

ETSI TS 138 463 V15.8.0 (2020-11)



**5G;
NG-RAN;
E1 Application Protocol (E1AP)
(3GPP TS 38.463 version 15.8.0 Release 15)**

Preview
Full standard available at: <https://standards.iteh.ai/catalog/standards/sist/943e38a9-0bb8-48ec-b6f4-d4ed8c06faa0/etsi-ts-138-463-v15-8-0-2020-11>



Reference

RTS/TSGR-0338463vf80

Keywords

5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at <https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2020.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M™ logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Legal Notice

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	8
1 Scope	9
2 References	9
3 Definitions and abbreviations.....	10
3.1 Definitions	10
3.2 Abbreviations	11
4 General	11
4.1 Procedure specification principles.....	11
4.2 Forwards and backwards compatibility.....	12
4.3 Specification notations	12
5 E1AP services	12
6 Services expected from signalling transport.....	12
7 Functions of E1AP	12
8 E1AP procedures.....	13
8.1 List of E1AP Elementary Procedures.....	13
8.2 Interface Management procedures	14
8.2.1 Reset	14
8.2.1.1 General	14
8.2.1.2 Successful Operation.....	14
8.2.1.2.1 Reset Procedure Initiated from the gNB-CU-CP.....	14
8.2.1.2.2 Reset Procedure Initiated from the gNB-CU-UP	15
8.2.1.3 Abnormal Conditions	16
8.2.2 Error Indication.....	16
8.2.2.1 General	16
8.2.2.2 Successful Operation.....	16
8.2.2.3 Abnormal Conditions.....	16
8.2.3 gNB-CU-UP E1 Setup.....	17
8.2.3.1 General	17
8.2.3.2 Successful Operation.....	17
8.2.3.3 Unsuccessful Operation	18
8.2.3.4 Abnormal Conditions	18
8.2.4 gNB-CU-CP E1 Setup	18
8.2.4.1 General	18
8.2.4.2 Successful Operation.....	19
8.2.4.3 Unsuccessful Operation	19
8.2.4.4 Abnormal Conditions	20
8.2.5 gNB-CU-UP Configuration Update.....	20
8.2.5.1 General	20
8.2.5.2 Successful Operation.....	20
8.2.5.3 Unsuccessful Operation	21
8.2.5.4 Abnormal Conditions	21
8.2.6 gNB-CU-CP Configuration Update.....	21
8.2.6.1 General	21
8.2.6.2 Successful Operation.....	22
8.2.6.3 Unsuccessful Operation	23
8.2.6.4 Abnormal Conditions	23
8.2.7 E1 Release	23
8.2.7.1 General	23

8.2.7.2	Successful Operation.....	23
8.2.7.2.1	E1 Release Procedure Initiated from the gNB-CU-CP.....	23
8.2.7.2.2	E1 Release Procedure Initiated from the gNB-CU-UP.....	24
8.2.7.3	Abnormal Conditions.....	24
8.2.8	gNB-CU-UP Status Indication.....	24
8.2.8.1	General.....	24
8.2.8.2	Successful Operation.....	24
8.2.8.3	Abnormal Conditions.....	25
8.3	Bearer Context Management procedures.....	25
8.3.1	Bearer Context Setup.....	25
8.3.1.1	General.....	25
8.3.1.2	Successful Operation.....	25
8.3.1.3	Unsuccessful Operation.....	28
8.3.1.4	Abnormal Conditions.....	28
8.3.2	Bearer Context Modification (gNB-CU-CP initiated).....	28
8.3.2.1	General.....	28
8.3.2.2	Successful Operation.....	29
8.3.2.3	Unsuccessful Operation.....	32
8.3.2.4	Abnormal Conditions.....	32
8.3.3	Bearer Context Modification Required (gNB-CU-UP initiated).....	33
8.3.3.1	General.....	33
8.3.3.2	Successful Operation.....	33
8.3.3.3	Abnormal Conditions.....	33
8.3.4	Bearer Context Release (gNB-CU-CP initiated).....	33
8.3.4.1	General.....	33
8.3.4.2	Successful Operation.....	34
8.3.4.3	Abnormal Conditions.....	34
8.3.5	Bearer Context Release Request (gNB-CU-UP initiated).....	34
8.3.5.1	General.....	34
8.3.5.2	Successful Operation.....	34
8.3.5.3	Abnormal Conditions.....	35
8.3.6	Bearer Context Inactivity Notification.....	35
8.3.6.1	General.....	35
8.3.6.2	Successful Operation.....	35
8.3.6.3	Abnormal Conditions.....	35
8.3.7	DL Data Notification.....	36
8.3.7.1	General.....	36
8.3.7.2	Successful Operation.....	36
8.3.7.3	Abnormal Conditions.....	36
8.3.8	Data Usage Report.....	36
8.3.8.1	General.....	36
8.3.8.2	Successful Operation.....	36
8.3.8.3	Abnormal Conditions.....	37
8.3.9	gNB-CU-UP Counter Check.....	37
8.3.9.1	General.....	37
8.3.9.2	Successful Operation.....	37
8.3.9.3	Unsuccessful Operation.....	37
8.3.9.4	Abnormal Conditions.....	37
8.3.10	UL Data Notification.....	37
8.3.10.1	General.....	37
8.3.10.2	Successful Operation.....	38
8.3.10.3	Abnormal Conditions.....	38
8.3.11	MR-DC Data Usage Report.....	38
8.3.11.1	General.....	38
8.3.11.2	Successful Operation.....	38
8.3.11.3	Abnormal Conditions.....	38
9	Elements for E1AP communication.....	39
9.1	General.....	39
9.2	Message Functional Definition and Content.....	39
9.2.1	Interface Management messages.....	39
9.2.1.1	RESET.....	39

9.2.1.2	RESET ACKNOWLEDGE	40
9.2.1.3	ERROR INDICATION	40
9.2.1.4	GNB-CU-UP E1 SETUP REQUEST	40
9.2.1.5	GNB-CU-UP E1 SETUP RESPONSE	41
9.2.1.6	GNB-CU-UP E1 SETUP FAILURE	41
9.2.1.7	GNB-CU-CP E1 SETUP REQUEST	42
9.2.1.8	GNB-CU-CP E1 SETUP RESPONSE	42
9.2.1.9	GNB-CU-CP E1 SETUP FAILURE	42
9.2.1.10	GNB-CU-UP CONFIGURATION UPDATE	43
9.2.1.11	GNB-CU-UP CONFIGURATION UPDATE ACKNOWLEDGE	43
9.2.1.12	GNB-CU-UP CONFIGURATION UPDATE FAILURE	44
9.2.1.13	GNB-CU-CP CONFIGURATION UPDATE	44
9.2.1.14	GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE	46
9.2.1.15	GNB-CU-CP CONFIGURATION UPDATE FAILURE	46
9.2.1.16	E1 RELEASE REQUEST	46
9.2.1.17	E1 RELEASE RESPONSE	47
9.2.1.18	GNB-CU-UP STATUS INDICATION	47
9.2.2	Bearer Context Management messages	47
9.2.2.1	BEARER CONTEXT SETUP REQUEST	47
9.2.2.2	BEARER CONTEXT SETUP RESPONSE	48
9.2.2.3	BEARER CONTEXT SETUP FAILURE	49
9.2.2.4	BEARER CONTEXT MODIFICATION REQUEST	49
9.2.2.5	BEARER CONTEXT MODIFICATION RESPONSE	51
9.2.2.6	BEARER CONTEXT MODIFICATION FAILURE	51
9.2.2.7	BEARER CONTEXT MODIFICATION REQUIRED	52
9.2.2.8	BEARER CONTEXT MODIFICATION CONFIRM	52
9.2.2.9	BEARER CONTEXT RELEASE COMMAND	53
9.2.2.10	BEARER CONTEXT RELEASE COMPLETE	53
9.2.2.11	BEARER CONTEXT RELEASE REQUEST	53
9.2.2.12	BEARER CONTEXT INACTIVITY NOTIFICATION	54
9.2.2.13	DL DATA NOTIFICATION	55
9.2.2.14	DATA USAGE REPORT	56
9.2.2.15	GNB-CU-UP COUNTER CHECK REQUEST	56
9.2.2.16	UL DATA NOTIFICATION	57
9.2.2.17	MR-DC DATA USAGE REPORT	58
9.3	Information Element Definitions	58
9.3.1	Radio Network Layer Related IEs	58
9.3.1.1	Message Type	58
9.3.1.2	Cause	58
9.3.1.3	Criticality Diagnostics	61
9.3.1.4	gNB-CU-CP UE E1AP ID	62
9.3.1.5	gNB-CU-UP UE E1AP ID	62
9.3.1.6	Time To wait	63
9.3.1.7	PLMN Identity	63
9.3.1.8	Slice Support List	63
9.3.1.9	S-NSSAI	63
9.3.1.10	Security Information	63
9.3.1.11	Cell Group Information	64
9.3.1.12	QoS Flow List	64
9.3.1.13	UP Parameters	65
9.3.1.14	NR CGI	65
9.3.1.15	gNB-CU-UP ID	65
9.3.1.16	DRB ID	65
9.3.1.17	E-UTRAN QoS	65
9.3.1.18	E-UTRAN Allocation and Retention Priority	66
9.3.1.19	GBR QoS Information	66
9.3.1.20	Bit Rate	67
9.3.1.21	PDU Session ID	67
9.3.1.22	PDU Session Type	67
9.3.1.23	Security Indication	68
9.3.1.24	QoS Flow Identifier	68
9.3.1.25	QoS Flow QoS Parameters List	68

9.3.1.26	QoS Flow Level QoS Parameters.....	68
9.3.1.27	Non Dynamic 5QI Descriptor	69
9.3.1.28	Dynamic 5QI Descriptor	69
9.3.1.29	NG-RAN Allocation and Retention Priority	70
9.3.1.30	GBR QoS Flow Information	71
9.3.1.31	Security Algorithm.....	72
9.3.1.32	User Plane Security Keys.....	72
9.3.1.33	UL Configuration.....	72
9.3.1.34	gNB-CU-UP Cell Group Related Configuration.....	73
9.3.1.35	PDCP Count.....	73
9.3.1.36	NR CGI Support List	74
9.3.1.37	QoS Parameters Support List	74
9.3.1.38	PDCP Configuration	74
9.3.1.39	SDAP Configuration	76
9.3.1.40	ROHC Parameters.....	76
9.3.1.41	T-Reordering Timer	76
9.3.1.42	Discard Timer	77
9.3.1.43	UL Data Split Threshold	77
9.3.1.44	Data Usage Report List	77
9.3.1.45	Flow Failed List	78
9.3.1.46	Packet Loss Rate	79
9.3.1.47	Packet Delay Budget.....	79
9.3.1.48	Packet Error Rate	79
9.3.1.49	Averaging Window	79
9.3.1.50	Maximum Data Burst Volume	79
9.3.1.51	Priority Level	79
9.3.1.52	Security Result	80
9.3.1.53	Transaction ID.....	80
9.3.1.54	Inactivity timer.....	80
9.3.1.55	Paging Priority Indicator (PPI).....	80
9.3.1.56	gNB-CU-UP Capacity.....	80
9.3.1.58	PDCP SN Status Information	81
9.3.1.59	QoS Flow Mapping List.....	81
9.3.1.60	QoS Flow Mapping Indication.....	82
9.3.1.61	PDCP SN Size.....	82
9.3.1.62	Network Instance	82
9.3.1.63	MR-DC Usage Information.....	82
9.3.1.64	MR-DC Data Usage Report List	83
9.3.1.65	gNB-DU ID.....	84
9.3.1.66	Common Network Instance.....	84
9.3.1.67	Activity Notification Level	85
9.3.2	Transport Network Layer Related IEs	85
9.3.2.1	UP Transport Layer Information.....	85
9.3.2.2	CP Transport Layer Information	85
9.3.2.3	GTP-TEID.....	85
9.3.2.4	Transport Layer Address.....	86
9.3.2.5	Data Forwarding Information Request.....	86
9.3.2.6	Data Forwarding Information.....	86
9.3.3	Container and List IE definitions	86
9.3.3.1	DRB To Setup List E-UTRAN	86
9.3.3.2	PDU Session Resource To Setup List	87
9.3.3.3	DRB Setup List E-UTRAN.....	89
9.3.3.4	DRB Failed List E-UTRAN.....	89
9.3.3.5	PDU Session Resource Setup List	89
9.3.3.6	PDU Session Resource Failed List.....	90
9.3.3.7	DRB To Setup Modification List E-UTRAN.....	90
9.3.3.8	DRB To Modify List E-UTRAN	91
9.3.3.9	DRB To Remove List E-UTRAN	91
9.3.3.10	PDU Session Resource To Setup Modification List	92
9.3.3.11	PDU Session Resource To Modify List	94
9.3.3.12	PDU Session Resource To Remove List.....	97
9.3.3.13	DRB Setup Modification List E-UTRAN	97

9.3.3.14	DRB Failed Modification List E-UTRAN	97
9.3.3.15	DRB Modified List E-UTRAN	98
9.3.3.16	DRB Failed To Modify List E-UTRAN.....	98
9.3.3.17	PDU Session Resource Setup Modification List.....	98
9.3.3.18	PDU Session Resource Failed Modification List.....	99
9.3.3.19	PDU Session Resource Modified List.....	99
9.3.3.20	PDU Session Resource Failed To Modify List	101
9.3.3.21	DRB Required To Modify List E-UTRAN.....	101
9.3.3.22	DRB Required To Remove List E-UTRAN.....	101
9.3.3.23	PDU Session Resource Required To Modify List.....	101
9.3.3.24	DRB Confirm Modified List E-UTRAN.....	102
9.3.3.25	PDU Session Resource Confirm Modified List	102
9.4	Message and Information Element Abstract Syntax (with ASN.1).....	103
9.4.1	General.....	103
9.4.4	PDU Definitions	110
9.4.5	Information Element Definitions	132
9.4.6	Common Definitions.....	168
9.4.7	Constant Definitions	169
9.4.8	Container Definitions.....	172
10	Handling of unknown, unforeseen and erroneous protocol data.....	176
Annex A (informative):	Change History	177
History		179

ITeH STANDARD PREVIEW
 (standards.iteh.ai)
 Full standard:
<https://standards.iteh.ai/catalog/standards/sist/943e38a9-0bb8-48ec-b6f4-d4ed8c06faa0/etsi-ts-138-463-v15.8.0-2020-11>

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

ITeH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/943e38a9-06b8-48ee-b6f4-d4ed8c06faa0/etsi-ts-138-463-v15.8.0-2020-11>

1 Scope

The present document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in the present document. E1AP is developed in accordance to the general principles stated in TS 38.401 [2] and TS 38.460 [3].

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 38.401: "NG-RAN; Architecture Description".
- [3] 3GPP TS 38.460: "NG-RAN; E1 general aspects and principles".
- [4] 3GPP TS 38.300: "NR; Overall description; Stage-2".
- [5] 3GPP TR 25.921 (version 7.0.0): "Guidelines and principles for protocol description and error".
- [6] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
- [7] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".
- [8] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [9] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".
- [10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".
- [11] 3GPP TS 23.401: "General Packet Radio Service (GPRS) Enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".
- [12] 3GPP TS 23.203: "Policy and Charging Control Architecture".
- [13] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".
- [14] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".
- [15] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".
- [16] 3GPP TS 38.414: "NG-RAN; NG Data Transport".
- [17] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [18] 3GPP TS 38.462: "NG-RAN; E1 Signalling Transport".
- [19] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

- [20] 3GPP TS 23.501: "System Architecture for the 5G System".
- [21] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".
- [22] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".
- [23] 3GPP TS 23.003: "Numbering, addressing and identification".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP 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 3GPP TR 21.905 [1].

Elementary Procedure: E1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between gNB-CU-CP and gNB-CU-UP. These Elementary Procedures are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as standalone procedures, which can be active in parallel. The usage of several E1AP EPs together is specified in stage 2 specifications (e.g., TS 38.460 [3]).

An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success and/or failure).
- **Class 2:** Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful:

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.

Unsuccessful:

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e., absence of expected response).

Successful and Unsuccessful:

- One signalling message reports both successful and unsuccessful outcome for the different included requests. The response message used is the one defined for successful outcome.

Class 2 EPs are considered always successful.

gNB: as defined in TS 38.300 [4].

gNB-CU: as defined in TS 38.401 [2].

gNB-DU: as defined in TS 38.401 [2].

gNB-CU-CP: as defined in TS 38.401 [2].

gNB-CU-UP: as defined in TS 38.401 [2].

PDU Session Resource: as defined in TS 38.401 [2].

UE-associated signalling: When E1AP messages associated to one UE uses the UE-associated logical E1-connection for association of the message to the UE in gNB-CU-UP and gNB-CU-CP.

UE-associated logical E1-connection: The UE-associated logical E1-connection uses the identities *GNB-CU-CP UE E1AP ID* and *GNB-CU-UP UE E1AP ID* according to the definition in TS 38.401 [2]. For a received UE associated E1AP message the gNB-CU-CP identifies the associated UE based on the *GNB-CU-CP UE E1AP ID IE* and the gNB-CU-UP identifies the associated UE based on the *GNB-CU-UP UE E1AP ID IE*.

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].

5GC	5G Core Network
5QI	5G QoS Identifier
CGI	Cell Global Identifier
CN	Core Network
CP	Control Plane
DL	Downlink
EN-DC	E-UTRA-NR Dual Connectivity
EPC	Evolved Packet Core
MCG	Master Cell Group
NSSAI	Network Slice Selection Assistance Information
RANAC	RAN Area Code
SCG	Secondary Cell Group
SDAP	Service Data Adaptation Protocol
S-NSSAI	Single Network Slice Selection Assistance Information
TNLA	Transport Network Layer Association

4 General

4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating node exactly and completely. Any rule that specifies the behaviour of the originating node shall be possible to be verified with information that is visible within the system.

The following specification principles have been applied for the procedure text in clause 8:

- The procedure text discriminates between:

- 1) Functionality which "shall" be executed.

The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the REQUEST message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

- 2) Functionality which "shall, if supported" be executed.

The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included. For requirements on including *Criticality Diagnostics IE*, see clause 10.

4.2 Forwards and backwards compatibility

The forwards and backwards compatibility of the protocol is assured by mechanism where all current and future messages, and IEs or groups of related IEs, include ID and criticality fields that are coded in a standard format that will not be changed in the future. These parts can always be decoded regardless of the standard version.

4.3 Specification notations

For the purposes of the present document, the following notations apply:

Procedure	When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure.
Message	When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. HANDOVER REQUEST message.
IE	When referring to an information element (IE) in the specification the <i>Information Element Name</i> is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. <i>E-RAB ID</i> IE.
Value of an IE	When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in the specification enclosed by quotation marks, e.g. "Value".

5 E1AP services

E1AP provides the signalling service between the gNB-CU-CP and the gNB-CU-UP that is required to fulfil the E1AP functions described in clause 7. E1AP services are divided into two groups:

Non UE-associated services:	They are related to the whole E1 interface instance between the gNB-CU-CP and gNB-CU-UP utilising a non UE-associated signalling connection.
UE-associated services:	They are related to one UE. E1AP functions that provide these services are associated with a UE-associated signalling connection that is maintained for the UE in question.

Unless explicitly indicated in the procedure specification, at any instance in time one protocol endpoint shall have a maximum of one ongoing E1AP procedure related to a certain UE.

6 Services expected from signalling transport

The signalling connection shall provide in sequence delivery of E1AP messages. E1AP shall be notified if the signalling connection breaks.

7 Functions of E1AP

The functions of E1AP are described in TS 38.460 [3].