**3GPP TSG-RAN2 Meeting #109bis-eR2-2004140**

**Electronic, 20 April – 30 April 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **1587** | **rev** |  | **Current version:** | **16.0.0** |  |
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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 *pdcp-Duplication* at RRC Reconfiguration |
|  |  |
| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** | R2 |
|  |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-04-24 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | This CR is a Category A CR for Rel-15 CR: R2-2004119, CR#1534In the current RRC specification, it is not clearly described if *pdcp-Duplication* indicates the initial state 1) at the (very first) initial configuration of bearer conifgured with PDCP duplication or 2) at the reception of *pdcp-Duplication* IE. Those two interpretations could be equivalent to 1) value of *pdcp-Duplication* is not changed during the lifetime of the radio bearer or 2) value of *pdcp-Duplication* can be changed. The correct interpretation is 2) *pdcp-Duplication* indicates the state at the reception of *pdcp-Duplication* IE and 2) value of *pdcp-Duplication* can be changed. |
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| ***Summary of change:*** | The field description of pdcp-Duplication clarifies that the value of this field indicates the state of the duplication “at the time of receiving this IE.” Also, “initial” is removed.**Impact Analysis**Architecture optionsStandalone and all MR-DC optionsImpacted functionalityPDCP duplicationInter-operability1. If the network is implemented according to the CR and the UE is not, the UE may not configure the changed duplication status. UE may consider it as a reconfiguration failure.
2. If the UE is implemented according to the CR but the network is not, it is not clear if UE applies original configuration of pdcp-Duplication or ignore it. Since UE behavior is not clear, there could be an inefficiency that the network does not change the value of pdcp-Duplication and sends MAC CE after the reconifiguration.
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| ***Consequences if not approved:*** | How to configure and apply pdcp-Duplication remains unclear. |
|  |  |
| ***Clauses affected:*** | 6.3.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.300 CR0222 |
| ***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

#### – *PDCP-Config*

The IE *PDCP-Config* is used to set the configurable PDCP parameters for signalling and data radio bearers.

*PDCP-Config* information element

-- ASN1START

-- TAG-PDCP-CONFIG-START

PDCP-Config ::= SEQUENCE {

 drb SEQUENCE {

 discardTimer ENUMERATED {ms10, ms20, ms30, ms40, ms50, ms60, ms75, ms100, ms150, ms200,

 ms250, ms300, ms500, ms750, ms1500, infinity} OPTIONAL, -- Cond Setup

 pdcp-SN-SizeUL ENUMERATED {len12bits, len18bits} OPTIONAL, -- Cond Setup2

 pdcp-SN-SizeDL ENUMERATED {len12bits, len18bits} OPTIONAL, -- Cond Setup2

 headerCompression CHOICE {

 notUsed NULL,

 rohc SEQUENCE {

 maxCID INTEGER (1..16383) DEFAULT 15,

 profiles SEQUENCE {

 profile0x0001 BOOLEAN,

 profile0x0002 BOOLEAN,

 profile0x0003 BOOLEAN,

 profile0x0004 BOOLEAN,

 profile0x0006 BOOLEAN,

 profile0x0101 BOOLEAN,

 profile0x0102 BOOLEAN,

 profile0x0103 BOOLEAN,

 profile0x0104 BOOLEAN

 },

 drb-ContinueROHC ENUMERATED { true } OPTIONAL -- Need N

 },

 uplinkOnlyROHC SEQUENCE {

 maxCID INTEGER (1..16383) DEFAULT 15,

 profiles SEQUENCE {

 profile0x0006 BOOLEAN

 },

 drb-ContinueROHC ENUMERATED { true } OPTIONAL -- Need N

 },

 ...

 },

 integrityProtection ENUMERATED { enabled } OPTIONAL, -- Cond ConnectedTo5GC1

 statusReportRequired ENUMERATED { true } OPTIONAL, -- Cond Rlc-AM

 outOfOrderDelivery ENUMERATED { true } OPTIONAL -- Need R

 } OPTIONAL, -- Cond DRB

 moreThanOneRLC SEQUENCE {

 primaryPath SEQUENCE {

 cellGroup CellGroupId OPTIONAL, -- Need R

 logicalChannel LogicalChannelIdentity OPTIONAL -- Need R

 },

 ul-DataSplitThreshold UL-DataSplitThreshold OPTIONAL, -- Cond SplitBearer

 pdcp-Duplication BOOLEAN OPTIONAL -- Need R

 } OPTIONAL, -- Cond MoreThanOneRLC

 t-Reordering ENUMERATED {

 ms0, ms1, ms2, ms4, ms5, ms8, ms10, ms15, ms20, ms30, ms40,

 ms50, ms60, ms80, ms100, ms120, ms140, ms160, ms180, ms200, ms220,

 ms240, ms260, ms280, ms300, ms500, ms750, ms1000, ms1250,

 ms1500, ms1750, ms2000, ms2250, ms2500, ms2750,

 ms3000, spare28, spare27, spare26, spare25, spare24,

 spare23, spare22, spare21, spare20,

 spare19, spare18, spare17, spare16, spare15, spare14,

 spare13, spare12, spare11, spare10, spare09,

 spare08, spare07, spare06, spare05, spare04, spare03,

 spare02, spare01 } OPTIONAL, -- Need S

 ...,

 [[

 cipheringDisabled ENUMERATED {true} OPTIONAL -- Cond ConnectedTo5GC

 ]],

 [[

 discardTimerExt-r16 ENUMERATED {ms0dot5, ms1, ms2, ms4, ms6, ms8, spare3, spare2, spare1} OPTIONAL, -- Cond DRB-Only

 moreThanTwoRLC-r16 SEQUENCE {

 splitSecondaryPath LogicalChannelIdentity OPTIONAL, -- Cond SplitBearer2

 duplicationState SEQUENCE (SIZE (3)) OF BOOLEAN OPTIONAL -- Need M

 } OPTIONAL, -- Cond MoreThanTwoRLC

 ethernetHeaderCompression-r16 CHOICE {

 notUsed NULL,

 ehc SEQUENCE {

 ehc-Common SEQUENCE {

 ehc-HeaderSize ENUMERATED { byte1, byte2 },

 ...

 },

 ehc-Downlink SEQUENCE {

 drb-ContinueEHC-DL ENUMERATED { true } OPTIONAL, -- Need N

 ...

 } OPTIONAL, -- Need N

 ehc-Uplink SEQUENCE {

 drb-ContinueEHC-UL ENUMERATED { true } OPTIONAL, -- Need N

 ...

 } OPTIONAL, -- Need N

 ...

 },

 ...

 } OPTIONAL -- Cond DRB

 ]]

}

UL-DataSplitThreshold ::= ENUMERATED {

 b0, b100, b200, b400, b800, b1600, b3200, b6400, b12800, b25600, b51200, b102400, b204800,

 b409600, b819200, b1228800, b1638400, b2457600, b3276800, b4096000, b4915200, b5734400,

 b6553600, infinity, spare8, spare7, spare6, spare5, spare4, spare3, spare2, spare1}

-- TAG-PDCP-CONFIG-STOP

-- ASN1STOP

Editor's note: FFS on moreThanonRLC in pdcp-Config.

| *PDCP-Config* field descriptions |
| --- |
| ***cipheringDisabled***If included, ciphering is disabled for this DRB regardless of which ciphering algorithm is configured for the SRB/DRBs. The field may only be included if the UE is connected to 5GC. Otherwise the field is absent. The network configures all DRBs with the same PDU-session ID with same value for this field. The value for this field cannot be changed after the DRB is set up. |
| ***discardTimer***Value in ms of *discardTimer* specified in TS 38.323 [5]. Value *ms10* corresponds to 10 ms, value *ms20* corresponds to 20 ms and so on. The value for this field cannot be changed in case of reconfiguration with sync, if *dapsConfig* is configured for this bearer. |
| ***discardTimerExt***Value in ms of *discardTimer* specified in TS 38.323 [5]. Value *ms0dot5* corresponds to 0.5 ms, value *ms1* corresponds to 1ms and so on. If this field is present, the field *discardTimer* is ignored and *discardTimerExt* is used instead. |
| ***drb-ContinueEHC-DL, drb-ContinueEHC-UL***The fieldsindicate whether the PDCP entity continues or resets the EHC header compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. The field *drb-ContinueEHC-DL* indicates whether the PDCP entity continues or resets for downlink and the field *drb-ContinueEHC-UL* indicates whether the PDCP entity continues or resets for uplink. These fields are configured only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated.  |
| ***drb-ContinueROHC***Indicates whether the PDCP entity continues or resets the ROHC header compression protocol during PDCP re-establishment, as specified in TS 38.323 [5]. This field is configured only in case of resuming an RRC connection or reconfiguration with sync, where the PDCP termination point is not changed and the *fullConfig* is not indicated. |
| ***duplicationState***This field indicates the initial uplink PDCP duplication state for the associated RLC entities. If set to *true,* the initial PDCP duplication state is activated for the associated RLC entity. The index for the indication is determined by ascending order of logical channel ID of all RLC entities other than the primary RLC entityindicated by *primaryPath* in the order of MCG and SCG, as in clause 6.1.3.Y of TS 38.321 [3]. If the number of associated RLC entities other than the primary RLC entity is two, UE ignores the value in the largest index of this field. The initial PDCP duplication state of the associated RLC entity is always activated for SRB.  |
| ***ehc-HeaderSize***Indicates the size of the header for EHC packet.Editor's note: The field is to capture the agreement "Both 1-byte header and 2-bytes header is supported and the choice depends on RRC configuration (of DRB). For one DRB the header size is fixed." This does not include the size of the Ethernet header, and the name will be updated. The name and the description will also be aligned with PDCP specification. FFS: The relation with the length of the CID field.  |
| ***ethernetHeaderCompression***If *ehc-Downlink* is configured, then Ethernet header compression is configured for downlink. Otherwise, it is not configured for downlink.If *ehc-Uplink* is configured, then Ethernet header compression is configured for uplink. Otherwise, it is not configured for uplink.The fields in *ehc-Common* applies for both downlink and uplink once configured. Ethernet Header compression can only be configured for DRB. |
| ***headerCompression***If rohc is configured, the UE shall apply the configured ROHC profile(s) in both uplink and downlink. If *uplinkOnlyROHC* is configured, the UE shall apply the configured ROHC profile(s) in uplink (there is no header compression in downlink). ROHC can be configured for any bearer type. ROHC and EHC can be both configured simultaneously for a DRB. The network reconfigures *headerCompression* only upon reconfiguration involving PDCP re-establishment. Network configures *headerCompression* to *notUsed* when *outOfOrderDelivery* is configured. |
| ***integrityProtection***Indicates whether or not integrity protection is configured for this radio bearer. The network configures all DRBs with the same PDU-session ID with same value for this field. The value for this field cannot be changed after the DRB is set up. |
| ***maxCID***Indicates the value of the MAX\_CID parameter as specified in TS 38.323 [5].The total value of MAX\_CIDs across all bearers for the UE should be less than or equal to the value of *maxNumberROHC-ContextSessions* parameter as indicated by the UE. |
| ***moreThanOneRLC***This field configures UL data transmission when more than one RLC entity is associated with the PDCP entity. |
| ***moreThanTwoRLC***This field configures UL data transmission when more than two RLC entities are associated with the PDCP entity. The presence of this field indicates that PDCP duplication is configured. PDCP duplication is not configured for CA packet duplication of LTE RLC bearer. |
| ***outOfOrderDelivery***Indicates whether or not *outOfOrderDelivery* specified in TS 38.323 [5] is configured. This field should be either always present or always absent, after the radio bearer is established. |
| ***pdcp-Duplication***Indicates whether or not uplink duplication status at the time of receiving this IE is configured and activated as specified in TS 38.323 [5]. The presence of this field indicates that duplication is configured. PDCP duplication is not configured for CA packet duplication of LTE RLC bearer. The value of this field, when the field is present, indicates the state of the duplication at the time of receiving this IE. If set to *true*, duplication is activated. The value of this field is always *true*, when configured for a SRB. This field is absent, if the field *moreThanTwoRLC* is present. |
| ***pdcp-SN-SizeDL***PDCP sequence number size for downlink, 12 or 18 bits, as specified in TS 38.323 [5]. For SRBs only the value *len12bits* is applicable. The value for this field cannot be changed in case of reconfiguration with sync, if *dapsConfig* is configured for this bearer. |
| ***pdcp-SN-SizeUL***PDCP sequence number size for uplink, 12 or 18 bits, as specified in TS 38.323 [5]. For SRBs only the value *len12bits* is applicable. The value for this field cannot be changed in case of reconfiguration with sync, if *dapsConfig* is configured for this bearer. |
| ***primaryPath***Indicates the cell group ID and LCID of the primary RLC entity as specified in TS 38.323 [5], clause 5.2.1 for UL data transmission when more than one RLC entity is associated with the PDCP entity. In this version of the specification, only cell group ID corresponding to MCG is supported for SRBs. The NW indicates *cellGroup* for split bearers using logical channels in different cell groups. The NW indicates *logicalChannel* for CA based PDCP duplication, i.e., if both logical channels terminate in the same cell group. |
| ***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.* Editor's Note: The name *splitSecondaryPath* needs to be confirmed, and the impacts on the legacy split bearer operation (if any) may need to be considered. |
| ***statusReportRequired***For AM DRBs, indicates whether the DRB is configured to send a PDCP status report in the uplink, as specified in TS 38.323 [5]. |
| ***t-Reordering***Value in ms of t-Reordering specified in TS 38.323 [5]. Value *ms0* corresponds to 0 ms, value *ms20* corresponds to 20 ms, value *ms40* corresponds to 40 ms, and so on. When the field is absent the UE applies the value *infinity*. The value for this field cannot be changed in case of reconfiguration with sync, if *dapsConfig* is configured for this bearer. |
| ***ul-DataSplitThreshold***Parameter specified in TS 38.323 [5]. Value *b0* corresponds to 0 bytes, value *b100* corresponds to 100 bytes, value *b200* corresponds to 200 bytes, and so on. The network sets this field to *infinity* for UEs not supporting *splitDRB-withUL-Both-MCG-SCG*. If the field is absent when the split bearer is configured for the radio bearer first time, then the default value *infinity* is applied. |

| Conditional presence | Explanation |
| --- | --- |
| *DRB* | This field is mandatory present when the corresponding DRB is being set up, absent for SRBs. Otherwise this field is optionally present, need M. |
| *DRB-Only* | This field is optionally present in case of DRB, need M. Otherwise, it is absent for SRBs. |
| *MoreThanOneRLC* | This field is mandatory present upon RRC reconfiguration with setup of a PDCP entity for a radio bearer with more than one associated logical channel and upon RRC reconfiguration with the association of additional logical channels to the PDCP entity.The field is also mandatory present in case the field *moreThanTwoRLC* is included in *PDCP-Config*.Upon RRC reconfiguration when a PDCP entity is associated with multiple logical channels, this field is optionally present need M. Otherwise, this field is absent. Need R. |
| *MoreThanTwoRLC* | This field is mandatory present upon RRC reconfiguration with setup of a PDCP entity for a radio bearer with more than two associated logical channels and upon RRC reconfiguration with the association of more than one additional logical channel to the PDCP entity.Upon RRC reconfiguration when none of the RLC entities is re-established, this field is optionally present, Need M. Otherwise, the field is absent, Need R. |
| *Rlc-AM* | For RLC AM, the field is optionally present, need R. Otherwise, the field is absent. |
| *Setup* | The field is mandatory present in case of radio bearer setup. Otherwise the field is optionally present, need M. |
| *SplitBearer* | The field is absent for SRBs. Otherwise, the field is optional present, need M, in case of radio bearer with more than one associated RLC mapped to different cell groups. |
| *SplitBearer2* | The field is mandatory present, in case of a split radio bearer. Otherwise the field is absent. |
| *ConnectedTo5GC* | The field is optionally present, need R, if the UE is connected to 5GC. Otherwise the field is absent. |
| *ConnectedTo5GC1* | The field is optionally present, need R, if the UE is connected to NR/5GC. Otherwise the field is absent. |
| *Setup2* | This field is mandatory present in case for radio bearer setup for RLC-AM and RLC-UM. Otherwise, this field is absent, Need M. |

End of changes