**3GPP TSG-RAN WG2 Meeting #127 *R2-240xxxx***

**Maastricht, Netherlands, Aug 19th – 23rd, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.323** | **CR** | **xxx** | **rev** | **-** | **Current version:** | **18.2.0** |  |
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| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | Correction on data transmission and data valume calculation in MP |
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| ***Source to WG:*** | InterDigital, Huawei, HiSilicon |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_SL\_relay\_enh-Core |  | ***Date:*** | 2024.08.19 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | In MP, the primary path can be either direct path or indirect path. But the following procedural text includes only the case of direct/Uu path configured as primay path, but not the case of direct/Uu path configured as secondary path.

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| Copied from clause 5.2.1else (i.e., PDCP duplication is deactivated for the RB):- if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the primary RLC entity, and data volume pending for initial transmission in the N3C (if available) or mapped SL RLC entity associated with the SRAP entity, is equal to or larger than *ul-DataSplitThreshold*:- submit the PDCP PDU to either the primary RLC entity or SRAP entity/N3C; |

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| Copied from clause 5.6else, if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the primary RLC entity, and data volume pending for initial transmission in the N3C (if available), or mapped SL RLC entity associated with the SRAP entity, is equal to or larger than *ul-DataSplitThreshold*:- indicate the PDCP data volume to both the MAC entity associated with the primary RLC entity and the MAC entity associated with the SRAP entity;- indicate the PDCP data volume as 0 to the MAC entity associated with Uu RLC entity other than the primary RLC entity; |

Then as specified in RRC specification, when the primay path is configured on indirect path, the split secondary RLC entity is a Uu RLC entity on direct path, therefore the term of “split secondary RLC entity” can be used to cover the above missing case by adding “split secondary RLC entity” after “primary RLC entity”.

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| Copied from TS 38.331***splitSecondaryPath***Indicates the LCID of the split secondary RLC entity as specified in TS 38.323 [5] for fallback to split bearer operation when UL data transmission with more than two RLC entities is associated with the PDCP entity. This RLC entity belongs to a cell group that is different from the cell group indicated by *cellGroup* in the field *primaryPath.* This RLC entity belongs to the cell group of the direct path if *primaryPathOnIndirectPath* is set to *true* in MP case. |

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| ***Summary of change:*** | In clause 5.2.1 and 5.6, * Clarify that when indirect/Uu path is the secondary path, the Uu RLC entity can be the split secondary RLC entity, which should be considered in data transmission and data valume calculation in MP.

 In clause 3.1, clarified the definition of split secondary RLC entity for MP.**Impact analysis**Impacted functionality: MP operationImpacted architecture options: NR SAInter-operability: * There are no inter-operability issues, considering this CR is only to clarify UE behaviour.
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| ***Consequences if not approved:*** | Without the change, some cases are missing in the procedual text for data transmission in 5.2.1 and data volume calculation in 5.6. |
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| ***Clauses affected:*** | 3.1, 5.2.1, 5.6 |
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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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*START OF CHANGES*

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**AM DRB**:a data radio bearer which utilizes RLC AM.

**AM MRB:** an MRB associated with at least one AM RLC bearer for PTP transmission.

**Broadcast MRB**: a radio bearer configured for MBS broadcast delivery.

**DAPS bearer**:a bearer whose radio protocols are located in both the source gNB and the target gNB during DAPS handover to use both source gNB and target gNB resources.

**Delay-critical PDCP SDU**: if *pdu-SetDiscard* is not configured, a PDCP SDU for which the remaining time till *discardTimer* expiry is less than the *remainingTimeThreshold*. If *pdu-SetDiscard* is configured, a PDCP SDU belonging to a PDU Set of which at least one PDCP SDU has the remaining time till *discardTimer* expiry less than the *remainingTimeThreshold*.

**MBS Radio Bearer:** a radio bearer that is configured for MBS delivery.

**Multicast MRB:** a radio bearer configured for MBS multicast delivery.

**Multi-path:** Mode of operation of a remote UE in RRC\_CONNECTED configured with one direct path on which the UE connects to the gNB using NR Uu and one indirect path on which the UE connects to the same gNB via another UE using PC5 unicast link or Non-3GPP Connection.

**Multi-path Primary Path**: In multi-path for a split DRB, the primary path is configured by RRC to be either the direct path or the indirect path. In multi-path for a split SRB, the primary path is always the direct path.

**Multi-path Secondary Path**: In multi-path for a split DRB, the path (either direct or indirect) which is not configured by RRC as the primary path. In multi-path for a split SRB, the secondary path is always the indirect path (SL or N3C).

**Multi-path split bearer:** In multi-path, a bearer in which one PDCP entity is mapped to one or more (direct) Uu RLC entities and either one SRAP entity of a SL indirect path or a non-3GPP connection.

**N3C indirect path:** In multi-path, the indirect path using Non-3GPP Connection between remote UE and relay UE.

**Non-split bearer**: a bearer whose radio protocols are located in either the MgNB or the SgNB to use MgNB or SgNB resource, respectively.

**NR sidelink communication**: AS functionality enabling at least V2X communication as defined in TS 23.287 [13] and ProSe communication (including ProSe non-Relay, UE-to-Network Relay, and UE-to-UE Relay communication) as defined in TS 23.304 [18], between two or more nearby UEs, using NR technology but not traversing any network node.

**NR sidelink discovery**: AS functionality enabling ProSe non-Relay Discovery, ProSe UE-to-Network Relay discovery, and ProSe UE-to-UE Relay discovery for Proximity based Services as defined in TS 23.304 [18] between two or more nearby UEs, using NR technology but not traversing any network node.

**NR sidelink transmission**: any NR Sidelink-based transmission, including both transmission for NR sidelink discovery and transmission for NR sidelink communication.

**PDCP data volume**: the amount of data available for transmission in a PDCP entity.

**PDU Set**: one or more PDUs carrying the payload of one unit of information generated at the application level (e.g. frame(s) or video slice(s) etc. for XR services), as defined in TS 23.501 [23]. A PDU in the PDU Set corresponds to a PDCP SDU.

**SL indirect path**: In multi-path, the indirect path on which the L2 U2N Remote UE connects to the network via a L2 U2N Relay UE.

**Split bearer**: in dual connectivity, a bearer whose radio protocols are located in both the MgNB and the SgNB to use both MgNB and SgNB resources.

**Split secondary RLC entity**: in dual connectivity, the RLC entity other than the primary RLC entity which is responsible for split bearer operation. If the PDCP entity is associated with two RLC entities, the split secondary RLC entity is the RLC entity other than the primary RLC entity. If the PDCP entity is associated with more than two RLC entities, the split secondary RLC entity is configured by upper layers. In multi-path, the split secondary RLC entity is the RLC entity on the direct path which is responsible for split bearer operation when the MP primary path is the indirect path. When the PDCP entity on the direct path is associated with one RLC entity, the split secondary RLC entity is that RLC entity. When the PDCP entity is associated with more than one RLC entity, the split secondary RLC entity is configured by upper layers.

*NEXT CHANGE*

### 5.2.1 Transmit operation

At reception of a PDCP SDU from upper layers, the transmitting PDCP entity shall:

- if *discardTimerForLowImportance* is configured and PSI based SDU discard is activated, and the PDCP SDU belongs to a low importance PDU Set:

- start the *discardTimerForLowImportance* associated with this PDCP SDU;

- else:

- start the *discardTimer* associated with this PDCP SDU (if configured).

NOTE 0: Identification of PSI of a PDU Set and determination of low importance PDU Set are left up to UE implementation.

For a PDCP SDU received from upper layers, the transmitting PDCP entity shall:

- associate the COUNT value corresponding to TX\_NEXT to this PDCP SDU;

NOTE 1: Associating more than half of the PDCP SN space of contiguous PDCP SDUs with PDCP SNs, when e.g., the PDCP SDUs are discarded or transmitted without acknowledgement, may cause HFN desynchronization problem. How to prevent HFN desynchronization problem is left up to UE implementation.

- perform header compression of the PDCP SDU using ROHC as specified in the clause 5.7.4 and/or using EHC as specified in the clause 5.12.4;

- perform uplink data compression of the PDCP SDU as specified in clause 5.14.4;

- perform integrity protection, and ciphering using the TX\_NEXT as specified in the clause 5.9 and 5.8, respectively;

- set the PDCP SN of the PDCP Data PDU to TX\_NEXT modulo 2[*pdcp-SN-SizeUL*];

- increment TX\_NEXT by one;

- submit the resulting PDCP Data PDU to lower layer as specified below.

When submitting a PDCP PDU to lower layer, the transmitting PDCP entity shall:

- if the transmitting PDCP entity is associated with one SRAP entity:

- submit the PDCP PDU to the associated SRAP entity;

- else, if the transmitting PDCP entity is associated with one RLC entity:

- submit the PDCP PDU to the associated RLC entity;

- else, if the transmitting PDCP entity is associated with one or more RLC entities and, either one SRAP entity or the N3C:

- if PDCP duplication is activated for the RB:

- if the PDCP PDU is a PDCP Data PDU:

- duplicate the PDCP Data PDU and submit the PDCP Data PDU to each of the MP primary path and MP secondary path which is activated for PDCP duplication, including any associated Uu RLC entities activated for PDCP duplication;

- else:

- if the MP primary path is the direct path:

- submit the PDCP Control PDU to the primary RLC entity;

- else:

- submit the PDCP Control PDU to the SRAP entity or N3C;

- else (i.e., PDCP duplication is deactivated for the RB):

- if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in either the primary RLC entity (when the MP primary path is the direct path) or the split secondary RLC entity on the direct path (when the MP primary path is the indirect path), and data volume pending for initial transmission in the N3C (if available) or mapped SL RLC entity associated with the SRAP entity, is equal to or larger than *ul-DataSplitThreshold*:

- submit the PDCP PDU to either the Uu RLC entity (i.e., either the primary RLC entity or split secondary RLC entity) or SRAP entity/N3C;

- else:

- if the MP primary path is the direct path:

- submit the PDCP PDU to the primary RLC entity;

- else:

- submit the PDCP PDU to the SRAP entity or N3C;

- else, if the transmitting PDCP entity is associated with at least two RLC entities:

- if the PDCP duplication is activated for the RB:

- if the PDCP PDU is a PDCP Data PDU:

- duplicate the PDCP Data PDU and submit the PDCP Data PDU to the associated RLC entities activated for PDCP duplication;

- else:

- submit the PDCP Control PDU to the primary RLC entity;

- else (i.e. the PDCP duplication is deactivated for the RB or the RB is a DAPS bearer):

- if the split secondary RLC entity is configured; and

- if the total amount of PDCP data volume and RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the primary RLC entity and the split secondary RLC entity is equal to or larger than *ul-DataSplitThreshold*:

- submit the PDCP PDU to either the primary RLC entity or the split secondary RLC entity;

- else, if the transmitting PDCP entity is associated with the DAPS bearer:

- if the uplink data switching has not been requested:

- submit the PDCP PDU to the RLC entity associated with the source cell;

- else:

- if the PDCP PDU is a PDCP Data PDU:

- submit the PDCP Data PDU to the RLC entity associated with the target cell;

- else:

- if the PDCP Control PDU is associated with source cell:

- submit the PDCP Control PDU to the RLC entity associated with the source cell;

- else:

- submit the PDCP Control PDU to the RLC entity associated with the target cell;

- else:

- submit the PDCP PDU to the primary RLC entity.

NOTE 2: If the transmitting PDCP entity is associated with two RLC entities, or with one or more RLC entities and either an SRAP entity or the N3C, the UE should minimize the amount of PDCP PDUs submitted to lower layers before receiving request from lower layers and minimize the PDCP SN gap between PDCP PDUs submitted to two associated RLC entities, or to the one or more RLC entities and either the SRAP entity or the N3C, to minimize PDCP reordering delay in the receiving PDCP entity.

*NEXT CHANGE*

## 5.6 Data volume calculation

For the purpose of MAC buffer status reporting, the transmitting PDCP entity shall consider the following as PDCP data volume:

- the PDCP SDUs for which no PDCP Data PDUs have been constructed;

- the PDCP Data PDUs that have not been submitted to lower layers;

- the PDCP Control PDUs;

- for AM DRBs, the PDCP SDUs to be retransmitted according to clause 5.1.2 and clause 5.13;

- for AM DRBs, the PDCP Data PDUs to be retransmitted according to clause 5.5.

If the transmitting PDCP entity is associated with at least two RLC entities, or with one or more RLC entities and either an SRAP entity or the N3C, when indicating the PDCP data volume to a MAC entity for BSR triggering and Buffer Size calculation (as specified in TS 38.321 [4] and TS 36.321 [12]), the transmitting PDCP entity shall:

- if the PDCP duplication is activated for the RB:

- indicate the PDCP data volume to the MAC entity associated with the primary RLC entity, or the MAC entity associated with the SRAP entity if the MP primary path is the indirect path;

- indicate the PDCP data volume excluding the PDCP Control PDU to the MAC entity associated with the RLC entity other than the primary RLC entity, or the MAC entity associated with any Uu RLC entity, when the MP secondary path is the direct path, activated for PDCP duplication;

- indicate the PDCP data volume as 0 to the MAC entity associated with RLC entity deactivated for PDCP duplication;

- else (i.e. the PDCP duplication is deactivated for the RB or the RB is a DAPS bearer):

- if the split secondary RLC entity is configured; and

- if the total amount of PDCP data volume and RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in the primary RLC entity and the split secondary RLC entity is equal to or larger than *ul-DataSplitThreshold*:

- indicate the PDCP data volume to both the MAC entity associated with the primary RLC entity and the MAC entity associated with the split secondary RLC entity;

- indicate the PDCP data volume as 0 to the MAC entity associated with RLC entity other than the primary RLC entity and the split secondary RLC entity;

- else, if the total amount of PDCP data volume, RLC data volume pending for initial transmission (as specified in TS 38.322 [5]) in either the primary RLC entity (when the MP primary path is the direct path) or the split secondary RLC entity on the direct path (when the MP primary path is the indirect path), and data volume pending for initial transmission in the N3C (if available), or mapped SL RLC entity associated with the SRAP entity, is equal to or larger than *ul-DataSplitThreshold*:

- indicate the PDCP data volume to both the MAC entity associated with the Uu RLC entity (i.e., either primary RLC entity or split secondary RLC entity) and the MAC entity associated with the SRAP entity;

- indicate the PDCP data volume as 0 to the MAC entity associated with Uu RLC entity other than the primary RLC entity or the split secondary RLC entity;

- else, if the transmitting PDCP entity is associated with the DAPS bearer:

- if the uplink data switching has not been requested:

- indicate the PDCP data volume to the MAC entity associated with the source cell;

- else:

- indicate the PDCP data volume excluding the PDCP Control PDU for interspersed ROHC feedback associated with the source cell to the MAC entity associated with the target cell;

- indicate the PDCP data volume of PDCP Control PDU for interspersed ROHC feedback associated with the source cell to the MAC entity associated with the source cell;

- else:

- if the transmitting PDCP entity is associated with one or more RLC entities and, either one SRAP entity or the N3C; and

- if the MP primary path is the indirect path:

- indicate the PDCP data volume to the MAC entity associated with the SRAP entity;

- indicate the PDCP data volume as 0 to the MAC entities associated with all Uu RLC entities on the direct path;

- else:

- indicate the PDCP data volume to the MAC entity associated with the primary RLC entity;

- indicate the PDCP data volume as 0 to the MAC entity associated with the RLC entity other than the primary RLC entity.

*END OF CHANGES*