

# ETSI TS 138 473 V15.8.0 (2020-01)



**5G;  
NG-RAN;  
F1 Application Protocol (F1AP)  
(3GPP TS 38.473 version 15.8.0 Release 15)**

*Full Standard Preview*  
*(standards.iteh.ai)*  
*https://standards.iteh.ai/catalog/standards/sist/0663ee66-1782-41f4-bdc1-a3ba63feaf5d/etsi-ts-138-473-v15.8.0-2020-01*



---

**Reference**RTS/TSGR-0338473vf80

---

---

**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](http://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 data .....218

**Annex A (informative): Change History .....219**

History .....223

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/0663ee66-1782-4164-bdc1-a3ba63feaf5d/etsi-ts-138-473-v15.8.0-2020-01>

---

# 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**  
**STANDARD**  
**ETSI**  
**(standards.iteh.ai)**  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/0663ee66-1782-4164-bdc1-a3ba63feaf5d/etsi-ts-138-473-v15.8.0-2020-01>

---

# 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.