**3GPP TSG- Meeting #**

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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. In clause 8.19.1, 8.19.2, 8.19.3, wrong RRC message name “*SidelinkUEInformation*” is used in L2 U2N Relay for U2N Relay UE to indicate NR sidelink UE information to the network, upon U2N Relay UE receives *RRCSetupRequest/RRCReestablishmentRequest/RRCResumeRequest* message from U2N Remote UE via PC5 Relay RLC Channel. Instead, “*SidelinkUEInformationNR*” shall be used. 2. In step 13 of clause 8.19.3 about U2N Remote UE RRC Resume procedure, the text description “According to the configuration from gNB-CU, the U2N Relay UE establishes a PC5 Relay RLC channel for relaying of SRB1 over PC5 and establishes a Uu Relay RLC channel for relaying of over Uu.” misses the information of realying which SRB of U2N Remote UE over Uu. 3. In clause 8.19.1, 8.19.2 and 8.19.3, the text description of relaying U2N Remote UE’s SRBs/DRBs needs to be improved to be specific to U2N Remote UE. 4. In step 30 of clause 8.19.1, the text “for the relaying of” in the spec “and additional PC5 Relay RLC channels for the U2N Relay UE for the relaying of U2N Remote UE’s DRBs and SRBs” contains an editorial error. 5. In step 1 of clause 8.19.3, the “Prose” in the spec “and establish PC5 connection using NR Prose procedure.” is not the correct abbreviation of “ProSe”. 6. In step 11 of clause 8.19.1, the text in the spec “The local ID of the U2N Remote UE and RB ID for SRB0 are conveyed in the SRAP header” lacks of a period in the end of the sentence. 7. In step 3 of clause 8.19.1, the term “status” is used to describe RRC state. “status” is not the standard term for this usage. | | | | | | | | |
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| ***Summary of change:*** | | 1. Change all “*SidelinkUEInformation*” RRC message names in clause 8.19.1, 8.19.2, 8.19.3 to “*SidelinkUEInformationNR*”. 2. In step 13 of clause 8.19.3, add text description to specify relaying U2N Remote UE’s SRB1 over Uu. 3. Improve the text description in cluase 8.19.1, 8.19.2 and 8.19.3 to make relaying U2N Remote UE’s SRBs/DRBs specific to U2N Remote UE. 4. In step 30 of clause 8.19.1, the text description “and additional PC5 Relay RLC channels for the U2N Relay UE for the relaying of U2N Remote UE’s DRBs and SRBs” removes “the” in the text “for the relaying of”. 5. In step 1 of clause 8.19.3, change “Prose” in the spec “and establish PC5 connection using NR Prose procedure.” to “ProSe”. 6. In step 11 of clause 8.19.1, add a period to the end of the text “The local ID of the U2N Remote UE and RB ID for SRB0 are conveyed in the SRAP header”. 7. In step 3 of clause 8.19.1, change “status” in “RRC\_IDLE/RRC\_INACTIVE status” and “RRC\_CONNECTED status” to “state”.   **Impact analysis**  Impact assessment towards the previous version of the specification (same release):  This CR has isolated impact with the previous version of the specification (same release).  The impact can be considered isolated because the first change corrects the IE name used in the spec description, and the rest of the changes are editioral to improve the spec quality. | | | | | | | | |
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| ***Consequences if not approved:*** | | 1. Wrong ASN.1 RRC message name specified in TS 38.401 will cause implementation and interoperability issue. 2. The missing content in the text description will cause ambiguity in the interpretation of the spec and have impact on implementation and interoperability. 3. The missing content in the text description will cause ambiguity in the interpretation of the spec and have impact on implementation and interoperability. 4. Editorial error will compromise the spec quality. 5. Wrong abbreviation use will compromise the spec quality and introuduce ambiguity. 6. Editorial error will compromise the spec quality. 7. Non-standard term use will cause spec interpretation issue and compromise spec quality. | | | | | | | | |
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| ***Clauses affected:*** | | 8.19.1, 8.19.2, 8.19.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
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| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | | Rev0: R3-231621, initial submission at RAN3 #119bis-e.  Rev1: R3-233084, resubmission of R3-231621 discussed at RAN3 #120.  Rev2: R3-233389, revision of R3-233084 to resolve comments received from the online discussion at RAN3 #120:   * added impact analysis in the coversheet; * edited the figures Figure 8.19.1-1, Figure 8.19.2-1 and Figure 8.19.3-1 to reflect the first proposed change: change “*SidelinkUEInformation*” to “*SidelinkUEInformationNR*” in each figure. | | | | | | | | |

*Start Change*

## 8.19 Overall procedures for L2 UE-to-Network Relay

### 8.19.1 Remote UE initial access

The signalling flow for Remote UE Initial access is shown in Figure 8.19.1-1.



Figure 8.19.1-1: Remote UE Initial Access procedure

1. The U2N Remote UE and the U2N Relay UE perform discovery procedure, and establish PC5 connection using NR ProSe procedure.

2. The U2N Remote UE sends an *RRCSetupRequest* message to the U2N Relay UE via PC5 Relay RLC Channel.

3. The U2N Relay UE withholds the received RRC message and sends the *SidelinkUEInformationNR* message to the gNB-DU. Before that, if the U2N Relay UE is in RRC\_IDLE/RRC\_INACTIVE state, it should trigger the RRC establishment/resume procedure to enter RRC\_CONNECTED state and gNB may configure the U2N Relay UE with Uu Relay RLC channel(s) for relaying of U2N Remote UE’s SRB0/1.

4. The gNB-DU sends the UL RRC MESSAGE TRANSFER message of the U2N Relay UE by encapsulating the *SidelinkUEInformationNR* message to gNB-CU, and gNB-CU allocates the local ID of U2N Remote UE.

5. The gNB-CU sends the UE CONTEXT MODIFICATION REQUEST message of the U2N Relay UE to gNB-DU. Such message may request the establishment of Uu Relay RLC channel(s) for the transmission of U2N Remote UE’s SRB0/1 if not configured yet.

6. The gNB-DU sends the UE CONTEXT MODIFICATION RESPONSE message of the U2N Relay UE to gNB-CU.

7. The gNB-CU sends the DL RRC MESSAGE TRANSFER message of the U2N Relay UE to gNB-DU by encapsulating the *RRCReconfiguration* message, which contains the local ID allocated to the U2N Remote UE. The *RRCReconfiguration* message shall also contain the Uu Relay RLC channel(s) configuration if not configured and bearer mapping for relaying of U2N Remote UE’s SRB0/1.

8. The gNB-DU sends the *RRCReconfiguration* message to the U2N Relay UE to configure the local ID of the U2N Remote UE, the Uu Relay RLC channel(s) configuration and bearer mapping for relaying of U2N Remote UE’s SRB0/1.

9. The U2N Relay UE sends the *RRCReconfigurationComplete* message to gNB-DU.

10. The gNB-DU sends the UL RRC MESSAGE TRANSFER message of the U2N Relay UE by encapsulating the *RRCReconfigurationComplete* message to gNB-CU.

11. After receiving the local ID of the U2N Remote UE and the Uu Relay RLC channel(s) configuration and bearer mapping for relaying of U2N Remote UE’s SRB0, the U2N Relay UE sends the *RRCSetupRequest* message of the U2N Remote UE to gNB-DU. The local ID of the U2N Remote UE and RB ID for SRB0 are conveyed in the SRAP header.

12. The gNB-DU allocates a C-RNTI and a gNB-DU UE F1AP ID for the U2N Remote UE and sends the INITIAL UL RRC MESSAGE TRANSFER message to gNB-CU by encapsulating the *RRCSetupRequest* message of the U2N Remote UE. In addition, the local ID of the U2N Remote UE , the gNB-DU UE F1AP ID of the U2N Relay UE and the sidelink configuration container for at least the PC5 Relay RLC channel configuration for relaying of U2N Remote UE’s SRB1 are included in the INITIAL UL RRC MESSAGE TRANSFER message.

13. The gNB-CU allocates a gNB-CU UE F1AP ID for the U2N Remote UE and generates a *RRCSetup* message towards the U2N Remote UE. The RRC message is encapsulated in the DL RRC MESSAGE TRANSFER message, and includes the configurations of PC5 Relay RLC channel and bearer mapping at least for the transmission of U2N Remote UE’s SRB1.

14. The gNB-DU sends the *RRCSetup* message to the U2N Remote UE via the U2N Relay UE.

15. The gNB-CU configures the U2N Relay UE with PC5 Relay RLC channel, Uu Relay RLC channel and bearer mapping for relaying of U2N Remote UE’s SRB1. According to the configuration from gNB-CU, the U2N Relay UE establishes a PC5 Relay RLC channel for relaying of U2N Remote UE’s SRB1 over PC5 and establishes a Uu Relay RLC channel for relaying of U2N Remote UE’s SRB1 towards gNB-DU if not configured yet.

NOTE 1: This step may be performed earlier, e.g., via steps 5~8.

16. The U2N Remote UE sends the *RRCSetupComplete* message to the gNB-DU via the U2N Relay UE.

17. The gNB-DU encapsulates the RRC message in the UL RRC MESSAGE TRANSFER message and sends it to the gNB-CU.

18. Upon receiving the *RRCSetupComplete* message of U2N Remote UE, the gNB-CU sends the INITIAL UE MESSAGE message to the AMF.

19. The AMF sends the INITIAL CONTEXT SETUP REQUEST message to the gNB-CU.

20. The gNB-CU sends the UE CONTEXT SETUP REQUEST message to establish the U2N Remote UE context in the gNB-DU. Such message may request the configuration of PC5 Relay RLC channels for the transmission of U2N Remote UE’s SRB2 and DRBs, and may also encapsulate the *SecurityModeCommand* message.

21. The gNB-DU sends the *SecurityModeCommand* message to the U2N Remote UE via U2N Relay UE.

22. The gNB-DU sends the UE CONTEXT SETUP RESPONSE message of the U2N Remote UE to the gNB-CU, which contains the configuration of PC5 Relay RLC channels for the transmission of U2N Remote UE’s SRB2 and DRBs.

23. The U2N Remote UE responds with the *SecurityModeComplete* message.

24. The gNB-DU encapsulates the RRC message in the UL RRC MESSAGE TRANSFER message and sends it to the gNB-CU.

25. The gNB-CU generates the *RRCReconfiguration* message for U2N Remote UE and encapsulates it in the DL RRC MESSAGE TRANSFER message. The *RRCReconfiguration* message contains the configuration of PC5 Relay RLC channels and bearer mapping for the transmission of U2N Remote UE’s SRB2 and DRBs.

26. The gNB-DU sends *RRCReconfiguration* message to the U2N Remote UE via the U2N Relay UE.

27. The U2N Remote UE sends *RRCReconfigurationComplete* message to the gNB-DU via the U2N Relay UE.

28. The gNB-DU encapsulates the RRC message in the UL RRC MESSAGE TRANSFER message and send it to the gNB-CU.

29. The gNB-CU sends the INITIAL CONTEXT SETUP RESPONSE message to the AMF.

30. The gNB-CU configures additional Uu Relay RLC channels between the gNB-DU and the U2N Relay UE, and additional PC5 Relay RLC channels for the U2N Relay UE for relaying of U2N Remote UE’s DRBs and SRBs. Also, such step may configure the bearer mapping between U2N Remote UE’s DRB/SRB and PC5/Uu Relay RLC channel at the U2N Relay UE.

NOTE 2: This step may be performed earlier.

### 8.19.2 Remote UE RRC Reestablishment

The signalling flow for Remote UE RRC Reestablishment is shown in Figure 8.19.2-1.



Figure 8.19.2-1: Remote UE RRC Reestablishment procedure

1. The U2N Remote UE and the U2N Relay UE perform discovery procedure, and establish PC5 connection using NR ProSe procedure. This step may be omitted if PC5 connection was established.

2. The U2N Remote UE sends an *RRCReestablishmentRequest* message to the U2N Relay UE via PC5 Relay RLC Channel.

3~10. The gNB-CU allocates the local ID of the U2N Remote UE if the U2N Relay UE does not have it. The details of those steps can be referred to clause 8.19.1.

11. After receiving the local ID of the U2N Remote UE, the U2N Relay UE sends the *RRCReestablishmentRequest* message of the U2N Remote UE to gNB-DU.

12. The gNB-DU allocates a C-RNTI and a gNB-DU UE F1AP ID for the U2N Remote UE and sends the INITIAL UL RRC MESSAGE TRANSFER message to gNB-CU by encapsulating the *RRCReestablishmentRequest* message of the U2N Remote UE. In addition, the local ID of the U2N Remote UE, the gNB-DU UE F1AP ID of the U2N Relay UE and the sidelink configuration container for at least the PC5 Relay RLC channel configuration for relaying of U2N Remote UE’s SRB1 are included in the INITIAL UL RRC MESSAGE TRANSFER message.

13. The gNB-CU configures the U2N Relay UE with PC5 Relay RLC channel, Uu Relay RLC channel and bearer mapping for relaying of U2N Remote UE’s SRB1. According to the configuration from gNB-CU, the U2N Relay UE establishes a PC5 Relay RLC channel for relaying of U2N Remote UE’s SRB1 over PC5 and establishes a Uu Relay RLC channel for relaying of U2N Remote UE’s SRB1 over Uu.

NOTE 1: This step may be performed earlier, e.g., via steps 5~8.

14~23. The details of those steps can be referred to Steps 5~14 in clause 8.7. For L2 U2N relay, the RRC message(s) between the U2N Remote UE and the gNB-DU are relayed via the U2N Relay UE; Steps 18~19 may additionally perform the configurations of PC5 Relay RLC channel(s) for relaying of U2N Remote UE’s SRB1, SRB2 and DRBs.

24. The gNB-CU configures additional Uu Relay RLC channels between the gNB-DU and the U2N Relay UE, and additional PC5 Relay RLC channels for the U2N Relay UE for relaying of U2N Remote UE’s DRBs and SRBs. Also, such step may configure the bearer mapping between U2N Remote UE’s DRB/SRB and PC5/Uu Relay RLC channel at the U2N Relay UE.

NOTE 2: This step may be performed earlier.

### 8.19.3 Remote UE RRC Inactive to other states

The signalling flow for Remote UE from RRC Inactive to other states is shown in Figure 8.19.3-1.



Figure 8.19.3-1: Remote UE RRC Resume procedure

1. The U2N Remote UE and the U2N Relay UE perform discovery procedure, and establish PC5 connection using NR ProSe procedure. This step may be omitted if PC5 connection was established.

2. The U2N Remote UE sends an *RRCResumeRequest* message to the U2N Relay UE via PC5 RLC Relay Channel.

3~10. The gNB-CU allocates the local ID of the U2N Remote UE if the U2N Relay UE does not have it. The details of those steps can be referred to clause 8.19.1.

11. After receiving the local ID of the U2N Remote UE, the U2N Relay UE sends the *RRCResumeRequest* message of the U2N Remote UE to gNB-DU.

12. The gNB-DU allocates a C-RNTI and a gNB-DU UE F1AP ID for the U2N Remote UE and sends the INITIAL UL RRC MESSAGE TRANSFER message to gNB-CU by encapsulating the *RRCResumeRequest* message of the U2N Remote UE. In addition, the local ID of the U2N Remote UE, the gNB-DU UE F1AP ID of the U2N Relay UE and the container of SL-PHY-MAC-RLC-Config for at least the PC5 Relay RLC channel configuration for relaying of U2N Remote UE’s SRB1 are included in the INITIAL UL RRC MESSAGE TRANSFER message.

13. The gNB-CU configures the U2N Relay UE with PC5 Relay RLC channel, Uu Relay RLC channel and bearer mapping for relaying of U2N Remote UE’s SRB1. According to the configuration from gNB-CU, the U2N Relay UE establishes a PC5 Relay RLC channel for relaying of U2N Remote UE’s SRB1 over PC5 and establishes a Uu Relay RLC channel for relaying of U2N Remote UE’s SRB1 over Uu.

NOTE 1: This step may be performed earlier, e.g., via steps 5~8.

14~19. The details of those steps can be referred to Steps 5~10 in clause 8.6.2. For L2 U2N relay, the RRC message(s) between the U2N Remote UE and the gNB-DU are relayed via the U2N Relay UE; Steps 14~15 may additionally perform the configurations of PC5 Relay RLC channel(s) for relaying of U2N Remote UE’s SRB2 and DRBs.

20. The gNB-CU establishes additional Uu Relay RLC channels between the gNB-DU and the U2N Relay UE, and additional PC5 Relay RLC channels for the U2N Relay UE for relaying of U2N Remote UE’s DRBs and SRBs. Also, such step may configure the bearer mapping between U2N Remote UE’s DRB/SRB and PC5/Uu Relay RLC channel at the U2N Relay UE.

NOTE 2: This step may be performed earlier.

*End of Change*