

# ETSI TS 138 423 V15.6.0 (2020-01)



TECHNICAL SPECIFICATION

**5G;  
NG-RAN;  
Xn Application Protocol (XnAP)  
(3GPP TS 38.423 version 15.6.0 Release 15)**

*Full Standards Catalogue  
https://standards.iteh.ai/catalog/standards/sist/b490853c-efaa-46de-b0f1-4e106532432c/etsi-ts-138-423-v15.6.0-2020-01*



---

Reference

RTS/TSGR-0338423vf60

---

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.....	10
1 Scope .....	11
2 References .....	11
3 Definitions, symbols and abbreviations .....	12
3.1 Definitions .....	12
3.2 Abbreviations .....	13
4 General .....	13
4.1 Procedure specification principles.....	13
4.2 Forwards and backwards compatibility.....	14
4.3 Specification notations .....	14
5 XnAP services .....	14
5.1 XnAP procedure modules .....	14
5.2 Parallel transactions.....	14
6 Services expected from signalling transport.....	14
7 Functions of XnAP.....	15
8 XnAP procedures .....	15
8.1 Elementary procedures .....	15
8.2 Basic mobility procedures .....	17
8.2.1 Handover Preparation .....	17
8.2.1.1 General .....	17
8.2.1.2 Successful Operation.....	17
8.2.1.3 Unsuccessful Operation .....	19
8.2.1.4 Abnormal Conditions .....	20
8.2.2 SN Status Transfer .....	20
8.2.2.1 General .....	20
8.2.2.2 Successful Operation.....	21
8.2.2.3 Unsuccessful Operation .....	21
8.2.2.4 Abnormal Conditions .....	21
8.2.3 Handover Cancel .....	21
8.2.3.1 General .....	21
8.2.3.2 Successful Operation.....	22
8.2.3.3 Unsuccessful Operation .....	22
8.2.3.4 Abnormal Conditions .....	22
8.2.4 Retrieve UE Context .....	22
8.2.4.1 General .....	22
8.2.4.2 Successful Operation.....	22
8.2.4.3 Unsuccessful Operation .....	23
8.2.4.4 Abnormal Conditions .....	23
8.2.5 RAN Paging.....	23
8.2.5.1 General .....	23
8.2.5.2 Successful operation.....	24
8.2.5.3 Unsuccessful Operation .....	24
8.2.5.4 Abnormal Condition.....	24
8.2.6 XN-U Address Indication .....	24
8.2.6.1 General .....	24
8.2.6.2 Successful Operation.....	25
8.2.6.3 Unsuccessful Operation .....	25
8.2.6.4 Abnormal Conditions .....	25

8.2.7	UE Context Release .....	26
8.2.7.1	General .....	26
8.2.7.2	Successful Operation.....	26
8.2.7.3	Unsuccessful Operation .....	27
8.2.7.4	Abnormal Conditions .....	27
8.3	Procedures for Dual Connectivity .....	27
8.3.1	S-NG-RAN node Addition Preparation .....	27
8.3.1.1	General .....	27
8.3.1.2	Successful Operation.....	28
8.3.1.3	Unsuccessful Operation .....	31
8.3.1.4	Abnormal Conditions .....	31
8.3.2	S-NG-RAN node Reconfiguration Completion .....	32
8.3.2.1	General .....	32
8.3.2.2	Successful Operation.....	32
8.3.2.3	Abnormal Conditions .....	32
8.3.3	M-NG-RAN node initiated S-NG-RAN node Modification Preparation .....	32
8.3.3.1	General .....	32
8.3.3.2	Successful Operation.....	33
8.3.3.3	Unsuccessful Operation .....	38
8.3.3.4	Abnormal Conditions .....	38
8.3.4	S-NG-RAN node initiated S-NG-RAN node Modification .....	39
8.3.4.1	General .....	39
8.3.4.2	Successful Operation.....	39
8.3.4.3	Unsuccessful Operation .....	41
8.3.4.4	Abnormal Conditions .....	42
8.3.5	S-NG-RAN node initiated S-NG-RAN node Change.....	42
8.3.5.1	General .....	42
8.3.5.2	Successful Operation.....	43
8.3.5.3	Unsuccessful Operation .....	43
8.3.5.4	Abnormal Conditions .....	43
8.3.6	M-NG-RAN node initiated S-NG-RAN node Release .....	44
8.3.6.1	General .....	44
8.3.6.2	Successful Operation.....	44
8.3.6.3	Unsuccessful Operation .....	45
8.3.6.4	Abnormal Conditions .....	45
8.3.7	S-NG-RAN node initiated S-NG-RAN node Release .....	45
8.3.7.1	General .....	45
8.3.7.2	Successful Operation.....	46
8.3.7.3	Unsuccessful Operation .....	46
8.3.7.4	Abnormal Conditions .....	46
8.3.8	S-NG-RAN node Counter Check.....	46
8.3.8.1	General .....	46
8.3.8.2	Successful Operation.....	47
8.3.8.3	Unsuccessful Operation .....	47
8.3.8.4	Abnormal Conditions .....	47
8.3.9	RRC Transfer.....	47
8.3.9.1	General .....	47
8.3.9.2	Successful Operation.....	48
8.3.9.3	Unsuccessful Operation .....	48
8.3.9.4	Abnormal Conditions .....	48
8.3.10	Notification Control Indication.....	48
8.3.10.1	General .....	48
8.3.10.2	Successful Operation – M-NG-RAN node initiated.....	49
8.3.10.3	Successful Operation – S-NG-RAN node initiated .....	49
8.3.10.4	Abnormal Conditions .....	49
8.3.11	Activity Notification .....	49
8.3.11.1	General .....	49
8.3.11.2	Successful Operation.....	50
8.3.11.3	Abnormal Conditions .....	50
8.3.12	E-UTRA – NR Cell Resource Coordination.....	50
8.3.12.1	General .....	50
8.3.12.2	Successful Operation.....	51

8.3.13	Secondary RAT Data Usage Report .....	52
8.3.13.1	General .....	52
8.3.13.2	Successful Operation.....	52
8.3.13.3	Unsuccessful Operation .....	52
8.3.13.4	Abnormal Conditions .....	52
8.4	Global procedures.....	52
8.4.1	Xn Setup .....	52
8.4.1.1	General .....	52
8.4.1.2	Successful Operation.....	53
8.4.1.3	Unsuccessful Operation .....	54
8.4.1.4	Abnormal Conditions .....	54
8.4.2	NG-RAN node Configuration Update .....	54
8.4.2.1	General .....	54
8.4.2.2	Successful Operation.....	55
8.4.2.3	Unsuccessful Operation .....	57
8.4.2.4	Abnormal Conditions .....	57
8.4.3	Cell Activation.....	57
8.4.3.1	General .....	57
8.4.3.2	Successful Operation.....	57
8.4.3.3	Unsuccessful Operation .....	58
8.4.3.4	Abnormal Conditions .....	58
8.4.4	Reset .....	58
8.4.4.1	General .....	58
8.4.4.2	Successful Operation.....	59
8.4.4.3	Unsuccessful Operation .....	59
8.4.4.4	Abnormal Conditions .....	59
8.4.5	Error Indication.....	60
8.4.5.1	General .....	60
8.4.5.2	Successful Operation.....	60
8.4.5.3	Unsuccessful Operation .....	60
8.4.5.4	Abnormal Conditions .....	60
8.4.6	Xn Removal.....	60
8.4.6.1	General .....	60
8.4.6.2	Successful Operation.....	61
8.4.6.3	Unsuccessful Operation .....	61
8.4.6.4	Abnormal Conditions .....	61
9	Elements for XnAP Communication.....	62
9.0	General .....	62
9.1	Message Functional Definition and Content .....	62
9.1.1	Messages for Basic Mobility Procedures.....	62
9.1.1.1	HANDOVER REQUEST .....	62
9.1.1.2	HANDOVER REQUEST ACKNOWLEDGE.....	64
9.1.1.3	HANDOVER PREPARATION FAILURE .....	65
9.1.1.4	SN STATUS TRANSFER .....	65
9.1.1.5	UE CONTEXT RELEASE .....	66
9.1.1.6	HANDOVER CANCEL .....	66
9.1.1.7	RAN PAGING .....	67
9.1.1.8	RETRIEVE UE CONTEXT REQUEST.....	67
9.1.1.9	RETRIEVE UE CONTEXT RESPONSE.....	68
9.1.1.10	RETRIEVE UE CONTEXT FAILURE.....	69
9.1.1.11	XN-U ADDRESS INDICATION .....	69
9.1.2	Messages for Dual Connectivity Procedures .....	70
9.1.2.1	S-NODE ADDITION REQUEST.....	70
9.1.2.2	S-NODE ADDITION REQUEST ACKNOWLEDGE.....	73
9.1.2.3	S-NODE ADDITION REQUEST REJECT.....	75
9.1.2.4	S-NODE RECONFIGURATION COMPLETE .....	75
9.1.2.5	S-NODE MODIFICATION REQUEST .....	76
9.1.2.6	S-NODE MODIFICATION REQUEST ACKNOWLEDGE .....	79
9.1.2.7	S-NODE MODIFICATION REQUEST REJECT .....	81
9.1.2.8	S-NODE MODIFICATION REQUIRED.....	82
9.1.2.9	S-NODE MODIFICATION CONFIRM.....	84

9.1.2.10	S-NODE MODIFICATION REFUSE .....	86
9.1.2.11	S-NODE CHANGE REQUIRED .....	86
9.1.2.12	S-NODE CHANGE CONFIRM .....	87
9.1.2.13	S-NODE CHANGE REFUSE.....	88
9.1.2.14	S-NODE RELEASE REQUEST.....	88
9.1.2.15	S-NODE RELEASE REQUEST ACKNOWLEDGE.....	89
9.1.2.16	S-NODE RELEASE REJECT .....	89
9.1.2.17	S-NODE RELEASE REQUIRED .....	90
9.1.2.18	S-NODE RELEASE CONFIRM .....	90
9.1.2.19	S-NODE COUNTER CHECK REQUEST .....	91
9.1.2.20	RRC TRANSFER .....	92
9.1.2.21	NOTIFICATION CONTROL INDICATION .....	92
9.1.2.22	ACTIVITY NOTIFICATION.....	93
9.1.2.23	E-UTRA – NR CELL RESOURCE COORDINATION REQUEST.....	94
9.1.2.24	E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE.....	95
9.1.2.25	SECONDARY RAT DATA USAGE REPORT .....	96
9.1.3	Messages for Global Procedures.....	97
9.1.3.1	XN SETUP REQUEST .....	97
9.1.3.2	XN SETUP RESPONSE.....	98
9.1.3.3	XN SETUP FAILURE.....	99
9.1.3.4	NG-RAN NODE CONFIGURATION UPDATE.....	99
9.1.3.5	NG-RAN NODE CONFIGURATION UPDATE ACKNOWLEDGE.....	101
9.1.3.6	NG-RAN NODE CONFIGURATION UPDATE FAILURE.....	101
9.1.3.7	CELL ACTIVATION REQUEST .....	102
9.1.3.8	CELL ACTIVATION RESPONSE .....	102
9.1.3.9	CELL ACTIVATION FAILURE .....	103
9.1.3.10	RESET REQUEST .....	103
9.1.3.11	RESET RESPONSE.....	104
9.1.3.12	ERROR INDICATION .....	105
9.1.3.13	XN REMOVAL REQUEST .....	105
9.1.3.14	XN REMOVAL RESPONSE .....	105
9.1.3.15	XN REMOVAL FAILURE .....	106
9.2	Information Element definitions.....	106
9.2.0	General.....	106
9.2.1	Container and List IE definitions.....	106
9.2.1.1	PDU Session Resources To Be Setup List .....	106
9.2.1.2	PDU Session Resources Admitted List.....	107
9.2.1.3	PDU Session Resources Not Admitted List.....	108
9.2.1.4	QoS Flow List with Cause.....	109
9.2.1.4a	QoS Flow List .....	109
9.2.1.5	PDU Session Resource Setup Info – SN terminated .....	109
9.2.1.6	PDU Session Resource Setup Response Info – SN terminated.....	110
9.2.1.7	PDU Session Resource Setup Info – MN terminated.....	112
9.2.1.8	PDU Session Resource Setup Response Info – MN terminated .....	113
9.2.1.9	PDU Session Resource Modification Info – SN terminated .....	113
9.2.1.10	PDU Session Resource Modification Response Info – SN terminated .....	115
9.2.1.11	PDU Session Resource Modification Info – MN terminated .....	117
9.2.1.12	PDU Session Resource Modification Response Info – MN terminated.....	119
9.2.1.13	UE Context Information Retrieve UE Context Response .....	119
9.2.1.14	DRBs Subject To Status Transfer List .....	120
9.2.1.15	DRB to QoS Flow Mapping List.....	122
9.2.1.16	Data Forwarding Info from target NG-RAN node .....	123
9.2.1.17	Data Forwarding and Offloading Info from source NG-RAN node.....	123
9.2.1.18	PDU Session Resource Change Required Info – SN terminated .....	124
9.2.1.19	PDU Session Resource Change Confirm Info – SN terminated .....	124
9.2.1.20	PDU Session Resource Modification Required Info – SN terminated.....	124
9.2.1.21	PDU Session Resource Modification Confirm Info – SN terminated.....	126
9.2.1.22	PDU Session Resource Modification Required Info – MN terminated.....	127
9.2.1.23	PDU Session Resource Modification Confirm Info – MN terminated.....	128
9.2.1.24	PDU Session List with data forwarding request info .....	128
9.2.1.25	PDU Session List with data forwarding info from the target node .....	128
9.2.1.26	PDU Session List with Cause.....	129

9.2.1.27	PDU Session List .....	129
9.2.1.28	DRB List with Cause .....	129
9.2.1.29	DRB List .....	130
9.2.1.30	PDU Session Resource Setup Complete Info – SN terminated.....	130
9.2.1.31	Secondary Data Forwarding Info from target NG-RAN node List .....	131
9.2.1.32	Additional UL NG-U UP TNL Information at UPF List .....	131
9.2.2	NG-RAN Node and Cell Configuration related IE definitions .....	131
9.2.2.1	Global gNB ID .....	131
9.2.2.2	Global ng-eNB ID .....	132
9.2.2.3	Global NG-RAN Node ID .....	132
9.2.2.4	PLMN Identity .....	132
9.2.2.5	TAC.....	133
9.2.2.6	RAN Area Code .....	133
9.2.2.7	NR CGI .....	133
9.2.2.8	E-UTRA CGI .....	133
9.2.2.9	NG-RAN Cell Identity .....	133
9.2.2.10	NG-RAN Cell PCI .....	133
9.2.2.11	Served Cell Information NR .....	134
9.2.2.12	Served Cell Information E-UTRA .....	136
9.2.2.13	Neighbour Information NR .....	139
9.2.2.14	Neighbour Information E-UTRA .....	139
9.2.2.15	Served Cells To Update NR .....	140
9.2.2.16	Served Cells to Update E-UTRA .....	141
9.2.2.17	Cell Assistance Information NR .....	141
9.2.2.18	SUL Information .....	142
9.2.2.19	NR Frequency Info.....	142
9.2.2.20	NR Transmission Bandwidth .....	143
9.2.2.21	E-UTRA ARFCN.....	144
9.2.2.22	E-UTRA Transmission Bandwidth .....	144
9.2.2.23	Number of Antenna Ports E-UTRA .....	144
9.2.2.24	E-UTRA Multiband Info List.....	144
9.2.2.25	E-UTRA PRACH Configuration .....	144
9.2.2.26	MBSFN Subframe Allocation E-UTRA .....	145
9.2.2.27	Global NG-RAN Cell Identity .....	145
9.2.2.28	Connectivity Support .....	145
9.2.2.29	Protected E-UTRA Resource Indication .....	145
9.2.2.30	Data Traffic Resource Indication .....	147
9.2.2.31	Data Traffic Resources.....	147
9.2.2.32	Reserved Subframe Pattern.....	148
9.2.2.33	MR-DC Resource Coordination Information .....	148
9.2.2.34	E-UTRA Resource Coordination Information .....	149
9.2.2.35	NR Resource Coordination Information .....	151
9.2.2.36	E-UTRA Coordination Assistance Information .....	153
9.2.2.37	NR Coordination Assistance Information .....	153
9.2.2.38	NE-DC TDM Pattern .....	154
9.2.2.39	Interface Instance Indication .....	154
9.2.3	General IE definitions .....	154
9.2.3.1	Message Type .....	154
9.2.3.2	Cause.....	154
9.2.3.3	Criticality Diagnostics.....	159
9.2.3.4	Bit Rate .....	160
9.2.3.5	QoS Flow Level QoS Parameters.....	160
9.2.3.6	GBR QoS Flow Information .....	161
9.2.3.7	Allocation and Retention Priority .....	161
9.2.3.8	Non dynamic 5QI Descriptor .....	162
9.2.3.9	Dynamic 5QI Descriptor .....	163
9.2.3.10	QoS Flow Identifier.....	163
9.2.3.11	Packet Loss Rate .....	163
9.2.3.12	Packet Delay Budget.....	163
9.2.3.13	Packet Error Rate .....	164
9.2.3.14	Averaging Window .....	164
9.2.3.15	Maximum Data Burst Volume .....	164



9.2.3.16	NG-RAN node UE XnAP ID .....	164
9.2.3.17	UE Aggregate Maximum Bit Rate .....	164
9.2.3.18	PDU Session ID .....	165
9.2.3.19	PDU Session Type .....	165
9.2.3.20	TAI Support List .....	165
9.2.3.21	S-NSSAI .....	165
9.2.3.22	Slice Support List .....	165
9.2.3.23	Index to RAT/Frequency Selection Priority .....	166
9.2.3.24	GUAMI .....	166
9.2.3.25	Target Cell Global ID .....	166
9.2.3.26	AMF UE NGAP ID .....	166
9.2.3.27	SCG Configuration Query .....	166
9.2.3.28	RLC Mode .....	166
9.2.3.29	Transport Layer Address .....	167
9.2.3.30	UP Transport Layer Information .....	167
9.2.3.31	CP Transport Layer Information .....	167
9.2.3.32	Masked IMEISV .....	167
9.2.3.33	DRB ID .....	168
9.2.3.34	DL Forwarding .....	168
9.2.3.35	Data Forwarding Accepted .....	168
9.2.3.36	COUNT Value for PDCP SN Length 12 .....	168
9.2.3.37	COUNT Value for PDCP SN Length 18 .....	168
9.2.3.38	RAN Paging Area .....	168
9.2.3.39	RAN Area ID .....	169
9.2.3.40	UE Context ID .....	169
9.2.3.41	Assistance Data for RAN Paging .....	170
9.2.3.42	RAN Paging Attempt Information .....	170
9.2.3.43	UE RAN Paging Identity .....	170
9.2.3.44	Paging Priority .....	171
9.2.3.45	Delivery Status .....	171
9.2.3.46	I-RNTI .....	171
9.2.3.47	Location Reporting Information .....	171
9.2.3.48	Area of Interest Information .....	172
9.2.3.49	UE Security Capabilities .....	172
9.2.3.50	AS Security Information .....	173
9.2.3.51	S-NG-RAN node Security Key .....	174
9.2.3.52	Security Indication .....	174
9.2.3.53	Mobility Restriction List .....	174
9.2.3.54	Xn Benefit Value .....	176
9.2.3.55	Trace Activation .....	177
9.2.3.56	Time To Wait .....	177
9.2.3.57	QoS Flow Notification Control Indication Info .....	177
9.2.3.58	Request Reporting Reference ID .....	178
9.2.3.59	User plane traffic activity report .....	178
9.2.3.60	Lower Layer presence status change .....	178
9.2.3.61	RRC Resume Cause .....	178
9.2.3.62	Priority Level .....	179
9.2.3.63	PDCP SN Length .....	179
9.2.3.64	UE History Information .....	179
9.2.3.65	Last Visited Cell Information .....	179
9.2.3.66	Paging DRX .....	180
9.2.3.67	Security Result .....	180
9.2.3.68	UE Context Kept Indicator .....	180
9.2.3.69	PDU Session Aggregate Maximum Bit Rate .....	180
9.2.3.70	LCID .....	181
9.2.3.71	Duplication Activation .....	181
9.2.3.72	RRC Config Indication .....	181
9.2.3.73	Maximum Integrity Protected Data Rate .....	181
9.2.3.74	PDCP Change Indication .....	182
9.2.3.75	UL Configuration .....	182
9.2.3.76	UP Transport Parameters .....	182
9.2.3.77	Desired Activity Notification Level .....	183

9.2.3.78	Number of DRB IDs .....	183
9.2.3.79	QoS Flow Mapping Indication .....	183
9.2.3.80	RLC Status .....	183
9.2.3.81	Expected UE Behaviour .....	184
9.2.3.82	Expected UE Activity Behaviour .....	184
9.2.3.83	AMF Region Information .....	185
9.2.3.84	TNL Association Usage .....	185
9.2.3.85	Network Instance .....	185
9.2.3.86	PDCP Duplication Configuration .....	186
9.2.3.87	Secondary RAT Usage Information .....	186
9.2.3.88	Volume Timed Report List .....	186
9.2.3.89	Maximum IP Rate .....	187
9.2.3.90	UL Forwarding .....	187
9.2.3.91	UE Radio Capability for Paging .....	187
9.2.3.92	Common Network Instance .....	188
9.2.3.93	Default DRB Allowed .....	188
9.2.3.94	Split Session Indicator .....	188
9.2.3.95	UL Forwarding Proposal .....	188
9.3	Message and Information Element Abstract Syntax (with ASN.1) .....	189
9.3.1	General .....	189
9.3.2	Usage of Private Message Mechanism for Non-standard Use .....	189
9.3.3	Elementary Procedure Definitions .....	190
9.3.4	PDU Definitions .....	198
9.3.5	Information Element definitions .....	234
9.3.6	Common definitions .....	299
9.3.7	Constant definitions .....	300
9.3.8	Container definitions .....	305
9.4	Message transfer syntax .....	310
9.5	Timers .....	310
10	Handling of unknown, unforeseen and erroneous protocol data .....	310
<b>Annex A (informative):</b>	<b>Change history .....</b>	<b>311</b>
History .....		314

---

# Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> 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/b490853c-efaa-46de-b0f1-4e106532432c/etsi-ts-138-423-v15.6.0-2020-01>

---

# 1 Scope

The present document specifies the radio network layer signalling procedures of the control plane between NG-RAN nodes in NG-RAN. XnAP supports the functions of the Xn interface by signalling procedures defined in this document. XnAP is developed in accordance to the general principles stated in TS 38.401 [2] and TS 38.420 [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 38.420: "NG-RAN; Xn General Aspects and Principles".
- [4] 3GPP TS 38.422: "NG-RAN; Xn Signalling Transport".
- [5] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP) ".
- [6] 3GPP TS 25.921: "Guidelines and principles for protocol description and error handling".
- [7] 3GPP TS 23.501: "System Architecture for the 5G System".
- [8] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".
- [9] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".
- [10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) Protocol specification".
- [11] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [12] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".
- [13] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [14] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".
- [15] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER) ".
- [16] ITU-T Recommendation X.680 (2002-07): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [17] ITU-T Recommendation X.681 (2002-07): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".
- [18] 3GPP TS 29.281: "General Packet Radio Service (GPRS); Tunnelling Protocol User Plane (GTPv1-U)".
- [19] 3GPP TS 38.424: "NG-RAN; Xn data transport".

- [20] 3GPP TS 38.414: "NG-RAN; NG data transport".
- [21] 3GPP TS 38.412: "NG-RAN; NG Signalling Transport".
- [22] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [23] 3GPP TS 32.422: "Trace control and configuration management".
- [24] 3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".
- [25] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".
- [26] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".
- [27] 3GPP TS 36.101: "User Equipment (UE) radio transmission and reception".
- [28] 3GPP TS 33.501: "Security architecture and procedures for 5G System".
- [29] 3GPP TS 33.401: "3GPP System Architecture Evolution (SAE); Security architecture".
- [30] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [31] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
- [32] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [33] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in Idle mode and RRC Inactive state".
- [34] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".
- [35] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [36] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
- [37] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".

---

## 3 Definitions, symbols 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:** XnAP protocol consists of Elementary Procedures (EPs). An XnAP Elementary Procedure is a unit of interaction between two NG-RAN nodes. 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 or failure),
- **Class 2:** Elementary Procedures without response.

**NG-RAN node:** as defined in TS 38.300 [9].

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

**PDU session split:** as defined in TS 37.340 [8].