

ETSI TS 138 473 V15.9.0 (2020-04)



**5G;
NG-RAN;
F1 Application Protocol (F1AP)
(3GPP TS 38.473 version 15.9.0 Release 15)**

*Full Standard Preview
iTech Standards (standards.it-ebooks.info)
https://standards.it-ebooks.info/catalogue/standards/4329ce01-ca5a-422f-8be0-d5f10aa1e124/etsi-ts-138-473-v15.9.0-2020-04*



ReferenceRTS/TSGR-0338473vf90

Keywords5G

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.....	9
1 Scope	10
2 References	10
3 Definitions and abbreviations.....	11
3.1 Definitions	11
3.2 Abbreviations	12
4 General	12
4.1 Procedure specification principles.....	12
4.2 Forwards and backwards compatibility.....	13
4.3 Specification notations	13
5 F1AP services.....	13
6 Services expected from signalling transport.....	14
7 Functions of F1AP	14
8 F1AP procedures	14
8.1 List of F1AP Elementary procedures	14
8.2 Interface Management procedures	15
8.2.1 Reset	15
8.2.1.1 General	15
8.2.1.2 Successful Operation.....	15
8.2.1.2.1 Reset Procedure Initiated from the gNB-CU.....	15
8.2.1.2.2 Reset Procedure Initiated from the gNB-DU.....	16
8.2.1.3 Abnormal Conditions	17
8.2.2 Error Indication.....	17
8.2.2.1 General	17
8.2.2.2 Successful Operation.....	17
8.2.2.3 Abnormal Conditions.....	18
8.2.3 F1 Setup	18
8.2.3.1 General	18
8.2.3.2 Successful Operation.....	18
8.2.3.3 Unsuccessful Operation	19
8.2.3.4 Abnormal Conditions	19
8.2.4 gNB-DU Configuration Update.....	19
8.2.4.1 General	19
8.2.4.2 Successful Operation.....	20
8.2.4.3 Unsuccessful Operation	21
8.2.4.4 Abnormal Conditions	21
8.2.5 gNB-CU Configuration Update	21
8.2.5.1 General	21
8.2.5.2 Successful Operation.....	22
8.2.5.3 Unsuccessful Operation	23
8.2.5.4 Abnormal Conditions	23
8.2.6 gNB-DU Resource Coordination.....	23
8.2.6.1 General	23
8.2.6.2 Successful Operation.....	24
8.2.7 gNB-DU Status Indication.....	24
8.2.7.1 General	24
8.2.7.2 Successful Operation.....	24
8.2.7.3 Abnormal Conditions	24

8.2.8	FI Removal.....	25
8.2.8.1	General.....	25
8.2.8.2	Successful Operation.....	25
8.2.8.3	Unsuccessful Operation.....	26
8.2.8.4	Abnormal Conditions.....	26
8.2.9	Network Access Rate Reduction.....	26
8.2.9.1	General.....	26
8.2.9.2	Successful operation.....	27
8.2.9.3	Abnormal Conditions.....	27
8.3	UE Context Management procedures.....	27
8.3.1	UE Context Setup.....	27
8.3.1.1	General.....	27
8.3.1.2	Successful Operation.....	27
8.3.1.3	Unsuccessful Operation.....	30
8.3.1.4	Abnormal Conditions.....	30
8.3.2	UE Context Release Request (gNB-DU initiated).....	31
8.3.2.1	General.....	31
8.3.2.2	Successful Operation.....	31
8.3.2.3	Abnormal Conditions.....	31
8.3.3	UE Context Release (gNB-CU initiated).....	31
8.3.3.1	General.....	31
8.3.3.2	Successful Operation.....	32
8.3.3.4	Abnormal Conditions.....	32
8.3.4	UE Context Modification (gNB-CU initiated).....	32
8.3.4.1	General.....	32
8.3.4.2	Successful Operation.....	33
8.3.4.3	Unsuccessful Operation.....	37
8.3.4.4	Abnormal Conditions.....	37
8.3.5	UE Context Modification Required (gNB-DU initiated).....	37
8.3.5.1	General.....	37
8.3.5.2	Successful Operation.....	38
8.3.5.2A	Unsuccessful Operation.....	39
8.3.5.3	Abnormal Conditions.....	39
8.3.6	UE Inactivity Notification.....	39
8.3.6.1	General.....	39
8.3.6.2	Successful Operation.....	39
8.3.6.3	Abnormal Conditions.....	39
8.3.7	Notify.....	40
8.3.7.1	General.....	40
8.3.7.2	Successful Operation.....	40
8.3.7.3	Abnormal Conditions.....	40
8.4	RRC Message Transfer procedures.....	40
8.4.1	Initial UL RRC Message Transfer.....	40
8.4.1.1	General.....	40
8.4.1.2	Successful operation.....	41
8.4.1.3	Abnormal Conditions.....	41
8.4.2	DL RRC Message Transfer.....	41
8.4.2.1	General.....	41
8.4.2.2	Successful operation.....	41
8.4.2.3	Abnormal Conditions.....	42
8.4.3	UL RRC Message Transfer.....	42
8.4.3.1	General.....	42
8.4.3.2	Successful operation.....	42
8.4.3.3	Abnormal Conditions.....	43
8.4.4	RRC Delivery Report.....	43
8.4.4.1	General.....	43
8.4.4.2	Successful operation.....	43
8.4.4.3	Abnormal Conditions.....	43
8.5	Warning Message Transmission Procedures.....	43
8.5.1	Write-Replace Warning.....	43
8.5.1.1	General.....	43
8.5.1.2	Successful Operation.....	44

8.5.1.3	Unsuccessful Operation	44
8.5.1.4	Abnormal Conditions	44
8.5.2	PWS Cancel	44
8.5.2.1	General	44
8.5.2.2	Successful Operation.....	45
8.5.1.3	Unsuccessful Operation	45
8.5.3	PWS Restart Indication.....	45
8.5.3.1	General	45
8.5.3.2	Successful Operation.....	46
8.5.3.3	Abnormal Conditions	46
8.5.4	PWS Failure Indication.....	46
8.5.4.1	General	46
8.5.4.2	Successful Operation.....	46
8.5.4.3	Abnormal Conditions	46
8.6	System Information Procedures	47
8.6.1	System Information Delivery.....	47
8.6.1.1	General	47
8.6.1.2	Successful Operation.....	47
8.6.1.3	Abnormal Conditions	47
8.7	Paging procedures	47
8.7.1	Paging	47
8.7.1.1	General	47
8.7.1.2	Successful Operation.....	48
8.7.1.3	Abnormal Conditions	48
9	Elements for F1AP Communication	48
9.1	General	48
9.2	Message Functional Definition and Content	49
9.2.1	Interface Management messages	49
9.2.1.1	RESET	49
9.2.1.2	RESET ACKNOWLEDGE	49
9.2.1.3	ERROR INDICATION	50
9.2.1.4	F1 SETUP REQUEST	50
9.2.1.5	F1 SETUP RESPONSE	51
9.2.1.6	F1 SETUP FAILURE	51
9.2.1.7	GNB-DU CONFIGURATION UPDATE	51
9.2.1.8	GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE	53
9.2.1.9	GNB-DU CONFIGURATION UPDATE FAILURE	54
9.2.1.10	GNB-CU CONFIGURATION UPDATE	54
9.2.1.11	GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE	57
9.2.1.12	GNB-CU CONFIGURATION UPDATE FAILURE	58
9.2.1.13	GNB-DU RESOURCE COORDINATION REQUEST	59
9.2.1.14	GNB-DU RESOURCE COORDINATION RESPONSE	59
9.2.1.15	GNB-DU STATUS INDICATION	60
9.2.1.16	F1 REMOVAL REQUEST	60
9.2.1.17	F1 REMOVAL RESPONSE	60
9.2.1.18	F1 REMOVAL FAILURE	60
9.2.1.19	NETWORK ACCESS RATE REDUCTION	60
9.2.2	UE Context Management messages.....	61
9.2.2.1	UE CONTEXT SETUP REQUEST	61
9.2.2.2	UE CONTEXT SETUP RESPONSE.....	64
9.2.2.3	UE CONTEXT SETUP FAILURE	66
9.2.2.4	UE CONTEXT RELEASE REQUEST	67
9.2.2.5	UE CONTEXT RELEASE COMMAND	67
9.2.2.6	UE CONTEXT RELEASE COMPLETE	67
9.2.2.7	UE CONTEXT MODIFICATION REQUEST	68
9.2.2.8	UE CONTEXT MODIFICATION RESPONSE.....	73
9.2.2.9	UE CONTEXT MODIFICATION FAILURE	76
9.2.2.10	UE CONTEXT MODIFICATION REQUIRED.....	76
9.2.2.11	UE CONTEXT MODIFICATION CONFIRM	78
9.2.2.11A	UE CONTEXT MODIFICATION REFUSE.....	79
9.2.2.12	UE INACTIVITY NOTIFICATION	80

9.2.2.13	NOTIFY	80
9.2.3	RRC Message Transfer messages	81
9.2.3.1	INITIAL UL RRC MESSAGE TRANSFER	81
9.2.3.2	DL RRC MESSAGE TRANSFER	82
9.2.3.3	UL RRC MESSAGE TRANSFER	83
9.2.3.4	RRC DELIVERY REPORT	84
9.2.4	Warning Message Transmission Messages	84
9.2.4.1	WRITE-REPLACE WARNING REQUEST	84
9.2.4.2	WRITE-REPLACE WARNING RESPONSE	84
9.2.4.3	PWS CANCEL REQUEST	85
9.2.4.4	PWS CANCEL RESPONSE	86
9.2.4.5	PWS RESTART INDICATION	87
9.2.4.6	PWS FAILURE INDICATION	87
9.2.5	System Information messages	88
9.2.5.1	SYSTEM INFORMATION DELIVERY COMMAND	88
9.2.6	Paging messages	88
9.2.6.1	PAGING	88
9.3	Information Element Definitions	89
9.3.1	Radio Network Layer Related IEs	89
9.3.1.1	Message Type	89
9.3.1.2	Cause	89
9.3.1.3	Criticality Diagnostics	92
9.3.1.4	gNB-CU UE F1AP ID	92
9.3.1.5	gNB-DU UE F1AP ID	93
9.3.1.6	RRC-Container	93
9.3.1.7	SRB ID	93
9.3.1.8	DRB ID	93
9.3.1.9	gNB-DU ID	93
9.3.1.10	Served Cell Information	93
9.3.1.11	Transmission Action Indicator	95
9.3.1.12	NR CGI	95
9.3.1.13	Time To wait	95
9.3.1.14	PLMN Identity	96
9.3.1.15	Transmission Bandwidth	96
9.3.1.16	Void	96
9.3.1.17	NR Frequency Info	96
9.3.1.18	gNB-DU System Information	97
9.3.1.19	E-UTRAN QoS	97
9.3.1.20	Allocation and Retention Priority	98
9.3.1.21	GBR QoS Information	98
9.3.1.22	Bit Rate	99
9.3.1.23	Transaction ID	99
9.3.1.24	DRX Cycle	99
9.3.1.25	CU to DU RRC Information	100
9.3.1.26	DU to CU RRC Information	101
9.3.1.27	RLC Mode	103
9.3.1.28	SUL Information	103
9.3.1.29	5GS TAC	103
9.3.1.29a	Configured EPS TAC	104
9.3.1.30	RRC Reconfiguration Complete Indicator	104
9.3.1.31	UL Configuration	104
9.3.1.32	C-RNTI	104
9.3.1.33	Cell UL Configured	104
9.3.1.34	RAT-Frequency Priority Information	105
9.3.1.35	LCID	105
9.3.1.36	Duplication activation	105
9.3.1.37	Slice Support List	105
9.3.1.38	S-NSSAI	105
9.3.1.39	UE Identity Index value	106
9.3.1.40	Paging DRX	106
9.3.1.41	Paging Priority	106
9.3.1.42	gNB-CU System Information	106

9.3.1.43	RAN UE Paging identity.....	107
9.3.1.44	CN UE Paging Identity	107
9.3.1.45	QoS Flow Level QoS Parameters.....	107
9.3.1.46	GBR QoS Flow Information	108
9.3.1.47	Dynamic 5QI Descriptor	108
9.3.1.48	NG-RAN Allocation and Retention Priority	109
9.3.1.49	Non Dynamic 5QI Descriptor	110
9.3.1.50	Maximum Packet Loss Rate.....	111
9.3.1.51	Packet Delay Budget.....	111
9.3.1.52	Packet Error Rate	111
9.3.1.53	Averaging Window	111
9.3.1.54	Maximum Data Burst Volume	112
9.3.1.55	Masked IMEISV	112
9.3.1.56	Notification Control	112
9.3.1.57	RAN Area Code	112
9.3.1.58	PWS System Information.....	112
9.3.1.59	Repetition Period.....	113
9.3.1.60	Number of Broadcasts Requested	113
9.3.1.61	Void.....	113
9.3.1.62	SIType List.....	113
9.3.1.63	QoS Flow Identifier.....	114
9.3.1.64	Served E-UTRA Cell Information	114
9.3.1.65	Available PLMN List.....	114
9.3.1.66	RLC Failure Indication	114
9.3.1.67	Uplink TxDirectCurrentList Information	114
9.3.1.68	Service Status	115
9.3.1.69	RLC Status	115
9.3.1.70	RRC Version.....	115
9.3.1.71	RRC Delivery Status	115
9.3.1.72	QoS Flow Mapping Indication.....	116
9.3.1.73	Resource Coordination Transfer Information	116
9.3.1.74	E-UTRA PRACH Configuration	116
9.3.1.75	Resource Coordination E-UTRA Cell Information.....	116
9.3.1.76	Extended Available PLMN List.....	118
9.3.1.77	Associated SCell List	118
9.3.1.78	Cell Direction.....	118
9.3.1.79	Paging Origin	118
9.3.1.80	E-UTRA Transmission Bandwidth	118
9.3.1.81	Message Identifier.....	119
9.3.1.82	Serial Number	119
9.3.1.83	UAC Assistance Information	120
9.3.1.84	UAC Action	120
9.3.1.85	UAC reduction Indication	121
9.3.1.86	Additional SIB Message List	121
9.3.1.87	Cell Type.....	121
9.3.2	Transport Network Layer Related IEs	121
9.3.2.1	UP Transport Layer Information.....	121
9.3.2.2	GTP-TEID.....	122
9.3.2.3	Transport Layer Address	122
9.3.2.4	CP Transport Layer Information	122
9.4	Message and Information Element Abstract Syntax (with ASN.1).....	122
9.4.1	General.....	122
9.4.2	Usage of private message mechanism for non-standard use.....	123
9.4.3	Elementary Procedure Definitions	124
9.4.4	PDU Definitions	131
9.4.5	Information Element Definitions	167
9.4.6	Common Definitions.....	207
9.4.7	Constant Definitions	207
9.4.8	Container Definitions.....	214
9.5	Message Transfer Syntax	218
9.6	Timers	218

10 Handling of unknown, unforeseen and erroneous protocol data218

Annex A (informative): Change History219

History223

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/4329ce01-ca5a-422f-8be0-d5f10aa1e124/etsi-ts-138-473-v15.9.0-2020-04>

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.

PREVIEW
iTech STANDARD
(standards.itih.ai)
Full standard:
<https://standards.itih.ai/catalog/standards/sist/4329ce01-ca5a-422f-8be0-d5f10aa1e124/etsi-ts-138-473-v15.9.0-2020-04>

1 Scope

The present document specifies the 5G radio network layer signalling protocol for the F1 interface. The F1 interface provides means for interconnecting a gNB-CU and a gNB-DU of a gNB within an NG-RAN, or for interconnecting a gNB-CU and a gNB-DU of an en-gNB within an E-UTRAN. The F1 Application Protocol (F1AP) supports the functions of F1 interface by signalling procedures defined in the present document. F1AP is developed in accordance to the general principles stated in TS 38.401 [4] and TS 38.470 [2].

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 38.470: "NG-RAN; F1 general aspects and principles".
- [3] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
- [4] 3GPP TS 38.401: "NG-RAN; Architecture Description".
- [5] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".
- [6] 3GPP TS 38.300: "NR; Overall description; Stage-2".
- [7] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".
- [8] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [9] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".
- [10] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".
- [11] 3GPP TS 23.203: "Policy and charging control architecture".
- [12] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [13] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".
- [14] 3GPP TR 25.921: (version.7.0.0): "Guidelines and principles for protocol description and error".
- [15] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
- [16] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [17] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".

- [18] 3GPP TS 29.281: "General Packet Radio System (GPRS); Tunnelling Protocol User Plane (GTPv1-U)".
- [19] 3GPP TS 38.414: "NG-RAN; NG data transport".
- [20] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".
- [21] 3GPP TS 23.501: "System Architecture for the 5G System".
- [22] 3GPP TS 38.472: "NG-RAN; F1 signalling transport".
- [23] 3GPP TS 23.003: "Numbering, addressing and identification".
- [24] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state".
- [25] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".
- [26] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".
- [27] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation".
- [28] 3GPP TS 38.423: "NG-RAN; Xn application protocol (XnAP)".

3 Definitions and abbreviations

3.1 Definitions

elementary procedure: F1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between gNB-CU and gNB-DU. 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 F1AP EPs together is specified in stage 2 specifications (e.g., TS 38.470 [2]).

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.

EN-DC operation: Used in this specification when the F1AP is applied for gNB-CU and gNB-DU in E-UTRAN.

gNB: as defined in TS 38.300 [6].

gNB-CU: as defined in TS 38.401 [4].

gNB-CU UE F1AP ID: as defined in TS 38.401 [4].

gNB-DU: as defined in TS 38.401 [4].

gNB-DU UE F1AP ID: as defined in TS 38.401 [4].

en-gNB: as defined in TS 37.340 [7].

UE-associated signalling: When F1AP messages associated to one UE uses the UE-associated logical F1-connection for association of the message to the UE in gNB-DU and gNB-CU.

UE-associated logical F1-connection: The UE-associated logical F1-connection uses the identities *GNB-CU UE F1AP ID* and *GNB-DU UE F1AP ID* according to the definition in TS 38.401 [4]. For a received UE associated F1AP message the gNB-CU identifies the associated UE based on the *GNB-CU UE F1AP ID* IE and the gNB-DU identifies the associated UE based on the *GNB-DU UE F1AP ID* IE. The UE-associated logical F1-connection may exist before the F1 UE context is setup in gNB-DU.

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
AMF	Access and Mobility Management Function
CN	Core Network
CG	Cell Group
CGI	Cell Global Identifier
CP	Control Plane
DL	Downlink
EN-DC	E-UTRA-NR Dual Connectivity
EPC	Evolved Packet Core
IMEISV	International Mobile station Equipment Identity and Software Version number
NSSAI	Network Slice Selection Assistance Information
RANAC	RAN Area Code
RRC	Radio Resource Control
S-NSSAI	Single Network Slice Selection Assistance Information
SUL	Supplementary Uplink
TAC	Tracking Area Code
TAI	Tracking Area Identity

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.