**3GPP TSG-RAN2 Meeting #109-e *R2-2001754***

**Electronic meeting, 24 Feb – 6 Mar 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.323** | **CR** | **0279** | **rev** | **1** | **Current version:** | **15.5.0** |  |
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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:*** | Introduction of DAPS handover | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon, Mediatek Inc. | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_feMob-Core | | | | |  | ***Date:*** | | | 2020-02-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduction of DAPS handover for minimizing interruption time during handover. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduction of DAPS handover. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | DAPS handover is not supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 3.2, 4.2, 4.4, 4.5, 5.3.1, 5.5.2, 5.5.4, 5.5.5, 5.5.6, 5.6.0, 5.x (New), 5.y (New) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 36.300 CR1270  TS 36.306 CR1742  TS 36.331 CR4205  TS 36.321 CR1463 | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***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].

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

**NB-IoT**: NB-IoT allows access to network services via E-UTRA with a channel bandwidth limited to 200 kHz.

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

**LWA bearer**: in LTE-WLAN Aggregation, a bearer whose radio protocols are located in both the eNB and the WLAN to use both eNB and WLAN resources.

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## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

AILC Assistance Information bit for Local Cache

AM Acknowledged Mode

ARP Address Resolution Protocol

CID Context Identifier

DAPS Dual Active Protocol Stack

DRB Data Radio Bearer carrying user plane data

EPS Evolved Packet System

E-UTRA Evolved UMTS Terrestrial Radio Access

E-UTRAN Evolved UMTS Terrestrial Radio Access Network

eNB E-UTRAN Node B

FIFO First In First Out

FMS First missing PDCP SN

HFN Hyper Frame Number

HRW Highest Received PDCP SN on WLAN

IETF Internet Engineering Task Force

IP Internet Protocol

L2 Layer 2 (data link layer)

L3 Layer 3 (network layer)

LWA LTE-WLAN Aggregation

MAC Medium Access Control

MAC-I Message Authentication Code for Integrity

MCG Master Cell Group

NB-IoT Narrow Band Internet of Things

NMP Number of Missing PDCP SDUs

PDCP Packet Data Convergence Protocol

PDU Protocol Data Unit

PEK ProSe Encryption Key

PGK ProSe Group Key

ProSe Proximity-based Services

PTK ProSe Traffic Key

R Reserved

RB Radio Bearer

RFC Request For Comments

RLC Radio Link Control

RN Relay Node

ROHC RObust Header Compression

RRC Radio Resource Control

RTP Real Time Protocol

SAP Service Access Point

SCG Secondary Cell Group

SDU Service Data Unit

SLRB Sidelink Radio Bearer carrying Sidelink Communication or V2X sidelink communication data

SN Sequence Number

SRB Signalling Radio Bearer carrying control plane data

TCP Transmission Control Protocol

UDC Uplink Data Compression

UDP User Datagram Protocol

UE User Equipment

UM Unacknowledged Mode

X-MAC Computed MAC-I

*NEXT CHANGE*

## 4.2 PDCP architecture

### 4.2.1 PDCP structure

Figure 4.2.1.1 represents one possible structure for the PDCP sublayer; it should not restrict implementation. The figure is based on the radio interface protocol architecture defined in TS 36.300 [2].



Figure 4.2.1.1 - PDCP layer, structure view

Each RB (i.e. DRB, SLRB and SRB, except for SRB0 and SRB1bis) is associated with one PDCP entity. Each PDCP entity is associated with one, two, or four (e.g uni-directional/bi-directional or split/non-split) RLC entities depending on the RB characteristic (i.e. uni-directional or bi-directional) or RLC mode:

- For split bearers or for RBs configured with PDCP duplication, each PDCP entity is associated with two (bi-directional) AM RLC entities, two (for same direction) UM RLC entities or four (uni-directional) UM RLC entities.

- For LWA bearers, each PDCP entity is associated with one (bi-directional) AM RLC entity or two (uni-directional) UM RLC entities and the LWAAP entity.

- For DAPS bearers, each PDCP entity is associated with two UM RLC entities (for same direction, one for source and one for target cell), four (uni-directional) UM RLC entities (two for each direction on source cell and target cell), or two AM RLC entities (bi-directional, one for source cell and one for target cell).

- Otherwise, each PDCP entity is associated with one UM RLC entity, two UM RLC entities (one for each direction), or one AM RLC entity (bi-directional).

PDCP entities are located in the PDCP sublayer. The PDCP sublayer is configured by upper layers, see TS 36.331 [3].

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### 4.2.2 PDCP entities

The PDCP entities are located in the PDCP sublayer. Several PDCP entities may be defined for a UE. Each PDCP entity carrying user plane data may be configured to use either uplink data compression (UDC) or to use header compression.

Each PDCP entity is carrying the data of one radio bearer. In this version of the specification, the robust header compression protocol (ROHC) and UDC, are supported. Every PDCP entity uses at most one ROHC or one UDC compressor instance and at most one ROHC or UDC decompressor instance. ROHC and UDC are not supported simultaneously for the same radio bearer.

A PDCP entity is associated either to the control plane or the user plane depending on which radio bearer it is carrying data for.

Figure 4.2.2.1 represents the functional view of the PDCP entity for the PDCP sublayer; it should not restrict implementation. The figure is based on the radio interface protocol architecture defined in TS 36.300 [2].

For RNs, integrity protection and verification are also performed for the u-plane.

For split and LWA bearers, routing is performed in the transmitting PDCP entity, and reordering is performed in the receiving PDCP entity.

For PDCP duplication, submission of duplicates is performed in the transmitting PDCP entity, and duplicate discard is performed in the receiving PDCP entity.

For split bearers, except when PDCP duplication is configured and activated, when requested by lower layers to submit PDCP PDUs, the transmitting PDCP entity shall:

- if *ul-DataSplitThreshold* is configured and the data available for transmission is larger than or equal to *ul-DataSplitThreshold*:

- submit the PDCP PDUs to either the associated RLC entity configured for SCG or the associated RLC entity configured for MCG, whichever the PDUs were requested by;

- else:

- if *ul-DataSplitDRB-ViaSCG* is set to *TRUE* by upper layers, see TS 36.331 [3]:

- if the PDUs were requested by the associated lower layers configured for SCG:

- submit the PDCP PDUs to the associated RLC entity configured for SCG;

- else:

- if the PDUs were requested by the associated lower layers configured for MCG:

- submit the PDCP PDUs to the associated RLC entity configured for MCG.

For LWA bearers, when submitting PDCP PDUs to lower layers, the transmitting PDCP entity shall:

- if *ul-LWA-DataSplitThreshold* is configured and the data available for transmission is larger than or equal to *ul-LWA-DataSplitThreshold*:

- submit the PDCP PDUs to either the associated RLC entity upon request from lower layers or the associated LWAAP entity;

- else:

- if *ul-LWA-DRB-ViaWLAN* is set to *TRUE* by upper layers,see TS 36.331 [3]:

- submit the PDCP PDUs to the associated LWAAP entity;

- else:

- submit the PDCP PDUs to the associated RLC entity upon request from lower layers.

NOTE: The selection of PDCP PDUs submitted to the associated LWAAP entity is left up to the UE implementation.

For bearers configured with PDCP duplication, when requested by lower layers to submit the PDCP PDUs, the transmitting PDCP entity shall:

- if PDCP duplication is activated:

- 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;

- else:

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

- else:

- submit the PDCP PDU to the associated RLC entity.



Figure 4.2.2.1 - PDCP layer, functional view

Figure 4.2.2.x represents the functional view of the PDCP entity associated with the DAPS bearer for the PDCP sublayer; it should not restrict implementation. The figure is based on the radio interface protocol architecture defined in TS 36.300 [2].

For DAPS bearers, the PDCP entity is configured with two sets of security functions and keys and two sets of header compression protocols.

For DAPS bearers, routing is performed in the transmitting PDCP entity, and reordering is performed in the receiving PDCP entity.

For DAPS bearers, when submitting PDCP PDUs to lower layers, the transmitting PDCP entity shall:

- if the uplink data switching has not been requested by upper layers:

- 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 souce cell;

- else:

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



Figure 4.2.2.x - PDCP layer with DAPS, functional view

*NEXT CHANGE*

## 4.4 Functions

The Packet Data Convergence Protocol supports the following functions:

- header compression and decompression of IP data flows using the ROHC protocol;

- compression and decompression of uplink PDCP SDU;

- transfer of data (user plane or control plane);

- maintenance of PDCP SNs;

- in-sequence delivery of upper layer PDUs at re-establishment of lower layers;

- duplicate elimination of lower layer SDUs at re-establishment of lower layers for radio bearers mapped on RLC AM;

- ciphering and deciphering of user plane data and control plane data;

- integrity protection and integrity verification of control plane data;

- integrity protection and integrity verification of sidelink one-to-one communication data;

- for RNs, integrity protection and integrity verification of user plane data;

- timer based discard;

- duplicate transmission and duplicate discarding;

- for split and LWA bearers, routing and reordering;

- for DAPS bearers, routing and reordering.

PDCP uses the services provided by the RLC sublayer and the LWAAP sublayer.

PDCP is used for SRBs, DRBs, and SLRBs mapped on DCCH, DTCH, and STCH type of logical channels. PDCP is not used for any other type of logical channels. PDCP is not used for SRB1bis. DAPS PDCP is only used for DAPS DRB.

*NEXT CHANGE*

## 4.5 Data available for transmission

For the purpose of MAC buffer status reporting, the UE shall consider PDCP Control PDUs, as well as the following as data available for transmission in the PDCP layer:

For SDUs for which no PDU has been submitted to lower layers:

- the SDU itself, if the SDU has not yet been processed by PDCP, or

- the PDU if the SDU has been processed by PDCP.

In addition, for radio bearers that are mapped on RLC AM, if the PDCP entity has previously performed the re-establishment procedure, the UE shall also consider the following as data available for transmission in the PDCP layer:

For SDUs for which a corresponding PDU has only been submitted to lower layers prior to the PDCP re-establishment, starting from the first SDU for which the delivery of the corresponding PDUs has not been confirmed by the lower layer, except the SDUs which are indicated as successfully delivered by the PDCP status report, if received:

- the SDU, if it has not yet been processed by PDCP, or

- the PDU once it has been processed by PDCP.

For radio bearers that are mapped on RLC AM, if the PDCP entity has previously performed the data recovery procedure, the UE shall also consider as data available for transmission in the PDCP layer, all the PDCP PDUs that have only been submitted to re-established AM RLC entity prior to the PDCP data recovery, starting from the first PDCP PDU whose successful delivery has not been confirmed by lower layers, except the PDUs which are indicated as successfully delivered by the PDCP status report, if received.

In addition, for bearers configured with PDCP duplication, when PDCP duplication is activated, for SDUs for which a PDU has only been submitted to lower layers associated with one logical channel, for the purpose of MAC buffer status reporting associated with the other logical channel the UE shall consider:

- the PDU, if the PDU has not yet been confirmed to be successfully delivered by those lower layers.

For split bearers, when indicating the data available for transmission to a MAC entity for BSR triggering and Buffer Size calculation, the UE shall:

- if *ul-DataSplitThreshold* is configured and the data available for transmission is larger than or equal to *ul-DataSplitThreshold*:

- indicate the data available for transmission to both the MAC entity configured for SCG and the MAC entity configured for MCG;

- else:

- if *ul-DataSplitDRB-ViaSCG* is set to *TRUE* by upper layer, see TS 36.331 [3]:

- indicate the data available for transmission to the MAC entity configured for SCG only;

- if *ul-DataSplitThreshold* is configured, indicate the data available for transmission as 0 to the MAC entity configured for MCG;

- else:

- indicate the data available for transmission to the MAC entity configured for MCG only;

- if *ul-DataSplitThreshold* is configured, indicate the data available for transmission as 0 to the MAC entity configured for SCG.

For uplink LWA bearers, when indicating the data available for transmission to the MAC entity for BSR triggering and Buffer Size calculation, the UE shall:

- if *ul-LWA-DataSplitThreshold* is configured and the data available for transmission is larger than or equal to *ul-LWA-DataSplitThreshold*:

- indicate the data available for transmission to the MAC entity;

- else:

- if *ul-LWA-DRB-ViaWLAN* is set to *TRUE* by upper layers, see TS 36.331 [3]:

- indicate the data available for transmission as 0 to the MAC entity;

- else:

- indicate the data available for transmission to the MAC entity.

NOTE: For LWA bearers, only the data that may be sent over LTE (i.e., excluding UL data already sent or decided to be sent over WLAN) is considered as "data available for transmission".

For bearers configured with PDCP duplication, when indicating the data available for transmission to a MAC entity for BSR triggering and Buffer Size calculation, the UE shall:

- if PDCP duplication is activated:

- indicate the data available for transmission to the MAC entity associated with the primary RLC entity and (if different) the MAC entity associated with the secondary RLC entity.

- else:

- if the two associated RLC entities belong to the different cell groups:

- if *ul-DataSplitThreshold* is configured and the data available for transmission is larger than or equal to *ul-DataSplitThreshold*:

- indicate the data available for transmission to both the MAC entity configured for SCG and the MAC entity configured for MCG.

- else:

- if *ul-DataSplitDRB-ViaSCG* is set to *TRUE* by upper layer, see TS 36.331 [3]:

- indicate the data available for transmission to the MAC entity configured for SCG only;

- if *ul-DataSplitThreshold* is configured, indicate the data available for transmission as 0 to the MAC entity configured for MCG.

- else:

- indicate the data available for transmission to the MAC entity configured for MCG only;

- if *ul-DataSplitThreshold* is configured, indicate the data available for transmission as 0 to the MAC entity configured for SCG.

- else:

- indicate the data available for transmission to the MAC entity.

For DAPS bearers, when indicating the data available for transmission to the MAC entity for BSR triggering and Buffer Size calculation, the UE shall:

- if the uplink data switching has not been requested by upper layers:

- indicate the data available for transmission to the MAC entity associated with the source cell;

- else:

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

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

*Next CHANGES*

## 5.3 PDCP Status Report

### 5.3.1 Transmit operation

When upper layers request a PDCP re-establishment or PDCP Data Recovery; or when PDCP status report is triggered by polling or periodic reporting; or when PDCP status report is triggered by WLAN Connection Status Reporting of temporary unavailability (*suspended*, see TS 36.331 [3]); or when upper layers request uplink data switching during DAPS handover, for radio bearers that are mapped on RLC AM, the UE shall:

- if the radio bearer is configured by upper layers to send a PDCP status report in the uplink (*statusReportRequired*, seeTS 36.331 [3]) or the status report is triggered by PDCP status report polling or PDCP periodic status reporting or the status report is triggered by WLAN Connection Status Reporting of temporary unavailability (*suspended*, see TS 36.331 [3]) when *wlan-SuspendTriggersStatusReport* is configured, see TS 36.331 [3], compile a status report as indicated below after processing the PDCP Data PDUs that are received from lower layers due to the re-establishment of the lower layers as specified in the subclause 5.2.2.1 or due to release of one set of RLC entity or due to uplink data switching, and submit it to lower layers as the first PDCP PDU for the transmission, by:

- setting the FMS field to the PDCP SN of the first missing PDCP SDU;

- if there is at least one out-of-sequence PDCP SDU stored, allocating a Bitmap field of length in bits equal to the number of PDCP SNs from and not including the first missing PDCP SDU up to and including the last out-of-sequence PDCP SDUs, rounded up to the next multiple of 8, or up to and including a PDCP SDU for which the resulting PDCP Control PDU size is equal to 8188 bytes, whichever comes first;

- setting as '0' in the corresponding position in the bitmap field for all PDCP SDUs that have not been received as indicated by lower layers, and optionally PDCP SDUs for which decompression have failed;

- indicating in the bitmap field as '1' for all other PDCP SDUs.

*FFS: if the receiving PDCP entity shall trigger a PDCP status report when upper layer requests a PDCP reconfiguration with source RLC entity release.*

*FFS: whether PDCP status reporting for DAPS bearers is needed for UL or DL for RLC UM.*

*NEXT CHANGE*

### 5.5.2 Configuration of header compression

PDCP entities associated with DRBs can be configured by upper layers, see TS 36.331 [3] to use header compression either bidirectional (if headerCompression is configured) or uplink-only (if *uplinkOnlyHeaderCompression* is configured). If *uplinkOnlyHeaderCompression* is configured, the UE shall process the received PDCP Control PDU for interspersed ROHC feedback packet corresponding to the uplink header compression as specified in subclause 5.5.6.2, but shall not perform header decompression for the received PDCP Data PDU. PDCP entities associated with SLRBs can be configured to use header compression for IP SDUs. For DAPS bearers, the PDCP entity uses at most one ROHC compressor instance and at most two ROHC decompressor instances.

*NEXT CHANGE*

### 5.5.4 Header compression

The header compression protocol generates two types of output packets:

- compressed packets, each associated with one PDCP SDU

- standalone packets not associated with a PDCP SDU, i.e. interspersed ROHC feedback packets

A compressed packet is associated with the same PDCP SN and COUNT value as the related PDCP SDU.

For DAPS bearers, the PDCP entity shall perform the header compression for the PDCP SDU using the header compression protocol either configured for the source cell or configured for the target cell, based on to which cell the PDCP SDU is transmitted. For downlink, the header compression protocol of the target cell shall maintain the IR state in U-mode during DAPS handover until source cell is released successfully.

Interspersed ROHC feedback packets are not associated with a PDCP SDU. They are not associated with a PDCP SN and are not ciphered.

NOTE: If the MAX\_CID number of ROHC contexts are already established for the compressed flows and a new IP flow does not match any established ROHC context, the compressor should associate the new IP flow with one of the ROHC CIDs allocated for the existing compressed flows or send PDCP SDUs belonging to the IP flow as uncompressed packet.

*NEXT CHANGE*

### 5.5.5 Header decompression

If header compression is configured by upper layers for PDCP entities associated with u-plane data the PDCP PDUs are de-compressed by the header compression protocol after performing deciphering as explained in the subclause 5.6.

For DAPS bearers, the PDCP entity shall perform the header decompression for the PDCP SDU using the header compression protocol either configured for the source cell or configured for the target cell, based on from which cell the PDCP SDU is received.

*NEXT CHANGE*

### 5.5.6 PDCP Control PDU for interspersed ROHC feedback packet

#### 5.5.6.1 Transmit Operation

When an interspersed ROHC feedback packet is generated by the header compression protocol, the UE shall:

- submit to lower layers the corresponding PDCP Control PDU as specified in subclause 6.2.5 i.e. without associating a PDCP SN, nor performing ciphering.

#### 5.5.6.2 Receive Operation

At reception of a PDCP Control PDU for interspersed ROHC feedback packet from lower layers, the UE shall:

- deliver the corresponding interspersed ROHC feedback packet to the associated header compression protocol without performing deciphering.

*NEXT CHANGE*

### 5.6.0 General

The ciphering function includes both ciphering and deciphering and is performed in PDCP. For the control plane, the data unit that is ciphered is the data part of the PDCP PDU (see subclause 6.3.3) and the MAC-I (see subclause 6.3.4). For the user plane, the data unit that is ciphered is the data part of the PDCP PDU (see subclause 6.3.3); ciphering is not applicable to PDCP Control PDUs.

For RNs, for the user plane, in addition to the data part of the PDCP PDU, the MAC-I (see 6.3.4) is also ciphered if integrity protection is configured.

The ciphering algorithm and key to be used by the PDCP entity are configured by upper layers, see TS 36.331 [3] and the ciphering method shall be applied as specified in TS 33.401 [6].

The ciphering function is activated/suspended/resumed by upper layers (TS 36.331 [3]). When security is activated and not suspended, the ciphering function shall be applied to all PDCP PDUs indicated by upper layers, see TS 36.331 [3], for the downlink and the uplink, respectively.

NOTE: Security is suspended upon connection suspension (and resumed upon connection resumption).

For DAPS bearers, the PDCP entity shall perform the ciphering or deciphering for the PDCP SDU using the ciphering algorithm and key either configured for the source cell or configured for the target cell, based on to/from which cell the PDCP SDU is transmitted/received.

For downlink and uplink ciphering and deciphering, the parameters that are required by PDCP for ciphering are defined in TS 33.401 [6] and are input to the ciphering algorithm. The required inputs to the ciphering function include the COUNT value, and DIRECTION (direction of the transmission: set as specified in TS 33.401 [6]).The parameters required by PDCP which are provided by upper layers, see TS 36.331 [3], are listed below:

- BEARER (defined as the radio bearer identifier in TS 33.401 [6]. It will use the value RB identity –1 as in TS 36.331 [3]);

- KEY (the ciphering keys for the control plane and for the user plane are KRRCenc and KUPenc, respectively).

*NEXT CHANGE*

## 5.x Uplink data switching

For DAPS bearers, when upper layers request uplink data switching, the transmitting PDCP entity shall:

- for AM DRBs, from the first PDCP SDU for which the successful delivery of the corresponding PDCP Data PDU has not been confirmed by the RLC entity associated with the source cell, perform retransmission or transmission of all the PDCP SDUs already associated with PDCP SNs in ascending order of the COUNT values associated to the PDCP SDU prior to uplink data switching to the RLC entity associated with the target cell as specified below:

- perform header compression of the PDCP SDU as specified in the clause 5.5.4;

- perform ciphering of the PDCP SDU using the COUNT value associated with this PDCP SDU as specified in the clause 5.6 and 5.7;

- submit the resulting PDCP Data PDU to lower layer, as specified in clause 5.1.1.

- for UM DRBs, for all PDCP SDUs which have been processed by PDCP but which have not yet been submitted to lower layers, perform transmission of PDCP SDU in ascending order of the COUNT values to the RLC entity associated with the target cell as specified below:

- perform header compression of the PDCP SDU as specified in the clause 5.5.4;

- perform ciphering of the PDCP SDU using the COUNT value associated with this PDCP SDU as specified in the clause 5.6 and 5.7;

- submit the resulting PDCP Data PDU to lower layer, as specified in clause 5.1.1.

*NEXT CHANGE*

## 5.y PDCP Reconfiguration

When upper layers request a PDCP entity reconfiguration and DAPS is configured for a data radio bearer, UE shall:

- establish a ciphering function for the radio bearer and apply the ciphering algorithm and key provided by upper layers for the ciphering function;

- establish an integrity protection function for the radio bearer and apply the integrity protection algorithm and key provided by upper layers for the integrity protection function;

- establish a header compression protocol for the radio bearer and apply the header compression configuration provided by upper layers for the header compression protocol.

When upper layers request a PDCP entity reconfiguration and the associated RLC entity is released for a radio bearer, UE shall:

- release the ciphering function associated to the released RLC entity for the radio bearer;

- release the integrity protection function associated to the released RLC entity for the radio bearer;

- release the header compression protocol associated to the released RLC entity for the radio bearer.

NOTE 1: The state variables which control the transmission and reception operation should not be reset during PDCP entity reconfiguration procedure. The following configuration should not be changed during PDCP entity reconfiguration procedure, including *discardTimer*, *pdcp-SN-Size* and *t-Reordering.* And the timers including *t-Reordering* and *discardTimer* keep running during PDCP entity reconfiguration procedure.

NOTE 2: Before releasing the header compression protocol, the ciphering function and the integrity protection function associated to the released RLC entity, how to handle all stored PDCP SDUs received from the released RLC entity is left up to UE implementation.

*END OF CHANGES*