

**Agenda Item:** 9.2.1

**Source:** Ericsson

**Title:** **Proposed changes to the RRC protocol specification regarding RRC connection establishment and re-establishment procedures**

**Document for:** Decision

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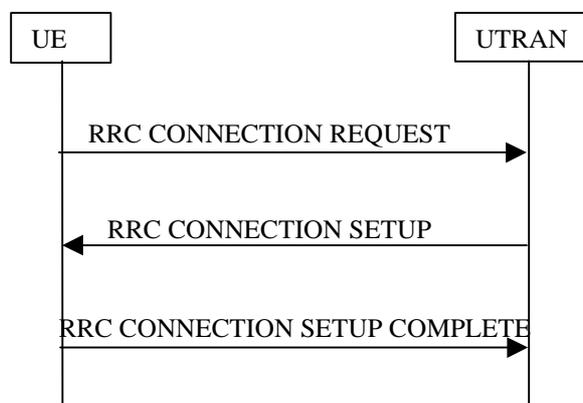
## 1 Introduction

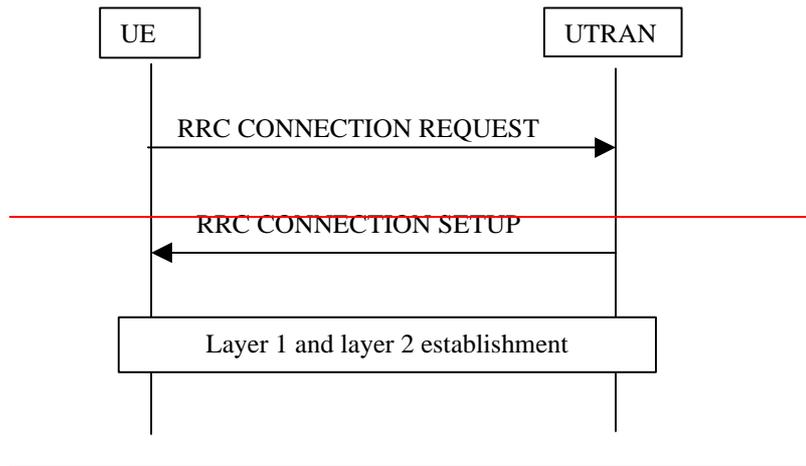
In a companion contribution [1] a third message that completes the RRC connection establishment and re-establishment procedures was proposed.

This contribution proposes changes to the RRC protocol specification 25.331 for the introduction of these messages.

## 2 Proposed changes to 25.331

### 8.2.1 RRC Connection Establishment





**Figure 14) Procedure for RRC connection establishment**

This procedure is initiated from the UE side to establish an RRC connection, as a result of either:

- (1) A request from the non-access stratum to establish the first signalling connection for the UE [Note: For a GSM-based Core Network some examples of reasons are: CM Establishment Request and Location Update Request.], or
- (2) A received paging request. [Note: Whether the RRC connection is established with or without an explicit request from UE non-access stratum in this case is FFS.]

The RRC connection establishment is initiated by the UE, which leaves the idle mode and sends an RRC CONNECTION REQUEST message using unassured mode on the uplink CCCH. [Note: The initial identification of the UE is FFS.]

The UTRAN makes an assignment of radio resources and the Radio Network Temporary Identity (RNTI) to be used by the UE. The UTRAN sends an RRC CONNECTION SETUP message to the UE using unassured mode on the downlink CCCH. The message includes radio resource parameters and the RNTI.

The UE configures the layer 2 and layer 1 processing for the DCCH using the radio resource parameters.

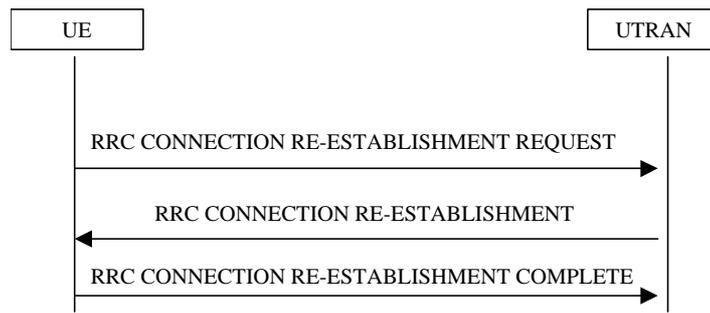
The procedure successfully ends when the ~~layer 2 signalling link is established on the DCCH~~ network receives an RRC CONNECTION SETUP COMPLETE message. The message, which is sent using acknowledged data transfer on the DCCH, confirms the assigned parameters and includes the UE capability.

*[Note: The necessity of an explicit RRC CONNECTION SETUP COMPLETE MESSAGE from the UE to the UTRAN on layer 3 is FFS. One assumption is, that there is an explicit layer 2 peer-to-peer signalling to establish the signalling link, making an explicit RRC CONNECTION SETUP COMPLETE message on layer 3 unnecessary.]*

Note also that on receipt of an RRC CONNECTION REQUEST message, the RNC can allocate a FAUSCH channel for the UE for the particular cell, in which the UE is camping on, or FAUSCH channels for a number of cells of the URA, in which the UE is currently staying depending on the type of UE. The FAUSCH channels allocated are conveyed to the UE in the RRC CONNECTION SETUP message. The following procedure which could be used during RRC connection establishment is for further study:

On receipt of an RRC CONNECTION REQUEST message, the RNC may allocate a dedicated channel to the mobile station. It is also possible to setup macrodiversity at this point. To do so means that the RRC CONNECTION REQUEST message must contain a measurement report. In this case, the RNC executes branch addition (physical channel activation) to each cell (/NodeB) that will be included in the active set. After the physical channel(s) are setup on the UTRAN side, the RRC CONNECTION SETUP message is sent to the UE on the FACH channel. When the UE has activated the physical channels in the active set, it returns an RRC CONNECTION SETUP COMPLETE message.

### 8.2.3 RRC Connection re-establishment



**Figure 22) RRC Connection re-establishment**

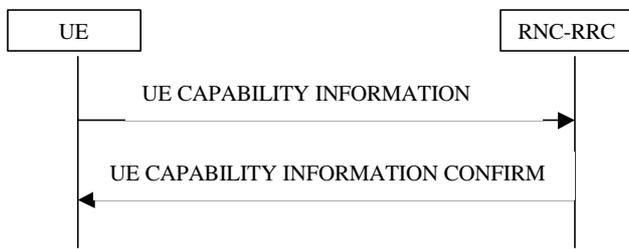
RRC connection re-establishment is needed, when a UE loses radio connection due to e.g. radio link failure. After having selected a new cell, the UE RRC sends the NW RRC an RRC CONNECTION RE-ESTABLISHMENT REQUEST message. The NW RRC configures the NW and acknowledges the connection re-establishment to the UE RRC with an RRC CONNECTION RE-ESTABLISHMENT message. This message may contain the FAUSCH channel(s) valid for this cell, and possibly other cells of the same URA, if FAUSCH channels have been allocated earlier. The UE RRC configures the UE L1 to activate the new radio link(s). After the UE has synchronised to at least one radio link, the MAC and RLC layers can be configured (if necessary).

After the UE has completed its configuration, it transmits an RRC CONNECTION RE-ESTABLISHMENT COMPLETE message to the network on the DCCH.

*[Note: The necessity of an explicit RRC CONNECTION REESTABLISHMENT COMPLETE message to be sent from the UE to the UTRAN on layer 3 is FFS. One assumption is, that there is an explicit layer 2 peer to peer signalling to establish the signalling link, making an explicit RRC CONNECTION REESTABLISHMENT COMPLETE message on layer 3 unnecessary].*

#### 8.3.8.1 Transmission of UE capability information

*Note: Changes below are relative to the results of RRC ad-hoc [2].*



**Figure 33) Procedure for transmission of UE capability information**

The UE transfers its capability information to the network by transmitting the UE CAPABILITY INFORMATION message on the DCCH. UTRAN acknowledges the successful update of UE capability by UE CAPABILITY INFORMATION CONFIRM message. This procedure can (optionally) be performed ~~after RRC Connection Setup procedure and also~~ during the lifetime of the RRC Connection if the UE capability information changes (e.g. due to change in UE power class). UE capability information can also explicitly be requested by UTRAN.

#### 10.1.4.2 RRC CONNECTION SETUP COMPLETE

This message confirms the establishment of the RRC Connection by the UE.

RLC-SAP: t.b.d.

Logical channel: DCCH

Direction: UE → UTRAN

<u>Information element category</u>	<u>Information elements</u>	<u>REFERENCE</u>	<u>TYPE</u>	<u>NOTE</u>
	<u>Message Type</u>		<u>M</u>	
<u>UE information elements</u>	<u>S-RNTI</u>		<u>M</u>	<u>New S-RNTI</u>
	<u>SRNC identity</u>		<u>M</u>	<u>New SRNC identity</u>
	<u>Power control capability</u>		<u>M</u>	<u>Note 1</u>
	<u>Code resource capability</u>		<u>M</u>	<u>Note 1</u>
	<u>UE mode capability</u>		<u>M</u>	<u>Note 1</u>
	<u>Transport CH support capability</u>		<u>O</u>	<u>Note 1</u>
	<u>Ciphering capability</u>		<u>M</u>	<u>Note 1</u>
	<u>Macro diversity capability</u>		<u>M</u>	<u>Note 1</u>
<u>RAB information elements</u>	<u>RAB identity</u>		<u>M</u>	<u>Indicates signalling link</u>
<u>TrCH information elements</u>	<u>Transport channel identity</u>		<u>M</u>	<u>For each new transport channel</u>
<u>Phy CH information elements</u>	<u>SSDT indicator</u>		<u>O</u>	<u>Necessity is FFS</u>

Note 1: The WG1 and WG4 discussion should be concluded before the UE capability IEs can be finalized.

### 3 References

- [1] TSGR2#4(99)416, source Ericsson, Completion of the procedures for RRC connection establishment and reestablishment
- [2] TSGR2#4(99)376, source Rapporteur (Ericsson), Results from the RRC procedures ad-hoc group
- [3] 25.331, v1.0.0, RRC protocol specification