IE failure cause”to configuration unacceptable”

8.3.4.4 Reception of message ACTIVE SET UPDATE COMPLETE by the UTRAN

When the UTRAN has received the ACTIVE SET UPDATE COMPLETE message,

- the UTRAN may remove radio link(s) which are indicated to remove to the UE in case b) and c)
- and the UTRAN stops the T360 and the procedure ends on the UTRAN side.

8.3.4.5 Reception of message ACTIVE SET UPDATE FAILURE by the UTRAN

When the UTRAN has received the ACTIVE SET UPDATE FAILURE message, the UTRAN may delete radio links which are indicated to add to the UE. The UTRAN stops the T360 and the procedure ends on the UTRAN side.

8.3.4.6 Abnormal case: T360 timeout

Upon expiry of timer T360 and no ACTIVE SET UPDATE COMPLETE or ACTIVE SET UPDATE FAILURE message has been received, the UTRAN may delete the new and old radio links. After the UTRAN deleted all the radio links, the UTRAN may wait for the UE to request a re-establishment of the RRC Connection. The UE context may then be cleared, unless the UE requests a re-establishment of the RRC Connection for a certain time period.

8.3.5 Hard handover

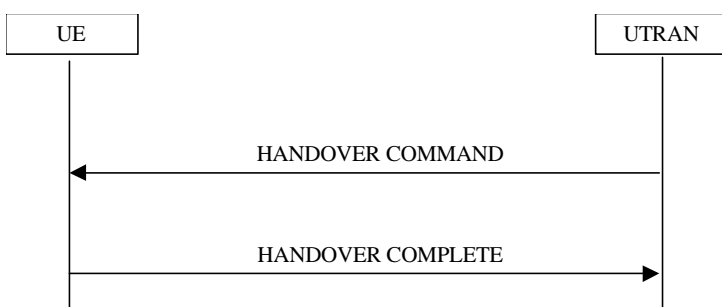


Figure 33. Hard handover, successful case

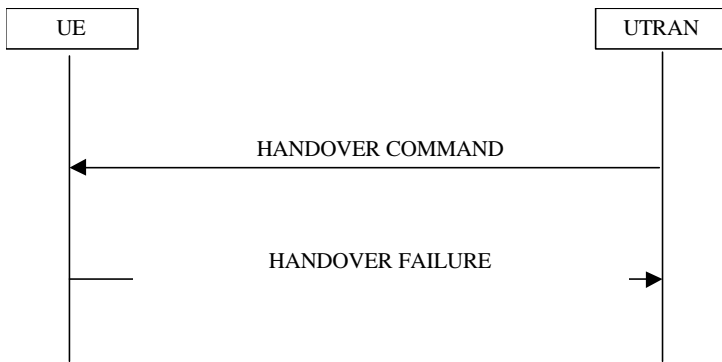


Figure 34. Hard handover, failure case

8.3.5.1 General

The purposes of the hard handover procedure are;

- to change the radio frequency band of the connection between the UE and UTRAN
- to change the cell on the same frequency but no network support of macro diversity, and
- to change the mode between TDD and FDD.

This procedure may be used in CELL_DCH state.

8.3.5.2 Initiation

UTRAN shall

- Configure new radio links in new physical configuration and L1 starts TX/RX on the new links immediately.
- Start timer T358.
- Send a HANOVER COMMAND message on downlink DCCH using AM or UM RLC.

8.3.5.2.1 Message HANOVER COMMAND contents to set

UTRAN shall include the following information:

IE 'physical CH information elements' frequency info, uplink radio resources, downlink radio resources and other optional parameters relevant for the target physical CH configuration in new physical configuration.

8.3.5.3 Reception of message HANOVER COMMAND by the UE

The UE shall take the following actions:

- Upon reception of a HANOVER COMMAND message the UE shall perform actions according to 8.3.5.3.1 and transmit a HANOVER COMPLETE message on the uplink DCCH using AM RLC. When the HANOVER COMPLETE message is sent the procedure ends.
- The UE shall be able to receive an HANOVER COMMAND message and perform an hard handover, even if no prior UE measurements have been performed on the target cell and/or frequency
- The UE in CELL_DCH is allowed to release all resources for the old connection before allocation of the new resources. The UE should also turn off the transmitter when the resource reallocation process takes place.

8.3.5.3.1 Message HANOVER COMMAND contents to use

The UE shall

- Release the old physical CH configuration.
- Re-establish the physical CH configuration on new physical configuration according to the IE Physical CH

8.3.5.3.2 Message HANDOVER COMPLETE contents to set

UE shall include the following information:

- IE "physical CH information elements" optional parameters relevant for the target physical CH configuration in new physical configuration.

8.3.5.4 Abnormal case: Unsupported configuration in the UE

If UTRAN instructs the UE to use a configuration that it does not support, the UE shall

- Transmit a HANDOVER FAILURE message on the DCCH using AM RLC.

8.3.5.4.1 Message HANDOVER FAILURE contents to set

UE shall include the following information:

- IE "failure cause" to "configuration unacceptable".

8.3.5.5 Abnormal case: Physical channel failure

If the UE fails to establish the physical channel(s) indicated in the message HANDOVER COMMAND the UE shall

- Revert to the configuration prior to the reception of the HANDOVER COMMAND message (old configuration) and transmit a HANDOVER FAILURE message on the DCCH using AM RLC. The procedure ends and the UE resumes the normal operation as if no hard handover attempt had occurred.

Criteria to be fulfilled for having a physical channel established are specified in subclause 8.5.4.

If the UE is unable to revert back to the old configuration, the UE shall

- Initiate a RRC connection re-establishment procedure according to subclause 8.1.5.

8.3.5.5.1 Message HANDOVER FAILURE contents to set

UE shall include the following information:

- IE "failure cause" to "physical channel failure".

8.3.5.6 Reception of message HANDOVER COMPLETE by the UTRAN

When the UTRAN has received the HANDOVER COMPLETE message, UTRAN may delete any old configuration. Timer T358 is stopped and the procedure ends on the UTRAN side.

8.3.5.7 Reception of message HANDOVER FAILURE by the UTRAN

When the UTRAN has received the HANDOVER FAILURE message, UTRAN may delete any new configuration. Timer T358 is stopped and the procedure ends on the UTRAN side.

8.3.5.8 Abnormal case: T358 timeout

Upon expiry of timer T358 and no HANDOVER COMPLETE or HANDOVER FAILURE message has been received, the UTRAN may delete the old and new configuration. After the UTRAN deleted all the configurations, the UTRAN may wait for the UE to request a re-establishment of the RRC Connection. The UE context may then be cleared, unless the UE requests a re-establishment of the RRC Connection for a certain time period.

8.3.6 Inter-system handover to UTRAN



Figure 35. Inter system handover to UTRAN, successful case

8.3.6.1 General

The purpose of the inter system handover procedure is to , controlled by the network, transfer a connection between the UE and another radio access system (e.g. GSM) to UTRAN.

8.3.6.2 Initiation

The procedure is initiated when the UE is connected to another radio access system than UTRAN, e.g. GSM, and, using system specific procedures, is ordered by that radio access system to make a handover to UTRAN.

A message XXXX is sent to the UE via the system from which inter- system handover is performed.

[Editor’s note: Message XXXX needs to be defined.]

8.3.6.2.1 Message XXXX contents to set

UTRAN should provide the following information to the other system to be included in the XXXX message.

- UE information elements
- RAB information elements
- TrCH information elements
- PhyCH information elements

If the other radio access system also provide other information is FFS.

8.3.6.3 Reception of message XXXX by the UE

The UE shall take the following actions:

- If the UE succeeds to establish the connection to UTRAN, it shall transmit a HANOVER COMPLETE message on the uplink DCCH

8.3.6.3.1 Message XXXX contents to use

The UE shall

- Store the values of the IEs S-RNTI and SRNC identity and
- Initiate the signalling link parameters according to the IEs Signalling link type and RB multiplexing info

If additional RB IEs are included, the UE shall

- use the multiplexing option applicable for the transport channels used according to the IE RB multiplexing info
- Configure MAC multiplexing if that is needed in order to use said transport channel(s).
- Use MAC logical channel priority when selecting TFC in MAC.

If the IE C-RNTI is included, the UE shall

- Use that C-RNTI when using common transport channels of type RACH, FACH and CPCH in the current cell.

If neither the IEs PRACH info nor Uplink DPCH info is included, the UE shall

- Let the physical channel of type PRACH that is given in system information be the default in uplink and enter the CELL_FACH state.

If neither the IEs Secondary CCPCH info nor Downlink DPCH info is included, the UE shall

- Start to receive the physical channel of type Secondary CCPCH that is given in system information.

The UE shall use the transport channel(s) applicable for the physical channel types that is used. If neither the IE TFS's is included or previously stored in the UE for that transport channel(s), the UE shall

- Use the TFS given in system information

If none of the TFS stored is compatible with the physical channel, the UE shall

- Delete stored TFS and use the TFS given in system information

Actions that shall be performed by the UE, for other IEs are specified in chapter 8.5.7.

8.3.6.3.2 Message HANDOVER COMPLETE contents to set

There are no requirements on the UE concerning the information elements to be provided within the handover complete message.

8.3.6.4 Abnormal case: UE fails to perform handover

If the UE does not succeed to establish the connection to UTRAN, it shall terminate the procedure including release of the associated resources and indicate the failure to the other radio access system.

Upon receiving an indication about the failure from the other radio access system, UTRAN should release the associated resources and the context information concerning this UE.

8.3.6.5 Reception of message HANDOVER COMPLETE by the UTRAN

Upon receiving a HANDOVER COMPLETE message, UTRAN should consider the inter- system handover procedure as completed successfully and indicate this to the CN.

8.3.6.5.1 Message HANDOVER COMPLETE contents to use

There are no requirements on UTRAN concerning the handling of information elements included in the HANDOVER COMPLETE message.

8.3.7 Inter-system handover from UTRAN

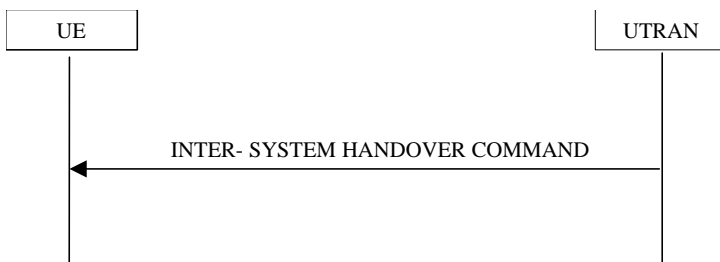


Figure 36. Inter system handover from UTRAN, successful case

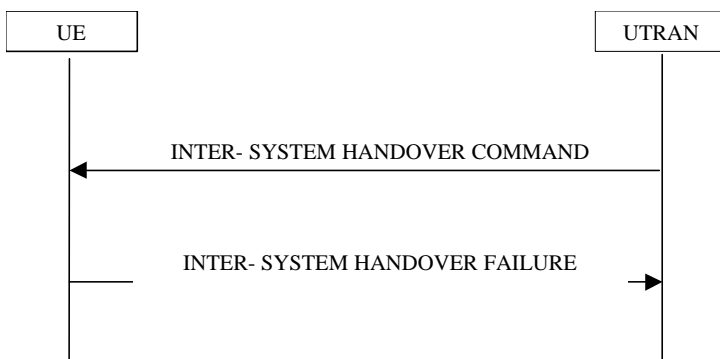


Figure 37. Inter system handover from UTRAN, failure case

8.3.7.1 General

The purpose of the inter system handover procedure is to, controlled by the network, transfer a connection between the UE and UTRAN to another radio access system (e.g. GSM). This procedure may be used in CELL_DCH and CELL_FACH state.

8.3.7.2 Initiation

The procedure is initiated when UTRAN orders a UE in CELL_DCH or CELL_FACH state, to make a handover to another radio access system than UTRAN, e.g. GSM.

UTRAN shall.

- start timer T359 and
- send an INTER- SYSTEM HANDOVER COMMAND message.

8.3.7.2.1 Message INTER- SYSTEM HANDOVER COMMAND contents to set

UTRAN shall include the following information:

- IE 'inter system message' candidate/ target cell identifier(s), radio parameters relevant for the other radio access system

8.3.7.3 Reception of message INTER- SYSTEM HANDOVER COMMAND by the UE

The UE shall take the following actions:

- If the UE succeeds to establish the connection to other radio access system, the release of the UMTS radio resources is initiated by the other system.

8.3.7.3.1 Message INTER- SYSTEM HANDOVER COMMAND contents to use

There are no requirements on the UE concerning the handling of information elements included in the HANDOVER COMPLETE message.

8.3.7.4 Successful completion of the inter-system handover

Upon successfully completing the handover, UTRAN should release the radio connection and remove all context information for the concerned UE.

8.3.7.5 Abnormal case: UE fails to complete requested handover

If the UE does not succeed to establish the connection to the other radio access system, it shall

- resume the connection to UTRAN using the resources used before receiving the INTER-SYSTEM HANDOVER COMMAND and
- transmit the INTER-SYSTEM HANDOVER FAILURE message.

8.3.7.5.1 Message INTER-SYSTEM HANDOVER FAILURE contents to set

FFS

8.3.7.6 Reception of INTER-SYSTEM HANDOVER FAILURE by UTRAN

Upon receiving INTER-SYSTEM HANDOVER FAILURE message UTRAN should stop timer T359.

8.3.7.7 Abnormal case: expiry of timer T359 in UTRAN

In case timer T359 expires while UTRAN is waiting for a CN initiated release, UTRAN should indicate a radio connection failure and wait for the CN to release the radio connection.

8.3.8 Inter-system cell reselection to UTRAN

8.3.8.1 General

The purpose of the inter system cell reselection procedure to UTRAN is to, controlled by the UE and to some extent the other radio access system, transfer a connection between the UE and another radio access system (e.g. GSM/GPRS) to UTRAN.

8.3.8.2 Initiation

When the UE makes an inter-system cell reselection to UTRAN according to the criteria specified in TS 25.304, it shall initiate this procedure. The inter-system cell reselection made by the UE may use system information broadcast from the other radio access system or UE dedicated information.

The UE shall initiate an RRC connection establishment procedure as specified in subclauses 8.1.3 and 8.3.8.2.1. After initiating an RRC connection establishment, the UE shall release all resources specific to the other radio access system.

8.3.8.2.1 Message RRC CONNECTION REQUEST contents to set

- The UE shall set the IE 'establishment cause' to 'inter-system cell reselection'
- Other IEs shall be set according to subclause 8.1.3.2.1

8.3.8.3 Abnormal case: UE fails to complete an inter-system cell reselection

If the inter-system cell reselection fails before the UE has initiated the RRC connection establishment the UE may return back to the other radio access system.

If the RRC connection establishment fails the UE shall enter idle mode.

8.3.9 Inter-system cell reselection from UTRAN

8.3.9.1 General

The purpose of the inter system cell reselection procedure from UTRAN is to, controlled by the UE and to some extent the network, transfer a connection between the UE and UTRAN to another radio access system (e.g. GSM/GPRS).

8.3.9.2 Initiation

This procedure may be initiated in states CELL_FACH or CELL_PCH. [Note: the usage of the procedure in state URA_PCH is FFS.]

When the UE based on received system information makes a cell reselection to another radio access system than UTRAN, e.g. GSM/GPRS, according to the criteria specified in TS 25.304, the UE shall.

- start timer T309
- initiate an establishment of a connection to the other radio access system according to its specifications

8.3.9.3 Successful cell reselection

When the UE succeeds to reselect a cell in the other radio access system and initiated an establishment of a connection, it shall stop timer T309 and release all UTRAN specific resources.

UTRAN should release all UE dedicated resources upon indication that the UE has completed a connection establishment to the other radio access system.

8.3.9.4 Expiry of timer T309

If the timer T309 expires before the UE succeeds to initiate an establishment of a connection to the other radio access system it shall resume the connection to UTRAN.

8.4 Measurement procedures

The UE measurements are grouped into 6 different types of measurements, according to what the UE should measure. The different types of measurements are:

- **Intra-frequency measurements:** measurements on downlink physical channels at the same frequency as the active set. Detailed description is found in subclause 15.1.
- **Inter-frequency measurements:** measurements on downlink physical channels at frequencies that differ from the frequency of the active set.
- **Inter-system measurements:** measurements on downlink physical channels belonging to another radio access system than UTRAN, e.g. PDC or GSM.
- **Traffic volume measurements:** measurements on uplink traffic volume. Detailed description is found in subclause 15.2.
- **Quality measurements:** Measurements of quality parameters, e.g. downlink transport block error rate.
- **Internal measurements:** Measurements of UE transmission power and UE received signal level. Detailed description is found in subclause 15.3.

The same type of measurements may be used as input to different functions in UTRAN. However, the UE shall support having a number of measurements running in parallel. The UE shall also support that each measurement is controlled and reported independently of each other.

Cells that the UE is monitoring (e.g. for handover measurements) are grouped in the UE into two different categories:

1. Cells that belong to the **active set**. User information is sent from all these cells and they are simultaneously demodulated and coherently combined. These cells are involved in soft handover.
2. Cells that are not included in the active set, but are monitored belong to the **monitored set**.

UTRAN may start a measurement in the UE by transmitting a MEASUREMENT CONTROL message. This message includes

1. **Measurement type:** One of the types listed above describing what the UE shall measure.
2. **Measurement identity number:** A reference number that should be used by the UTRAN when modifying or releasing the measurement and by the UE in the measurement report.
3. **Measurement command:** One out of three different measurement commands
 - Setup: Setup a new measurement.
 - Modify: Modify a previously defined measurement, e.g. to change the reporting criteria.
 - Release: Stop a measurement and clear all information in the UE that are related to that measurement.
4. **Measurement objects:** The objects the UE shall measure on, and corresponding object information.
5. **Measurement quantity:** The quantity the UE shall measure. This also includes the filtering of the measurements.
6. **Reporting quantities:** The quantities the UE shall include in the report in addition to the quantities that are mandatory to report for the specific event.
7. **Measurement reporting criteria:** The triggering of the measurement report, e.g. periodical or event-triggered reporting. The events are described for each measurement type in chapter 15.
8. **Reporting mode:** This specifies whether the UE shall transmit the measurement report using acknowledged or unacknowledged data transfer of RLC.

All these measurement parameters depend on the measurement type and are described in more detail in chapter 15.

When the reporting criteria is fulfilled, i.e. the specified event occurred or the time since last report indicated for periodical reporting has elapsed, the UE shall send a MEASUREMENT REPORT to UTRAN.

In idle mode the UE shall perform measurements according to the measurement control messages sent in SYSTEM INFORMATION on the BCCH. A UE in connected mode that has not received a dedicated measurement control message shall also use the measurement control messages sent in SYSTEM INFORMATION on the BCCH. The UTRAN may divide the measurement control information in SYSTEM INFORMATION into idle mode and connected mode SIBs. However, if connected mode information is missing, a connected mode UE shall use the same measurement control message as for idle mode.

On the DCH, the UE shall report radio link related measurements to the UTRAN with a MEASUREMENT REPORT message. In order to receive information for the establishment of immediate macrodiversity, the UTRAN may also request the UE to append radio link related measurement reports to the following messages sent on the RACH:

- RRC CONNECTION REQUEST sent to establish an RRC connection.
- RRC CONNECTION RE-ESTABLISHMENT REQUEST sent to re-establish an RRC connection.
- DIRECT TRANSFER sent uplink to establish a signalling connection.
- CELL UPDATE sent to respond to a UTRAN originated page.
- MEASUREMENT REPORT sent to report uplink traffic volume.

[Note: Whether or not measured results can be appended to other messages and in other scenarios is FFS.]

8.4.1 Measurement control

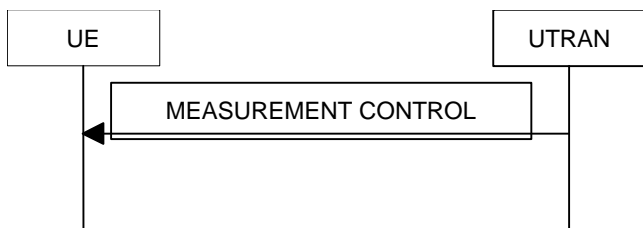


Figure 38. Measurement Control, normal case

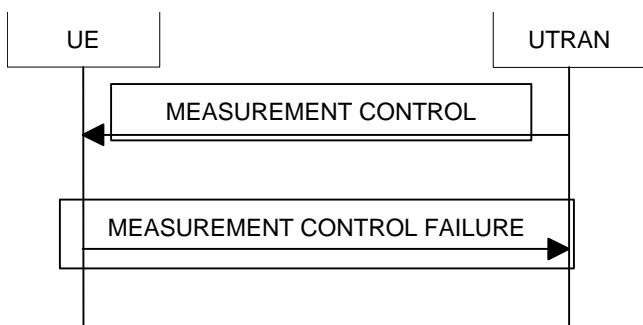


Figure 39. Measurement Control, UE reverts to old measurements

8.4.1.1 General

The purpose with this procedure is to Setup, Modify or Release a measurement in the UE.

8.4.1.2 Initiation

The UTRAN may request a measurement in the UE to be setup, modified or released.

UTRAN shall transmit a MEASUREMENT CONTROL message on the downlink DCCH using AM RLC.

8.4.1.2.1 Message MEASUREMENT CONTROL contents to set

When a new measurement is setup, UTRAN should set the IE 'measurement identity number' to a value that is not used for other measurements.

UTRAN should take the UE capabilities into account when a measurement is configured in the UE.

[Editor's note: Other IEs are included and set according to selection by the UTRAN.]

8.4.1.3 Reception of MEASUREMENT CONTROL by the UE

Upon reception of a MEASUREMENT CONTROL message the UE shall perform actions according to 8.4.1.3.1. These actions end the procedure.

8.4.1.3.1 Message MEASUREMENT CONTROL contents to use

The UE shall

- Read the IE fmeasurement command”

If the IE fmeasurement command”has the value fsetup;”the UE shall

- Associate this measurement with the identity number given in the IE fmeasurement identity number”
- Store the IEs giving fmeasurement objects;”fmeasurement quantity;”freporting quantity;”fmeasurement reporting criteria” and freporting mode;”that are valid for this measurement type and
- Start measurements according to the stored IEs for this measurement identity number

See chapter 15 for detailed description of measurement object, measurement quantity and measurement reporting criteria for the different types of measurements.

If the IE fmeasurement command has the value fmodify;”the UE shall

- Retrieve the stored measurement IEs associated with the identity given in the IE fmeasurement identity number”
- If any of the IEs giving fmeasurement objects;” fmeasurement quantity;” freporting quantity;” fmeasurement reporting criteria”or freporting mode”are present in the MEASUREMENT CONTROL message, that IE shall replace the corresponding stored IE.
- Store the new set of IEs and associate them with the measurement identity number and
- Resume the measurements according to the new stored set of measurement IEs

If the IE fmeasurement command has the value frelease;”the UE shall

- Stop the measurement associated with the identity given in the IE fmeasurement identity number”
- Clear all stored configuration related to this measurement

8.4.1.4 Abnormal case: Unsupported measurement in the UE

If UTRAN instructs the UE to perform a measurement that is not supported by the UE, the UE shall

- Keep the measurement configuration that was valid before the MEASUREMENT CONTROL message was received.
- Transmit a MEASUREMENT CONTROL FAILURE message on the DCCH using AM RLC.

8.4.1.4.1 Message MEASUREMENT CONTROL FAILURE contents to set

The UE shall set the cause value in IE failure cause”to funsupported measurement.”

8.4.1.5 Reception of MEASUREMENT CONTROL FAILURE by the UTRAN

When UTRAN receives MEASUREMENT CONTROL FAILURE message the procedure ends.

8.4.2 Measurement report



Figure 40. Measurement report, normal case

8.4.2.1 Purpose

The purpose with this procedure is to transfer measurement results from the UE to UTRAN.

8.4.2.2 Initiation

The UE shall transmit a MEASUREMENT REPORT on the uplink DCCH when the reporting criteria are fulfilled for any of the measurements that are performed in the UE.

Criteria is fulfilled if either

- The time indicated in the stored IE "periodical reporting" has elapsed since the last measurement report with this measurement identity number was sent or initiated, or
- Event in stored IE "measurement reporting criteria" was triggered. Detailed event description and report trigger mechanisms that may be setup in the UE by UTRAN, for the different measurement types are described in Chapter 15.

The UE shall transmit the MEASUREMENT REPORT using either AM or UM RLC according to the stored IE "measurement reporting mode" associated with the measurement identity number that triggered the report.

8.4.2.2.1 Message MEASUREMENT REPORT contents to set

For the measurement that triggered the MEASUREMENT REPORT message, the UE shall

- Set the IE "measurement identity number" to the measurement identity number that is associated with that measurement
- Set the IE "measured results" to include measurements according to the stored IE "reporting quantity" of that measurement

If the MEASUREMENT REPORT message was triggered by an event (i.e. not a periodical report), the UE shall

- Set the measurement event results according to the event that triggered the MEASUREMENT REPORT message

8.4.2.3 Reception of MEASUREMENT REPORT by the UTRAN

When UTRAN receives the MEASUREMENT REPORT message the procedure ends.

8.5 General procedures

8.5.1 Selection of initial UE identity

FFS

8.5.2 Actions when entering idle mode

FFS

8.5.3 Actions when entering CELL_DCH state

FFS

8.5.4 Physical channel establishment criteria

FFS

8.5.5 Detection of out of service area

FFS

8.5.6 Radio link failure criteria

FFS

8.5.7 Default actions on receipt of an information element

When any of the following IEs are received by the UE in any RRC message, the UE shall perform the actions specified below, unless specified otherwise.

8.5.7.1 CN information elements

8.5.7.2 UTRAN mobility information elements

8.5.7.3 UE information elements

8.5.7.3.1 Activation time

If the IE 'Activation time' is present, the UE shall

- activate the new configuration present in the same message as this IE at the indicated time.

[Editor's note: The new configuration is typically a dedicated physical channel present in the same message as the

8.5.7.4 Radio bearer information elements

8.5.7.4.1 RB Multiplexing Info

If the IEs 'RB identity' and 'RB Multiplexing Info' are included, the UE shall

- If any, delete all previously stored multiplexing options for that radio bearer.
- Store each new multiplexing option for that radio bearer.

8.5.7.4.2 RLC Info

If the IEs 'RB identity' and 'RLC Info' are included, the UE shall

- Configure the transmitting and receiving RLC entities in the UE for that radio bearer accordingly.

8.5.7.5 Transport channel information elements

8.5.7.5.1 Transport Format Set

If the IEs transport channel identity and Transport format set is included, the UE shall

- store the transport format set for that transport channel.

8.5.7.5.2 Transport format combination set

If the IE Transport format combination set is included, the UE shall

- start to respect those transport format combinations.

8.5.7.5.3 Transport format combination subset

If the IE Transport format combination subset is included, the UE shall

- restrict the transport format combination set to that transport format combination subset. If the transport format combination subset indicates the full transport format combination set any restriction on transport format combination set is released and the UE may use the full transport format combination set.

8.5.7.6 Physical channel information elements

8.5.7.6.1 Frequency info

If the IE Frequency info is included the UE shall

- Store that frequency as the active frequency and
- Tune to that frequency.

If the IE Frequency info is not included and the UE has a stored active frequency, the UE shall

- Continue to use the stored active frequency

If the IE Frequency info is not included and the UE has no stored active frequency, it shall

- map any used physical channels on the frequency given in system information as default

8.5.7.6.2 PRACH info

If the IE PRACH info is included, the UE shall

- Release any active dedicated physical channels in the uplink and
- let the PRACH be the default in the uplink for RACH

8.5.7.6.3 Secondary CCPCH info

If the IE Secondary CCPCH info is included and the IE PICH info is not included, the UE shall

- Start to receive that Secondary CCPCH in the downlink and
- enter the CELL_FACH state if not already in that state.

8.5.7.6.4 Uplink DPCH info

If the IE Uplink DPCH info is included, the UE shall

- Release any active uplink physical channels, activate the given physical channels and
- enter the CELL_DCH state if not already in that state. Additional actions the UE shall perform when entering the CELL_DCH state from another state are specified in subclause **Error! Reference source not found.**

8.5.7.6.5 Downlink DPCH info

If the IE Downlink DPCH info is included, the UE shall

- Activate the dedicated physical channels indicated by that IE

8.5.7.7 Measurement information elements

8.5.7.8 Other information elements

14 Protocol timers, counters and other parameters

14.1 Timers for UE

Timer	Value Range (seconds)	Relations	Start	Stop	At expiry
T300			Transmission of RRC CONNECTION REQUEST	Reception of RRC CONNECTION SETUP	Retransmit RRC CONNECTION REQUEST if $V300 \leq N300$, else go to Idle mode
T301			Transmission of RRC CONNECTION REESTABLISHMENT REQUEST	Reception of RRC CONNECTION REESTABLISHMENT	Retransmit RRC CONNECTION REESTABLISHMENT REQUEST if $V301 \leq N301$, else go to Idle mode
T302			Transmission of CELL UPDATE	Reception of CELL UPDATE CONFIRM	Retransmit CELL UPDATE if $V302 \leq N302$, else, go to Idle mode
T303			Transmission of URA UPDATE	Reception of URA UPDATE CONFIRM	Retransmit URA UPDATE if $V303 \leq N303$, else go to Idle mode
T304			Transmission of UE CAPABILITY INFORMATION	Reception of UE CAPABILITY INFORMATION CONFIRM	Retransmit UE CAPABILITY INFORMATION if $V304 \leq N304$, else initiate RRC connection reestablishment
T305			Entering CELL_FACH or CELL_PCH state. Reception of CELL UPDATE CONFIRM.	Entering another state.	Transmit CELL UPDATE.
T306			Entering URA_PCH state. Reception of URA UPDATE CONFIRM.	Entering another state.	Transmit URA UPDATE.
T307			When the timer T305 or T306 has expired and the UE detects that it is out of service area.	When the UE detects that it is no longer out of service area. Initiate cell update or URA update procedure depending on state	Transit to idle mode
T308			Transmission of RRC CONNECTION RELEASE COMPLETE	Not stopped	Transmit RRC CONNECTION RELEASE COMPLETE if $V308 \leq N308$, else go to idle mode.

Timer	Value Range (seconds)	Relations	Start	Stop	At expiry
T309			Upon reselection of a cell belonging to another radio access system from connected mode	Successful establishment of a connection in the new cell	Resume the connection to UTRAN

14.2 Timers for UTRAN

Timer	Value range (seconds)	Relations	Start	Stop	At expiry
T350		SIB_REP ¹ Activation time ²	Transmission of RRC CONNECTION SETUP	Reception of RRC CONNECTION SETUP COMPLETE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T352		SIB_REP Activation time	Transmission of RRC CONNECTION RE-ESTABLISHMENT	Reception of RRC CONNECTION RE-ESTABLISHMENT COMPLETE	Release UE context
T353		SIB_REP Activation time	Transmission of RADIO BEARER SETUP	Reception of RADIO BEARER SETUP COMPLETE or RADIO BEARER SETUP FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T354		SIB_REP Activation time	Transmission of RADIO BEARER RELEASE	Reception of RADIO BEARER RELEASE COMPLETE or RADIO BEARER RELEASE FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T355		SIB_REP Activation time	Transmission of RADIO BEARER RECONFIGURATION	Received RADIO BEARER RECONFIGURATION COMPLETE or RADIO BEARER RECONFIGURATION FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T356		SIB_REP Activation time	Sent TRANSPORT CHANNEL RECONFIGURATION	Received TRANSPORT CHANNEL RECONFIGURATION COMPLETE or TRANSPORT CHANNEL RECONFIGURATION FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received

¹ SIB_REP is the repetition of a System Information Block (SIB). If a specific SIB has to be read prior to transmission of a COMPLETE message from the UE this timer should be set to at least SIB_REP to ensure the UE can read the SIB.

² This timer should be set to value so it expires after the used activation time for this procedure, if any

Timer	Value range (seconds)	Relations	Start	Stop	At expiry
T357		SIB_REP Activation time	Sent PHYSICAL CHANNEL RECONFIGURATION	Received PHYSICAL CHANNEL RECONFIGURATION COMPLETE or PHYSICAL CHANNEL RECONFIGURATION FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T358		Activation time	Sent HANDOVER COMMAND	Received HANDOVER COMPLETE or HANDOVER FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received
T359			Sent INTER-SYSTEM HANDOVER COMMAND	Successful handover to other radio access system or received INTER-SYSTEM HANDOVER FAILURE	Release UE context if no RRC CONNECTION RE-ESTABLISHMENT REQUEST received

14.3 Counters for UE

Counter	Reset	Incremented	When reaching max value
V300	When initiating the procedure RRC connection establishment	Upon expiry of T300.	When $V300 > N300$, the UE enters idle mode.
V301	When initiating the procedure RRC connection reestablishment	Upon expiry of T301.	When $V301 > N301$, the UE enters idle mode.
V302	When initiating the procedure Cell update	Upon expiry of T302	When $V302 > N302$ the UE enters idle mode.
V303	When initiating the procedure URA update	Upon expiry of T303	When $V302 > N303$ the UE enters idle mode.
V304	When sending the first UE CAPABILITY INFORMATION message.	Upon expiry of T304	When $V304 > N304$ the UE initiates the RRC connection re-establishment procedure

Counter	Reset	Decrement	When reaching zero
V308	When sending the first RRC CONNECTION RELEASE COMPLETE message in a RRC connection release procedure.	Upon expiry of T308	When $V308 = 0$ the UE stops re-transmitting the RRC CONNECTION RELEASE COMPLETE message.

14.4 Counters for UTRAN

Counter	Reset	Incremented	When reaching max value

14.5 UE constants and parameters

Constant	Value	Usage
N300		Maximum number of retransmissions of the RRC CONNECTION REQUEST message
N301		Maximum number of retransmissions of the RRC CONNECTION REESTABLISHMENT REQUEST message
N302		Maximum number of retransmissions of the CELL UPDATE message
N303		Maximum number of retransmissions of the URA UPDATE message
N304		Maximum number of retransmissions of the UE CAPABILITY INFORMATION message

14.6 UTRAN constants and parameters

Constant	Value	Usage