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TECHNICAL SPECIFICATION

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NR;**

**Packet Data Convergence Protocol (PDCP) specification  
(3GPP TS 38.323 version 15.6.0 Release 15)**

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# Contents

Intellectual Property Rights .....	2
Legal Notice .....	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope .....	6
2 References .....	6
3 Definitions and abbreviations.....	6
3.1 Definitions .....	6
3.2 Abbreviations .....	7
4 General .....	7
4.1 Introduction .....	7
4.2 Architecture .....	7
4.2.1 PDCP structure .....	7
4.2.2 PDCP entities.....	8
4.3 Services .....	9
4.3.1 Services provided to upper layers .....	9
4.3.2 Services expected from lower layers .....	9
4.4 Functions .....	10
5 Procedures .....	10
5.1 PDCP entity handling.....	10
5.1.1 PDCP entity establishment .....	10
5.1.2 PDCP entity re-establishment.....	10
5.1.3 PDCP entity release .....	11
5.1.4 PDCP entity suspend .....	12
5.2 Data transfer .....	12
5.2.1 Transmit operation.....	12
5.2.2 Receive operation .....	13
5.2.2.1 Actions when a PDCP Data PDU is received from lower layers .....	13
5.2.2.2 Actions when a <i>t-Reordering</i> expires.....	14
5.2.2.3 Actions when the value of <i>t-Reordering</i> is reconfigured .....	14
5.3 SDU discard .....	15
5.4 Status reporting .....	15
5.4.1 Transmit operation.....	15
5.4.2 Receive operation .....	15
5.5 Data recovery .....	15
5.6 Data volume calculation.....	16
5.7 Header compression and decompression.....	16
5.7.1 Supported header compression protocols and profiles.....	16
5.7.2 Configuration of header compression.....	17
5.7.3 Protocol parameters .....	17
5.7.4 Header compression.....	17
5.7.5 Header decompression.....	18
5.7.6 PDCP Control PDU for interspersed ROHC feedback .....	18
5.7.6.1 Transmit Operation .....	18
5.7.6.2 Receive Operation.....	18
5.8 Ciphering and deciphering .....	18
5.9 Integrity protection and verification .....	19
5.10 Handling of unknown, unforeseen, and erroneous protocol data .....	19
5.11 PDCP duplication.....	19
5.11.1 Activation/Deactivation of PDCP duplication.....	19
5.11.2 Duplicate PDU discard .....	20
6 Protocol data units, formats, and parameters.....	20

6.1	Protocol data units .....	20
6.1.1	Data PDU .....	20
6.1.2	Control PDU .....	20
6.2	Formats .....	20
6.2.1	General .....	20
6.2.2	Data PDU .....	20
6.2.2.1	Data PDU for SRBs .....	20
6.2.2.2	Data PDU for DRBs with 12 bits PDCP SN .....	21
6.2.2.3	Data PDU for DRBs with 18 bits PDCP SN .....	21
6.2.3	Control PDU .....	22
6.2.3.1	Control PDU for PDCP status report .....	22
6.2.3.2	Control PDU for interspersed ROHC feedback .....	22
6.3	Parameters .....	23
6.3.1	General .....	23
6.3.2	PDCP SN .....	23
6.3.3	Data .....	23
6.3.4	MAC-I .....	23
6.3.5	COUNT .....	23
6.3.6	R .....	24
6.3.7	D/C .....	24
6.3.8	PDU type .....	24
6.3.9	FMC .....	24
6.3.10	Bitmap .....	24
6.3.11	Interspersed ROHC feedback .....	25
7	State variables, constants, and timers .....	25
7.1	State variables .....	25
7.2	Constants .....	25
7.3	Timers .....	25
<b>Annex A (informative):</b>	<b>Change history .....</b>	<b>27</b>
History .....		28

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# Foreword

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# 1 Scope

The present document provides the description of the Packet Data Convergence Protocol (PDCP).

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 38.300: "NG Radio Access Network; Overall description".
- [3] 3GPP TS 38.331: "NR Radio Resource Control (RRC); Protocol Specification".
- [4] 3GPP TS 38.321: "NR Medium Access Control (MAC) protocol specification".
- [5] 3GPP TS 38.322: "NR Radio Link Control (RLC) protocol specification".
- [6] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".
- [7] IETF RFC 5795: "The RObust Header Compression (ROHC) Framework".
- [8] IETF RFC 3095: "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP and uncompressed".
- [9] IETF RFC 4815: "RObust Header Compression (ROHC): Corrections and Clarifications to RFC 3095".
- [10] IETF RFC 6846: "RObust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".
- [11] IETF RFC 5225: "RObust Header Compression (ROHC) Version 2: Profiles for RTP, UDP, IP, ESP and UDP Lite".
- [12] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) protocol specification".

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# 3 Definitions and abbreviations

## 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.

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

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

**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.

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

## 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].

AM	Acknowledged Mode
CID	Context Identifier
DRB	Data Radio Bearer carrying user plane data
gNB	NR Node B
HFN	Hyper Frame Number
IETF	Internet Engineering Task Force
IP	Internet Protocol
MAC	Medium Access Control
MAC-I	Message Authentication Code for Integrity
PDCP	Packet Data Convergence Protocol
PDU	Protocol Data Unit
RB	Radio Bearer
RFC	Request For Comments
RLC	Radio Link Control
ROHC	RObust Header Compression
RRC	Radio Resource Control
RTP	Real Time Protocol
SAP	Service Access Point
SDU	Service Data Unit
SN	Sequence Number
SRB	Signalling Radio Bearer carrying control plane data
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UE	User Equipment
UM	Unacknowledged Mode
X-MAC	Computed MAC-I

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## 4 General

### 4.1 Introduction

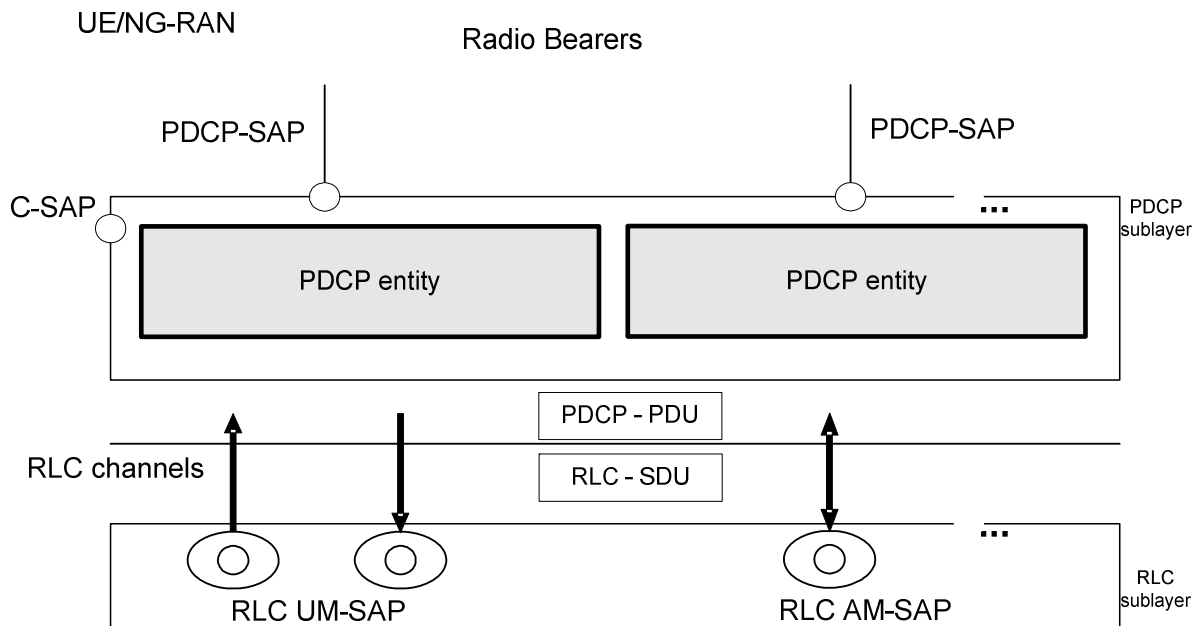
The present document describes the functionality of the PDCP.

### 4.2 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 38.300 [2].





**Figure 4.2.1-1: PDCP layer, structure view**

The PDCP sublayer is configured by upper layers TS 38.331 [3]. The PDCP sublayer is used for RBs mapped on DCCH and DTCH type of logical channels. The PDCP sublayer is not used for any other type of logical channels.

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

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

## 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 is carrying the data of one 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 38.300 [2].

For split bearers, routing is performed in the transmitting PDCP entity.

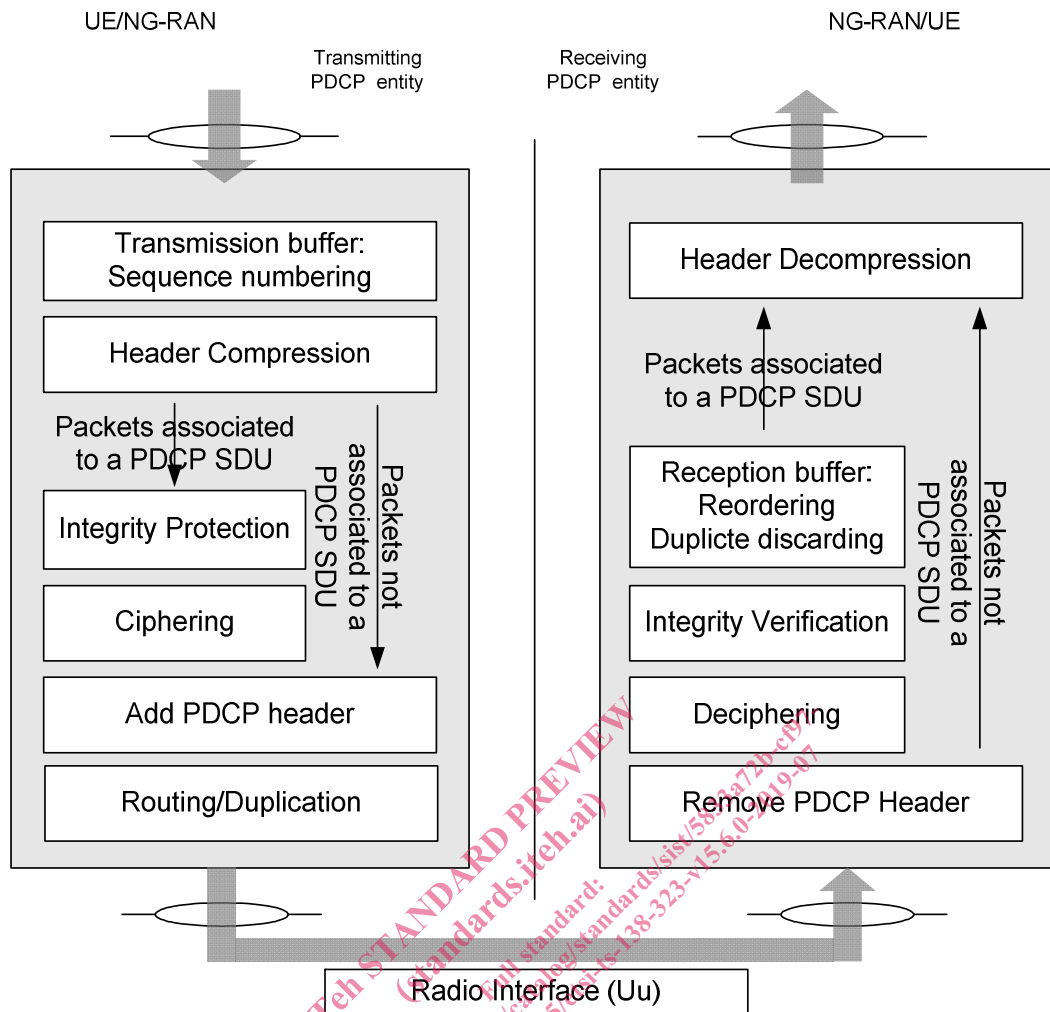


Figure 4.2.2-1: PDCP layer, functional view

## 4.3 Services

### 4.3.1 Services provided to upper layers

The PDCP layer provides its services to the RRC or SDAP layers. The following services are provided by PDCP to upper layers:

- transfer of user plane data;
- transfer of control plane data;
- header compression;
- ciphering;
- integrity protection.

The maximum supported size of a PDCP SDU is 9000 bytes. The maximum supported size of a PDCP Control PDU is 9000 bytes.

### 4.3.2 Services expected from lower layers

A PDCP entity expects the following services from lower layers per RLC entity (for a detailed description see TS 38.322 [5]):