**3GPP TSG-RAN WG2 Meeting #112e *R2-20xxxxx***

**Electronic Meeting, Nov 2-13, 2020**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **38.331** | **CR** | **XXXX** | **rev** | **-** | **Current version:** | **16.2.0** |  |
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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 | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Clarification on RRC Reestablishment procedure |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-11-09 |
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| ***Category:*** | **A** |  | ***Release:*** | Rel-16 |
|  | *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 canbe 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | When the network signaling the first RRCReconfiguration message upon RRC re-establishment, the understanding is that the fields reestablishPDCP and reestablishRLC should not be set to *true* for the SRB1 since the security refresh is already performed by the UE upon the reception of the *RRCReestablishment* message.However, according to the current TS 38.331, the behavior of the field *reestablishPDCP* and *reestablishRLC* in the first *RRCReconfiguration* message upon re-establishment is only clear for the SRB2 and DRB by the following sentence*reestablishPDCP**Key change could for example be due to reconfiguration with sync, for SRB2 when resuming an RRC connection, or at the first reconfiguration after RRC connection reestablishment in NR**reestablishRLC**For SRB2 and DRBs, it is also set to true during the resumption of the RRC connection or the first reconfiguration after reestablishment.*For the reestablishPDCP field, the highlighted comma in the field description may implies that the field is set to true for SRB2 resuming an RRC connection or, for SRB1 and SRB2, at the first reconfiguration after RRC connection reestablishment. This is of course not true as all the cases mentioned in the sentence refer “only” to SRB2.According to this, is not clear how the network should set these fields for the SRB1 in the first reconfiguration after re-establishment and if the UE expects those fields to be set to *true* or not.  |
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| ***Summary of change:*** | Section 6.3.2RadioBearerConfig (field description of reestablishPDCP within SRB-ToAddMod)- Clarified that for SRB1, instead, the network does not need to set this to true at the first reconfiguration after RRC connection reestablishment in NR.RLC-BearerConfig (field description of reestablishRLC)- Clarified that for SRB1, instead, the network does not need to set this to true at the first reconfiguration after RRC connection reestablishment in NR.**Impact Analysis**Impacted 5G architecture options: NR SA Impacted functionality: RRC re-establishment procedureInter-operability:1. If the network is implemented according to the CR and the UE is not, the UE may expect that the network always set the *reestablishPDCP* and *reestablishRLC* field to *true* for SRB1, in the first *RRCReconfiguration* message after re-establishment.2. If the UE is implemented according to the CR and the network is not, the UE will perform an unnecessary security key refresh for SRB1 in the first *RRCReconfiguration* message after re-establishment. |
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| ***Consequences if not approved:*** | If the CR is not approved, a UE that always expects the *reestablishPDCP* and *reestablishRLC* field set to true for SRB1, in the first *RRCReconfiguration* message after re-establishment, may trigger reconfiguration error. On the other side, if reconfiguration error is not triggered, the UE will perform an unneccesary security key refresh for SRB1 in the first *RRCReconfiguration* message after re-establishment. |
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| ***Clauses affected:*** | 6.3.2 |
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|  | **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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*START OF CHANGES*

### 6.3.2 Radio resource control information elements

<Unnecessary IEs omitted>

– *RadioBearerConfig*

The IE *RadioBearerConfig* is used to add, modify and release signalling and/or data radio bearers. Specifically, this IE carries the parameters for PDCP and, if applicable, SDAP entities for the radio bearers.

***RadioBearerConfig* information element**

-- ASN1START

-- TAG-RADIOBEARERCONFIG-START

RadioBearerConfig ::= SEQUENCE {

 srb-ToAddModList SRB-ToAddModList OPTIONAL, -- Cond HO-Conn

 srb3-ToRelease ENUMERATED{true} OPTIONAL, -- Need N

 drb-ToAddModList DRB-ToAddModList OPTIONAL, -- Cond HO-toNR

 drb-ToReleaseList DRB-ToReleaseList OPTIONAL, -- Need N

 securityConfig SecurityConfig OPTIONAL, -- Need M

 ...

}

SRB-ToAddModList ::= SEQUENCE (SIZE (1..2)) OF SRB-ToAddMod

SRB-ToAddMod ::= SEQUENCE {

 srb-Identity SRB-Identity,

 reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

 discardOnPDCP ENUMERATED{true} OPTIONAL, -- Need N

 pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

 ...

}

DRB-ToAddModList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-ToAddMod

DRB-ToAddMod ::= SEQUENCE {

 cnAssociation CHOICE {

 eps-BearerIdentity INTEGER (0..15),

 sdap-Config SDAP-Config

 } OPTIONAL, -- Cond DRBSetup

 drb-Identity DRB-Identity,

 reestablishPDCP ENUMERATED{true} OPTIONAL, -- Need N

 recoverPDCP ENUMERATED{true} OPTIONAL, -- Need N

 pdcp-Config PDCP-Config OPTIONAL, -- Cond PDCP

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 daps-Config-r16 ENUMERATED{true} OPTIONAL --Need N

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}

DRB-ToReleaseList ::= SEQUENCE (SIZE (1..maxDRB)) OF DRB-Identity

SecurityConfig ::= SEQUENCE {

 securityAlgorithmConfig SecurityAlgorithmConfig OPTIONAL, -- Cond RBTermChange1

 keyToUse ENUMERATED{master, secondary} OPTIONAL, -- Cond RBTermChange

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}

-- TAG-RADIOBEARERCONFIG-STOP

-- ASN1STOP

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| ***DRB-ToAddMod* field descriptions** |
| ***cnAssociation***Indicates if the bearer is associated with the *eps-bearerIdentity* (when connected to EPC) or *sdap-Config* (when connected to 5GC). |
| ***daps-Config***Indicates that the bearer is configured as DAPS bearer.This field is optional present, need N, in case *masterCellGroup* includes *ReconfigurationWithSync*, MR-DC is not configured and *ethernetHeaderCompression* is not configured for the DRB. Otherwise the field is absent. |
| ***drb-Identity***In case of DC, the DRB identity is unique within the scope of the UE, i.e. an MCG DRB cannot use the same value as a split DRB. For a split DRB the same identity is used for the MCG and SCG parts of the configuration. |
| ***eps-BearerIdentity***The EPS bearer ID determines the EPS bearer. |
| ***reestablishPDCP***Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to termination point change for the bearer, reconfiguration with sync, resuming an RRC connection, or the first reconfiguration after reestablishment. It is also applicable for LTE procedures when NR PDCP is configured. Network doesn't include this field for DRB if the bearer is configured as DAPS bearer. |
| ***recoverPDCP***Indicates that PDCP should perform recovery according to TS 38.323 [5]. Network doesn't include this field if the bearer is configured as DAPS bearer. |
| ***sdap-Config***The SDAP configuration determines how to map QoS flows to DRBs when NR or E-UTRA connects to the 5GC and presence/absence of UL/DL SDAP headers. |

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| ***RadioBearerConfig* field descriptions** |
| ***securityConfig***Indicates the security algorithm and key to use for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included after AS security has been activated, the UE shall continue to use the currently configured *keyToUse* and security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. The field is not included when configuring SRB1 before AS security is activated. |
| ***srb3-ToRelease***Release SRB3. SRB3 release can only be done over SRB1 and only at SCG release and reconfiguration with sync. |

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| ***SecurityConfig* field descriptions** |
| ***keyToUse***Indicates if the bearers configured with the list in this IE *RadioBearerConfig* are using the master key or the secondary key for deriving ciphering and/or integrity protection keys. For MR-DC, network should not configure SRB1 and SRB2 with secondary key and SRB3 with the master key. When the field is not included, the UE shall continue to use the currently configured *keyToUse* for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |
| ***securityAlgorithmConfig***Indicates the security algorithm for the signalling and data radio bearers configured with the list in this IE *RadioBearerConfig*. When the field is not included, the UE shall continue to use the currently configured security algorithm for the radio bearers reconfigured with the lists in this IE *RadioBearerConfig*. |

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| ***SRB-ToAddMod* field descriptions** |
| ***discardOnPDCP***Indicates that PDCP should discard stored SDU and PDU according to TS 38.323 [5]. |
| ***reestablishPDCP***Indicates that PDCP should be re-established. Network sets this to *true* whenever the security key used for this radio bearer changes. Key change could for example be due to reconfiguration with sync, for SRB2 when resuming an RRC connection or at the first reconfiguration after RRC connection reestablishment in NR. For LTE SRBs using NR PDCP, it could be for handover, RRC connection reestablishment or resume. Network doesn't include this field if any DAPS bearer is configured. For SRB1, instead, the network does not need to set this to true at the first reconfiguration after RRC connection reestablishment in NR. |
| ***srb-Identity***Value 1 is applicable for SRB1 only. Value 2 is applicable for SRB2 only. Value 3 is applicable for SRB3 only. |

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| **Conditional Presence** | **Explanation** |
| *RBTermChange* | The field is mandatory present in case of set up of signalling and data radio bearer and change of termination point for the radio bearer between MN and SN. It is optionally present otherwise, Need S. |
| *RBTermChange1* | The field is mandatory present in case of:- set up of signalling and data radio bearer,- change of termination point for the radio bearer between MN and SN,- handover from E-UTRA/EPC or E-UTRA/5GC to NR,- handover from NR or E-UTRA/EPC to E-UTRA/5GC if the UE supports NGEN-DC.It is optionally present otherwise, Need S. |
| *PDCP* | The field is mandatory present if the corresponding DRB is being setup or corresponding DRB is reconfigured with NR PDCP or corresponding SRB associated with two RLC entities is being setup or if the number of RLC bearers associated with the DRB or SRB is changed. The field is optionally present, Need S, if the corresponding SRB associated with one RLC entity is being setup or corresponding SRB is reconfigured with NR PDCP; otherwise the field is optionally present, need M. |
| *DRBSetup* | The field is mandatory present if the corresponding DRB is being setup; otherwise the field is optionally present, need M. |
| *HO-Conn* | The field is mandatory present- in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,- or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured,- or in case of *RRCSetup*.Otherwise the field is optionally present, need N.Upon *RRCSetup*, only SRB1 can be present. |
| *HO-toNR* | The field is mandatory present- in case of inter-system handover from E-UTRA/EPC to E-UTRA/5GC or NR,- or when the *fullConfig* is included in the *RRCReconfiguration* message and NE-DC/NR-DC is not configured.In case of *RRCSetup*, the field is absent; otherwise the field is optionally present, need N. |

<Unnecessary IEs omitted>

– *RLC-BearerConfig*

The IE *RLC-BearerConfig* is used to configure an RLC entity, a corresponding logical channel in MAC and the linking to a PDCP entity (served radio bearer).

***RLC-BearerConfig* information element**

-- ASN1START

-- TAG-RLC-BEARERCONFIG-START

RLC-BearerConfig ::= SEQUENCE {

 logicalChannelIdentity LogicalChannelIdentity,

 servedRadioBearer CHOICE {

 srb-Identity SRB-Identity,

 drb-Identity DRB-Identity

 } OPTIONAL, -- Cond LCH-SetupOnly

 reestablishRLC ENUMERATED {true} OPTIONAL, -- Need N

 rlc-Config RLC-Config OPTIONAL, -- Cond LCH-Setup

 mac-LogicalChannelConfig LogicalChannelConfig OPTIONAL, -- Cond LCH-Setup

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 rlc-Config-v1610 RLC-Config-v1610 OPTIONAL -- Need R

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}

-- TAG-RLC-BEARERCONFIG-STOP

-- ASN1STOP

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| ***RLC-BearerConfig* field descriptions** |
| ***logicalChannelIdentity***ID used commonly for the MAC logical channel and for the RLC bearer. |
| ***reestablishRLC***Indicates that RLC should be re-established. Network sets this to *true* at least whenever the security key used for the radio bearer associated with this RLC entity changes. For SRB2 and DRBs, it is also set to *true* during the resumption of the RRC connection or the first reconfiguration after reestablishment. For SRB1, instead, the network does not need to set this to true at the first reconfiguration after RRC connection reestablishment in NR. |
| ***rlc-Config***Determines the RLC mode (UM, AM) and provides corresponding parameters. RLC mode reconfiguration can only be performed by DRB release/addition or full configuration. The network may configure *rlc-Config-v1610* only when *rlc-Config* (without suffix) is set to *am*. |
| ***servedRadioBearer***Associates the RLC Bearer with an SRB or a DRB. The UE shall deliver DL RLC SDUs received via the RLC entity of this RLC bearer to the PDCP entity of the *servedRadioBearer*. Furthermore, the UE shall advertise and deliver uplink PDCP PDUs of the uplink PDCP entity of the *servedRadioBearer* to the uplink RLC entity of this RLC bearer unless the uplink scheduling restrictions (*moreThanOneRLC* in *PDCP-Config* and the restrictions in *LogicalChannelConfig*) forbid it to do so. |

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| **Conditional Presence** | **Explanation** |
| *LCH-Setup* | This field is mandatory present upon creation of a new logical channel for a DRB. This field is optionally present, Need S, upon creation of a new logical channel for an SRB. It is optionally present, Need M, otherwise. |
| *LCH-SetupOnly* | This field is mandatory present upon creation of a new logical channel. It is absent, Need M otherwise. |

*END OF CHANGES*