

ETSI TS 137 473 V16.2.0 (2020-09)



**LTE;
5G;
W1 interface;
Application Protocol (W1AP)
(3GPP TS 37.473 version 16.2.0 Release 16)**



Reference

DTS/TSGR-0337473vg20

Keywords

5G,LTE

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/CommitteeSupportStaff.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 | 10 |
| 2 References | 10 |
| 3 Definitions of terms, symbols and abbreviations | 11 |
| 3.1 Terms..... | 11 |
| 3.2 Symbols..... | 12 |
| 3.3 Abbreviations | 12 |
| 4 General | 12 |
| 4.1 Procedure specification principles..... | 12 |
| 4.2 Forwards and backwards compatibility..... | 13 |
| 4.3 Specification notations | 13 |
| 5 W1AP services | 13 |
| 6 Services expected from signalling transport..... | 13 |
| 7 Functions of W1AP | 13 |
| 8 W1AP procedures | 14 |
| 8.1 List of W1AP 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 ng-eNB-CU..... | 15 |
| 8.2.1.2.2 Reset Procedure Initiated from the ng-eNB-DU..... | 16 |
| 8.2.1.3 Abnormal Conditions | 16 |
| 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 | 17 |
| 8.2.3 W1 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 ng-eNB-DU Configuration Update..... | 19 |
| 8.2.4.1 General | 19 |
| 8.2.4.2 Successful Operation..... | 19 |
| 8.2.4.3 Unsuccessful Operation | 20 |
| 8.2.4.4 Abnormal Conditions | 20 |
| 8.2.5 ng-eNB-CU Configuration Update | 21 |
| 8.2.5.1 General | 21 |
| 8.2.5.2 Successful Operation..... | 21 |
| 8.2.5.3 Unsuccessful Operation | 22 |
| 8.2.5.4 Abnormal Conditions | 22 |
| 8.2.6 ng-eNB-DU Resource Coordination | 22 |
| 8.2.6.1 General | 22 |
| 8.2.6.2 Successful Operation..... | 22 |
| 8.2.7 ng-eNB-DU Status Indication..... | 23 |
| 8.2.7.1 General | 23 |
| 8.2.7.2 Successful Operation..... | 23 |

| | | |
|---------|--|----|
| 8.2.7.3 | Abnormal Conditions | 23 |
| 8.3 | UE Context Management procedures | 23 |
| 8.3.1 | UE Context Setup | 23 |
| 8.3.1.1 | General | 23 |
| 8.3.1.2 | Successful Operation | 24 |
| 8.3.1.3 | Unsuccessful Operation | 25 |
| 8.3.1.4 | Abnormal Conditions | 25 |
| 8.3.2 | UE Context Release Request (ng-eNB-DU initiated) | 25 |
| 8.3.2.1 | General | 25 |
| 8.3.2.2 | Successful Operation | 25 |
| 8.3.2.3 | Abnormal Conditions | 26 |
| 8.3.3 | UE Context Release (ng-eNB-CU initiated) | 26 |
| 8.3.3.1 | General | 26 |
| 8.3.3.2 | Successful Operation | 26 |
| 8.3.3.4 | Abnormal Conditions | 26 |
| 8.3.4 | UE Context Modification (ng-eNB-CU initiated) | 27 |
| 8.3.4.1 | General | 27 |
| 8.3.4.2 | Successful Operation | 27 |
| 8.3.4.3 | Unsuccessful Operation | 28 |
| 8.3.4.4 | Abnormal Conditions | 28 |
| 8.3.5 | UE Context Modification Required (ng-eNB-DU initiated) | 29 |
| 8.3.5.1 | General | 29 |
| 8.3.5.2 | Successful Operation | 29 |
| 8.3.5.3 | Unsuccessful Operation | 29 |
| 8.3.5.4 | Abnormal Conditions | 29 |
| 8.3.6 | UE Inactivity Notification | 29 |
| 8.3.6.1 | General | 29 |
| 8.3.6.2 | Successful Operation | 30 |
| 8.3.6.3 | Abnormal Conditions | 30 |
| 8.3.7 | Notify | 30 |
| 8.3.7.1 | General | 30 |
| 8.3.7.2 | Successful Operation | 30 |
| 8.3.7.3 | Abnormal Conditions | 31 |
| 8.4 | RRC Message Transfer procedures | 31 |
| 8.4.1 | Initial UL RRC Message Transfer | 31 |
| 8.4.1.1 | General | 31 |
| 8.4.1.2 | Successful operation | 31 |
| 8.4.1.3 | Abnormal Conditions | 31 |
| 8.4.2 | DL RRC Message Transfer | 31 |
| 8.4.2.1 | General | 31 |
| 8.4.2.2 | Successful operation | 32 |
| 8.4.2.3 | Abnormal Conditions | 32 |
| 8.4.3 | UL RRC Message Transfer | 32 |
| 8.4.3.1 | General | 32 |
| 8.4.3.2 | Successful operation | 32 |
| 8.4.3.3 | Abnormal Conditions | 33 |
| 8.4.4 | RRC Delivery Report | 33 |
| 8.5 | Warning Message Transmission Procedures | 33 |
| 8.5.1 | Write-Replace Warning | 33 |
| 8.5.1.1 | General | 33 |
| 8.5.1.2 | Successful Operation | 33 |
| 8.5.1.3 | Unsuccessful Operation | 33 |
| 8.5.1.4 | Abnormal Conditions | 33 |
| 8.5.2 | PWS Cancel | 34 |
| 8.5.2.1 | General | 34 |
| 8.5.2.2 | Successful Operation | 34 |
| 8.5.2.3 | Unsuccessful Operation | 34 |
| 8.5.3 | PWS Restart Indication | 34 |
| 8.5.3.1 | General | 34 |
| 8.5.3.2 | Successful Operation | 35 |
| 8.5.3.3 | Abnormal Conditions | 35 |
| 8.5.4 | PWS Failure Indication | 35 |

| | | |
|----------|--|----|
| 8.5.4.1 | General | 35 |
| 8.5.4.2 | Successful Operation..... | 35 |
| 8.5.4.3 | Abnormal Conditions | 35 |
| 8.6 | Paging procedures | 36 |
| 8.6.1 | Paging | 36 |
| 8.6.1.1 | General | 36 |
| 8.6.1.2 | Successful Operation..... | 36 |
| 8.6.1.3 | Abnormal Conditions | 36 |
| 9 | Elements for W1AP Communication..... | 36 |
| 9.1 | General | 36 |
| 9.2 | Message Functional Definition and Content | 37 |
| 9.2.1 | Interface Management messages | 37 |
| 9.2.1.1 | RESET | 37 |
| 9.2.1.2 | RESET ACKNOWLEDGE | 37 |
| 9.2.1.3 | ERROR INDICATION | 38 |
| 9.2.1.4 | W1 SETUP REQUEST..... | 38 |
| 9.2.1.5 | W1 SETUP RESPONSE..... | 39 |
| 9.2.1.6 | W1 SETUP FAILURE..... | 40 |
| 9.2.1.7 | NG-ENB-DU CONFIGURATION UPDATE | 40 |
| 9.2.1.8 | NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE | 41 |
| 9.2.1.9 | NG-ENB-DU CONFIGURATION UPDATE FAILURE | 42 |
| 9.2.1.10 | NG-ENB-CU CONFIGURATION UPDATE | 42 |
| 9.2.1.11 | NG-ENB-CU CONFIGURATION UPDATE ACKNOWLEDGE..... | 43 |
| 9.2.1.12 | NG-ENB-CU CONFIGURATION UPDATE FAILURE..... | 44 |
| 9.2.1.13 | NG-ENB-DU RESOURCE COORDINATION REQUEST | 44 |
| 9.2.1.14 | NG-ENB-DU RESOURCE COORDINATION RESPONSE | 45 |
| 9.2.1.15 | NG-ENB-DU STATUS INDICATION | 45 |
| 9.2.2 | UE Context Management messages..... | 45 |
| 9.2.2.1 | UE CONTEXT SETUP REQUEST..... | 45 |
| 9.2.2.2 | UE CONTEXT SETUP RESPONSE..... | 48 |
| 9.2.2.3 | UE CONTEXT SETUP FAILURE..... | 50 |
| 9.2.2.4 | UE CONTEXT RELEASE REQUEST | 50 |
| 9.2.2.5 | UE CONTEXT RELEASE COMMAND | 50 |
| 9.2.2.6 | UE CONTEXT RELEASE COMPLETE | 51 |
| 9.2.2.7 | UE CONTEXT MODIFICATION REQUEST..... | 51 |
| 9.2.2.8 | UE CONTEXT MODIFICATION RESPONSE..... | 55 |
| 9.2.2.9 | UE CONTEXT MODIFICATION FAILURE..... | 57 |
| 9.2.2.10 | UE CONTEXT MODIFICATION REQUIRED..... | 58 |
| 9.2.2.11 | UE CONTEXT MODIFICATION CONFIRM | 59 |
| 9.2.2.12 | UE CONTEXT MODIFICATION REFUSE..... | 59 |
| 9.2.2.13 | UE INACTIVITY NOTIFICATION | 60 |
| 9.2.2.14 | NOTIFY..... | 60 |
| 9.2.3 | RRC Message Transfer messages..... | 60 |
| 9.2.3.1 | INITIAL UL RRC MESSAGE TRANSFER..... | 60 |
| 9.2.3.2 | DL RRC MESSAGE TRANSFER | 61 |
| 9.2.3.3 | UL RRC MESSAGE TRANSFER | 61 |
| 9.2.4 | Warning Message Transmission Messages..... | 62 |
| 9.2.4.1 | WRITE-REPLACE WARNING REQUEST | 62 |
| 9.2.4.2 | WRITE-REPLACE WARNING RESPONSE..... | 62 |
| 9.2.4.3 | PWS CANCEL REQUEST..... | 63 |
| 9.2.4.4 | PWS CANCEL RESPONSE..... | 63 |
| 9.2.4.5 | PWS RESTART INDICATION | 64 |
| 9.2.4.6 | PWS FAILURE INDICATION | 65 |
| 9.2.5 | Paging messages | 65 |
| 9.2.5.1 | PAGING | 65 |
| 9.3 | Information Element Definitions..... | 66 |
| 9.3.1 | Radio Network Layer Related IEs | 66 |
| 9.3.1.1 | Message Type | 66 |
| 9.3.1.2 | Cause..... | 66 |
| 9.3.1.3 | PWS System Information..... | 69 |
| 9.3.1.4 | ng-eNB-CU UE W1AP ID..... | 69 |

| | | |
|----------|--|----|
| 9.3.1.5 | ng-eNB-DU UE W1AP ID..... | 69 |
| 9.3.1.6 | RRC-Container..... | 69 |
| 9.3.1.7 | SRB ID..... | 69 |
| 9.3.1.8 | DRB ID..... | 69 |
| 9.3.1.9 | ng-eNB-DU ID..... | 70 |
| 9.3.1.10 | Served Cell Information..... | 70 |
| 9.3.1.11 | Transmission Action Indicator..... | 72 |
| 9.3.1.12 | E-UTRAN CGI..... | 72 |
| 9.3.1.13 | Repetition Period..... | 72 |
| 9.3.1.14 | PLMN Identity..... | 73 |
| 9.3.1.15 | Transmission Bandwidth..... | 73 |
| 9.3.1.16 | Void..... | 73 |
| 9.3.1.17 | E-UTRAN Frequency Info..... | 73 |
| 9.3.1.18 | ng-eNB-DU System Information..... | 74 |
| 9.3.1.19 | E-UTRAN QoS..... | 74 |
| 9.3.1.20 | Allocation and Retention Priority..... | 74 |
| 9.3.1.21 | GBR QoS Information..... | 75 |
| 9.3.1.22 | Bit Rate..... | 75 |
| 9.3.1.23 | Transaction ID..... | 76 |
| 9.3.1.24 | DRX Cycle..... | 76 |
| 9.3.1.25 | RLC Mode..... | 76 |
| 9.3.1.26 | 5GS TAC..... | 76 |
| 9.3.1.27 | Void..... | 76 |
| 9.3.1.28 | RRC Reconfiguration Complete Indicator..... | 76 |
| 9.3.1.29 | C-RNTI..... | 77 |
| 9.3.1.30 | RAT-Frequency Priority Information..... | 77 |
| 9.3.1.31 | Slice Support List..... | 77 |
| 9.3.1.32 | S-NSSAI..... | 77 |
| 9.3.1.33 | ng-eNB-CU System Information..... | 77 |
| 9.3.1.34 | QoS Flow Level QoS Parameters..... | 78 |
| 9.3.1.35 | GBR QoS Flow Information..... | 78 |
| 9.3.1.36 | Dynamic 5QI Descriptor..... | 79 |
| 9.3.1.37 | NG-RAN Allocation and Retention Priority..... | 79 |
| 9.3.1.38 | Non Dynamic 5QI Descriptor..... | 80 |
| 9.3.1.39 | Maximum Packet Loss Rate..... | 81 |
| 9.3.1.40 | Packet Delay Budget..... | 81 |
| 9.3.1.41 | Packet Error Rate..... | 81 |
| 9.3.1.42 | Averaging Window..... | 81 |
| 9.3.1.43 | Maximum Data Burst Volume..... | 82 |
| 9.3.1.44 | Notification Control..... | 82 |
| 9.3.1.45 | RAN Area Code..... | 82 |
| 9.3.1.46 | QoS Flow Identifier..... | 82 |
| 9.3.1.47 | Available PLMN List..... | 82 |
| 9.3.1.48 | Service Status..... | 82 |
| 9.3.1.49 | RLC Status..... | 83 |
| 9.3.1.50 | Void..... | 83 |
| 9.3.1.51 | QoS Flow Mapping Indication..... | 83 |
| 9.3.1.52 | Resource Coordination Transfer Information..... | 83 |
| 9.3.1.53 | E-UTRA PRACH Configuration..... | 83 |
| 9.3.1.54 | Resource Coordination E-UTRA Cell Information..... | 84 |
| 9.3.1.55 | Extended Available PLMN List..... | 86 |
| 9.3.1.56 | Associated SCell List..... | 86 |
| 9.3.1.57 | CU to DU RRC Information..... | 86 |
| 9.3.1.58 | DU to CU RRC Information..... | 87 |
| 9.3.1.59 | E-UTRA Transmission Bandwidth..... | 88 |
| 9.3.1.60 | Number of Broadcasts Requested..... | 88 |
| 9.3.1.61 | Criticality Diagnostics..... | 88 |
| 9.3.1.62 | Cell Type..... | 89 |
| 9.3.1.63 | UE Identity Index value..... | 89 |
| 9.3.1.64 | RAN UE Paging identity..... | 89 |
| 9.3.1.65 | CN UE Paging Identity..... | 89 |
| 9.3.1.66 | Paging DRX..... | 89 |

| | | |
|--|--|------------|
| 9.3.2 | Transport Network Layer Related IEs | 89 |
| 9.3.2.1 | UP Transport Layer Information | 89 |
| 9.3.2.2 | GTP-TEID | 90 |
| 9.3.2.3 | Transport Layer Address | 90 |
| 9.4 | Message and Information Element Abstract Syntax (with ASN.1) | 90 |
| 9.4.1 | General | 90 |
| 9.4.2 | Usage of private message mechanism for non-standard use | 91 |
| 9.4.3 | Elementary Procedure Definitions | 91 |
| 9.4.4 | PDU Definitions | 96 |
| 9.4.5 | Information Element Definitions | 115 |
| 9.4.6 | Common Definitions | 136 |
| 9.4.7 | Constant Definitions | 137 |
| 9.4.8 | Container Definitions | 140 |
| 9.5 | Message Transfer Syntax | 142 |
| 9.6 | Timers | 142 |
| 10 | Handling of unknown, unforeseen and erroneous protocol data | 142 |
| Annex A (informative): Change History | | 143 |
| History | | 144 |

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.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the 5G radio network layer signalling protocol for the W1 interface. The W1 interface provides means for interconnecting a ng-eNB-CU and a ng-eNB-DU of a ng-eNB within an NG-RAN. The W1 Application Protocol (W1AP) supports the functions of W1 interface by signalling procedures defined in the present document. W1AP is developed in accordance to the general principles stated in TS 38.401 [4] and TS 37.470 [5].

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 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRAN); Radio Resource Control (RRC) Protocol Specification".
- [3] 3GPP TS 36.401: "E-UTRAN Architecture Description".
- [4] 3GPP TS 38.401: "NG-RAN; Architecture Description".
- [5] 3GPP TS 37.470: "E-UTRAN and NG-RAN; W1 general aspects and principles".
- [6] 3GPP TS 38.300: "NR; Overall description; Stage-2".
- [7] 3GPP TS 38.423: "NG-RAN; Xn application protocol (XnAP)".
- [8] 3GPP TS 23.501: "System Architecture for the 5G System (5GS)".
- [9] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [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] 3GPP TS 36.423: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)".
- [13] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation".
- [14] 3GPP TS 36.104: "Base Station (BS) radio transmission and reception".
- [15] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRAN); Medium Access Control (MAC) protocol specification".
- [16] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [17] 3GPP TS 29.281: "General Packet Radio System (GPRS); Tunnelling Protocol User Plane (GTPv1-U)".
- [18] 3GPP TS 38.414: "NG-RAN; NG data transport".
- [19] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

- [20] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA), User Equipment (UE) procedures in idle mode".
- [21] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".
- [22] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [23] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

elementary procedure: W1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between ng-eNB-CU and ng-eNB-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 W1AP EPs together is specified in stage 2 specifications (e.g., TS 37.470 [5]).

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 the present document when the W1AP is applied for ng-eNB-CU and ng-eNB-DU in E-UTRAN.

ng-eNB: As defined in TS 38.300 [6].

ng-eNB-CU: As defined in TS 37.470 [5].

ng-eNB-DU: As defined in TS 37.470 [5].

ng-eNB-CU UE W1AP ID: As defined in TS 38.401 [4].

ng-eNB-DU UE W1AP ID: As defined in TS 38.401 [4].

UE-associated signalling: When W1AP messages associated to one UE uses the UE-associated logical W1-connection for association of the message to the UE in ng-eNB-DU and ng-eNB-CU.

UE-associated logical W1-connection: The UE-associated logical W1-connection uses the identities *ng-eNB-CU UE W1AP ID* and *ng-eNB-DU UE W1AP ID* according to the definition in TS 38.401 [4]. For a received UE associated W1AP message the ng-eNB-CU identifies the associated UE based on the *ng-eNB-CU UE W1AP ID* IE and the ng-eNB-DU identifies the associated UE based on the *ng-eNB-DU UE W1AP ID* IE. The UE-associated logical W1-connection may exist before the W1 UE context is setup in ng-eNB-DU.

3.2 Symbols

Void.

3.3 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 |
| DL | Downlink |
| EN-DC | E-UTRA-NR Dual Connectivity |
| NSSAI | Network Slice Selection Assistance Information |
| RANAC | RAN Area Code |
| RRC | Radio Resource Control |
| S-NSSAI | Single Network Slice Selection Assistance Information |
| 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.

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 <i>Italic font</i> 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 W1AP services

W1AP provides the signalling service between ng-eNB-DU and the ng-eNB-CU that is required to fulfil the W1AP functions described in clause 7. W1AP services are divided into two groups:

| | |
|-----------------------------|---|
| Non UE-associated services: | They are related to the whole W1 interface instance between the ng-eNB-DU and ng-eNB-CU utilising a non UE-associated signalling connection. |
| UE-associated services: | They are related to one UE. W1AP 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 W1AP procedure related to a certain UE.

6 Services expected from signalling transport

The signalling connection shall provide in sequence delivery of W1AP messages. W1AP shall be notified if the signalling connection breaks.

7 Functions of W1AP

The functions of W1AP are described in TS 37.470 [5].

8 W1AP procedures

8.1 List of W1AP Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs:

Table 8.1-1: Class 1 procedures

| Elementary Procedure | Initiating Message | Successful Outcome | Unsuccessful Outcome |
|--|---|--|--|
| | | Response message | Response message |
| Reset | RESET | RESET ACKNOWLEDGE | |
| W1 Setup | W1 SETUP REQUEST | W1 SETUP RESPONSE | W1 SETUP FAILURE |
| ng-eNB-DU Configuration Update | NG-ENB-DU CONFIGURATION UPDATE | NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE | NG-ENB-DU CONFIGURATION UPDATE FAILURE |
| ng-eNB-CU Configuration Update | NG-ENB-CU CONFIGURATION UPDATE | NG-ENB-CU CONFIGURATION UPDATE ACKNOWLEDGE | NG-ENB-CU CONFIGURATION UPDATE FAILURE |
| UE Context Setup | UE CONTEXT SETUP REQUEST | UE CONTEXT SETUP RESPONSE | UE CONTEXT SETUP FAILURE |
| UE Context Release (ng-eNB-CU initiated) | UE CONTEXT RELEASE COMMAND | UE CONTEXT RELEASE COMPLETE | |
| UE Context Modification (ng-eNB-CU initiated) | UE CONTEXT MODIFICATION REQUEST | UE CONTEXT MODIFICATION RESPONSE | UE CONTEXT MODIFICATION FAILURE |
| UE Context Modification Required (ng-eNB-DU initiated) | UE CONTEXT MODIFICATION REQUIRED | UE CONTEXT MODIFICATION CONFIRM | UE CONTEXT MODIFICATION REFUSE |
| Write-Replace Warning | WRITE-REPLACE WARNING REQUEST | WRITE-REPLACE WARNING RESPONSE | |
| PWS Cancel | PWS CANCEL REQUEST | PWS CANCEL RESPONSE | |
| NG-ENB-DU RESOURCE COORDINATION | NG-ENB-DU RESOURCE COORDINATION REQUEST | NG-ENB-DU RESOURCE COORDINATION RESPONSE | |

Table 8.2-2: Class 2 procedures

| Elementary Procedure | Message |
|--|-------------------------------------|
| Error Indication | ERROR INDICATION |
| UE Context Release Request (ng-eNB-DU initiated) | UE CONTEXT RELEASE REQUEST |
| Initial UL RRC Message Transfer | INITIAL UL RRC MESSAGE TRANSFER |
| DL RRC Message Transfer | DL RRC MESSAGE TRANSFER |
| UL RRC Message Transfer | UL RRC MESSAGE TRANSFER |
| UE Inactivity Notification | UE INACTIVITY NOTIFICATION |
| System Information Delivery | SYSTEM INFORMATION DELIVERY COMMAND |
| Paging | PAGING |
| Notify | NOTIFY |
| PWS Restart Indication | PWS RESTART INDICATION |
| PWS Failure Indication | PWS FAILURE INDICATION |
| ng-eNB-DU Status Indication | NG-ENB-DU STATUS INDICATION |
| RRC Delivery Report | RRC DELIVERY REPORT |

8.2 Interface Management procedures

8.2.1 Reset

8.2.1.1 General

The purpose of the Reset procedure is to initialise or re-initialise the W1AP UE-related contexts, in the event of a failure in the ng-eNB-CU or ng-eNB-DU. This procedure does not affect the application level configuration data exchanged during, e.g., the W1 Setup procedure.

The procedure uses non-UE associated signalling.

8.2.1.2 Successful Operation

8.2.1.2.1 Reset Procedure Initiated from the ng-eNB-CU

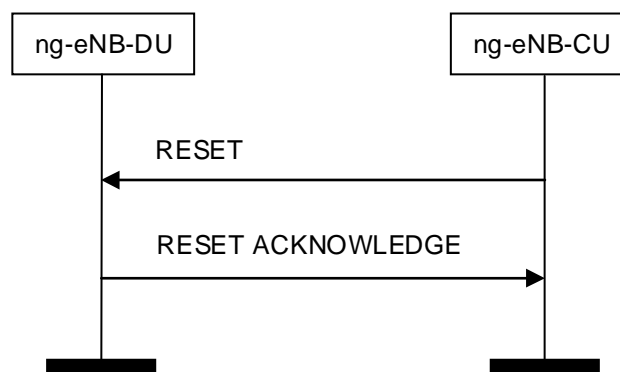


Figure 8.2.1.2.1-1: Reset procedure initiated from the ng-eNB-CU. Successful operation

In the event of a failure at the ng-eNB-CU, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the ng-eNB-DU.

At reception of the RESET message the ng-eNB-DU shall release all allocated resources on W1 and radio resources related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the indicated UE contexts including W1AP ID.

After the ng-eNB-DU has released all assigned W1 resources and the UE W1AP IDs for all indicated UE associations which can be used for new UE-associated logical W1-connections over the W1 interface, the ng-eNB-DU shall respond with the RESET ACKNOWLEDGE message. The ng-eNB-DU does not need to wait for the release of radio resources to be completed before returning the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical W1-connection list* IE, then:

- The ng-eNB-DU shall use the *ng-eNB-CU UE W1AP ID* IE and/or the *ng-eNB-DU UE W1AP ID* IE to explicitly identify the UE association(s) to be reset.
- The ng-eNB-DU shall include in the RESET ACKNOWLEDGE message, for each UE association to be reset, the *UE-associated logical W1-connection Item* IE in the *UE-associated logical W1-connection list* IE. The *UE-associated logical W1-connection Item* IEs shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical W1-connections. Empty *UE-associated logical W1-connection Item* IEs, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.
- If the *ng-eNB-CU UE W1AP ID* IE is included in the *UE-associated logical W1-connection Item* IE for a UE association, the ng-eNB-DU shall include the *ng-eNB-CU UE W1AP ID* IE in the corresponding *UE-associated logical W1-connection Item* IE in the RESET ACKNOWLEDGE message.
- If the *ng-eNB-DU UE W1AP ID* IE is included in the *UE-associated logical W1-connection Item* IE for a UE association, the ng-eNB-DU shall include the *ng-eNB-DU UE W1AP ID* IE in the corresponding *UE-associated logical W1-connection Item* IE in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same W1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

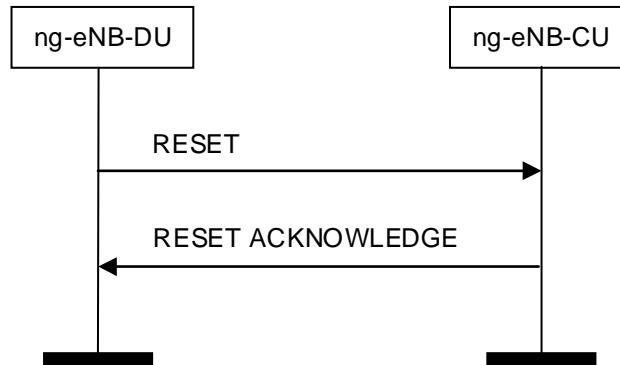
8.2.1.2.2 Reset Procedure Initiated from the ng-eNB-DU

Figure 8.2.1.2.2-1: Reset procedure initiated from the ng-eNB-DU. Successful operation

In the event of a failure at the ng-eNB-DU, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the ng-eNB-CU.

At reception of the RESET message the ng-eNB-CU shall release all allocated resources on W1 related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the W1AP ID for the indicated UE associations.

After the ng-eNB-CU has released all assigned W1 resources and the UE W1AP IDs for all indicated UE associations which can be used for new UE-associated logical W1-connections over the W1 interface, the ng-eNB-CU shall respond with the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical W1-connection list* IE, then:

- The ng-eNB-CU shall use the *ng-eNB-CU UE W1AP ID* IE and/or the *ng-eNB-DU UE W1AP ID* IE to explicitly identify the UE association(s) to be reset.
- The ng-eNB-CU shall in the RESET ACKNOWLEDGE message include, for each UE association to be reset, the *UE-associated logical W1-connection Item* IE in the *UE-associated logical W1-connection list* IE. The *UE-associated logical W1-connection Item* IEs shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical W1-connections. Empty *UE-associated logical W1-connection Item* IEs, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.
- If the *ng-eNB-CU UE W1AP ID* IE is included in the *UE-associated logical W1-connection Item* IE for a UE association, the ng-eNB-CU shall include the *ng-eNB-CU UE W1AP ID* IE in the corresponding *UE-associated logical W1-connection Item* IE in the RESET ACKNOWLEDGE message.
- If the *ng-eNB-DU UE W1AP ID* IE is included in a *UE-associated logical W1-connection Item* IE for a UE association, the ng-eNB-CU shall include the *ng-eNB-DU UE W1AP ID* IE in the corresponding *UE-associated logical W1-connection Item* IE in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same W1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

8.2.1.3 Abnormal Conditions

Not applicable.

8.2.2 Error Indication

8.2.2.1 General

The Error Indication procedure is initiated by a node in order to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

If the error situation arises due to reception of a message utilising UE associated signalling, then the Error Indication procedure uses UE associated signalling. Otherwise the procedure uses non-UE associated signalling.

8.2.2.2 Successful Operation

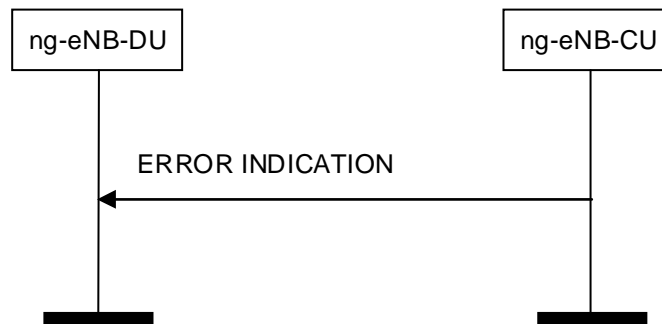


Figure 8.2.2.2-1: Error Indication procedure, ng-eNB-CU originated. Successful operation

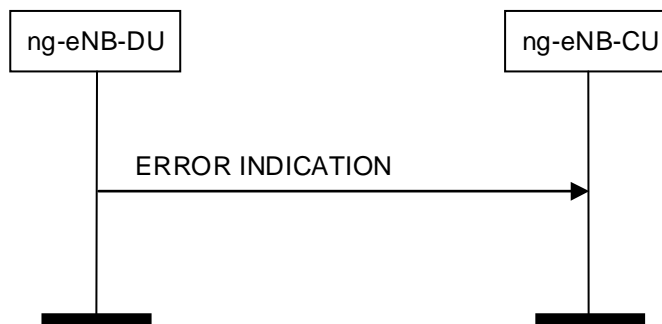


Figure 8.2.2.2-2: Error Indication procedure, ng-eNB-DU originated. Successful operation

When the conditions defined in clause 10 are fulfilled, the Error Indication procedure is initiated by an ERROR INDICATION message sent from the receiving node.

The ERROR INDICATION message shall contain at least the *Cause* IE. In case the Error Indication procedure is triggered by utilising UE associated signalling the *ng-eNB-CU UE W1AP ID* IE and *ng-eNB-DU UE W1AP ID* IE shall be included in the ERROR INDICATION message. If one or both of the *ng-eNB-CU UE W1AP ID* IE and the *ng-eNB-DU UE W1AP ID* IE are not correct, the cause shall be set to appropriate value, e.g., "Unknown or already allocated ng-eNB-CU UE W1AP ID", "Unknown or already allocated ng-eNB-DU UE W1AP ID" or "Unknown or inconsistent pair of UE W1AP ID".

8.2.2.3 Abnormal Conditions

Not applicable.

8.2.3 W1 Setup

8.2.3.1 General

The purpose of the W1 Setup procedure is to exchange application level data needed for the ng-eNB-DU and the ng-eNB-CU to correctly interoperate on the W1 interface. The procedure uses non-UE associated signalling. This procedure shall be the first W1AP procedure triggered for the W1-C interface instance after a TNL association has become operational.

The procedure uses non-UE associated signalling.

This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also re-initialises the W1AP UE-related contexts (if any) and erases all related signalling connections in the two nodes like a Reset procedure would do.

8.2.3.2 Successful Operation

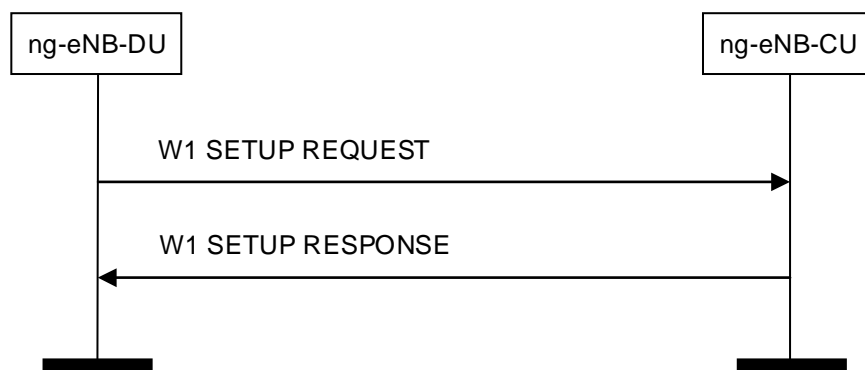


Figure 8.2.3.2-1: W1 Setup procedure: Successful Operation

The ng-eNB-DU initiates the procedure by sending a W1 SETUP REQUEST message including the appropriate data to the ng-eNB-CU. The ng-eNB-CU responds with a W1 SETUP RESPONSE message including the appropriate data.

The exchanged data shall be stored in respective node and used as long as there is an operational TNL association. When this procedure is finished, the W1 interface is operational and other W1 messages may be exchanged.

If the W1 SETUP REQUEST message contains the *ng-eNB-DU Served Cells List* IE, the ng-eNB-CU shall take into account as specified in TS 38.401 [4].

If *ng-eNB-DU System Information* IE is included in the W1 SETUP REQUEST message, the ng-eNB-CU shall take into account, and the ng-eNB-CU may include the *ng-eNB-CU System Information* IE in the W1 SETUP RESPONSE message. The ng-eNB-DU shall include the *TAI Slice Support List* IE in the W1 SETUP REQUEST message.

The ng-eNB-CU may include the *Cells to be Activated List* IE in the W1 SETUP RESPONSE message. The *Cells to be Activated List* IE includes a list of cells that the ng-eNB-CU requests the ng-eNB-DU to activate. The ng-eNB-DU shall activate the cells included in the *Cells to be Activated List* IE and reconfigure the physical cell identity for cells for which the *E-UTRAN PCI* IE is included.

If the *RAN Area Code* IE is included in the W1 SETUP REQUEST message, the ng-eNB-CU may use it according to TS 38.300 [6].

The ng-eNB-CU may include *Available PLMN List* IE, and optionally also *Extended Available PLMN List* IE, if the available PLMN(s) are different from what ng-eNB-DU has provided in W1 SETUP REQUEST message, ng-eNB-DU shall take this into account and only broadcast the PLMN(s) included in the received Available PLMN list(s).

8.2.3.3 Unsuccessful Operation

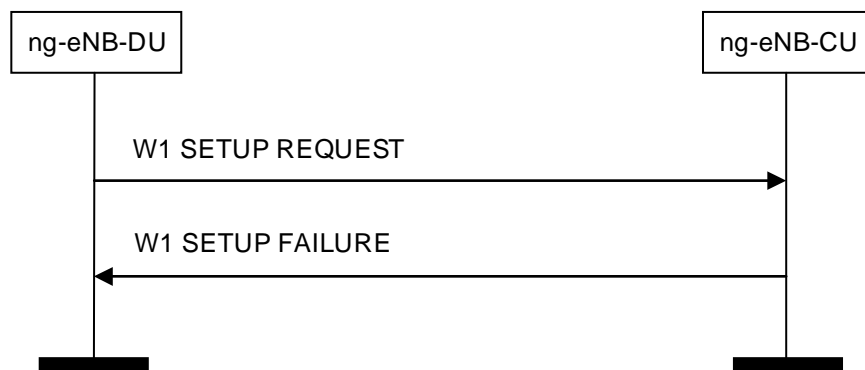


Figure 8.2.3.3-1: W1 Setup procedure: Unsuccessful Operation

If the ng-eNB-CU cannot accept the setup, it should respond with a W1 SETUP FAILURE and appropriate cause value.

8.2.3.4 Abnormal Conditions

Not applicable.

8.2.4 ng-eNB-DU Configuration Update

8.2.4.1 General

The purpose of the ng-eNB-DU Configuration Update procedure is to update application level configuration data needed for the ng-eNB-DU and the ng-eNB-CU to interoperate correctly on the W1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.4.2 Successful Operation

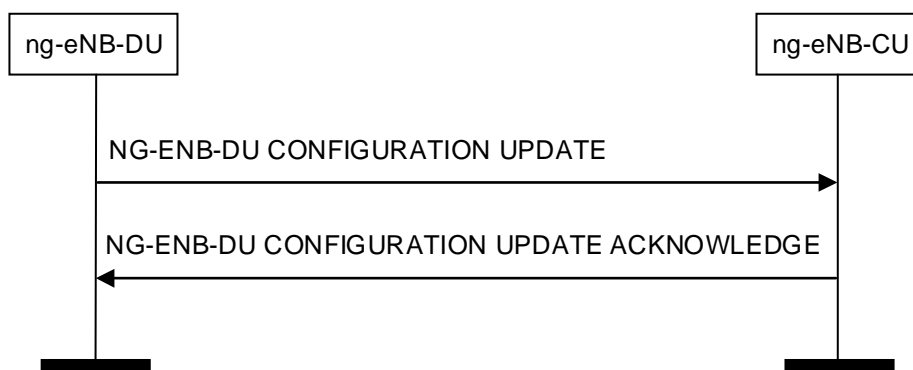


Figure 8.2.4.2-1: ng-eNB-DU Configuration Update procedure: Successful Operation

The ng-eNB-DU initiates the procedure by sending an ng-eNB-DU CONFIGURATION UPDATE message to the ng-eNB-CU including an appropriate set of updated configuration data that it has just taken into operational use. The ng-eNB-CU responds with NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall interpret that the corresponding configuration data is not changed and shall continue to operate the W1-C interface with the existing related configuration data.

The updated configuration data shall be stored in both nodes and used as long as there is an operational TNL association or until any further update is performed.

If *Served Cells To Add Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall add cell information according to the information in the *Served Cell Information IE*. If the *ng-eNB-DU System*

Information IE is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall store and replace any previously provided system info if any, and may include the *ng-eNB-CU System Information IE* in the NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message. The *SIB type to Be Updated List IE* shall contain the full list of SIBs to be broadcast.

If *Served Cells To Modify Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall modify information of cell indicated by *Old E-UTRAN CGI IE* according to the information in the *Served Cell Information IE* and overwrite the served cell information for the affected served cell. Further, if the *ng-eNB-DU System Information IE* is present the ng-eNB-CU shall store and replace any previous information received.

If *Served Cells To Delete Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall delete information of cell indicated by *Old E-UTRAN CGI IE*.

If *Cells Status Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall update the information about the cells, as described in TS 38.401 [4].

If *Cells to be Activated List Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the ng-eNB-DU shall activate the cell indicated by *E-UTRAN CGI IE* and reconfigure the physical cell identity for cells for which the *E-UTRAN PCI IE* is included.

If *Cells to be Activated List Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message and the indicated cells are already activated, the ng-eNB-DU shall update the cell information received in *Cells to be Activated List Item IE*.

If *Cells to be Deactivated List Item IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the ng-eNB-DU shall deactivate all the cells with E-UTRAN CGI listed in the IE.

If the *RAN Area Code IE* is contained in the NG-ENB-DU CONFIGURATION UPDATE message, the ng-eNB-CU shall store and replace any previously provided *RAN Area Code IE* by the received *RAN Area Code IE*.

If *Available PLMN List IE*, and optionally also *Extended Available PLMN List IE*, is contained in NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE message, the ng-eNB-DU shall overwrite the whole available PLMN list and update the corresponding system information.

8.2.4.3 Unsuccessful Operation

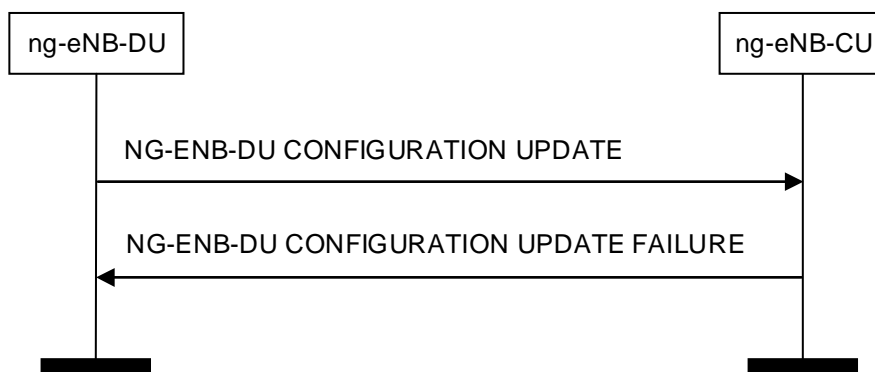


Figure 8.2.4.3-1: ng-eNB-DU Configuration Update procedure: Unsuccessful Operation

If the ng-eNB-CU cannot accept the update, it shall respond with an ng-eNB-DU CONFIGURATION UPDATE FAILURE message and appropriate cause value.

8.2.4.4 Abnormal Conditions

Not applicable.

8.2.5 ng-eNB-CU Configuration Update

8.2.5.1 General

The purpose of the ng-eNB-CU Configuration Update procedure is to update application level configuration data needed for the ng-eNB-DU and ng-eNB-CU to interoperate correctly on the W1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.5.2 Successful Operation

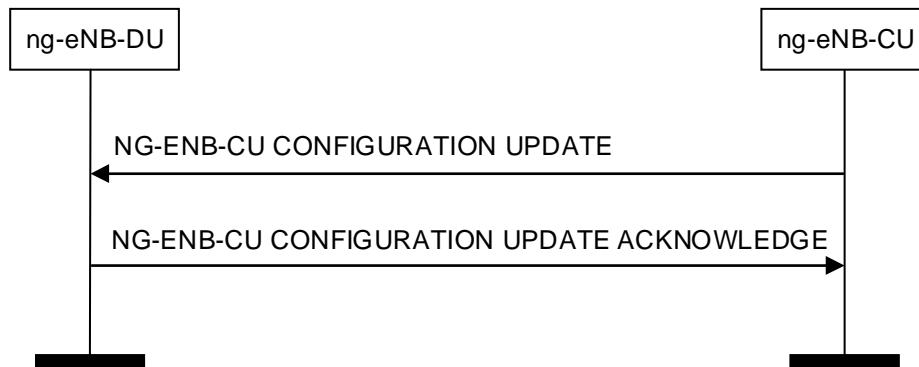


Figure 8.2.5.2-1: ng-eNB-CU Configuration Update procedure: Successful Operation

The ng-eNB-CU initiates the procedure by sending an ng-eNB-CU CONFIGURATION UPDATE message including the appropriate updated configuration data to the ng-eNB-DU. The ng-eNB-DU responds with an ng-eNB-CU CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the NG-ENB-CU CONFIGURATION UPDATE message, the ng-eNB-DU shall interpret that the corresponding configuration data is not changed and shall continue to operate the W1-C interface with the existing related configuration data.

The updated configuration data shall be stored in the respective node and used as long as there is an operational TNL association or until any further update is performed.

If *Cells to be Activated List Item* IE is contained in the NG-ENB-CU CONFIGURATION UPDATE message, the ng-eNB-DU shall activate the cell indicated by *E-UTRAN CGI* IE and reconfigure the physical cell identity for which the *E-UTRAN PCI* IE is included.

If *Cells to be Deactivated List Item* IE is contained in the NG-ENB-CU CONFIGURATION UPDATE message, the ng-eNB-DU shall deactivate the cell indicated by *E-UTRAN CGI* IE.

If *Cells to be Activated List Item* IE is contained in the NG-ENB-CU CONFIGURATION UPDATE message and the indicated cells are already activated, the ng-eNB-DU shall update the cell information received in *Cells to be Activated List Item* IE.

If the *ng-eNB-CU System Information* IE is contained in the NG-ENB-CU CONFIGURATION UPDATE message, the ng-eNB-DU shall store and replace any previously provided system info if any. The *SIB type to Be Updated List* IE shall contain the full list of SIBs to be broadcast.

If *Available PLMN List* IE, and optionally also *Extended Available PLMN List* IE, is contained in NG-ENB-CU CONFIGURATION UPDATE message, the ng-eNB-DU shall overwrite the whole available PLMN list and update the corresponding system information.

If *Cells Failed to be Activated Item* IE is contained in the NG-ENB-CU CONFIGURATION UPDATE ACKNOWLEDGE message, the ng-eNB-CU shall consider that the indicated cells are out-of-service as defined in TS 38.401 [4].

8.2.5.3 Unsuccessful Operation

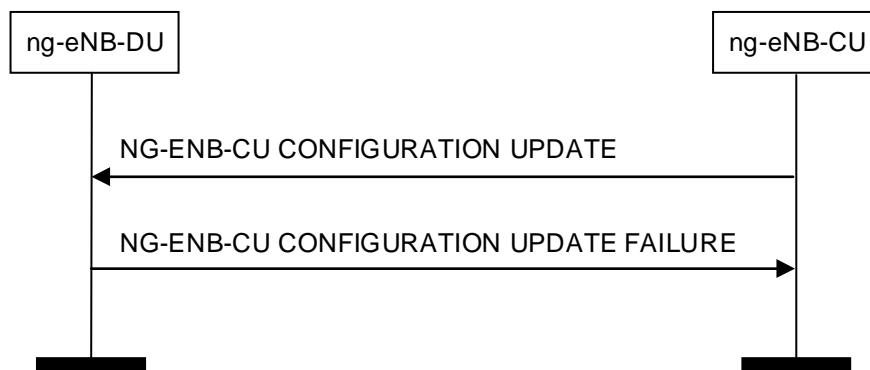


Figure 8.2.5.3-1: ng-eNB-CU Configuration Update: Unsuccessful Operation

If the ng-eNB-DU cannot accept the update, it shall respond with an ng-eNB-CU CONFIGURATION UPDATE FAILURE message and appropriate cause value.

8.2.5.4 Abnormal Conditions

Not applicable.

8.2.6 ng-eNB-DU Resource Coordination

8.2.6.1 General

The purpose of the ng-eNB-DU Resource Coordination procedure is to enable coordination of radio resource allocation between an ng-eNB-CU and an ng-eNB-DU for the purpose of spectrum sharing between E-UTRA and NR. This procedure is to be used only for the purpose of spectrum sharing between E-UTRA and NR.

The procedure uses non-UE-associated signalling.

8.2.6.2 Successful Operation

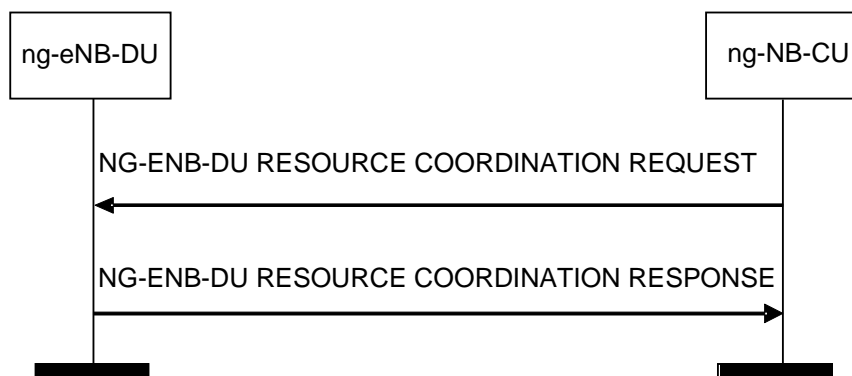


Figure 8.2.6.2-1: ng-eNB-DU Resource Coordination, successful operation

An ng-eNB-CU initiates the procedure by sending the NG-ENB-DU RESOURCE COORDINATION REQUEST message to an ng-eNB-DU over the W1 interface.

The ng-eNB-DU extracts the *E-UTRA – NR Cell Resource Coordination Request Container* IE and it replies by sending the NG-ENB-DU RESOURCE COORDINATION RESPONSE message.

In case of NR-initiated ng-eNB-DU Resource Coordination procedure, the *Ignore Coordination Request Container* IE shall be present and set to "yes" and the *E-UTRA – NR Cell Resource Coordination Request Container* IE in the NG-ENB-DU RESOURCE COORDINATION REQUEST message shall be ignored.

8.2.7 ng-eNB-DU Status Indication

8.2.7.1 General

The purpose of the ng-eNB-DU Status Indication procedure is informing the ng-eNB-CU that the ng-eNB-DU is overloaded so that overload reduction actions can be applied. The procedure uses non-UE associated signalling.

8.2.7.2 Successful Operation

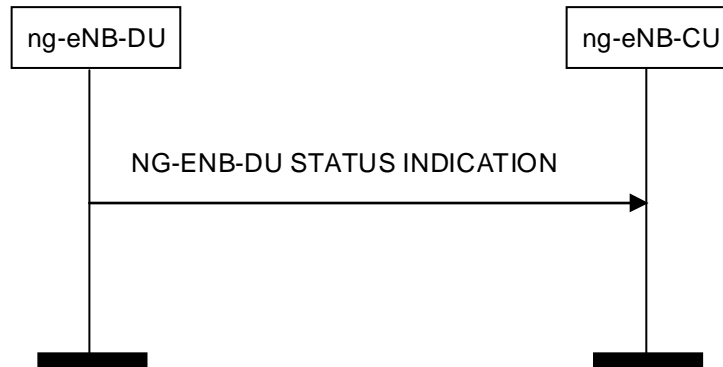


Figure 8.2.7.2-1: ng-eNB-DU Status Indication procedure

If the *ng-eNB-DU Overload Information* IE in the NG-ENB-DU STATUS INDICATION message indicates that the ng-eNB-DU is overloaded, the ng-eNB-CU shall apply overload reduction actions until informed, with a new NG-ENB-DU STATUS INDICATION message, that the overload situation has ceased.

The detailed overload reduction policy is up to ng-eNB-CU implementation.

8.2.7.3 Abnormal Conditions

Void.

8.3 UE Context Management procedures

8.3.1 UE Context Setup

8.3.1.1 General

The purpose of the UE Context Setup procedure is to establish the UE Context including, among others, SRB, and DRB configuration. The procedure uses UE-associated signalling.

8.3.1.2 Successful Operation

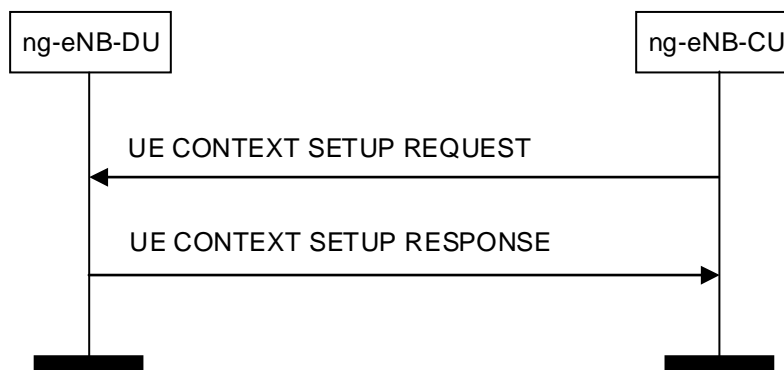


Figure 8.3.1.2-1: UE Context Setup Request procedure: Successful Operation

The ng-eNB-CU initiates the procedure by sending UE CONTEXT SETUP REQUEST message to the ng-eNB-DU. If the ng-eNB-DU succeeds to establish the UE context, it replies to the ng-eNB-CU with UE CONTEXT SETUP RESPONSE. If no UE-associated logical W1-connection exists, the UE-associated logical W1-connection shall be established as part of the procedure.

If the *SCell To Be Setup List* IE is included in the UE CONTEXT SETUP REQUEST message, the ng-eNB-DU shall act as specified in TS 38.401 [4].

If the *DRX Cycle* IE is contained in the UE CONTEXT SETUP REQUEST message, the ng-eNB-DU shall use the provided value from the ng-eNB-CU.

If the *SRB To Be Setup List* IE is contained in the UE CONTEXT SETUP REQUEST message, the ng-eNB-DU shall act as specified in TS 38.401 [4].

If the *DRB To Be Setup List* IE is contained in the UE CONTEXT SETUP REQUEST message, the ng-eNB-DU shall act as specified in TS 38.401 [4].

The ng-eNB-DU shall report to the ng-eNB-CU, in the UE CONTEXT SETUP RESPONSE message, the result for all the requested DRBs and SRBs in the following way:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;
- A list of DRBs which failed to be established shall be included in the *DRB Failed to Setup List* IE;
- A list of SRBs which failed to be established shall be included in the *SRB Failed to Setup List* IE.

When the ng-eNB-DU reports the unsuccessful establishment of a DRB or SRB, the cause value should be precise enough to enable the ng-eNB-CU to know the reason for the unsuccessful establishment.

The ng-eNB-CU shall include in the UE CONTEXT SETUP REQUEST the *DRB Information* IE.

If the *SCell Failed To Setup List* IE is contained in the UE CONTEXT SETUP RESPONSE message, the ng-eNB-CU shall regard the corresponding SCell(s) failed to be established with an appropriate cause value for each SCell failed to setup.

If the *C-RNTI* IE is included in the UE CONTEXT SETUP RESPONSE, the ng-eNB-CU shall consider that the C-RNTI has been allocated by the ng-eNB-DU for this UE context.

The UE Context Setup Procedure is not used to configure SRB0.

If the UE CONTEXT SETUP REQUEST message contains the *RRC-Container* IE, the ng-eNB-DU shall send the corresponding RRC message to the UE via SRB1.

If the *UL PDU Session Aggregate Maximum Bit Rate* IE is included in the *QoS Flow Level QoS Parameters* IE contained in the UE CONTEXT SETUP REQUEST message, the ng-eNB-DU shall store the received UL PDU Session Aggregate Maximum Bit Rate and use it when enforcing uplink traffic policing for non-GBR Bearers for the concerned UE as specified in TS 23.501 [8].

The ng-eNB-DU shall store the received ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink and use it for non-GBR Bearers for the concerned UE.

8.3.1.3 Unsuccessful Operation

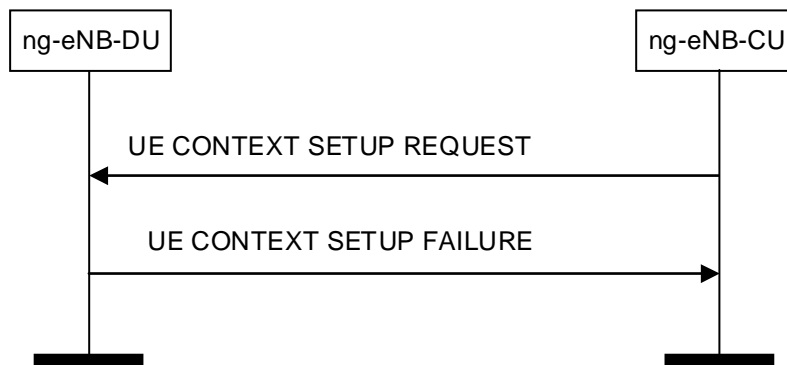


Figure 8.3.1.3-1: UE Context Setup Request procedure: unsuccessful Operation

If the ng-eNB-DU is not able to establish a W1 UE context, or cannot even establish one bearer it shall consider the procedure as failed and reply with the UE CONTEXT SETUP FAILURE message.

If the ng-eNB-DU is not able to accept the *SpCell ID* IE in UE CONTEXT SETUP REQUEST message, it shall reply with the UE CONTEXT SETUP FAILURE message with an appropriate cause value. Further, if the *Candidate SpCell List* IE is included in the UE CONTEXT SETUP REQUEST message and the ng-eNB-DU is not able to accept the *SpCell ID* IE, the ng-eNB-DU shall, if supported, include the *Potential SpCell List* IE in the UE CONTEXT SETUP FAILURE message and the ng-eNB-CU should take this into account for selection of an opportune SpCell. The ng-eNB-DU shall include the cells in the *Potential SpCell List* IE in a priority order, where the first cell in the list is the one most desired and the last one is the one least desired (e.g., based on load conditions). If the *Potential SpCell List* IE is present but no *Potential SpCell Item* IE is present, the ng-eNB-CU should assume that none of the cells in the *Candidate SpCell List* IE are acceptable for the ng-eNB-DU.

8.3.1.4 Abnormal Conditions

Not applicable.

8.3.2 UE Context Release Request (ng-eNB-DU initiated)

8.3.2.1 General

The purpose of the UE Context Release Request procedure is to enable the ng-eNB-DU to request the ng-eNB-CU to release the UE-associated logical W1-connection. The procedure uses UE-associated signalling.

8.3.2.2 Successful Operation



Figure 8.3.2.2-1: UE Context Release (ng-eNB-DU initiated) procedure. Successful operation

The ng-eNB-DU controlling a UE-associated logical W1-connection initiates the procedure by generating a UE CONTEXT RELEASE REQUEST message towards the affected ng-eNB-CU node.

The UE CONTEXT RELEASE REQUEST message shall indicate the appropriate cause value.

Interactions with UE Context Release procedure:

The UE Context Release procedure may be initiated upon reception of a UE CONTEXT RELEASE REQUEST message.

8.3.2.3 Abnormal Conditions

Not applicable.

8.3.3 UE Context Release (ng-eNB-CU initiated)

8.3.3.1 General

The purpose of the UE Context Release procedure is to enable the ng-eNB-CU to order the release of the UE-associated logical connection. The procedure uses UE-associated signalling.

8.3.3.2 Successful Operation

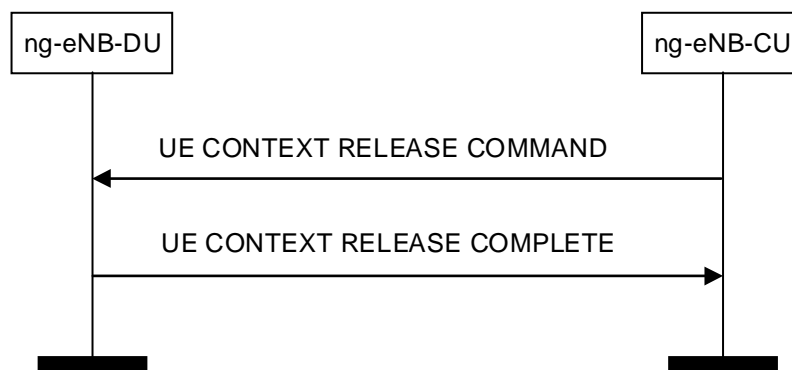


Figure 8.3.3.2-1: UE Context Release (ng-eNB-CU initiated) procedure. Successful operation

The ng-eNB-CU initiates the procedure by sending the UE CONTEXT RELEASE COMMAND message to the ng-eNB-DU.

Upon reception of the UE CONTEXT RELEASE COMMAND message, the ng-eNB-DU shall release all related signalling and user data transport resources and reply with the UE CONTEXT RELEASE COMPLETE message.

If the *old ng-eNB-DU UE WIAP ID* IE is included in the UE CONTEXT RELEASE COMMAND message, the ng-eNB-DU shall additionally release the UE context associated with the old ng-eNB-DU UE WIAP ID.

Interactions with UE Context Setup procedure:

The UE Context Release procedure may be performed before the UE Context Setup procedure to release an existing UE-associated logical W1-connection and related resources in the ng-eNB-DU, e.g. when ng-eNB-CU rejects UE access it shall trigger UE Context Release procedure with the cause value of UE rejection.

8.3.3.4 Abnormal Conditions

Not applicable.

8.3.4 UE Context Modification (ng-eNB-CU initiated)

8.3.4.1 General

The purpose of the UE Context Modification procedure is to modify the established UE Context, e.g., establishing, modifying and releasing radio resources. This procedure is also used to command the ng-eNB-DU to stop data transmission for the UE for mobility (see TS 38.401 [4]). The procedure uses UE-associated signalling.

8.3.4.2 Successful Operation

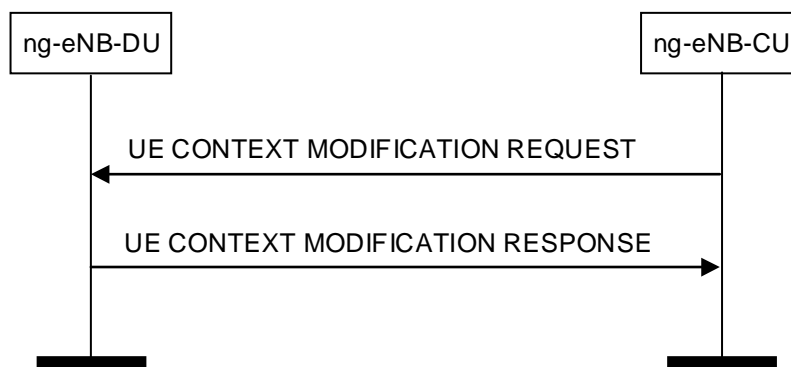


Figure 8.3.4.2-1: UE Context Modification procedure. Successful operation

The UE CONTEXT MODIFICATION REQUEST message is initiated by the ng-eNB-CU.

Upon reception of the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall perform the modifications, and if successful reports the update in the UE CONTEXT MODIFICATION RESPONSE message.

If the *SpCell ID* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall replace any previously received value and regard it as a reconfiguration with sync as defined in TS 36.331 [2]. If the *ServCellIndex* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall take this into account for the indicated SpCell.

If the *SCell To Be Setup List* IE or *SCell To Be Removed List* IE is included in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall act as specified in TS 38.401 [4]. If the *SCell To Be Setup List* IE is included in the UE CONTEXT MODIFICATION REQUEST message and the indicated SCell(s) are already setup, the ng-eNB-DU shall replace any previously received value.

If the *DRX Cycle* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall use the provided value from the ng-eNB-CU.

If the *SRB To Be Setup List* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall act as specified in the TS 38.401 [4], and replace any previously received value.

If the *DRB To Be Setup List* IE is contained in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall act as specified in the TS 38.401 [4].

If the UE CONTEXT MODIFICATION REQUEST message contains the *RRC-Container* IE, the ng-eNB-DU shall send the corresponding RRC message to the UE.

The ng-eNB-CU shall include the *DRB Information* IE in the UE CONTEXT MODIFICATION REQUEST message.

The ng-eNB-DU shall report to the ng-eNB-CU, in the UE CONTEXT MODIFICATION RESPONSE message, the result for all the requested or modified DRBs and SRBs in the following way:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List* IE;
- A list of DRBs which failed to be established shall be included in the *DRB Failed to be Setup List* IE;
- A list of DRBs which are successfully modified shall be included in the *DRB Modified List* IE;

- A list of DRBs which failed to be modified shall be included in the *DRB Failed to be Modified List IE*;
- A list of SRBs which failed to be established shall be included in the *SRB Failed to be Setup List IE*.

When the ng-eNB-DU reports the unsuccessful establishment of a DRB or SRB, the cause value should be precise enough to enable the ng-eNB-CU to know the reason for the unsuccessful establishment.

If the *SCell Failed To Setup List IE* is contained in the UE CONTEXT MODIFICATION RESPONSE message, the ng-eNB-CU shall regard the corresponding SCell(s) failed to be established with an appropriate cause value for each SCell failed to setup.

If the *C-RNTI IE* is included in the UE CONTEXT MODIFICATION RESPONSE, the ng-eNB-CU shall consider that the C-RNTI has been allocated by the ng-eNB-DU for this UE context.

The UE Context Modify Procedure is not used to configure SRB0.

If the *UL PDU Session Aggregate Maximum Bit Rate IE* is included in the *QoS Flow Level QoS Parameters IE* contained in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall replace the received UL PDU Session Aggregate Maximum Bit Rate and use it as specified in TS 23.501 [8].

If the *ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink IE* is included in the UE CONTEXT MODIFICATION REQUEST message, the ng-eNB-DU shall:

- replace the previously provided ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink with the new received ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink;
- use the received ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink for non-GBR Bearers for the concerned UE.

The *UL PDU Session Aggregate Maximum Bit Rate IE* shall be sent if *DRB to Be Setup List IE* is included and the ng-eNB-CU has not previously sent it. The ng-eNB-DU shall store and use the received ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink.

8.3.4.3 Unsuccessful Operation

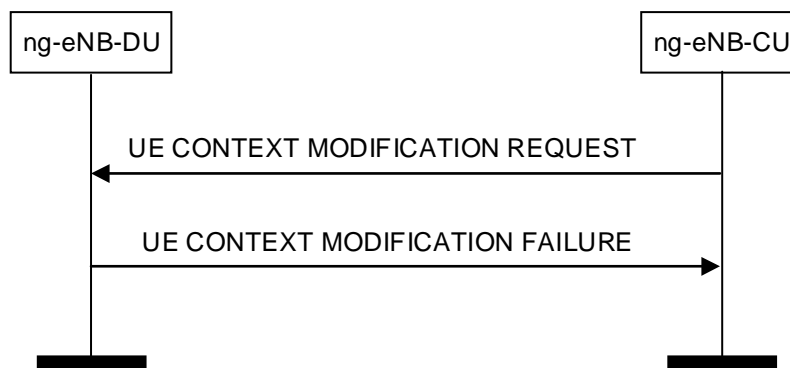


Figure 8.3.4.3-1: UE Context Modification procedure. Unsuccessful operation

In case none of the requested modifications of the UE context can be successfully performed, the ng-eNB-DU shall respond with the UE CONTEXT MODIFICATION FAILURE message with an appropriate cause value.

If the ng-eNB-DU is not able to accept the *SpCell ID IE* in UE CONTEXT MODIFICATION REQUEST message, it shall reply with the UE CONTEXT MODIFICATION FAILURE message.

8.3.4.4 Abnormal Conditions

Not applicable.

8.3.5 UE Context Modification Required (ng-eNB-DU initiated)

8.3.5.1 General

The purpose of the UE Context Modification Required procedure is to modify the established UE Context, e.g., modifying and releasing radio bearer resources. The procedure uses UE-associated signalling.

8.3.5.2 Successful Operation

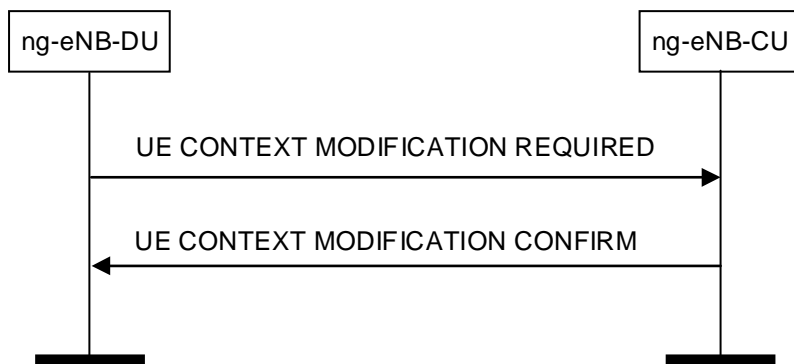


Figure 8.3.5.2-1: UE Context Modification Required procedure. Successful operation

The W1AP UE CONTEXT MODIFICATION REQUIRED message is initiated by the ng-eNB-DU.

The ng-eNB-CU reports the successful update of the UE context in the UE CONTEXT MODIFICATION CONFIRM message.

8.3.5.3 Unsuccessful Operation

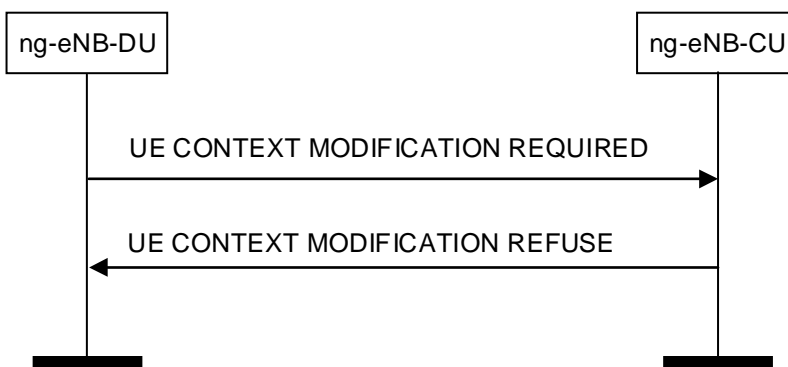


Figure 8.3.5.2A-1: UE Context Modification Required procedure. Unsuccessful operation.

In case none of the requested modifications of the UE context can be successfully performed, the ng-eNB-CU shall respond with the UE CONTEXT MODIFICATION REFUSE message with an appropriate cause value.

8.3.5.4 Abnormal Conditions

Not applicable.

8.3.6 UE Inactivity Notification

8.3.6.1 General

This procedure is initiated by the ng-eNB-DU to indicate the UE activity event.

The procedure uses UE-associated signalling.

8.3.6.2 Successful Operation



Figure 8.3.6.2-1: UE Inactivity Notification procedure.

The ng-eNB-DU initiates the procedure by sending the UE INACTIVITY NOTIFICATION message to the ng-eNB-CU.

If the *DRB ID* IE is included in the *DRB Activity Item* IE in the UE INACTIVITY NOTIFICATION message, the *DRB Activity* IE shall also be included

8.3.6.3 Abnormal Conditions

Not applicable.

8.3.7 Notify

8.3.7.1 General

The purpose of the Notify procedure is to enable the ng-eNB-DU to inform the ng-eNB-CU that the QoS of an already established GBR DRB cannot be fulfilled any longer or that it can be fulfilled again. The procedure uses UE-associated signalling.

8.3.7.2 Successful Operation



Figure 8.3.7.2-1: Notify procedure. Successful operation.

The ng-eNB-DU initiates the procedure by sending a NOTIFY message.

The NOTIFY message shall contain the list of the GBR DRBs associated with notification control for which the QoS is not fulfilled anymore or for which the QoS is fulfilled again by the ng-eNB-DU.

Upon reception of the NOTIFY message, the ng-eNB-CU may identify which are the affected PDU sessions and QoS flows. The ng-eNB-CU may inform the 5GC that the QoS for these PDU sessions or QoS flows is not fulfilled any longer or it is fulfilled again.

8.3.7.3 Abnormal Conditions

Not applicable.

8.4 RRC Message Transfer procedures

8.4.1 Initial UL RRC Message Transfer

8.4.1.1 General

The purpose of the Initial UL RRC Message Transfer procedure is to transfer the initial RRC message to the ng-eNB-CU. The procedure uses non-UE-associated signaling.

8.4.1.2 Successful operation



Figure 8.4.1.2-1: Initial UL RRC Message Transfer procedure

The establishment of the UE-associated logical W1-connection shall be initiated as part of the procedure.

8.4.1.3 Abnormal Conditions

Not applicable.

8.4.2 DL RRC Message Transfer

8.4.2.1 General

The purpose of the DL RRC Message Transfer procedure is to transfer an RRC message. The procedure uses UE-associated signalling.

8.4.2.2 Successful operation



Figure 8.4.2.2-1: DL RRC Message Transfer procedure

If a UE-associated logical W1-connection exists, the DL RRC MESSAGE TRANSFER message shall contain the *ng-eNB-DU UE WIAP ID* IE, which should be used by ng-eNB-DU to lookup the stored UE context. If no UE-associated logical W1-connection exists, the UE-associated logical W1-connection shall be established at reception of the DL RRC MESSAGE TRANSFER message.

The DL RRC MESSAGE TRANSFER message shall include, if available, the *old ng-eNB-DU UE WIAP ID* IE so that the ng-eNB-DU can retrieve the existing UE context in RRC connection reestablishment procedure, as defined in TS 38.401 [4].

If the ng-eNB-DU identifies the UE-associated logical W1-connection by the *ng-eNB-DU UE WIAP ID* IE in the DL RRC MESSAGE TRANSFER message and the *old ng-eNB-DU UE WIAP ID* IE is included, it shall release the old ng-eNB-DU UE WIAP ID and the related configurations associated with the old ng-eNB-DU UE WIAP ID.

8.4.2.3 Abnormal Conditions

Not applicable.

8.4.3 UL RRC Message Transfer

8.4.3.1 General

The purpose of the UL RRC Message Transfer procedure is to transfer an uplink RRC message as UL RLC SDU to the ng-eNB-CU. The procedure uses UE-associated signalling.

8.4.3.2 Successful operation



Figure 8.4.3.2-1: UL RRC Message Transfer procedure

When the ng-eNB-DU has received from the radio interface an RRC message to which a UE-associated logical W1-connection for the UE exists, the ng-eNB-DU shall send the UL RRC MESSAGE TRANSFER message to the ng-eNB-CU including the RRC message as a *RRC-Container* IE.

8.4.3.3 Abnormal Conditions

Not applicable.

8.4.4 RRC Delivery Report

Void

8.5 Warning Message Transmission Procedures

8.5.1 Write-Replace Warning

8.5.1.1 General

The purpose of Write-Replace Warning procedure is to start or overwrite the broadcasting of warning messages. The procedure uses non UE-associated signalling.

8.5.1.2 Successful Operation

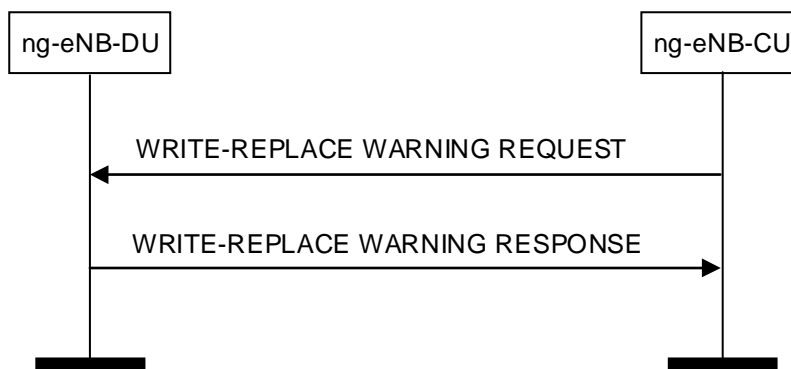


Figure 8.5.1.2-1: Write-Replace Warning procedure: successful operation

The ng-eNB-CU initiates the procedure by sending a WRITE-REPLACE WARNING REQUEST message to the ng-eNB-DU.

Upon receipt of the WRITE-REPLACE WARNING REQUEST message, the ng-eNB-DU shall prioritise its resources to process the warning message.

The ng-eNB-DU acknowledges the WRITE-REPLACE WARNING REQUEST message by sending a WRITE-REPLACE WARNING RESPONSE message to the ng-eNB-CU.

8.5.1.3 Unsuccessful Operation

Not applicable.

8.5.1.4 Abnormal Conditions

Not applicable.

8.5.2 PWS Cancel

8.5.2.1 General

The purpose of the PWS Cancel procedure is to cancel an already ongoing broadcast of a warning message. The procedure uses non UE-associated signalling.

8.5.2.2 Successful Operation

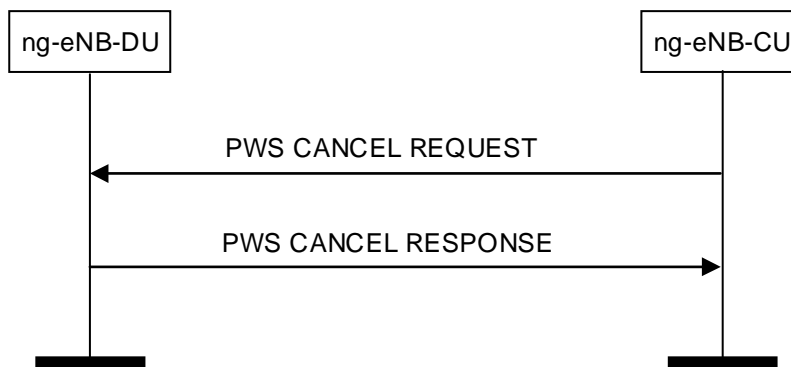


Figure 8.5.2.2-1: PWS Cancel procedure: successful operation

The ng-eNB-CU initiates the procedure by sending a PWS CANCEL REQUEST message to the ng-eNB-DU.

The ng-eNB-DU shall acknowledge the PWS CANCEL REQUEST message by sending the PWS CANCEL RESPONSE message.

8.5.2.3 Unsuccessful Operation

Not applicable.

8.5.2.4 Abnormal Conditions

Not applicable.

8.5.3 PWS Restart Indication

8.5.3.1 General

The purpose of PWS Restart Indication procedure is to inform the ng-eNB-CU that PWS information for some or all cells of the ng-eNB-DU are available for reloading from the CBC if needed. The procedure uses non UE-associated signalling.

8.5.3.2 Successful Operation



Figure 8.5.3.2-1: PWS restart indication

The ng-eNB-DU initiates the procedure by sending a PWS RESTART INDICATION message to the ng-eNB-CU.

8.5.3.3 Abnormal Conditions

Not applicable.

8.5.4 PWS Failure Indication

8.5.4.1 General

The purpose of the PWS Failure Indication procedure is to inform the ng-eNB-CU that ongoing PWS operation for one or more cells of the ng-eNB-DU has failed. The procedure uses non UE-associated signalling.

8.5.4.2 Successful Operation



Figure 8.5.4.2-1: PWS failure indication

The ng-eNB-DU initiates the procedure by sending a PWS FAILURE INDICATION message to the ng-eNB-CU.

8.5.4.3 Abnormal Conditions

Not applicable.

8.6 Paging procedures

8.6.1 Paging

8.6.1.1 General

The purpose of the Paging procedure is used to provide the paging information to enable the ng-eNB-DU to page a UE. The procedure uses non-UE associated signalling.

8.6.1.2 Successful Operation

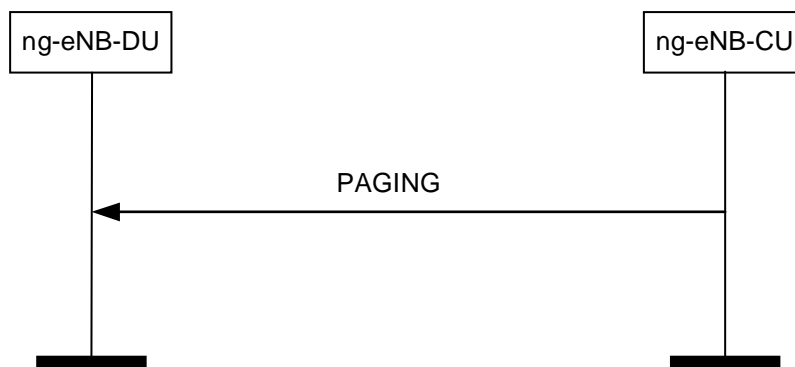


Figure 8.6.1.2-1: Paging procedure. Successful operation.

The ng-eNB-CU initiates the procedure by sending a PAGING message.

The *Paging DRX* IE may be included in the PAGING message, and if present the ng-eNB-DU may use it to determine the final paging cycle for the UE.

At the reception of the PAGING message, the ng-eNB-DU shall perform paging of the UE in cells which belong to cells as indicated in the *Paging Cell List* IE.

8.6.1.3 Abnormal Conditions

Not applicable.

9 Elements for W1AP Communication

9.1 General

Clauses 9.2 and 9.3 present the W1AP message and IE definitions in tabular format. The corresponding ASN.1 definition is presented in clause 9.4. In case there is contradiction between the tabular format and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional IEs, where the tabular format shall take precedence.

The messages have been defined in accordance to the guidelines specified in TR 25.921 [21].

When specifying IEs which are to be represented by bitstrings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);
- The last bit (rightmost bit) contains the least significant bit (LSB);
- When importing bitstrings from other specifications, the first bit of the bitstring contains the first bit of the concerned information;

The following attributes are used for the tabular description of the messages and information elements: Presence, Range Criticality and Assigned Criticality. Their definition and use can be found in TS 38.413 [19].

9.2 Message Functional Definition and Content

9.2.1 Interface Management messages

9.2.1.1 RESET

This message is sent by both the ng-eNB-CU and the ng-eNB-DU and is used to request that the W1 interface, or parts of the W1 interface, to be reset.

Direction: ng-eNB-CU → ng-eNB-DU and ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|----------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |
| CHOICE Reset Type | M | | | | YES | reject |
| >W1 interface | | | | | | |
| >>Reset All | M | | ENUMERATED (Reset all,...) | | - | |
| >Part of W1 interface | | | | | | |
| >>UE-associated logical W1-connection list | | 1 | | | - | |
| >>>UE-associated logical W1-connection item | | 1 .. <maxnoofIndividualW1ConnectionsToReset> | | | EACH | reject |
| >>>> ng-eNB-CU UE W1AP ID | O | | 9.3.1.4 | | - | |
| >>>> ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | | - | |

| Range bound | Explanation |
|---------------------------------------|--|
| maxnoofIndividualW1ConnectionsToReset | Maximum no. of UE-associated logical W1-connections allowed to reset in one message. Value is 65536. |

9.2.1.2 RESET ACKNOWLEDGE

This message is sent by both the ng-eNB-CU and the ng-eNB-DU as a response to a RESET message.

Direction: ng-eNB-DU → ng-eNB-CU and ng-eNB-CU → ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|---|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| UE-associated logical W1-connection list | | 0..1 | | | YES | ignore |
| >UE-associated logical W1-connection Item | | 1 .. <maxnoofIndividualW1ConnectionsToReset> | | | EACH | ignore |
| >>ng-eNB-CU UE W1AP ID | O | | 9.3.1.4 | | - | |
| >>ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | | - | |

| Range bound | Explanation |
|---------------------------------------|--|
| maxnoofIndividualW1ConnectionsToReset | Maximum no. of UE-associated logical W1-connections allowed to reset in one message. Value is 65536. |

9.2.1.3 ERROR INDICATION

This message is sent by both the ng-eNB-CU and the ng-eNB-DU and is used to indicate that some error has been detected in the node.

Direction: ng-eNB-CU → ng-eNB-DU and ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| Transaction ID | M | | 9.3.1.23 | This IE shall be ignored if received in UE associated signalling message. | YES | reject |
| ng-eNB-CU UE W1AP ID | O | | 9.3.1.4 | | YES | ignore |
| ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | | YES | ignore |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.1.4 W1 SETUP REQUEST

This message is sent by the ng-eNB-DU to transfer information associated to a W1-C interface instance.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------------------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3. 1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| ng-eNB-DU ID | M | | 9.3.1.9 | | YES | reject |
| ng-eNB-DU Served Cells List | | 0.. 1 | | List of cells configured in the ng-eNB-DU | YES | reject |
| >ng-eNB-DU Served Cells Item | | 1.. <maxCellin ng- eNB-DU> | | | EACH | reject |
| >>Served Cell Information | M | | 9.3.1.10 | Information about the cells configured in the ng-eNB-DU | - | |
| >>ng-eNB-DU System Information | O | | 9.3.1.18 | RRC container with system information owned by ng-eNB-DU | - | |

| Range bound | Explanation |
|--------------------|---|
| maxCellinng-eNB-DU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.5 W1 SETUP RESPONSE

This message is sent by the ng-eNB-CU to transfer information associated to a W1-C interface instance.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|------------------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cells to be Activated List | | 0.. 1 | | | YES | reject |
| >Cells to be Activated List Item | | 1.. <maxCellin ng- eNBDU> | | List of cells to be activated | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >> E-UTRAN PCI | O | | INTEGER (0..503) | Physical Cell ID | - | |
| >>ng-eNB-CU System Information | O | | 9.3.1.33 | RRC container with system information owned by ng-eNB-CU | YES | reject |
| >>Available PLMN List | O | | 9.3.1.47 | | YES | ignore |
| >>Extended Available PLMN List | O | | 9.3.1.55 | This is included if <i>Available PLMN List</i> IE is included and if more than 6 Available PLMNs is to be signalled. | YES | ignore |

| Range bound | Explanation |
|-------------------|---|
| maxCellinng-eNBDU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.6 W1 SETUP FAILURE

This message is sent by the ng-eNB-CU to indicate W1 Setup failure.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.1.7 NG-ENB-DU CONFIGURATION UPDATE

This message is sent by the ng-eNB-DU to transfer updated information associated to a W1-C interface instance.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------|----------|-------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Served Cells To Add List | | 0..1 | | Complete list of added cells served by the ng-eNB-DU | YES | reject |

| | | | | | | |
|--|---|------------------------------|-------------------------|--|------|--------|
| >Served Cells To Add Item | | 1 .. <maxCellinng-eNB-DU> | | | EACH | reject |
| >>Served Cell Information | M | | 9.3.1.10 | Information about the cells configured in the ng-eNB-DU | - | |
| >>ng-eNB-DU System Information | O | | 9.3.1.18 | RRC container with system information owned by ng-eNB-DU | - | |
| Served Cells To Modify List | | 0..1 | | Complete list of modified cells served by the ng-eNB-DU | YES | reject |
| >Served Cells To Modify Item | | 1 .. <maxCellinng-eNB-DU> | | | EACH | reject |
| >>Old E-UTRAN CGI | M | | E-UTRAN CGI 9.3.1.12 | | - | |
| >>Served Cell Information | M | | 9.3.1.10 | Information about the cells configured in the ng-eNB-DU | - | |
| >>ng-eNB-DU System Information | O | | 9.3.1.18 | RRC container with system information owned by ng-eNB-DU | - | |
| Served Cells To Delete List | | 0..1 | | Complete list of deleted cells served by the ng-eNB-DU | YES | reject |
| >Served Cells To Delete Item | | 1.. <maxCellinng-eNB-DU> | | | EACH | reject |
| >>Old E-UTRAN CGI | M | | E-UTRAN CGI 9.3.1.12 | | - | |
| Cells Status List | | 0..1 | | Complete list of active cells | YES | reject |
| > Cells Status Item | | 0 .. <maxCellinng-eNB-DU> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >> Service Status | M | | 9.3.1.48 | | - | |
| ng-eNB-DU ID | O | | 9.3.1.9 | | YES | reject |

| Range bound | Explanation |
|--------------------|---|
| maxCellinng-eNB-DU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.8 NG-ENB-DU CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by an ng-eNB-CU to an ng-eNB-DU to acknowledge update of information associated to a W1-C interface instance.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------------------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cells to be Activated List | | 0.. 1 | | List of cells to be activated | YES | reject |
| >Cells to be Activated List Item | | 1.. <maxCell inng- eNB-DU> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >> E-UTRAN PCI | O | | INTEGER (0..503) | Physical Cell ID | - | |
| >> ng-eNB-CU System Information | O | | 9.3.1.33 | RRC container with system information owned by ng-eNB-CU | YES | reject |
| >> Available PLMN List | O | | 9.3.1.47 | | YES | ignore |
| >> Extended Available PLMN List | O | | 9.3.1.55 | This is included if <i>Available PLMN List</i> IE is included and if more than 6 Available PLMNs is to be signalled. | YES | ignore |
| Cells to be Deactivated List | | 0.. 1 | | List of cells to be deactivated | YES | reject |
| >Cells to be Deactivated List Item | | 1.. <maxCell inng- eNB-DU> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | - |

| Range bound | Explanation |
|--------------------|---|
| maxCellinng-eNB-DU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.9 NG-ENB-DU CONFIGURATION UPDATE FAILURE

This message is sent by the ng-eNB-CU to indicate ng-eNB-DU Configuration Update failure.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.1.10 NG-ENB-CU CONFIGURATION UPDATE

This message is sent by the ng-eNB-CU to transfer updated information associated to a W1-C interface instance.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|----------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cells to be Activated List | | 0..1 | | List of cells to be activated or modified | YES | reject |
| >Cells to be Activated List Item | | 1.. <maxCellinng-eNBdu> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >> E-UTRAN PCI | O | | INTEGER (0..503) | Physical Cell ID | - | |
| >> ng-eNB-CU System Information | O | | 9.3.1.33 | RRC container with system information owned by ng-eNB-CU | YES | reject |
| >>> Available PLMN List | O | | 9.3.1.47 | | YES | ignore |
| >>> Extended Available PLMN List | O | | 9.3.1.55 | This is included if <i>Available PLMN List</i> IE is included and if more than 6 Available PLMNs is to be signalled. | YES | ignore |
| Cells to be Deactivated List | | 0..1 | | List of cells to be deactivated | YES | reject |
| >Cells to be Deactivated List Item | | 1.. <maxCellinng-eNBdu> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |

| Range bound | Explanation |
|-------------------|--|
| maxCellinng-eNBdu | Maximum numerbs of cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.11 NG-ENB-CU CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by an ng-eNB-DU to an ng-eNB-CU to acknowledge update of information associated to a W1-C interface instance.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------------------|----------|-------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cells Failed to be Activated List | | 0..1 | | List of cells which are failed to be activated | YES | reject |
| >Cells Failed to be Activated Item | | 1.. <maxCellinng-eNBDU> | | | EACH | reject |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >>Cause | M | | 9.3.1.2 | | - | |

| Range bound | Explanation |
|-------------------|---|
| maxCellinng-eNBDU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.1.12 NG-ENB-CU CONFIGURATION UPDATE FAILURE

This message is sent by the ng-eNB-DU to indicate ng-eNB-CU Configuration Update failure.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.1.13 NG-ENB-DU RESOURCE COORDINATION REQUEST

This message is sent by an ng-eNB-CU to an ng-eNB-DU, to express the desired resource allocation for data traffic, for the sake of resource coordination.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------|------------------------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Request type | M | | ENUMERATED (offer, execution, ...) | | YES | reject |
| E-UTRA – NR Cell Resource Coordination Request Container | M | | OCTET STRING | Includes the XNAP E-UTRA – NR CELL RESOURCE COORDINATION REQUEST message as defined in clause 9.1.2.23 in TS 38.423 [7]. | YES | reject |
| Ignore Resource Coordination Request Container | O | | ENUMERATED (yes, ...) | | YES | reject |

9.2.1.14 NG-ENB-DU RESOURCE COORDINATION RESPONSE

This message is sent by an ng-eNB-DU to an ng-eNB-CU, to express the desired resource allocation for data traffic, as a response to the NG-ENB-DU RESOURCE COORDINATION REQUEST.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| E-UTRA – NR Cell Resource Coordination Response Container | M | | OCTET STRING | Includes the XNAP E-UTRA – NR CELL RESOURCE COORDINATION RESPONSE message as defined in clause 9.1.2.24 in TS 38.423 [7]. | YES | reject |

9.2.1.15 NG-ENB-DU STATUS INDICATION

This message is sent by the ng-eNB-DU to indicate to the ng-eNB-CU its status of overload.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|-------|---|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| ng-eNB-DU Overload Information | M | | ENUMERATED (overloaded, not-overloaded) | | YES | reject |

9.2.2 UE Context Management messages

9.2.2.1 UE CONTEXT SETUP REQUEST

This message is sent by the ng-eNB-CU to request the setup of a UE context.

Direction: ng-eNB-CU → ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------------------------------|----------|-----------------------------------|------------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | | YES | ignore |
| CU to DU RRC Information | M | | 9.3.1.57 | | YES | reject |
| DRX Cycle | O | | DRX Cycle 9.3.1.24 | | YES | ignore |
| SpCell ID | M | | ECGI 9.3.1.12 | Special Cell as defined in TS 36.321 [15]. For handover case, this IE shall be considered as target cell. | YES | reject |
| ServCellIndex | M | | INTEGER (0..31,...) | | YES | reject |
| Candidate SpCell List | | 0..1 | | | YES | ignore |
| >Candidate SpCell Item IEs | | 1 .. <maxnoofCandidateSpCells> | | | EACH | ignore |
| >>Candidate SpCell ID | M | | ECGI 9.3.1.12 | Special Cell as defined in TS 36.321 [15] | - | |
| SCell To Be Setup List | | 0..1 | | | YES | ignore |
| >SCell to Be Setup Item IEs | | 1.. <maxnoofSCells> | | | EACH | ignore |
| >>SCell ID | M | | ECGI 9.3.1.12 | SCell Identifier in ng-eNB | - | |
| >>SCellIndex | M | | INTEGER (1..31) | | - | |
| SRB to Be Setup List | | 0..1 | | | YES | reject |
| >SRB to Be Setup Item IEs | | 1 .. <maxnoofSRBs> | | | EACH | reject |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| DRB to Be Setup List | | 0..1 | | | YES | reject |
| >DRB to Be Setup Item IEs | | 1 .. <maxnoofDRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>CHOICE QoS Information | M | | | | - | |
| >>>E-UTRAN QoS | M | | 9.3.1.19 | Shall be used for DC case to convey E-RAB Level QoS Parameters | - | |
| >>>>DRB Information | | 1 | | Shall be used for NG-RAN cases | YES | ignore |
| >>>>DRB QoS | M | | 9.3.1.34 | | - | |
| >>>>S-NSSAI | M | | 9.3.1.32 | | - | |
| >>>>Notification Control | O | | 9.3.1.44 | | - | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|-------------|------------------------|--|--|-------------|----------------------|
| >>>>Flows Mapped to DRB Item | | 1 .. <maxnoofQoSFlows> | | | - | |
| >>>>QoS Flow Identifier | M | | 9.3.1.46 | | - | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.3.1.34 | | - | |
| >>>>QoS Flow Mapping Indication | O | | 9.3.1.51 | | YES | ignore |
| >>UL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-CU endpoint of the W1 transport bearer. For delivery of UL PDUs. | - | |
| >> RLC Mode | M | | 9.3.1.25 | | - | |
| >>DL PDCP SN length | M | | ENUMERATED (12bits, 18bits, ...) | | YES | ignore |
| >>UL PDCP SN length | O | | ENUMERATED (12bits, 18bits, ...) | | YES | ignore |
| Inactivity Monitoring Request | O | | ENUMERATED (true, ...) | | YES | reject |
| RAT-Frequency Priority Information | O | | 9.3.1.30 | | YES | reject |
| RRC-Container | O | | 9.3.1.6 | Includes the DL-DCCH-Message IE as defined in clause 6.2 of TS 36.331 [2], encapsulated in a PDCP PDU. | YES | ignore |
| Serving PLMN | O | | PLMN ID 9.3.1.14 | Indicates the PLMN serving the UE. | YES | ignore |
| ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink | Conditional | | Bit Rate 9.3.1.22 | The ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink is to be enforced by the ng-eNB-DU. | YES | ignore |
| Resource Coordination Transfer Information | O | | 9.3.1.52 | | YES | ignore |

| Range bound | Explanation |
|-------------------------|--|
| maxnoofSCells | Maximum no. of SCells allowed towards one UE, the maximum value is 32. |
| maxnoofSRBs | Maximum no. of SRB allowed towards one UE, the maximum value is 4. |
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |
| maxnoofCandidateSpCells | Maximum no. of SpCells allowed towards one UE, the maximum value is 64. |
| maxnoofQoSFlows | Maximum no. of flows allowed to be mapped to one DRB, the maximum value is 64. |

| Condition | Explanation |
|------------|---|
| ifDRBSetup | This IE shall be present only if the <i>DRB to Be Setup List</i> IE is present. |

9.2.2.2 UE CONTEXT SETUP RESPONSE

This message is sent by the ng-eNB-DU to confirm the setup of a UE context.

Direction: ng-eNB-DU → ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------------------------|---|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| DU To CU RRC Information | M | | 9.3.1.58 | | YES | reject |
| C-RNTI | O | | 9.3.1.29 | C-RNTI allocated at the ng-eNB-DU | YES | ignore |
| Resource Coordination Transfer Container | O | | OCTET STRING | Includes the <i>MR-DC Resource Coordination Information</i> IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases. | YES | ignore |
| DRB Setup List | | 0..1 | | The List of DRBs which are successfully established. | YES | ignore |
| >DRB Setup Item list | | 1 .. <maxnoofDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>DL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-DU endpoint of the W1 transport bearer. For delivery of DL PDUs. | - | |
| SRB Failed to Setup List | | 0..1 | | | YES | ignore |
| >SRB Failed to Setup Item | | 1 .. <maxnoofSRBs> | | | EACH | ignore |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| DRB Failed to Setup List | | 0..1 | | | YES | ignore |
| >DRB Failed to Setup Item | | 1 .. <maxnoofDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| SCell Failed To Setup List | | 0..1 | | | YES | ignore |
| >SCell Failed to Setup Item | | 1 .. <maxnoofSCells> | | | EACH | ignore |
| >>SCell ID | M | | E-UTRAN CGI 9.3.1.12 | SCell Identifier in ng-eNB | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| Inactivity Monitoring Response | O | | ENUMERATED (not-supported, ...) | | YES | reject |
| SRB Setup List | | 0..1 | | | YES | ignore |
| >SRB Setup Item | | 1 .. <maxnoofSRBs> | | | EACH | ignore |
| >>SRB ID | M | | 9.3.1.7 | | - | |

| Range bound | Explanation |
|---------------|--|
| maxnoofSCells | Maximum no. of SCells allowed towards one UE, the maximum value is 32. |
| maxnoofSRBs | Maximum no. of SRB allowed towards one UE, the maximum value is 4. |
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |

9.2.2.3 UE CONTEXT SETUP FAILURE

This message is sent by the ng-eNB-DU to indicate that the setup of the UE context was unsuccessful.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------------|----------|----------------------------------|-------------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | | YES | ignore |
| Cause | M | | 9.3.1.2 | | YES | ignore |
| Potential SpCell List | | 0..1 | | | YES | ignore |
| >Potential SpCell Item IEs | | 0.. <maxnoofPotentialSpCells> | | | EACH | ignore |
| >>Potential SpCell ID | M | | E-UTRAN CGI 9.3.1.12 | Special Cell as defined in TS 38.321 [9] | - | |

| Range bound | Explanation |
|-------------------------|---|
| maxnoofPotentialSpCells | Maximum no. of SpCells allowed towards one UE, the maximum value is 64. |

9.2.2.4 UE CONTEXT RELEASE REQUEST

This message is sent by the ng-eNB-DU to request the ng-eNB-CU to release the UE-associated logical W1.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.2.5 UE CONTEXT RELEASE COMMAND

This message is sent by the ng-eNB-CU to request the ng-eNB-DU to release the UE-associated logical W1 connection.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |
| RRC-Container | O | | 9.3.1.6 | Includes the <i>DL-DCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2] encapsulated in a PDCP PDU, or the <i>DL-CCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2]. | YES | ignore |
| SRB ID | O | | 9.3.1.7 | It shall be included if the <i>RRC-Container</i> IE is present. The ng-eNB-DU shall send the RRC message on the indicated SRB. | YES | ignore |
| old ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | Include it if RRCReestablishmentRequest is not accepted | YES | ignore |

9.2.2.6 UE CONTEXT RELEASE COMPLETE

This message is sent by the ng-eNB-DU to confirm the release of the UE-associated logical W1 connection.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |

9.2.2.7 UE CONTEXT MODIFICATION REQUEST

This message is sent by the ng-eNB-CU to provide UE Context information changes to the ng-eNB-DU.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|----------------------------|-------------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| SpCell ID | O | | E-UTRAN CGI 9.3.1.12 | Special Cell as defined in TS 38.321 [9]. For handover case, this IE shall be considered as target cell. | YES | ignore |
| ServCellIndex | O | | INTEGER (0..31, ...) | | YES | reject |
| DRX Cycle | O | | DRX Cycle 9.3.1.24 | | YES | ignore |
| CU to DU RRC Information | O | | 9.3.1.57 | | YES | reject |
| Transmission Action Indicator | O | | 9.3.1.11 | | YES | ignore |
| Resource Coordination Transfer Container | O | | OCTET STRING | Includes the <i>MR-DC Resource Coordination Information</i> IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases. | YES | ignore |
| RRC Reconfiguration Complete Indicator | O | | 9.3.1.27 | | YES | ignore |
| RRC-Container | O | | 9.3.1.6 | Includes the RRCConnectionReconfiguration message as defined in TS 36.331 [2], encapsulated in a PDCP PDU. | YES | reject |
| SCell To Be Setup List | | 0..1 | | | YES | ignore |
| >SCell to Be Setup Item IEs | | 1.. <maxnoof SCells> | | | EACH | ignore |
| >>SCell ID | M | | E-UTRAN CGI 9.3.1.12 | SCell Identifier in ng-eNB | - | |
| >>ServCellIndex | M | | INTEGER (1..31) | | - | |
| SCell To Be Removed List | | 0..1 | | | YES | ignore |
| >SCell to Be Removed Item IEs | | 1.. <maxnoof SCells> | | | EACH | ignore |
| >>SCell ID | M | | E-UTRAN CGI 9.3.1.12 | SCell Identifier in ng-eNB | - | |
| SRB to Be Setup List | | 0..1 | | | YES | reject |
| >SRB to Be Setup Item IEs | | 1..<maxno ofSRBs> | | | EACH | reject |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| DRB to Be Setup List | | 0..1 | | | YES | reject |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------|---|---|-------------|----------------------|
| >DRB to Be Setup Item IEs | | 1 .. <maxnoof DRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>CHOICE QoS Information | M | | | | - | |
| >>>E-UTRAN QoS | M | | 9.3.1.19 | Shall be used for DC case to convey E-RAB Level QoS Parameters | | |
| >>>DRB Information | | 1 | | Shall be used for NG-RAN cases | YES | ignore |
| >>>>DRB QoS | M | | 9.3.1.34 | | - | |
| >>>>S-NSSAI | M | | 9.3.1.32 | | - | |
| >>>>Notification Control | O | | 9.3.1.44 | | - | |
| >>>>Flows Mapped to DRB Item | | 1 .. <maxnoof QoSFlows > | | | - | |
| >>>>>QoS Flow Identifier | M | | 9.3.1.46 | | - | |
| >>>>>QoS Flow Level QoS Parameters | M | | 9.3.1.34 | | - | |
| >>>>>QoS Flow Mapping Indication | O | | 9.3.1.51 | | YES | ignore |
| >>UL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-CU endpoint of the W1 transport bearer. For delivery of UL PDUs. | - | |
| >> RLC Mode | M | | 9.3.1.25 | | - | |
| >>DL PDCP SN length | O | | ENUMERATED (12bits, 18bits, ...) | | YES | ignore |
| >>UL PDCP SN length | O | | ENUMERATED (12bits, 18bits, ...) | | YES | ignore |
| DRB to Be Modified List | | 0..1 | | | YES | reject |
| >DRB to Be Modified Item IEs | | 1 .. <maxnoof DRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>CHOICE QoS Information | O | | | | - | |
| >>>E-UTRAN QoS | M | | 9.3.1.19 | Shall be used for EN-DC case to convey E-RAB Level QoS Parameters | - | |
| >>>DRB Information | | 1 | | Shall be used for NG-RAN cases | YES | ignore |
| >>>>DRB QoS | M | | 9.3.1.34 | | - | |
| >>>>S-NSSAI | M | | 9.3.1.32 | | - | |
| >>>>Notification Control | O | | 9.3.1.44 | | - | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--------------------------|--|--|-------------|----------------------|
| >>>>Flows Mapped to DRB Item | | 1 .. <maxnoof QoSFlows > | | | - | |
| >>>>QoS Flow Identifier | M | | 9.3.1.46 | | - | |
| >>>>QoS Flow Level QoS Parameters | M | | 9.3.1.34 | | - | |
| >>>>QoS Flow Mapping Indication | O | | 9.3.1.51 | | YES | ignore |
| >>UL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-CU endpoint of the W1 transport bearer. For delivery of UL PDUs. | - | |
| >>DL PDCP SN length | O | | ENUMERATED(12bits,18bits, ...) | | YES | ignore |
| >>UL PDCP SN length | O | | ENUMERATED(12bits,18bits, ...) | | YES | ignore |
| >>Bearer Type Change | O | | ENUMERATED(true, ...) | | YES | ignore |
| >> RLC Mode | O | | 9.3.1.25 | | YES | ignore |
| SRB To Be Released List | | 0..1 | | | YES | reject |
| >SRB To Be Released Item IEs | | 1.. <maxnoof SRBs> | | | EACH | reject |
| >>SRB ID | M | | 9.3.1.7 | | | |
| DRB to Be Released List | | 0..1 | | | YES | reject |
| >DRB to Be Released Item IEs | | 1 .. <maxnoof DRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| Inactivity Monitoring Request | O | | ENUMERATED(true, ...) | | YES | reject |
| ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink | O | | Bit Rate 9.3.1.22 | The ng-eNB-DU UE Aggregate Maximum Bit Rate Uplink is to be enforced by the ng-eNB-DU. | YES | ignore |
| RAT-Frequency Priority Information | O | | 9.3.1.30 | | YES | reject |
| Resource Coordination Transfer Information | O | | 9.3.1.52 | | YES | ignore |

| Range bound | Explanation |
|--------------------|--|
| maxnoofSCells | Maximum no. of SCells allowed towards one UE, the maximum value is 32. |
| maxnoofSRBs | Maximum no. of SRB allowed towards one UE, the maximum value is 4. |
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |
| maxnoofQoSFlows | Maximum no. of flows allowed to be mapped to one DRB, the maximum value is 64. |

9.2.2.8 UE CONTEXT MODIFICATION RESPONSE

This message is sent by the ng-eNB-DU to confirm the modification of a UE context.

Direction: ng-eNB-DU → ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------------------|---|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Resource Coordination Transfer Container | O | | OCTET STRING | Includes the <i>MR-DC Resource Coordination Information</i> IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases. | YES | ignore |
| DU To CU RRC Information | O | | 9.3.1.58 | | YES | reject |
| DRB Setup List | | 0..1 | | The List of DRBs which are successfully established. | YES | ignore |
| >DRB Setup Item IEs | | 1 .. <maxnoo fDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>DL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-DU endpoint of the W1 transport bearer. For delivery of DL PDUs. | - | |
| DRB Modified List | | 0..1 | | The List of DRBs which are successfully modified. | YES | ignore |
| >DRB Modified Item IEs | | 1 .. <maxnoo fDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>DL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-DU endpoint of the W1 transport bearer. For delivery of DL PDUs. | - | |
| >>RLC Status | O | | 9.3.1.49 | Indicates the RLC has been re-established at the ng-eNB-DU. | YES | ignore |
| SRB Failed to be Setup List | | 0..1 | | The List of SRBs which are failed to be established. | YES | ignore |
| >SRB Failed to be Setup Item IEs | | 1 .. <maxnoo fSRBs> | | | EACH | ignore |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| DRB Failed to be Setup List | | 0..1 | | The List of DRBs which are failed to be setup. | YES | ignore |
| >DRB Failed to be Setup Item IEs | | 1 .. <maxnoo fDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>Cause | O | | 9.3.1.2 | | - | |

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-----------------------------|---|--|-------------|----------------------|
| SCell Failed To Setup List | | 0..1 | | | YES | ignore |
| >SCell Failed to Setup Item | | 1 .. <maxnoo fSCells> | | | EACH | ignore |
| >>SCell ID | M | | E-UTRAN CGI 9.3.1.12 | SCell Identifier in ng-eNB | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| DRB Failed to be Modified List | | 0..1 | | The List of DRBs which are failed to be modified. | YES | ignore |
| >DRB Failed to be Modified Item IEs | | 1 .. <maxnoo fDRBs> | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>Cause | O | | 9.3.1.2 | | - | |
| Inactivity Monitoring Response | O | | ENUMERATE D (Not- supported, ...) | | YES | reject |
| C-RNTI | O | | 9.3.1.29 | C-RNTI allocated at the ng-eNB-DU | YES | ignore |
| Associated SCell List | O | | 9.3.1.56 | | YES | ignore |
| SRB Setup List | | 0..1 | | | YES | ignore |
| >SRB Setup Item | | 1 .. <maxnoo fSRBs> | | | EACH | ignore |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| SRB Modified List | | 0..1 | | | YES | ignore |
| >SRB Modified Item | | 1 .. <maxnoo fSRBs> | | | EACH | ignore |
| >>SRB ID | M | | 9.3.1.7 | | - | |

| Range bound | Explanation |
|---------------|--|
| maxnoofSRBs | Maximum no. of SRB allowed towards one UE, the maximum value is 4. |
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |
| maxnoofSCells | Maximum no. of SCells allowed towards one UE, the maximum value is 32. |

9.2.2.9 UE CONTEXT MODIFICATION FAILURE

This message is sent by the ng-eNB-DU to indicate a context modification failure.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.2.10 UE CONTEXT MODIFICATION REQUIRED

This message is sent by the ng-eNB-DU to request the modification of a UE context.

Direction: ng-eNB-DU → ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|--------------------|--|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Resource Coordination Transfer Container | O | | OCTET STRING | Includes the <i>MR-DC Resource Coordination Information</i> IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases. | YES | ignore |
| DU To CU RRC Information | O | | 9.3.1.58 | | YES | reject |
| DRB Required to Be Modified List | | 0..1 | | | YES | reject |
| >DRB Required to Be Modified Item IEs | | 1 .. <maxnoofDRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>DL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-CU endpoint of the W1 transport bearer. For delivery of DL PDUs. | - | |
| >>RLC Status | O | | 9.3.1.49 | Indicates the RLC has been re-established at the ng-eNB-DU. | YES | ignore |
| SRB Required to be Released List | | 0..1 | | | YES | reject |
| >SRB Required to be Released List Item IEs | | 1 .. <maxnoofSRBs> | | | EACH | reject |
| >>SRB ID | M | | 9.3.1.7 | | - | |
| DRB Required to be Released List | | 0..1 | | | YES | reject |
| >DRB Required to be Released List Item IEs | | 1 .. <maxnoofDRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| Cause | M | | 9.3.1.2 | | YES | ignore |

| Range bound | Explanation |
|-------------|---|
| maxnoofSRBs | Maximum no. of SRB allowed towards one UE, the maximum value is 4. |
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |

9.2.2.11 UE CONTEXT MODIFICATION CONFIRM

This message is sent by the ng-eNB-CU to inform the ng-eNB-DU the successful modification.

Direction: ng-eNB-CU → ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|---------------------|---|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Resource Coordination Transfer Container | O | | OCTET STRING | Includes the <i>MR-DC Resource Coordination Information</i> IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases. | YES | ignore |
| DRB Modified List | | 0..1 | | The List of DRBs which are successfully modified. | YES | ignore |
| >DRB Modified Item IEs | | 1 .. <maxnoofDRBs > | | | EACH | ignore |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>UL UP TNL Information | M | | UP Transport Layer Information 9.3.2.1 | ng-eNB-DU endpoint of the W1 transport bearer. For delivery of UL PDUs. | - | |
| RRC-Container | O | | 9.3.1.6 | Includes the <i>RRConnectionReconfiguration</i> message as defined in TS 36.331 [2], encapsulated in a PDCP PDU. | YES | ignore |
| Resource Coordination Transfer Information | O | | 9.3.1.52 | | YES | ignore |

| Range bound | Explanation |
|-------------|---|
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |

9.2.2.12 UE CONTEXT MODIFICATION REFUSE

This message is sent by the ng-eNB-CU to indicate the UE context modification was unsuccessful.

Direction: ng-eNB-CU → ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| Cause | M | | 9.3.1.2 | | YES | ignore |

9.2.2.13 UE INACTIVITY NOTIFICATION

This message is sent by the ng-eNB-DU to provide information about the UE activity to the ng-eNB-CU.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-----------------------|------------------------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| DRB Activity List | | 1 | | | YES | reject |
| >DRB Activity Item | | 1 .. <maxnoofDRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>DRB Activity | O | | ENUMERATED (Active, Not active) | | - | |

| Range bound | Explanation |
|-------------|---|
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |

9.2.2.14 NOTIFY

This message is sent by the ng-eNB-DU to notify the ng-eNB-CU that the QoS for already established DRBs associated with notification control is not fulfilled any longer or it is fulfilled again.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------|----------|-----------------------|---|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| DRB Notify List | | 1 | | | YES | reject |
| >DRB Notify Item IEs | | <1 .. maxnoofDRBs> | | | EACH | reject |
| >>DRB ID | M | | 9.3.1.8 | | - | |
| >>Notification Cause | M | | ENUMERATED (Fulfilled, Not-Fulfilled, ...) | | - | |

| Range bound | Explanation |
|-------------|---|
| maxnoofDRBs | Maximum no. of DRB allowed towards one UE, the maximum value is 32. |

9.2.3 RRC Message Transfer messages

9.2.3.1 INITIAL UL RRC MESSAGE TRANSFER

This message is sent by the ng-eNB-DU to transfer the initial layer 3 message to the ng-eNB-CU over the W1 interface.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|------------------------|----------|-------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| Transaction ID | M | | 9.3.1.23 | | YES | ignore |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| E-UTRAN CGI | M | | 9.3.1.12 | NG-RAN Cell Global Identifier | YES | reject |
| C-RNTI | M | | 9.3.1.29 | C-RNTI allocated at the ng-eNB-DU | YES | reject |
| RRC-Container | M | | 9.3.1.6 | Includes the <i>UL-CCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2]. | YES | reject |
| DU to CU RRC Container | O | | OCTET STRING | <i>RadioResourceConfigDedicated</i> IE as defined in clause 6.3.2 in TS 36.331 [2]. Required at least to carry SRB1 configuration. | YES | reject |

9.2.3.2 DL RRC MESSAGE TRANSFER

This message is sent by the ng-eNB-CU to transfer the layer 3 message to the ng-eNB-DU over the W1 interface.

Direction: ng-eNB-CU →ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------|----------|-------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| old ng-eNB-DU UE W1AP ID | O | | 9.3.1.5 | Include it if <i>RRConnectionReestablishment</i> is included in RRC-Container | YES | reject |
| SRB ID | M | | 9.3.1.7 | | YES | reject |
| RRC-Container | M | | 9.3.1.6 | Includes the <i>DL-DCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2] encapsulated in a PDCP PDU, or the <i>DL-CCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2]. | YES | reject |

9.2.3.3 UL RRC MESSAGE TRANSFER

This message is sent by the ng-eNB-DU to transfer the layer 3 message to the ng-eNB-CU over the W1 interface.

Direction: ng-eNB-DU →ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------|----------|-------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| ng-eNB-CU UE W1AP ID | M | | 9.3.1.4 | | YES | reject |
| ng-eNB-DU UE W1AP ID | M | | 9.3.1.5 | | YES | reject |
| SRB ID | M | | 9.3.1.7 | | YES | reject |
| RRC-Container | M | | 9.3.1.6 | Includes the <i>UL-DCCH-Message</i> IE as defined in clause 6.2 of TS 36.331 [2], encapsulated in a PDCP PDU. | YES | reject |

9.2.4 Warning Message Transmission Messages

9.2.4.1 WRITE-REPLACE WARNING REQUEST

This message is sent by the ng-eNB-CU to request the start or overwrite of the broadcast of a warning message.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|------------------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| PWS System Information | M | | 9.3.1.3 | This IE includes the system information for public warning, as defined in TS 36.331 [2]. | YES | reject |
| Repetition Period | M | | 9.3.1.13 | | YES | reject |
| Number of Broadcasts Requested | M | | 9.3.1.60 | | YES | reject |
| Cell To Be Broadcast List | | 0..1 | | | YES | reject |
| >Cell to Be Broadcast Item IEs | | 1.. <maxCelli nng- eNBdu> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |

| Range bound | Explanation |
|-------------------|---|
| maxCellInng-eNBdu | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.4.2 WRITE-REPLACE WARNING RESPONSE

This message is sent by the ng-eNB-DU to acknowledge the ng-eNB-CU on the start or overwrite request of a warning message.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cell Broadcast Completed List | | 0..1 | | | YES | reject |
| >Cell Broadcast Completed Item IEs | | 1.. <maxCellinng-eNB-DU> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |

| Range bound | Explanation |
|--------------------|---|
| maxCellinng-eNB-DU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.4.3 PWS CANCEL REQUEST

This message is forwarded by the ng-eNB-CU to ng-eNB-DU to cancel an already ongoing broadcast of a warning message

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-----------------------------|-----------------------|--|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Number of Broadcasts Requested | M | | 9.3.1.60 | This IE is not used in this version of the specification | YES | reject |
| Cell Broadcast To Be Cancelled List | | 0..1 | | | YES | reject |
| >Cell Broadcast to Be Cancelled Item IEs | | 1.. <maxCellinng-eNB-DU> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| Cancel-all Warning Messages Indicator | O | | | ENUMERATED (true, ...) | YES | reject |

| Range bound | Explanation |
|--------------------|---|
| maxCellinng-eNB-DU | Maximum no. cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.4.4 PWS CANCEL RESPONSE

This message is sent by the ng-eNB-DU to indicate the list of warning areas where cancellation of the broadcast of the identified message was successful and unsuccessful.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|------------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | reject |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| Cell Broadcast Cancelled List | | 0..1 | | | YES | reject |
| >Cell Broadcast Cancelled Item IEs | | 1..<maxCellinng-eNBDU> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >>Number of Broadcasts | M | | INTEGER (0..65535) | This IE is set to '0' if valid results are not known or not available. It is set to 65535 if the counter results have overflowed. | - | |
| Criticality Diagnostics | O | | 9. 3.1.82 | | YES | ignore |

| Range bound | Explanation |
|-------------------|--|
| maxCellinng-eNBDU | Maximum no. of cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.4.5 PWS RESTART INDICATION

This message is sent by the ng-eNB-DU to inform the ng-eNB-CU that PWS information for some or all cells of the ng-eNB-DU are available if needed.

Direction: ng-eNB-DU →ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|------------------------|-----------------------|-----------------------|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| E-UTRAN CGI List for Restart List | | 1 | | | YES | reject |
| > E-UTRAN CGI List for Restart Item IEs | | 1..<maxCellinng-eNBDU> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |

| Range bound | Explanation |
|-------------------|--|
| maxCellinng-eNBDU | Maximum no. of cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.4.6 PWS FAILURE INDICATION

This message is sent by the ng-eNB-DU to inform the ng-eNB-CU that ongoing PWS operation for one or more cells of the ng-eNB-DU has failed.

Direction: ng-eNB-DU → ng-eNB-CU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--|----------|-------------------------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| Transaction ID | M | | 9.3.1.23 | | YES | reject |
| PWS failed E-UTRAN CGI List | | <i>0..1</i> | | | YES | reject |
| >PWS failed E-UTRAN CGI Item IEs | | <i>1..<maxCellinng-eNBdu></i> | | | EACH | reject |
| >>E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| >>Number of Broadcasts | M | | INTEGER (0..65535) | This IE is set to '0' if valid results are not known or not available. It is set to 65535 if the counter results have overflowed. | - | |

| Range bound | Explanation |
|-------------------|--|
| maxCellinng-eNBdu | Maximum no. of cells that can be served by an ng-eNB-DU. Value is 512. |

9.2.5 Paging messages

9.2.5.1 PAGING

This message is sent by the ng-eNB-CU and is used to request the ng-eNB-DU to page UEs.

Direction: ng-eNB-CU → ng-eNB-DU

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------|----------|------------------------------|-----------------------|---|-------------|----------------------|
| Message Type | M | | 9.3.1.1 | | YES | ignore |
| UE Identity Index value | M | | 9.3.1.63 | | YES | reject |
| CHOICE Paging Identity | M | | | | YES | reject |
| >RAN UE Paging identity | M | | 9.3.1.64 | | - | |
| >CN UE paging identity | M | | 9.3.1.65 | | - | |
| Paging DRX | O | | 9.3.1.66 | It is defined as the minimum between the RAN UE Paging DRX and CN UE Paging DRX | YES | ignore |
| Paging Cell List | | 1 | | | YES | ignore |
| >Paging Cell Item IEs | | 1 .. <maxnoofPagingCells> | | | EACH | ignore |
| >> E-UTRAN CGI | M | | 9.3.1.12 | | - | |

| Range bound | Explanation |
|--------------------|--|
| maxnoofPagingCells | Maximum no. of paging cells, the maximum value is 512. |

9.3 Information Element Definitions

9.3.1 Radio Network Layer Related IEs

9.3.1.1 Message Type

The *Message Type* IE uniquely identifies the message being sent. It is mandatory for all messages.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|--|-----------------------|
| Message Type | | | | |
| >Procedure Code | M | | INTEGER (0..255) | |
| >Type of Message | M | | CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, ...) | |

9.3.1.2 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the WIAP protocol.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-----------------------------|----------|-------|---|-----------------------|
| CHOICE Cause Group | M | | | |
| >Radio Network Layer | | | | |
| >>Radio Network Layer Cause | M | | ENUMERATED (Unspecified, RL failure-RLC, Unknown or already allocated ng-eNB-CU UE W1AP ID, Unknown or already allocated ng-eNB-DU UE W1AP ID, Unknown or inconsistent pair of UE W1AP ID, Interaction with other procedure, Not supported QCI Value, Action Desirable for Radio Reasons, No Radio Resources Available, Procedure cancelled, Normal Release, Cell not available, RL failure-others, UE rejection, Resources not available for the slice, AMF initiated abnormal release, Release due to Pre-Emption, Multiple DRB ID Instances, Unknown DRB ID, ...) | |
| >Transport Layer | | | | |
| >>Transport Layer Cause | M | | ENUMERATED (Unspecified, Transport Resource Unavailable, ...) | |
| >Protocol | | | | |
| >>Protocol Cause | M | | ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State, Semantic Error, Abstract Syntax Error (Falsely Constructed Message), Unspecified, ...) | |
| >Misc | | | | |
| >>Miscellaneous Cause | M | | ENUMERATED (Control Processing Overload, Not enough User Plane Processing Resources, Hardware Failure, O&M Intervention, Unspecified, ...) | |

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

| Radio Network Layer cause | Meaning |
|---|---|
| Unspecified | Sent for radio network layer cause when none of the specified cause values applies. |
| RL Failure-RLC | The action is due to an RL failure caused by exceeding the maximum number of ARQ retransmissions. |
| Unknown or already allocated ng-eNB-CU UE W1AP ID | The action failed because the ng-eNB-CU UE W1AP ID is either unknown, or (for a first message received at the ng-eNB-CU) is known and already allocated to an existing context. |
| Unknown or already allocated ng-eNB-DU UE W1AP ID | The action failed because the ng-eNB-DU UE W1AP ID is either unknown, or (for a first message received at the ng-eNB-DU) is known and already allocated to an existing context. |
| Unknown or inconsistent pair of UE W1AP ID | The action failed because both UE W1AP IDs are unknown, or are known but do not define a single UE context. |
| Interaction with other procedure | The action is due to an ongoing interaction with another procedure. |
| Not supported QCI Value | The action failed because the requested QCI is not supported. |
| Action Desirable for Radio Reasons | The reason for requesting the action is radio related. |
| No Radio Resources Available | The cell(s) in the requested node don't have sufficient radio resources available. |
| Procedure cancelled | The sending node cancelled the procedure due to other urgent actions to be performed. |
| Normal Release | The action is due to a normal release of the UE (e.g. because of mobility) and does not indicate an error. |
| Cell Not Available | The action failed due to no cell available in the requested node. |
| RL Failure-others | The action is due to an RL failure caused by other radio link failures than exceeding the maximum number of ARQ retransmissions. |
| UE rejection | The action is due to ng-eNB-CU's rejection of a UE access request. |
| Resources not available for the slice | The requested resources are not available for the slice. |
| AMF initiated abnormal release | The release is triggered by an error in the AMF or in the NAS layer. |
| Release due to Pre-Emption | Release is initiated due to pre-emption. |
| Multiple DRB ID Instances | The action failed because multiple instances of the same DRB had been provided. |
| Unknown DRB ID | The action failed because the DRB ID is unknown. |

| Transport Layer cause | Meaning |
|--------------------------------|--|
| Unspecified | Sent when none of the above cause values applies but still the cause is Transport Network Layer related. |
| Transport Resource Unavailable | The required transport resources are not available. |

| Protocol cause | Meaning |
|---|--|
| Transfer Syntax Error | The received message included a transfer syntax error. |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerning criticality indicated "reject". |
| Abstract Syntax Error (Ignore And Notify) | The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify". |
| Message Not Compatible With Receiver State | The received message was not compatible with the receiver state. |
| Semantic Error | The received message included a semantic error. |
| Abstract Syntax Error (Falsely Constructed Message) | The received message contained IEs or IE groups in wrong order or with too many occurrences. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related. |

| Miscellaneous cause | Meaning |
|--|--|
| Control Processing Overload | Control processing overload. |
| Not Enough User Plane Processing Resources Available | No enough resources are available related to user plane processing. |
| Hardware Failure | Action related to hardware failure. |
| O&M Intervention | The action is due to O&M intervention. |
| Unspecified Failure | Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer or Protocol. |

9.3.1.3 PWS System Information

This IE contains the system information used for public warning.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---------------|----------|-------|-----------------------|---|-------------|----------------------|
| SIB type | M | | INTEGER (10..12, ...) | Indicates a certain SIB block for public warning message, e.g. 10 means sibType10, 11 for sibType11, etc. | - | |
| SIB message | M | | OCTET STRING | SIB message for public warning, as defined in TS 36.331 [2]. | - | |

9.3.1.4 ng-eNB-CU UE W1AP ID

The ng-eNB-CU UE W1AP ID uniquely identifies the UE association over the W1 interface within the ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|-----------------------------------|-----------------------|
| ng-eNB-CU UE W1AP ID | M | | INTEGER (0 .. 2 ³² -1) | |

9.3.1.5 ng-eNB-DU UE W1AP ID

The ng-eNB-DU UE W1AP ID uniquely identifies the UE association over the W1 interface within the ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------|----------|-------|-----------------------------------|-----------------------|
| ng-eNB-DU UE W1AP ID | M | | INTEGER (0 .. 2 ³² -1) | |

9.3.1.6 RRC-Container

This information element contains a ng-eNB-CU→UE or a UE → ng-eNB-CU message that is transferred without interpretation in the ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| RRC-Container | M | | OCTET STRING | |

9.3.1.7 SRB ID

This IE uniquely identifies a SRB for a UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| SRB ID | M | | INTEGER (0..3, ...) | Corresponds to the <i>SRB-Identity</i> defined in TS 36.331 [2]. |

9.3.1.8 DRB ID

This IE uniquely identifies a DRB for a UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|---|
| DRB ID | M | | INTEGER (1..32, ...) | Corresponds to the <i>DRB-Identity</i> defined in TS 36.331[2]. |

9.3.1.9 ng-eNB-DU ID

The ng-eNB-DU ID uniquely identifies the ng-eNB-DU at least within an ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|----------------------------|---|
| ng-eNB-DU ID | M | | INTEGER (0 .. $2^{36}-1$) | The ng-eNB-DU ID is independently configured from cell identifiers, i.e. no connection between ng-eNB-DU ID and cell identifiers. |

9.3.1.10 Served Cell Information

This IE contains cell configuration information of a cell in the ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|-------------------------------------|----------|--|---------------------------------|---|-------------|----------------------|
| E-UTRAN CGI | M | | 9.3.1.12 | | - | |
| E-UTRAN PCI | M | | INTEGER (0..503) | Physical Cell ID | - | |
| 5GS TAC | O | | 9.3.1.26 | 5GS Tracking Area Code | - | |
| Served PLMNs | | <i>1..<maxno ofBPLMNs ></i> | | Broadcast PLMNs | - | |
| >PLMN Identity | M | | 9.3.1.14 | | - | |
| >TAI Slice Support List | O | | Slice Support List 9.3.1.31 | Supported S-NSSAIs per TA. | YES | ignore |
| CHOICE E-UTRAN -Mode-Info | M | | | | - | |
| > FDD | | | | | - | |
| >> FDD Info | | 1 | | | - | |
| >>>UL FreqInfo | M | | E-UTRAN Frequency Info 9.3.1.17 | | - | |
| >>>DL FreqInfo | M | | E-UTRAN Frequency Info 9.3.1.17 | | - | |
| >>>UL Transmission Bandwidth | M | | Transmission Bandwidth 9.3.1.15 | | - | |
| >>>DL Transmission Bandwidth | M | | Transmission Bandwidth 9.3.1.15 | | - | |
| > TDD | | | | | - | |
| >> TDD Info | | 1 | | | - | |
| >>> E-UTRAN FreqInfo | M | | E-UTRAN Frequency Info 9.3.1.17 | | - | |
| >>> Transmission Bandwidth | M | | Transmission Bandwidth 9.3.1.15 | | - | |
| Measurement Timing Configuration | M | | OCTET STRING | Contains the <i>MeasurementTimingConfiguration</i> inter-node message defined in TS 36.331 [2]. | - | |
| RANAC | O | | RAN Area Code 9.3.1.45 | | YES | ignore |
| Extended Served PLMNs List | | 0..1 | | This is included if more than 6 Served PLMNs is to be signalled. | YES | ignore |
| > Extended Served PLMNs Item | | <i>1 ..<maxno ofExtended BPLMNs></i> | | | - | |
| >>PLMN Identity | M | | 9.3.1.14 | | - | |
| >>TAI Slice Support List | O | | Slice Support List 9.3.1.31 | Supported S-NSSAIs per TA. | - | |
| Cell Type | O | | 9.3.1.62 | | YES | ignore |

| | | | | | | |
|--|---|---------------------------------------|--|--|-----|--------|
| Broadcast PLMN Identity Info List | | <i>0..<maxno ofBPLMNs NR-1></i> | | This IE corresponds to the <i>PLMN-IdentityInfoList</i> IE in <i>SIB1</i> as specified in TS 36.331 [2]. The PLMN Identities and associated information contained in this IE shall be provided in the same order as broadcast in <i>SIB1</i> . | YES | ignore |
| >PLMN Identity List | M | | Available PLMN List 9.3.1.47 | | - | |
| >Extended PLMN Identity List | O | | Extended Available PLMN List 9.3.1.55 | | - | |
| >5GS-TAC | O | | OCTET STRING (3) | | - | |
| >E-UTRAN Cell Identity | M | | BIT STRING (28) | | - | |
| >RANAC | O | | RAN Area Code 9.3.1.45 | | - | |

| Range bound | Explanation |
|-----------------------|---|
| maxnoofBPLMNs | Maximum no. of Broadcast PLMN Ids. Value is 6. |
| maxnoofExtendedBPLMNs | Maximum no. of Extended Broadcast PLMN Ids. Value is 6. |

9.3.1.11 Transmission Action Indicator

This IE indicates actions for the ng-eNB-DU for the data transmission to the UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------|----------|-------|------------------------------------|-----------------------|
| Transmission Action Indicator | M | | ENUMERATED (stop, ..., restart) | |

9.3.1.12 E-UTRAN CGI

This information element is used to globally identify a cell (see TS 36.401 [3]).

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| PLMN Identity | M | | 9.3.1.14 | |
| Cell Identity | M | | BIT STRING (SIZE(28)) | The leftmost bits of the Cell Identity correspond to the eNB ID. |

9.3.1.13 Repetition Period

This IE indicates the periodicity of the warning message to be broadcast.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------|----------|-------|---------------------------------|--|
| Repetition Period | M | | INTEGER (0..2 ¹⁷ -1) | The unit of value 1 to 2 ¹⁷ -1 is [second]. |

9.3.1.14 PLMN Identity

This information element indicates the PLMN Identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|------------------------|---|
| PLMN Identity | M | | OCTET STRING (SIZE(3)) | <ul style="list-style-type: none"> - digits 0 to 9, encoded 0000 to 1001, - 1111 used as filler digit, two digits per octet, - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n <p>-The PLMN identity consists of 3 digits from MCC followed by either</p> <ul style="list-style-type: none"> -a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC). |

9.3.1.15 Transmission Bandwidth

The *Transmission Bandwidth* IE is used to indicate the UL or DL transmission bandwidth.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|--|--|
| NRB | M | | ENUMERATED (mbw6, mbw15, mbw25, mbw50, mbw75, mbw100, ...) | This IE is used to indicate the UL or DL transmission bandwidth expressed in units of resource blocks "N _{RB} " (TS 36.104 [14]). The values mbw6, mbw15, etc. correspond to the number of resource blocks "N _{RB} " 6, 15, etc. |

9.3.1.16 Void

Reserved for future use.

9.3.1.17 E-UTRAN Frequency Info

The E-UTRAN Frequency Info defines the carrier frequency used in a cell for a given direction (UL or DL) in FDD or for both UL and DL directions in TDD.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|----------------------------|----------|-------------------------------|------------------------------|--|
| E-UTRAN ARFCN | M | | INTEGER (0..maxE-UTRANARFCN) | RF Reference Frequency as defined in TS 36.104 [14]. |
| Frequency Band List | | 1 | | |
| >Frequency Band Item | | 1..<maxnoofE-UTRAN CellBands> | | |
| >>E-UTRAN Frequency Band | M | | INTEGER (1..maxBandsEUTRA) | Operating Band as defined in TS 36.104 [14]. |

| Range bound | Explanation |
|-------------------------|---|
| maxE-UTRANARFCN | Maximum value of E-UTRAN ARFCNs. Value is 262143. |
| maxnoofE-UTRANCellBands | Maximum no. of frequency bands supported for an E-UTRAN cell. Value is 8. |
| maxBandsEUTRA | Maximum value of E-UTRAN Bands. Value is 256. |

9.3.1.18 ng-eNB-DU System Information

This IE contains the system information generated by the ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|---|
| MIB message | M | | OCTET STRING | MIB message, as defined in TS 36.331 [2]. |
| SIB1 message | M | | OCTET STRING | SIB1 message, as defined in TS 36.331 [2]. |
| SIB2 message | M | | OCTET STRING | SIB2 message, as defined in TS 36.331 [2]. |
| SIB3 message | M | | OCTET STRING | SIB3 message, as defined in TS 36.331 [2]. |
| SIB8 message | M | | OCTET STRING | SIB8 message, as defined in TS 36.331 [2]. |
| SIB16 message | M | | OCTET STRING | SIB16 message, as defined in TS 36.331 [2]. |

9.3.1.19 E-UTRAN QoS

This IE defines the QoS to be applied to a DRB for DC case.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------------|----------|-------|-----------------------|---|
| QCI | M | | INTEGER (0..255) | QoS Class Identifier defined in TS 23.401 [10]. Logical range and coding specified in TS 23.203 [20]. |
| Allocation and Retention Priority | M | | 9.3.1.20 | |
| GBR QoS Information | O | | 9.3.1.21 | This IE applies to GBR bearers only and shall be ignored otherwise. |

9.3.1.20 Allocation and Retention Priority

This IE specifies the relative importance compared to other E-RABs for allocation and retention of the E-UTRAN Radio Access Bearer.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|--|--|
| Priority Level | M | | INTEGER (0..15) | Desc.: This IE should be understood as "priority of allocation and retention" (see TS 23.401 [10]). Usage: Value 15 means "no priority". Values between 1 and 14 are ordered in decreasing order of priority, i.e. 1 is the highest and 14 the lowest. Value 0 shall be treated as a logical error if received. |
| Pre-emption Capability | M | | ENUMERATED(shall not trigger pre-emption, may trigger pre-emption) | Desc.: This IE indicates the pre-emption capability of the request on other E-RABs Usage: The E-RAB shall not pre-empt other E-RABs or, the E-RAB may pre-empt other E-RABs The Pre-emption Capability indicator applies to the allocation of resources for an E-RAB and as such it provides the trigger to the pre-emption procedures/processes of the eNB. |
| Pre-emption Vulnerability | M | | ENUMERATED(not pre-emptable, pre-emptable) | Desc.: This IE indicates the vulnerability of the E-RAB to pre-emption of other E-RABs. Usage: The E-RAB shall not be pre-empted by other E-RABs or the E-RAB may be pre-empted by other RABs. Pre-emption Vulnerability indicator applies for the entire duration of the E-RAB, unless modified, and as such indicates whether the E-RAB is a target of the pre-emption procedures/processes of the eNB. |

9.3.1.21 GBR QoS Information

This IE indicates the maximum and guaranteed bit rates of a GBR E-RAB for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|-----------------------|---|
| E-RAB Maximum Bit Rate Downlink | M | | Bit Rate 9.3.1.22 | Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [10]. |
| E-RAB Maximum Bit Rate Uplink | M | | Bit Rate 9.3.1.22 | Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [10]. |
| E-RAB Guaranteed Bit Rate Downlink | M | | Bit Rate 9.3.1.22 | Guaranteed Bit Rate (provided that there is data to deliver) in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [10]. |
| E-RAB Guaranteed Bit Rate Uplink | M | | Bit Rate 9.3.1.22 | Guaranteed Bit Rate (provided that there is data to deliver) in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [10]. |

9.3.1.22 Bit Rate

This IE indicates the number of bits delivered by NG-RAN in UL or to NG-RAN in DL within a period of time, divided by the duration of the period. It is used, for example, to indicate the maximum or guaranteed bit rate for a GBR QoS flow, or an aggregated maximum bit rate.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|------------------------------------|-----------------------|
| Bit Rate | M | | INTEGER (0..4,000,000,000,000,...) | The unit is: bit/s |

9.3.1.23 Transaction ID

The *Transaction ID* IE uniquely identifies a procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure shall use the same Transaction ID. The Transaction ID is determined by the initiating peer of a procedure.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------|----------|-------|-----------------------|-----------------------|
| Transaction ID | M | | INTEGER (0..255, ...) | |

9.3.1.24 DRX Cycle

The *DRX Cycle* IE is to indicate the desired DRX cycle.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|------------------------|----------|-------|--|-------------------------------------|
| Long DRX Cycle Length | M | | ENUMERATED (sf10, sf20, sf32, sf40, sf64, sf80, sf128, sf160, sf256, sf320, sf512, sf640, sf1024, sf1280, sf2048, sf2560, ...) | This IE is defined in TS 36.331 [2] |
| Short DRX Cycle Length | O | | ENUMERATED (sf2, sf5, sf8, sf10, sf16, sf20, sf32, sf40, sf64, sf80, sf128, sf160, sf256, sf320, sf512, sf640, ...) | This IE is defined in TS 36.331 [2] |
| Short DRX Cycle Timer | O | | INTEGER (1..16) | This IE is defined in TS 36.331 [2] |

9.3.1.25 RLC Mode

The *RLC Mode* IE indicates the RLC Mode used for a DRB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|---------------|----------|-------|---|-----------------------|
| RLC Mode | | | ENUMERATED (RLC-AM, RLC-UM-Bidirectional, RLC-UM-Unidirectional-UL, RLC-UM-Unidirectional-DL, ...) | |

9.3.1.26 5GS TAC

This information element is used to identify Tracking Area Code.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-------------------------|-----------------------|
| 5GS TAC | M | | OCTET STRING (SIZE (3)) | |

9.3.1.27 Void

9.3.1.28 RRC Reconfiguration Complete Indicator

This IE indicates the result of the reconfiguration performed towards the UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|-------|---------------------------------|-----------------------|
| RRC Reconfiguration Complete Indicator | M | | ENUMERATED (true, ..., failure) | |

9.3.1.29 C-RNTI

This IE contains the C-RNTI information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-------------------------|-------------------------------------|
| C-RNTI | M | | INTEGER (0..65535, ...) | C-RNTI as defined in TS 36.331 [2]. |

9.3.1.30 RAT-Frequency Priority Information

The RAT-Frequency Priority Information contains either the *Subscriber Profile ID for RAT/Frequency priority* IE or the *Index to RAT/Frequency Selection Priority* IE. These parameters are used to define local configuration for RRM strategies.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|------------------------|-----------------------|
| CHOICE RAT-Frequency Priority Information | M | | | |
| >EN-DC | | | | |
| >>Subscriber Profile ID for RAT/Frequency priority | M | | INTEGER (1.. 256, ...) | |
| >NG-RAN | | | | |
| >> <i>Index to RAT/Frequency Selection Priority</i> | M | | INTEGER (1.. 256, ...) | |

9.3.1.31 Slice Support List

This IE indicates the list of supported slices.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------|----------|------------------------|-----------------------|-----------------------|
| Slice Support Item IEs | | 1..<maxnoofSliceltems> | | |
| >S-NSSAI | M | | 9.3.1.32 | |

| Range bound | Explanation |
|-------------------|--|
| maxnoofSliceltems | Maximum no. of signalled slice support items. Value is 1024. |

9.3.1.32 S-NSSAI

This IE indicates the S-NSSAI.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|------------------------|-----------------------|
| SST | M | | OCTET STRING (SIZE(1)) | |
| SD | O | | OCTET STRING (SIZE(3)) | |

9.3.1.33 ng-eNB-CU System Information

This IE contains the system information encoded by the ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|---------------------------|--|---|
| SIB type to Be Updated List | | 1 | | |
| >SIB type to Be Updated Item IEs | | 1... <maxnoofSIBtypes> | | |
| >>SIB type | M | | INTEGER (4,... 7, 9...15,...32, ...) | Indicates a certain SIB block. |
| >>SIB message | M | | OCTET STRING | SIB message containing SIB as defined in TS 36.331 [2]. |
| >>Value Tag | M | | INTEGER (0..31, ...) | |

9.3.1.34 QoS Flow Level QoS Parameters

This IE defines the QoS to be applied to a QoS flow or to a DRB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|---|----------|-------|---------------------------------|--|-------------|----------------------|
| CHOICE QoS Characteristics | M | | | | - | |
| > <i>Non-dynamic 5QI</i> | | | | | - | |
| >>Non Dynamic 5QI Descriptor | M | | 9.3.1.38 | | - | |
| > <i>Dynamic 5QI</i> | | | | | - | |
| >>Dynamic 5QI Descriptor | M | | 9.3.1.36 | | - | |
| NG-RAN Allocation and Retention Priority | M | | 9.3.1.37 | | - | |
| GBR QoS Flow Information | O | | 9.3.1.35 | This IE shall be present for GBR QoS Flows only. | - | |
| Reflective QoS Attribute | O | | ENUMERATED (subject to, ...) | Details in TS 23.501 [8]. This IE applies to non-GBR flows only and shall be ignored otherwise. | - | |
| PDU Session ID | O | | INTEGER (0 ..255) | As specified in TS 23.501 [8]. | YES | ignore |
| UL PDU Session Aggregate Maximum Bit Rate | O | | Bit Rate 9.3.1.22 | The PDU session Aggregate Maximum Bit Rate Uplink which is associated with the involved PDU session. | YES | ignore |

9.3.1.35 GBR QoS Flow Information

This IE indicates QoS parameters for a GBR QoS flow or GBR bearer for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------------|----------|-------|--------------------------------------|--|
| Maximum Flow Bit Rate Downlink | M | | Bit Rate 9.3.1.22 | Maximum Bit Rate in DL. Details in TS 23.501 [8]. |
| Maximum Flow Bit Rate Uplink | M | | Bit Rate 9.3.1.22 | Maximum Bit Rate in UL. Details in TS 23.501 [8]. |
| Guaranteed Flow Bit Rate Downlink | M | | Bit Rate 9.3.1.22 | Guaranteed Bit Rate (provided there is data to deliver) in DL. Details in TS 23.501 [8]. |
| Guaranteed Flow Bit Rate Uplink | M | | Bit Rate 9.3.1.22 | Guaranteed Bit Rate (provided there is data to deliver). Details in TS 23.501 [8]. |
| Maximum Packet Loss Rate Downlink | O | | Maximum Packet Loss Rate 9.3.1.39 | Indicates the maximum rate for lost packets that can be tolerated in the downlink direction. Details in TS 23.501 [8]. |
| Maximum Packet Loss Rate Uplink | O | | Maximum Packet Loss Rate 9.3.1.39 | Indicates the maximum rate for lost packets that can be tolerated in the uplink direction. Details in TS 23.501 [8]. |

9.3.1.36 Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a Non-standardised or not pre-configured 5QI for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|-----------------|-------|---|---|
| QoS Priority Level | M | | INTEGER (1..127) | For details see TS 23.501 [8]. |
| Packet Delay Budget | M | | 9.3.1.40 | For details see TS 23.501 [8]. |
| Packet Error Rate | M | | 9.3.1.41 | For details see TS 23.501 [8]. |
| 5QI | O | | INTEGER (0..255,...) | This IE contains the dynamically assigned 5QI as specified in TS 23.501 [8]. |
| Delay Critical | C- ifGBRflow | | ENUMERATED (delay critical, non-delay critical) | For details see TS 23.501 [8]. |
| Averaging Window | C- ifGBRflow | | 9.3.1.42 | For details see TS 23.501 [8]. |
| Maximum Data Burst Volume | O | | 9.3.1.43 | For details see TS 23.501 [8]. This IE shall be included if the <i>Delay Critical</i> IE is set to "delay critical" and shall be ignored otherwise. |

| Condition | Explanation |
|-----------|---|
| ifGBRflow | This IE shall be present if the <i>GBR QoS Flow Information</i> IE is present in the <i>QoS Flow Level QoS Parameters</i> IE. |

9.3.1.37 NG-RAN Allocation and Retention Priority

This IE specifies the relative importance of a QoS flow or a DRB compared to other QoS flows or DRBs for allocation and retention of NG-RAN resources.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|---|---|
| Priority Level | M | | INTEGER (0..15) | Desc.: This IE defines the relative importance of a resource request (see TS 23.501 [8]). Usage: Values are ordered in decreasing order of priority, i.e., with 1 as the highest priority and 15 as the lowest priority. Further usage is defined in TS 23.501 [8]. |
| Pre-emption Capability | M | | ENUMERATED (shall not trigger pre-emption, may trigger pre-emption) | Desc.: This IE indicates the pre-emption capability of the request on other QoS flows. Usage: The QoS flow shall not pre-empt other QoS flows or, the QoS flow may pre-empt other QoS flows. The Pre-emption Capability indicator applies to the allocation of resources for a QoS flow and as such it provides the trigger to the pre-emption procedures/processes of the NG-RAN node. |
| Pre-emption Vulnerability | M | | ENUMERATED (not pre-emptable, pre-emptable) | Desc.: This IE indicates the vulnerability of the QoS flow to pre-emption of other QoS flows. Usage: The QoS flow shall not be pre-empted by other QoS flows or the QoS flow may be pre-empted by other QoS flows. The Pre-emption Vulnerability indicator applies for the entire duration of the QoS flow, unless modified and as such indicates whether the QoS flow is a target of the pre-emption procedures/processes of the NG-RAN node. |

9.3.1.38 Non Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a standardized or pre-configured 5QI for downlink and uplink.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|-----------------------|--|
| 5QI | M | | INTEGER (0..255,...) | This IE contains the standardized or pre-configured 5QI as specified in TS 23.501 [8] |
| Priority Level | O | | INTEGER (1..127) | For details see TS 23.501 [8]. When included overrides standardized or pre-configured value. |
| Averaging Window | O | | 9.3.1.42 | This IE applies to GBR QoS Flows only. For details see TS 23.501 [8]. When included overrides standardized or pre-configured value. |
| Maximum Data Burst Volume | O | | 9.3.1.43 | For details see TS 23.501 [8]. When included overrides standardized or pre-configured value. If the 5QI refers to a non-delay critical QoS flow the IE shall be ignored. |

9.3.1.39 Maximum Packet Loss Rate

This IE indicates the Maximum Packet Loss Rate.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------|----------|-------|-----------------------|--|
| Maximum Packet Loss Rate | M | | INTEGER(0..1000) | Ratio of lost packets per number of packets sent, expressed in tenth of percent. |

9.3.1.40 Packet Delay Budget

This IE indicates the Packet Delay Budget for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|------------------------|--|
| Packet Delay Budget | M | | INTEGER (0..1023, ...) | Upper bound value for the delay that a packet may experience expressed in unit of 0.5ms. |

9.3.1.41 Packet Error Rate

This IE indicates the Packet Error Rate for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|--|
| Scalar | M | | INTEGER (0..9, ...) | The packet error rate is expressed as Scalar x 10-k where k is the Exponent. |
| Exponent | M | | INTEGER (0..9, ...) | |

9.3.1.42 Averaging Window

This IE indicates the Averaging Window for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------|----------|-------|------------------------|--|
| Averaging Window | M | | INTEGER (0..4095, ...) | Unit: ms. The default value is 2000ms. |

9.3.1.43 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume for a QoS flow.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------------|----------|-------|------------------------|-----------------------|
| Maximum Data Burst Volume | M | | INTEGER (0..4095, ...) | Unit: byte. |

9.3.1.44 Notification Control

The *Notification Control* IE indicates whether the notification control for a given DRB is active or not-active. If the notification control is set to active, the ng-eNB-DU shall, if supported, monitor the QoS of the DRB and notify the ng-eNB-CU.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|----------------------|----------|-------|-------------------------------------|-----------------------|
| Notification Control | M | | ENUMERATED(Active, Not-Active, ...) | |

9.3.1.45 RAN Area Code

This information element is used to uniquely identify a RAN Area Code.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| RANAC | M | | INTEGER (0..255) | RAN Area Code |

9.3.1.46 QoS Flow Identifier

This IE identifies a QoS Flow within a PDU Session. The definition and use of the QoS Flow Identifiers specified in TS 23.501 [8].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------------|----------|-------|-----------------------|-----------------------|
| QoS Flow Identifier | M | | INTEGER (0 ..63) | |

9.3.1.47 Available PLMN List

This IE indicates the list of available PLMN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|---------------------|-----------------------|-----------------------|
| Available PLMN Item IEs | | 1..<maxnoofBPLMNs > | | |
| >PLMN Identity | M | | 9.3.1.14 | |

| Range bound | Explanation |
|---------------|--|
| maxnoofBPLMNs | Maximum no. of Broadcast PLMN Ids. Value is 6. |

9.3.1.48 Service Status

This IE is used to indicate the service status of a cell by the ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------|----------|-------|--|---|
| Service State | M | | ENUMERATED (In-Service, Out-Of-Service, ...) | Indicates the Service State of the cell. In-Service and Out-of-Service Service States are defined in TS 38.401 [4]. |
| Switching Off Ongoing | O | | ENUMERATED (True, ...) | This IE indicates that the ng-eNB-DU will delete the cell after some time using a new ng-eNB-DU Configuration Update procedure. When this IE is set to "True" the <i>Service State</i> IE shall be set to "In-Service". |

9.3.1.49 RLC Status

This IE indicates about the RLC configuration change included in the container towards the UE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------|----------|-------|---------------------------------|---|
| Reestablishment Indication | O | | ENUMERATED (reestablished, ...) | Indicates that following a change in the radio status, the RLC has been re-established. |

9.3.1.50 Void

9.3.1.51 QoS Flow Mapping Indication

This IE is used to indicate only the uplink or downlink QoS flow is mapped to the DRB.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-----------------------------|----------|-------|-------------------------|--|
| QoS Flow Mapping Indication | O | | ENUMERATED (ul, dl,...) | Indicates that only the uplink or downlink QoS flow is mapped to the DRB |

9.3.1.52 Resource Coordination Transfer Information

This IE contains information for UE-associated E-UTRA – NR resource coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-------|-----------------------|--|
| MeNB Cell ID | M | | BIT STRING (SIZE(28)) | E-UTRAN Cell Global Identifier defined in TS 36.423 [12] clause 9.2.14 |
| Resource Coordination E-UTRA Cell Information | O | | 9.3.1.54 | |

9.3.1.53 E-UTRA PRACH Configuration

This IE indicates the PRACH resources used in E-UTRA cell.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|----------------------------------|----------|-------|-----------------------|--|
| RootSequenceIndex | M | | INTEGER (0..837) | See clause 5.7.2. in TS 36.211 [13] |
| ZeroCorrelationZoneConfiguration | M | | INTEGER (0..15) | See clause 5.7.2. in TS 36.211 [13] |
| HighSpeedFlag | M | | BOOLEAN | TRUE corresponds to Restricted set and FALSE to Unrestricted set. See clause 5.7.2 in TS 36.211 [13] |
| PRACH-FrequencyOffset | M | | INTEGER (0..94) | See clause 5.7.1 of TS 36.211 [13] |
| PRACH-ConfigurationIndex | O | | INTEGER (0..63) | Mandatory for TDD, shall not be present for FDD. See clause 5.7.1. in TS 36.211 [13] |

9.3.1.54 Resource Coordination E-UTRA Cell Information

This IE contains E-UTRA cell information for UE-associated E-UTRA – NR resource coordination.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|-------|--|--|-------------|----------------------|
| CHOICE <i>EUTRA-Mode-Info</i> | M | | | | - | |
| > <i>FDD</i> | | | | | - | |
| >> FDD Info | | 1 | | | - | |
| >>>UL EARFCN | O | | INTEGER (0 .. maxExtendedEARFCN, ...) | The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [14]. | - | |
| >>>DL EARFCN | M | | INTEGER (0 .. maxExtendedEARFCN, ...) | The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [14]. | - | |
| >>>UL Transmission Bandwidth | O | | E-UTRA Transmission Bandwidth 9.3.1.59 | Present if <i>UL EARFCN</i> IE is present. | - | |
| >>>DL Transmission Bandwidth | M | | E-UTRA Transmission Bandwidth 9.3.1.59 | | - | |
| > <i>TDD</i> | | | | | - | |
| >> TDD Info | | 1 | | | - | |
| >>>EARFCN | M | | INTEGER (0 .. maxExtendedEARFCN, ...) | The relation between EARFCN and carrier frequency (in MHz) is defined in TS 36.104 [14]. | - | |
| >>>Transmission Bandwidth | M | | E-UTRA Transmission Bandwidth 9.3.1.59 | | - | |
| >>>Subframe Assignment | M | | ENUMERATED(sa0, sa1, sa2, sa3, sa4, sa5, sa6,...) | Uplink-downlink subframe configuration information defined in TS 36.211 [13]. In NB-IOT, sa0 and sa6 are not applicable. | - | |
| >>> Special Subframe Info | | 1 | | Special subframe configuration information defined in TS 36.211 [13] | - | |
| >>>>Special Subframe Patterns | M | | ENUMERATED(ssp0, ssp1, ssp2, ssp3, ssp4, ssp5, ssp6, ssp7, ssp8, ssp9, ssp10, ...) | | - | |
| >>>>Cyclic Prefix DL | M | | ENUMERATED(Normal, Extended,...) | | - | |
| >>>>Cyclic Prefix UL | M | | ENUMERATED(Normal, Extended,...) | | - | |

| | | | | | | |
|----------------------------|---|--|-----------------------|--|-----|--------|
| E-UTRA PRACH Configuration | M | | 9.3.1.53 | | - | |
| Ignore PRACH Configuration | O | | ENUMERATED (true,...) | | YES | reject |

| Range bound | Explanation |
|-------------------|--|
| maxExtendedEARFCN | Maximum value of extended EARFCN. Value is 262143. |

9.3.1.55 Extended Available PLMN List

This IE indicates the list of available PLMN.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---|----------|-----------------------------|-----------------------|-----------------------|
| Extended Available PLMN Item IEs | | 1..<maxnoofExtendedBPLMNs > | | |
| >PLMN Identity | M | | 9.3.1.14 | |

| Range bound | Explanation |
|-----------------------|---|
| maxnoofExtendedBPLMNs | Maximum no. of Extended Broadcast PLMN Ids. Value is 6. |

9.3.1.56 Associated SCell List

This IE indicates the list of SCells associated with the RLC entity indicated by the *RLC Failure Indication* IE.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|---------------------|-------------------------|-----------------------|-------------|----------------------|
| Associated SCell Item IEs | | 1..<maxnoofSCells > | | | - | - |
| >SCell ID | M | | E-UTRAN CGI 9.3.1.12 | | - | |

| Range bound | Explanation |
|---------------|--|
| maxnoofSCells | Maximum no. of SCells allowed towards one UE, the maximum value is 32. |

9.3.1.57 CU to DU RRC Information

This IE contains the RRC Information that are sent from ng-eNB-CU to ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|----------------------------------|----------|-------|-----------------------|---|-------------|----------------------|
| CG-ConfigInfo | O | | OCTET STRING | CG-ConfigInfo, as defined in TS 38.331 [16]. | - | |
| UE-CapabilityRAT-ContainerList | O | | OCTET STRING | This IE is used in the NG-RAN and it consists of the UE-CapabilityRAT-ContainerList, as defined in TS 36.331 [2]. | - | |
| MeasConfig | O | | OCTET STRING | MeasConfig, as defined in TS 38.331 [16] (without MeasGapConfig). | - | |
| Handover Preparation Information | O | | OCTET STRING | HandoverPreparationInformation, as defined in TS 36.331 [2]. | YES | ignore |
| RadioResourceConfigDedicated | O | | OCTET STRING | RadioResourceConfigDedicated, as defined in TS 36.331 [2]. | YES | ignore |
| Measurement Timing Configuration | O | | OCTET STRING | Contains the <i>MeasurementTimingConfiguration</i> inter-node message defined in TS 38.331 [16]. | YES | ignore |
| UEAssistanceInformation | O | | OCTET STRING | UEAssistanceInformation, as defined in TS 36.331 [2]. | YES | ignore |
| requestedP-MaxFR1 | O | | OCTET STRING | requestedP-MaxFR1, as defined in TS 38.331 [16]. | YES | ignore |

9.3.1.58 DU to CU RRC Information

This IE contains the RRC Information that are sent from the ng-eNB-DU to the ng-eNB-CU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
|--------------------------------|----------|-------|-----------------------|--|-------------|----------------------|
| RadioResourceConfigDedicated | M | | OCTET STRING | RadioResourceConfigDedicated, as defined in TS 36.331 [2]. | | |
| MeasGapConfig | O | | OCTET STRING | MeasGapConfig as defined in TS 36.331 [2]. | | |
| Requested P-MaxFR1 | O | | OCTET STRING | requestedP-MaxFR1, as defined in TS 36.331 [2]. | | |
| DRX Long Cycle Start Offset | O | | INTEGER (0..10239) | Identical to the value of the drx-LongCycleStartOffset IE within the DRX-Config as defined in TS 36.331 [2]. | | |
| Selected BandCombinationIndex | O | | OCTET STRING | BandCombinationIndex, as defined in TS 38.331 [16]. | YES | ignore |
| Selected FeatureSetEntryIndex | O | | OCTET STRING | FeatureSetEntryIndex, as defined in TS 38.331 [16]. | YES | ignore |
| Ph-InfoSCG | O | | OCTET STRING | PH-TypeListSCG, as defined in TS 38.331[16]. | Yes | ignore |
| Requested BandCombinationIndex | O | | OCTET STRING | BandCombinationIndex, as defined in TS 38.331 [16]. This IE is used for the ng-eNB-DU to request a new Band Combination. | YES | ignore |
| Requested FeatureSetEntryIndex | O | | OCTET STRING | FeatureSetEntryIndex, as defined in TS 38.331 [16]. This IE is used for the ng-eNB-DU to request a new Feature Set. | YES | ignore |
| DRX Config | O | | OCTET STRING | DRX-Config, as defined in TS 36.331 [2]. | YES | ignore |

9.3.1.59 E-UTRA Transmission Bandwidth

This IE is used to indicate the E-UTRA UL or DL transmission bandwidth expressed in units of resource blocks "N_{RB}" (TS 36.104 [14]). The values bw1, bw6, bw15, bw25, bw50, bw75, bw100 correspond to the number of resource blocks "N_{RB}" 1, 6, 15, 25, 50, 75, 100.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
|-------------------------------|----------|-------|---|-----------------------|
| E-UTRA Transmission Bandwidth | M | | ENUMERATED (bw1, bw6, bw15, bw25, bw50, bw75, bw100,...) | |

9.3.1.60 Number of Broadcasts Requested

This IE indicates the number of times a message is to be broadcast.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--------------------------------|----------|-------|-----------------------|-----------------------|
| Number of Broadcasts Requested | M | | INTEGER (0..65535) | |

9.3.1.61 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the ng-eNB-DU or the ng-eNB-CU when parts of a received message have not been comprehended or were missing, or if the message contained logical errors. When applicable, it contains information about which IEs were not comprehended or were missing.

For further details on how to use the *Criticality Diagnostics* IE, (see clause 10). The conditions for inclusion of the *Transaction ID* IE are described in clause 10.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|--|----------|----------------------|--|---|
| Procedure Code | O | | INTEGER (0..255) | Procedure Code is to be used if Criticality Diagnostics is part of Error Indication procedure, and not within the response message of the same procedure that caused the error. |
| Triggering Message | O | | ENUMERATED(initiating message, successful outcome, unsuccessful outcome) | The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure. |
| Procedure Criticality | O | | ENUMERATED(reject, ignore, notify) | This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure). |
| Transaction ID | O | | 9.3.1.23 | |
| Information Element Criticality Diagnostics | | 0 .. <maxnoofErrors> | | |
| >IE Criticality | M | | ENUMERATED(reject, ignore, notify) | The IE Criticality is used for reporting the criticality of the triggering IE. The value 'ignore' is not applicable. |
| >IE ID | M | | INTEGER (0..65535) | The IE ID of the not understood or missing IE. |
| >Type of Error | M | | ENUMERATED(not understood, missing, ...) | |

| Range bound | Explanation |
|---------------|--|
| maxnoofErrors | Maximum no. of IE errors allowed to be reported with a single message. The value for maxnoofErrors is 256. |

9.3.1.62 Cell Type

This IE provides the cell coverage area.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|---|-----------------------|
| Cell Size | M | | ENUMERATED (verysmall, small, medium, large, ...) | |

9.3.1.63 UE Identity Index value

The *UE Identity Index value* IE is used by the eNB to calculate the Paging Frame TS 36.304 [20].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|--------------------------|--|
| UE Identity Index Value | M | | BIT STRING (SIZE(10)) | Coded as specified in TS 36.304 [20]. |

9.3.1.64 RAN UE Paging identity

This IE indicates the RAN UE Paging identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|-----------------------|-----------------------|
| I-RNTI | M | | BIT STRING (SIZE(40)) | |

9.3.1.65 CN UE Paging Identity

The 5G-S-TMSI is used as UE identifier for CN paging.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------------------|----------|-------|-----------------------|---|
| CHOICE <i>CN UE paging identity</i> | M | | | |
| >5G-S-TMSI | | | | |
| >>5G-S-TMSI | M | | BIT STRING (SIZE(48)) | Details defined in TS 38.413 [19] |

9.3.1.66 Paging DRX

This IE indicates the Paging DRX as defined in TS 36.304 [20].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|--------------------------------------|-----------------------|
| Paging DRX | M | | ENUMERATED(32, 64, 128, 256, ...) | Unit in radio frame. |

9.3.2 Transport Network Layer Related IEs

9.3.2.1 UP Transport Layer Information

The *UP Transport Layer Information* IE identifies a W1 transport bearer associated to a DRB. It contains a Transport Layer Address and a GTP Tunnel Endpoint Identifier. The Transport Layer Address is an IP address to be used for the W1 user plane transport. The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between ng-eNB-CU and ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|------------------------------------|----------|-------|-----------------------|-----------------------|
| CHOICE Transport Layer Information | M | | | |
| >GTP Tunnel | | | | |
| >>Transport Layer Address | M | | 9.3.2.3 | |
| >>GTP-TEID | M | | 9.3.2.2 | |

9.3.2.2 GTP-TEID

The *GTP-TEID* IE is the GTP Tunnel Endpoint Identifier to be used for the user plane transport between the ng-eNB-CU and ng-eNB-DU.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|---------------|----------|-------|------------------------|--|
| GTP-TEID | M | | OCTET STRING (SIZE(4)) | For details and range, see TS 29.281 [17]. |

9.3.2.3 Transport Layer Address

This *Transport Layer Address* IE is an IP address.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
|-------------------------|----------|-------|--------------------------------|---|
| Transport Layer Address | M | | BIT STRING (SIZE(1..160, ...)) | The Radio Network Layer is not supposed to interpret the address information. It should pass it to the Transport Layer for interpretation. For details, see TS 38.414 [18]. |

9.4 Message and Information Element Abstract Syntax (with ASN.1)

9.4.1 General

W1AP ASN.1 definition conforms to ITU-T Recommendation X.691 [21], ITU-T Recommendation X.680 [22] and ITU-T Recommendation X.681 [23].

The ASN.1 definition specifies the structure and content of W1AP messages. W1AP messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct a W1AP message according to the PDU definitions module and with the following additional rules:

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.
- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e., an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list where the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

NOTE: In the above "IE" means an IE in the object set with an explicit ID. If one IE needs to appear more than once in one object set, then the different occurrences will have different IE IDs.

If a W1AP message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in clause 10.

9.4.2 Usage of private message mechanism for non-standard use

The private message mechanism for non-standard use may be used:

- for special operator- (and/or vendor) specific features considered not to be part of the basic functionality, i.e., the functionality required for a complete and high-quality specification in order to guarantee multivendor interoperability;
- by vendors for research purposes, e.g., to implement and evaluate new algorithms/features before such features are proposed for standardisation.

The private message mechanism shall not be used for basic functionality. Such functionality shall be standardised.

9.4.3 Elementary Procedure Definitions

```
-- ASN1START
-- *****
--
-- Elementary Procedure definitions
--
-- *****

W1AP-PDU-Descriptions {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlap (3) version1 (1) wlap-PDU-Descriptions (0)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    Criticality,
    ProcedureCode

FROM W1AP-CommonDataTypes
    Reset,
    ResetAcknowledge,
    W1SetupRequest,
    W1SetupResponse,
    W1SetupFailure,
    NGENBDUConfigurationUpdate,
    NGENBDUConfigurationUpdateAcknowledge,
    NGENBDUConfigurationUpdateFailure,
    NGENBCUConfigurationUpdate,
    NGENBCUConfigurationUpdateAcknowledge,
    NGENBCUConfigurationUpdateFailure,
    UEContextSetupRequest,
    UEContextSetupResponse,
    UEContextSetupFailure,
    UEContextReleaseCommand,
    UEContextReleaseComplete,
    UEContextModificationRequest,
    UEContextModificationResponse,
    UEContextModificationFailure,
    UEContextModificationRequired,
    UEContextModificationConfirm,
    ErrorIndication,
    UEContextReleaseRequest,
    DLRRCMMessageTransfer,
    ULRRCMMessageTransfer,
    NGENBDUResourceCoordinationRequest,
    NGENBDUResourceCoordinationResponse,
    PrivateMessage,
    UEInactivityNotification,
```

```

    InitialULRRCTestTransfer,
    Paging,
    Notify,
    WriteReplaceWarningRequest,
    WriteReplaceWarningResponse,
    PWSCancelRequest,
    PWSCancelResponse,
    PWSRestartIndication,
    PWSFailureIndication,
    NGENBDUStatusIndication,
    UEContextModificationRefuse

FROM W1AP-PDU-Contents
    id-Reset,
    id-W1Setup,
    id-ngeNBDCOnfigurationUpdate,
    id-ngeNBCUCOnfigurationUpdate,
    id-UEContextSetup,
    id-UEContextRelease,
    id-UEContextModification,
    id-UEContextModificationRequired,
    id-ErrorIndication,
    id-UEContextReleaseRequest,
    id-DLRRCTestTransfer,
    id-ULRRCTestTransfer,
    id-NGENBDUResourceCoordination,
    id-privateMessage,
    id-UEInactivityNotification,
    id-InitialULRRCTestTransfer,
    id-Paging,
    id-Notify,
    id-WriteReplaceWarning,
    id-PWSCancel,
    id-PWSRestartIndication,
    id-PWSFailureIndication,
    id-NGENBDUStatusIndication

FROM W1AP-Constants
    ProtocolIE-SingleContainer{},
    W1AP-PROTOCOL-IES

FROM W1AP-Containers;

-- *****
--
-- Interface Elementary Procedure Class
--
-- *****

W1AP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage          ,
    &SuccessfulOutcome          ,          OPTIONAL,
    &UnsuccessfulOutcome        ,          OPTIONAL,
    &procedureCode              ProcedureCode  UNIQUE,
    &criticality                 Criticality   DEFAULT ignore
}
WITH SYNTAX {
    INITIATING MESSAGE          &InitiatingMessage
    [SUCCESSFUL OUTCOME        &SuccessfulOutcome]
    [UNSUCCESSFUL OUTCOME     &UnsuccessfulOutcome]
    PROCEDURE CODE             &procedureCode
    [CRITICALITY               &criticality]
}

-- *****
--
-- Interface PDU Definition
--
-- *****

W1AP-PDU ::= CHOICE {
    initiatingMessage    InitiatingMessage,
    successfulOutcome    SuccessfulOutcome,
    unsuccessfulOutcome  UnsuccessfulOutcome
}

```

```

InitiatingMessage ::= SEQUENCE {
    procedureCode    W1AP-ELEMENTARY-PROCEDURE.&procedureCode    ( {W1AP-ELEMENTARY-PROCEDURES} ),
    criticality      W1AP-ELEMENTARY-PROCEDURE.&criticality      ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} ),
    value           W1AP-ELEMENTARY-PROCEDURE.&InitiatingMessage ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} )
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode    W1AP-ELEMENTARY-PROCEDURE.&procedureCode    ( {W1AP-ELEMENTARY-PROCEDURES} ),
    criticality      W1AP-ELEMENTARY-PROCEDURE.&criticality      ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} ),
    value           W1AP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} )
}

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode    W1AP-ELEMENTARY-PROCEDURE.&procedureCode    ( {W1AP-ELEMENTARY-PROCEDURES} ),
    criticality      W1AP-ELEMENTARY-PROCEDURE.&criticality      ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} ),
    value           W1AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ( {W1AP-ELEMENTARY-
PROCEDURES}{@procedureCode} )
}

-- *****
--
-- Interface Elementary Procedure List
--
-- *****

W1AP-ELEMENTARY-PROCEDURES W1AP-ELEMENTARY-PROCEDURE ::= {
    W1AP-ELEMENTARY-PROCEDURES-CLASS-1 |
    W1AP-ELEMENTARY-PROCEDURES-CLASS-2,
    ...
}

W1AP-ELEMENTARY-PROCEDURES-CLASS-1 W1AP-ELEMENTARY-PROCEDURE ::= {
    reset |
    w1Setup |
    ngeNBDUConfigurationUpdate |
    ngeNBCUConfigurationUpdate |
    uEContextSetup |
    uEContextRelease |
    uEContextModification |
    uEContextModificationRequired |
    writeReplaceWarning |
    pWSCancel |
    ngeNBDUResourceCoordination |
    ,
    ...
}

W1AP-ELEMENTARY-PROCEDURES-CLASS-2 W1AP-ELEMENTARY-PROCEDURE ::= {
    errorIndication |
    uEContextReleaseRequest |
    dLRRCMMessageTransfer |
    uLRRCMMessageTransfer |
    uEInactivityNotification |
    privateMessage |
    initialULRRCMMessageTransfer |
    paging |
    notify |
    pWSRestartIndication |
    pWSFailureIndication |
    ngeNBDUStatusIndication |
    ,
    ...
}

-- *****
--
-- Interface Elementary Procedures
--
-- *****

reset W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Reset
    SUCCESSFUL OUTCOME      ResetAcknowledge
    PROCEDURE CODE          id-Reset
}

```

```

    CRITICALITY          reject
  }

w1Setup W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    W1SetupRequest
  SUCCESSFUL OUTCOME    W1SetupResponse
  UNSUCCESSFUL OUTCOME W1SetupFailure
  PROCEDURE CODE        id-W1Setup
  CRITICALITY          reject
}

ngeNBDUConfigurationUpdate W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    NGENBDUConfigurationUpdate
  SUCCESSFUL OUTCOME    NGENBDUConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME NGENBDUConfigurationUpdateFailure
  PROCEDURE CODE        id-ngeNBDUConfigurationUpdate
  CRITICALITY          reject
}

ngeNBCUConfigurationUpdate W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    NGENBCUConfigurationUpdate
  SUCCESSFUL OUTCOME    NGENBCUConfigurationUpdateAcknowledge
  UNSUCCESSFUL OUTCOME NGENBCUConfigurationUpdateFailure
  PROCEDURE CODE        id-ngeNBCUConfigurationUpdate
  CRITICALITY          reject
}

ueContextSetup W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    UEContextSetupRequest
  SUCCESSFUL OUTCOME    UEContextSetupResponse
  UNSUCCESSFUL OUTCOME UEContextSetupFailure
  PROCEDURE CODE        id-UEContextSetup
  CRITICALITY          reject
}

ueContextRelease W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    UEContextReleaseCommand
  SUCCESSFUL OUTCOME    UEContextReleaseComplete
  PROCEDURE CODE        id-UEContextRelease
  CRITICALITY          reject
}

ueContextModification W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    UEContextModificationRequest
  SUCCESSFUL OUTCOME    UEContextModificationResponse
  UNSUCCESSFUL OUTCOME UEContextModificationFailure
  PROCEDURE CODE        id-UEContextModification
  CRITICALITY          reject
}

ueContextModificationRequired W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    UEContextModificationRequired
  SUCCESSFUL OUTCOME    UEContextModificationConfirm
  UNSUCCESSFUL OUTCOME UEContextModificationRefuse
  PROCEDURE CODE        id-UEContextModificationRequired
  CRITICALITY          reject
}

writeReplaceWarning W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    WriteReplaceWarningRequest
  SUCCESSFUL OUTCOME    WriteReplaceWarningResponse
  PROCEDURE CODE        id-WriteReplaceWarning
  CRITICALITY          reject
}

pWSCancel W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    PWSCancelRequest
  SUCCESSFUL OUTCOME    PWSCancelResponse
  PROCEDURE CODE        id-PWSCancel
  CRITICALITY          reject
}

errorIndication W1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE    ErrorIndication
  PROCEDURE CODE        id-ErrorIndication
  CRITICALITY          ignore
}

```

```

ueContextReleaseRequest W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEContextReleaseRequest
    PROCEDURE CODE          id-UEContextReleaseRequest
    CRITICALITY             ignore
}

initialULRRCTestMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      InitialULRRCTestMessageTransfer
    PROCEDURE CODE          id-InitialULRRCTestMessageTransfer
    CRITICALITY             ignore
}

dlRRCTestMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DLRRCTestMessageTransfer
    PROCEDURE CODE          id-DLRRCTestMessageTransfer
    CRITICALITY             ignore
}

ulRRCTestMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ULRRCTestMessageTransfer
    PROCEDURE CODE          id-ULRRCTestMessageTransfer
    CRITICALITY             ignore
}

ueInactivityNotification W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      UEInactivityNotification
    PROCEDURE CODE          id-UEInactivityNotification
    CRITICALITY             ignore
}

ngenBDUResourceCoordination W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      NGENBDUResourceCoordinationRequest
    SUCCESSFUL OUTCOME      NGENBDUResourceCoordinationResponse
    PROCEDURE CODE          id-NGENBDUResourceCoordination
    CRITICALITY             reject
}

privateMessage W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PrivateMessage
    PROCEDURE CODE          id-privateMessage
    CRITICALITY             ignore
}

paging W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Paging
    PROCEDURE CODE          id-Paging
    CRITICALITY             ignore
}

notify W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Notify
    PROCEDURE CODE          id-Notify
    CRITICALITY             ignore
}

pWSRestartIndication W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PWSRestartIndication
    PROCEDURE CODE          id-PWSRestartIndication
    CRITICALITY             ignore
}

pWSFailureIndication W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      PWSFailureIndication
    PROCEDURE CODE          id-PWSFailureIndication
    CRITICALITY             ignore
}

ngenBDUStatusIndication W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      NGENBDUStatusIndication
    PROCEDURE CODE          id-NGENBDUStatusIndication
    CRITICALITY             ignore
}

```



```
END
-- ASN1STOP
```

9.4.4 PDU Definitions

```
-- ASN1START
-- *****
--
-- PDU definitions for Wlap.
--
-- *****

Wlap-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlap (3) version1 (1) wlap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    Candidate-SpCell-Item,
    Cause,
    Cells-Failed-to-be-Activated-List-Item,
    Cells-Status-Item,
    Cells-to-be-Activated-List-Item,
    Cells-to-be-Deactivated-List-Item,
    C-RNTI,
    CriticalityDiagnostics,
    CUtoDURRCInformation,
    DRB-Activity-Item,
    DRBID,
    DRBs-FailedToBeModified-Item,
    DRBs-FailedToBeSetup-Item,
    DRBs-FailedToBeSetupMod-Item,
    DRB-Notify-Item,
    DRBs-ModifiedConf-Item,
    DRBs-Modified-Item,
    DRBs-Required-ToBeModified-Item,
    DRBs-Required-ToBeReleased-Item,
    DRBs-Setup-Item,
    DRBs-SetupMod-Item,
    DRBs-ToBeModified-Item,
    DRBs-ToBeReleased-Item,
    DRBs-ToBeSetup-Item,
    DRBs-ToBeSetupMod-Item,
    DRXCycle,
    DUtoCURRCInformation,
    EUTRANQoS,
    NGENB-CU-UE-Wlap-ID,
    NGENB-DU-UE-Wlap-ID,
    NGENB-DU-ID,
    NGENB-DU-Served-Cells-Item,
    NGENB-DU-System-Information,
    InactivityMonitoringRequest,
    InactivityMonitoringResponse,
    NotificationControl,
    EUTRANCGI,
    EUTRANPCI,
    Potential-SpCell-Item,
    RAT-FrequencyPriorityInformation,
    ResourceCoordinationTransferContainer,
    RRCContainer,
    RRCReconfigurationCompleteIndicator,
    SCellIndex,
    SCell-ToBeRemoved-Item,
    SCell-ToBeSetup-Item,
    SCell-ToBeSetupMod-Item,
    SCell-FailedtoSetup-Item,
    SCell-FailedtoSetupMod-Item,
```

ServCellIndex,
 Served-Cell-Information,
 Served-Cells-To-Add-Item,
 Served-Cells-To-Delete-Item,
 Served-Cells-To-Modify-Item,
 SRBID,
 SRBs-FailedToBeSetup-Item,
 SRBs-FailedToBeSetupMod-Item,
 SRBs-Required-ToBeReleased-Item,
 SRBs-ToBeReleased-Item,
 SRBs-ToBeSetup-Item,
 SRBs-ToBeSetupMod-Item,
 SRBs-Modified-Item,
 SRBs-Setup-Item,
 SRBs-SetupMod-Item,
 TransactionID,
 TransmissionActionIndicator,
 DUtoCURRCContainer,
 PagingCell-Item,
 UEIdentityIndexValue,
 UE-associatedLogicalWl-ConnectionItem,
 PagingDRX,
 PagingIdentity,
 PWSSystemInformation,
 Broadcast-To-Be-Cancelled-Item,
 Cells-Broadcast-Cancelled-Item,
 E-UTRAN-CGI-List-For-Restart-Item,
 PWS-Failed-E-UTRAN-CGI-Item,
 RepetitionPeriod,
 NumberOfBroadcastRequest,
 Cells-To-Be-Broadcast-Item,
 Cells-Broadcast-Completed-Item,
 Cancel-all-Warning-Messages-Indicator,
 EUTRA-NR-CellResourceCoordinationReq-Container,
 EUTRA-NR-CellResourceCoordinationReqAck-Container,
 RequestType,
 PLMN-Identity,
 BitRate,
 NGENBDUOverloadInformation,
 ResourceCoordinationTransferInformation,
 Associated-SCell-Item,
 IgnoreResourceCoordinationRequestContainer

FROM W1AP-IEs

PrivateIE-Container{},
 ProtocolExtensionContainer{},
 ProtocolIE-Container{},
 ProtocolIE-ContainerPair{},
 ProtocolIE-SingleContainer{},
 W1AP-PRIVATE-IES,
 W1AP-PROTOCOL-EXTENSION,
 W1AP-PROTOCOL-IES,
 W1AP-PROTOCOL-IES-PAIR

FROM W1AP-Containers

id-Candidate-SpCell-List,
 id-Cause,
 id-Cancel-all-Warning-Messages-Indicator,
 id-Cells-Failed-to-be-Activated-List,
 id-Cells-Status-List,
 id-Cells-to-be-Activated-List,
 id-Cells-to-be-Deactivated-List,
 id-ConfirmedUEID,
 id-C-RNTI,
 id-CUtoDURRCInformation,
 id-CriticalityDiagnostics,
 id-DRB-Activity-List,
 id-DRBs-FailedToBeModified-List,
 id-DRBs-FailedToBeSetup-List,
 id-DRBs-FailedToBeSetupMod-List,
 id-DRBs-ModifiedConf-List,
 id-DRBs-Modified-List,
 id-DRB-Notify-List,
 id-DRBs-Required-ToBeModified-List,
 id-DRBs-Required-ToBeReleased-List,
 id-DRBs-Setup-List,

id-DRBs-SetupMod-List,
id-DRBs-ToBeModified-List,
id-DRBs-ToBeReleased-List,
id-DRBs-ToBeSetup-List,
id-DRBs-ToBeSetupMod-List,
id-DRXCycle,
id-DUtoCURRRCInformation,
id-ngeNB-CU-UE-WLAP-ID,
id-ngeNB-DU-UE-WLAP-ID,
id-ngeNB-DU-ID,
id-ngeNB-DU-Served-Cells-List,
id-InactivityMonitoringRequest,
id-InactivityMonitoringResponse,
id-oldngeNB-DU-UE-WLAP-ID,
id-Potential-SpCell-List,
id-RAT-FrequencyPriorityInformation,
id-ResetType,
id-ResourceCoordinationTransferContainer,
id-RRCContainer,
id-RRCReconfigurationCompleteIndicator,
id-SCell-FailedtoSetup-List,
id-SCell-FailedtoSetupMod-List,
id-SCell-ToBeRemoved-List,
id-SCell-ToBeSetup-List,
id-SCell-ToBeSetupMod-List,
id-Served-Cells-To-Add-List,
id-Served-Cells-To-Delete-List,
id-Served-Cells-To-Modify-List,
id-ServCellIndex,
id-SpCell-ID,
id-SRBID,
id-SRBs-FailedToBeSetup-List,
id-SRBs-FailedToBeSetupMod-List,
id-SRBs-Required-ToBeReleased-List,
id-SRBs-ToBeReleased-List,
id-SRBs-ToBeSetup-List,
id-SRBs-ToBeSetupMod-List,
id-SRBs-Modified-List,
id-SRBs-Setup-List,
id-SRBs-SetupMod-List,
id-TransactionID,
id-TransmissionActionIndicator,
id-UE-associatedLogicalW1-ConnectionListResAck,
id-DUtoCURRCCContainer,
id-EUTRANCGI,
id-PagingCell-List,
id-PagingDRX,
id-UEIdentityIndexValue,
id-PagingIdentity,
id-PWSSystemInformation,
id-RepetitionPeriod,
id-NumberOfBroadcastRequest,
id-Cells-To-Be-Broadcast-List,
id-Cells-Broadcast-Completed-List,
id-Broadcast-To-Be-Cancelled-List,
id-Cells-Broadcast-Cancelled-List,
id-E-UTRAN-CGI-List-For-Restart-List,
id-PWS-Failed-E-UTRAN-CGI-List,
id-EUTRA-NR-CellResourceCoordinationReq-Container,
id-EUTRA-NR-CellResourceCoordinationReqAck-Container,
id-RequestType,
id-ServingPLMN,
id-NGENB-DU-UE-AMBR-UL,
id-NGENBDUOverloadInformation,
id-ResourceCoordinationTransferInformation,
id-Associated-SCell-List,
id-IgnoreResourceCoordinationRequestContainer,
maxCellInngeNBDU,
maxnoofCandidateSpCells,
maxnoofDRBs,
maxnoofErrors,
maxnoofIndividualW1ConnectionsToReset,
maxnoofPotentialSpCells,
maxnoofSCells,
maxnoofSRBs,
maxnoofPagingCells,
maxnoofTNLAssociations,
maxCellInneNB,

```

maxnoofUEIDs

FROM WlAP-Constants;

-- *****
--
-- RESET ELEMENTARY PROCEDURE
--
-- *****
--
-- Reset
--
-- *****

Reset ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {ResetIEs} },
    ...
}

ResetIEs WlAP-PROTOCOL-IES ::= {
    { ID id-TransactionID    CRITICALITY reject  TYPE TransactionID    PRESENCE mandatory }|
    { ID id-Cause            CRITICALITY ignore  TYPE Cause                PRESENCE mandatory }|
    { ID id-ResetType       CRITICALITY reject  TYPE ResetType           PRESENCE mandatory },
    ...
}

ResetType ::= CHOICE {
    w1-Interface                ResetAll,
    partOfW1-Interface          UE-associatedLogicalW1-ConnectionListRes,
    choice-extension            ProtocolIE-SingleContainer { { ResetType-ExtIEs} }
}

ResetType-ExtIEs WlAP-PROTOCOL-IES ::= {
    ...
}

ResetAll ::= ENUMERATED {
    reset-all,
    ...
}

UE-associatedLogicalW1-ConnectionListRes ::= SEQUENCE (SIZE(1..
maxnoofIndividualW1ConnectionsToReset)) OF UE-associatedLogicalW1-ConnectionItem

-- *****
--
-- Reset Acknowledge
--
-- *****

ResetAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {ResetAcknowledgeIEs} },
    ...
}

ResetAcknowledgeIEs WlAP-PROTOCOL-IES ::= {
    { ID id-TransactionID    CRITICALITY reject  TYPE TransactionID    PRESENCE mandatory }|
    { ID id-UE-associatedLogicalW1-ConnectionListResAck    CRITICALITY ignore  TYPE UE-
associatedLogicalW1-ConnectionListResAck    PRESENCE optional },
    ...
}

UE-associatedLogicalW1-ConnectionListResAck ::= SEQUENCE (SIZE(1..
maxnoofIndividualW1ConnectionsToReset)) OF UE-associatedLogicalW1-ConnectionItem

-- *****
--
-- ERROR INDICATION ELEMENTARY PROCEDURE
--
-- *****

```

```

--
-- Error Indication
--
-- *****

ErrorIndication ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      {{ErrorIndicationIEs}},
    ...
}

ErrorIndicationIEs W1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-ngenB-CU-UE-W1AP-ID    CRITICALITY ignore  TYPE NGENB-CU-UE-W1AP-ID      PRESENCE optional }|
    { ID id-ngenB-DU-UE-W1AP-ID    CRITICALITY ignore  TYPE NGENB-DU-UE-W1AP-ID      PRESENCE optional }|
    { ID id-Cause                  CRITICALITY ignore  TYPE Cause                    PRESENCE mandatory }
},
...
}

-- *****
--
-- W1 SETUP ELEMENTARY PROCEDURE
--
-- *****

--
-- W1 Setup Request
--
-- *****

W1SetupRequest ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {W1SetupRequestIEs} },
    ...
}

W1SetupRequestIEs W1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-ngenB-DU-ID            CRITICALITY reject  TYPE NGENB-DU-ID            PRESENCE mandatory }|
    { ID id-ngenB-DU-Served-Cells-List  CRITICALITY reject  TYPE NGENB-DU-Served-Cells-List  PRESENCE optional },
    ...
}

NGENB-DU-Served-Cells-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF NGENB-DU-Served-Cells-Item

-- *****
--
-- W1 Setup Response
--
-- *****

W1SetupResponse ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {W1SetupResponseIEs} },
    ...
}

W1SetupResponseIEs W1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Cells-to-be-Activated-List  CRITICALITY reject  TYPE Cells-to-be-Activated-List  PRESENCE optional },
    ...
}

Cells-to-be-Activated-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Cells-to-be-Activated-List-Item

-- *****
--
-- W1 Setup Failure
--
-- *****

```

```

WlSetupFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {WlSetupFailureIEs} },
    ...
}

WlSetupFailureIEs WlAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Cause                  CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory }|
    ...
}

-- *****
--
-- NGENB-DU CONFIGURATION UPDATE ELEMENTARY PROCEDURE
--
-- *****
--
-- *****
--
-- NGENB-DU CONFIGURATION UPDATE
--
-- *****

NGENBDUConfigurationUpdate ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {NGENBDUConfigurationUpdateIEs} },
    ...
}

NGENBDUConfigurationUpdateIEs WlAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Served-Cells-To-Add-List  CRITICALITY reject  TYPE Served-Cells-To-Add-List  PRESENCE optional }|
    { ID id-Served-Cells-To-Modify-List CRITICALITY reject  TYPE Served-Cells-To-Modify-List PRESENCE optional }|
    { ID id-Served-Cells-To-Delete-List CRITICALITY reject  TYPE Served-Cells-To-Delete-List PRESENCE optional }|
    { ID id-Cells-Status-List        CRITICALITY reject  TYPE Cells-Status-List        PRESENCE optional }|
    { ID id-ngenB-DU-ID             CRITICALITY reject  TYPE NGENB-DU-ID             PRESENCE optional }|
    ...
}

Served-Cells-To-Add-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Served-Cells-To-Add-Item

Served-Cells-To-Modify-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Served-Cells-To-Modify-Item

Served-Cells-To-Delete-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Served-Cells-To-Delete-Item

Cells-Status-List ::= SEQUENCE (SIZE(0.. maxCellinngenBDU)) OF Cells-Status-Item

-- *****
--
-- NGENB-DU CONFIGURATION UPDATE ACKNOWLEDGE
--
-- *****

NGENBDUConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {NGENBDUConfigurationUpdateAcknowledgeIEs} },
    ...
}

NGENBDUConfigurationUpdateAcknowledgeIEs WlAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Cells-to-be-Activated-List  CRITICALITY reject  TYPE Cells-to-be-Activated-List  PRESENCE optional }|
    { ID id-Cells-to-be-Deactivated-List CRITICALITY reject  TYPE Cells-to-be-Deactivated-List PRESENCE optional }|
    ...
}

-- *****
--
-- NGENB-DU CONFIGURATION UPDATE FAILURE

```

```

--
-- *****
NGENBDUConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {NGENBDUConfigurationUpdateFailureIEs} },
    ...
}

NGENBDUConfigurationUpdateFailureIEs WAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE
    mandatory }|
    { ID id-Cause                  CRITICALITY ignore  TYPE Cause                  PRESENCE
    mandatory },
    ...
}

-- *****
--
-- NGENB-CU CONFIGURATION UPDATE ELEMENTARY PROCEDURE
--
-- *****
--
-- NGENB-CU CONFIGURATION UPDATE
--
-- *****

NGENBCUConfigurationUpdate ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { { NGENBCUConfigurationUpdateIEs } },
    ...
}

NGENBCUConfigurationUpdateIEs WAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-Cells-to-be-Activated-List  CRITICALITY reject  TYPE      Cells-to-be-Activated-List
      PRESENCE optional }|
    { ID id-Cells-to-be-Deactivated-List  CRITICALITY reject  TYPE      Cells-to-be-Deactivated-
    List
      PRESENCE optional },
    ...
}

Cells-to-be-Deactivated-List ::= SEQUENCE (SIZE(1.. maxCellInngeNBDU)) OF Cells-to-be-
Deactivated-List-Item

-- *****
--
-- NGENB-CU CONFIGURATION UPDATE ACKNOWLEDGE
--
-- *****

NGENBCUConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { { NGENBCUConfigurationUpdateAcknowledgeIEs } },
    ...
}

NGENBCUConfigurationUpdateAcknowledgeIEs WAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-Cells-Failed-to-be-Activated-List  CRITICALITY reject  TYPE Cells-Failed-to-be-
    Activated-List
      PRESENCE optional},
    ...
}

Cells-Failed-to-be-Activated-List ::= SEQUENCE (SIZE(1.. maxCellInngeNBDU)) OF Cells-Failed-to-be-
Activated-List-Item

-- *****
--
-- NGENB-CU CONFIGURATION UPDATE FAILURE
--
-- *****

NGENBCUConfigurationUpdateFailure ::= SEQUENCE {

```

```

    protocolIEs      ProtocolIE-Container      { { NGENBCUConfigurationUpdateFailureIEs } },
  ...
}

NGENBCUConfigurationUpdateFailureIEs WLAB-PROTOCOL-IES ::= {
  { ID id-TransactionID      CRITICALITY reject  TYPE TransactionID      PRESENCE
mandatory }|
  { ID id-Cause              CRITICALITY ignore  TYPE Cause                PRESENCE
mandatory }|,
  ...
}

-- *****
--
-- NGENB-DU RESOURCE COORDINATION REQUEST
--
-- *****

NGENBDUResourceCoordinationRequest ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container      {{NGENBDUResourceCoordinationRequest-IEs}},
  ...
}

NGENBDUResourceCoordinationRequest-IEs WLAB-PROTOCOL-IES ::= {
  { ID id-TransactionID      CRITICALITY reject  TYPE TransactionID      PRESENCE mandatory }|
  { ID id-RequestType        CRITICALITY reject  TYPE RequestType        PRESENCE mandatory }|
  { ID id-EUTRA-NR-CellResourceCoordinationReq-Container CRITICALITY reject  TYPE EUTRA-NR-
CellResourceCoordinationReq-Container      PRESENCE mandatory }|
  { ID id-IgnoreResourceCoordinationRequestContainer CRITICALITY reject  TYPE
IgnoreResourceCoordinationRequestContainer PRESENCE optional },
  ...
}

-- *****
--
-- NGENBDU RESOURCE COORDINATION RESPONSE
--
-- *****

NGENBDUResourceCoordinationResponse ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container      {{NGENBDUResourceCoordinationResponse-IEs}},
  ...
}

NGENBDUResourceCoordinationResponse-IEs WLAB-PROTOCOL-IES ::= {
  { ID id-TransactionID      CRITICALITY reject  TYPE TransactionID      PRESENCE mandatory }|
  { ID id-EUTRA-NR-CellResourceCoordinationReqAck-Container CRITICALITY reject  TYPE EUTRA-NR-
CellResourceCoordinationReqAck-Container    PRESENCE mandatory },
  ...
}

-- *****
--
-- UE Context Setup ELEMENTARY PROCEDURE
--
-- *****
--
-- UE CONTEXT SETUP REQUEST
--
-- *****

UEContextSetupRequest ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container      { { UEContextSetupRequestIEs } },
  ...
}

UEContextSetupRequestIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenB-CU-UE-WLAB-ID      CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
PRESENCE mandatory }|
  { ID id-ngenB-DU-UE-WLAB-ID      CRITICALITY ignore  TYPE NGENB-DU-UE-WLAB-ID
PRESENCE optional }|
  { ID id-SpCell-ID                CRITICALITY reject  TYPE EUTRANCGI
PRESENCE mandatory }|
}

```



```

    { ID id-ServCellIndex
      PRESENCE mandatory }|
    { ID id-CUtoDURRCInformation
      PRESENCE mandatory}|
    { ID id-Candidate-SpCell-List
      PRESENCE optional }|
    { ID id-DRXCycle
      PRESENCE optional }|
    { ID id-SCell-ToBeSetup-List
      PRESENCE optional }|
    { ID id-SRBs-ToBeSetup-List
      PRESENCE optional }|
    { ID id-DRBs-ToBeSetup-List
      PRESENCE optional }|
    { ID id-InactivityMonitoringRequest
      PRESENCE optional }|
    { ID id-RAT-FrequencyPriorityInformation
      PRESENCE optional }|
    { ID id-RRCContainer
      PRESENCE optional }|
    { ID id-ServingPLMN
      PRESENCE optional }|
    { ID id-NGENB-DU-UE-AMBR-UL
      PRESENCE conditional }|
    { ID id-ResourceCoordinationTransferInformation
      PRESENCE optional },
    ...
  }

```

Candidate-SpCell-List ::= SEQUENCE (SIZE(1..maxnoofCandidateSpCells)) OF Candidate-SpCell-Item

SCell-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF SCell-ToBeSetup-Item

SRBs-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-ToBeSetup-Item

DRBs-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-ToBeSetup-Item

```

-- *****
--
-- UE CONTEXT SETUP RESPONSE
--
-- *****

```

```

UEContextSetupResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container    { { UEContextSetupResponseIEs } },
  ...
}

```

```

UEContextSetupResponseIEs W1AP-PROTOCOL-IES ::= {
  { ID id-ngenB-CU-UE-W1AP-ID
    PRESENCE mandatory }|
  { ID id-ngenB-DU-UE-W1AP-ID
    PRESENCE mandatory }|
  { ID id-DUtoCURRCInformation
    PRESENCE mandatory }|
  { ID id-C-RNTI
    PRESENCE optional }|
  { ID id-ResourceCoordinationTransferContainer
    PRESENCE optional }|
  { ID id-DRBs-Setup-List
    PRESENCE optional }|
  { ID id-SRBs-FailedToBeSetup-List
    PRESENCE optional }|
  { ID id-DRBs-FailedToBeSetup-List
    PRESENCE optional }|
  { ID id-SCell-FailedtoSetup-List
    PRESENCE optional }|
  { ID id-InactivityMonitoringResponse
    PRESENCE optional }|
  { ID id-SRBs-Setup-List
    PRESENCE optional },
  ...
}

```

DRBs-Setup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-Setup-Item

```

SRBs-FailedToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-FailedToBeSetup-Item
DRBs-FailedToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-FailedToBeSetup-Item
SCell-FailedtoSetup-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF SCell-FailedtoSetup-Item
SRBs-Setup-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-Setup-Item

-- *****
--
-- UE CONTEXT SETUP FAILURE
--
-- *****

UEContextSetupFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { UEContextSetupFailureIEs } },
    ...
}

UEContextSetupFailureIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngenb-cu-ue-wlap-id          CRITICALITY reject  TYPE NGENB-CU-UE-WLAP-ID          PRESENCE mandatory }|
    { ID id-ngenb-du-ue-wlap-id          CRITICALITY ignore  TYPE NGENB-DU-UE-WLAP-ID          PRESENCE optional  }|
    { ID id-cause                         CRITICALITY ignore  TYPE Cause                         PRESENCE mandatory }|
    { ID id-potential-sp-cell-list        CRITICALITY ignore  TYPE Potential-SpCell-List        PRESENCE optional  },
    ...
}

Potential-SpCell-List ::= SEQUENCE (SIZE(0..maxnoofPotentialSpCells)) OF Potential-SpCell-Item

-- *****
--
-- UE Context Release Request ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- UE Context Release Request
--
-- *****

UEContextReleaseRequest ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      {{ UEContextReleaseRequestIEs}},
    ...
}

UEContextReleaseRequestIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngenb-cu-ue-wlap-id          CRITICALITY reject  TYPE NGENB-CU-UE-WLAP-ID          PRESENCE mandatory }|
    { ID id-ngenb-du-ue-wlap-id          CRITICALITY reject  TYPE NGENB-DU-UE-WLAP-ID          PRESENCE mandatory }|
    { ID id-cause                         CRITICALITY ignore  TYPE Cause                         PRESENCE mandatory },
    ...
}

-- *****
--
-- UE Context Release (ngenb-cu initiated) ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- UE CONTEXT RELEASE COMMAND
--
-- *****

UEContextReleaseCommand ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { UEContextReleaseCommandIEs } },
    ...
}

```

```

UEContextReleaseCommandIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenB-CU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
  PRESENCE mandatory }|
  { ID id-ngenB-DU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID
  PRESENCE mandatory }|
  { ID id-Cause                         CRITICALITY ignore  TYPE Cause
  PRESENCE mandatory }|
  { ID id-RRCContainer                  CRITICALITY ignore  TYPE RRCContainer
  PRESENCE optional }|
  { ID id-SRBID                         CRITICALITY ignore  TYPE SRBID
  PRESENCE optional }|
  { ID id-oldngenB-DU-UE-WLAB-ID       CRITICALITY ignore  TYPE NGENB-DU-UE-WLAB-ID
  PRESENCE optional },
  ...
}

-- *****
--
-- UE CONTEXT RELEASE COMPLETE
--
-- *****

UEContextReleaseComplete ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { { UEContextReleaseCompleteIEs } },
  ...
}

UEContextReleaseCompleteIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenB-CU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
  PRESENCE mandatory }|
  { ID id-ngenB-DU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID
  PRESENCE mandatory },
  ...
}

-- *****
--
-- UE Context Modification ELEMENTARY PROCEDURE
--
-- *****
--
-- UE CONTEXT MODIFICATION REQUEST
--
-- *****

UEContextModificationRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { { UEContextModificationRequestIEs } },
  ...
}

UEContextModificationRequestIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenB-CU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
  PRESENCE mandatory }|
  { ID id-ngenB-DU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID
  PRESENCE mandatory }|
  { ID id-SpCell-ID                   CRITICALITY ignore  TYPE EUTRANCGI
  PRESENCE optional }|
  { ID id-ServCellIndex                CRITICALITY reject  TYPE ServCellIndex
  PRESENCE optional }|
  { ID id-DRXCycle                     CRITICALITY ignore  TYPE DRXCycle
  PRESENCE optional }|
  { ID id-CUtoDURRCInformation         CRITICALITY reject  TYPE CUtoDURRCInformation
  PRESENCE optional }|
  { ID id-TransmissionActionIndicator CRITICALITY ignore  TYPE
  TransmissionActionIndicator PRESENCE optional }|
  { ID id-ResourceCoordinationTransferContainer CRITICALITY ignore  TYPE
  ResourceCoordinationTransferContainer PRESENCE optional }|
  { ID id-RRCReconfigurationCompleteIndicator CRITICALITY ignore  TYPE
  RRCReconfigurationCompleteIndicator PRESENCE optional }|
  { ID id-RRCContainer                 CRITICALITY reject  TYPE RRCContainer
  PRESENCE optional }|
  { ID id-SCell-ToBeSetupMod-List      CRITICALITY ignore  TYPE SCell-ToBeSetupMod-List
  PRESENCE optional }|
}

```

```

    { ID id-SCell-ToBeRemoved-List
      PRESENCE optional }|
    { ID id-SRBs-ToBeSetupMod-List
      PRESENCE optional }|
    { ID id-DRBs-ToBeSetupMod-List
      PRESENCE optional }|
    { ID id-DRBs-ToBeModified-List
      PRESENCE optional }|
    { ID id-SRBs-ToBeReleased-List
      PRESENCE optional }|
    { ID id-DRBs-ToBeReleased-List
      PRESENCE optional }|
    { ID id-InactivityMonitoringRequest
      PRESENCE optional }|
    { ID id-NGENB-DU-UE-AMBR-UL
      PRESENCE optional }|
    { ID id-RAT-FrequencyPriorityInformation
      PRESENCE optional }|
    { ID id-ResourceCoordinationTransferInformation
      PRESENCE optional }|
    ...
  }

```

SCell-ToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF SCell-ToBeSetupMod-Item

SCell-ToBeRemoved-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF SCell-ToBeRemoved-Item

SRBs-ToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-ToBeSetupMod-Item

DRBs-ToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-ToBeSetupMod-Item

DRBs-ToBeModified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-ToBeModified-Item

SRBs-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-ToBeReleased-Item

DRBs-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-ToBeReleased-Item

```

-- *****
--
-- UE CONTEXT MODIFICATION RESPONSE
--
-- *****

```

```

UEContextModificationResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container    { { UEContextModificationResponseIEs } },
  ...
}

```

```

UEContextModificationResponseIEs W1AP-PROTOCOL-IES ::= {
  { ID id-ngenb-cu-ue-wlap-id
    PRESENCE mandatory }|
  { ID id-ngenb-du-ue-wlap-id
    PRESENCE mandatory }|
  { ID id-ResourceCoordinationTransferContainer
    PRESENCE optional }|
  { ID id-DUtoCURRCInformation
    PRESENCE optional }|
  { ID id-DRBs-SetupMod-List
    PRESENCE optional }|
  { ID id-DRBs-Modified-List
    PRESENCE optional }|
  { ID id-SRBs-FailedToBeSetupMod-List
    PRESENCE optional }|
  { ID id-DRBs-FailedToBeSetupMod-List
    PRESENCE optional }|
  { ID id-SCell-FailedtoSetupMod-List
    PRESENCE optional }|
  { ID id-DRBs-FailedToBeModified-List
    PRESENCE optional }|
  { ID id-InactivityMonitoringResponse
    PRESENCE optional }|
  { ID id-C-RNTI
    PRESENCE optional }|
  { ID id-Associated-SCell-List
    PRESENCE optional }|
}

```

```

    { ID id-SRBs-SetupMod-List
      PRESENCE optional }|
    { ID id-SRBs-Modified-List
      PRESENCE optional },
    ...
  }

```

DRBs-SetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-SetupMod-Item

DRBs-Modified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-Modified-Item

SRBs-SetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-SetupMod-Item

SRBs-Modified-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-Modified-Item

DRBs-FailedToBeModified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-FailedToBeModified-Item

SRBs-FailedToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-FailedToBeSetupMod-Item

DRBs-FailedToBeSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-FailedToBeSetupMod-Item

SCell-FailedtoSetupMod-List ::= SEQUENCE (SIZE(1..maxnoofSCells)) OF SCell-FailedtoSetupMod-Item

Associated-SCell-List ::= SEQUENCE (SIZE(1.. maxnoofSCells)) OF Associated-SCell-Item

```

-- *****
--
-- UE CONTEXT MODIFICATION FAILURE
--
-- *****

```

```

UEContextModificationFailure ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container    { { UEContextModificationFailureIEs } },
  ...
}

```

```

UEContextModificationFailureIEs W1AP-PROTOCOL-IES ::= {
  { ID id-ngenb-cu-ue-wlap-id          CRITICALITY reject  TYPE NGENB-CU-UE-WLAP-ID
    PRESENCE mandatory }|
  { ID id-ngenb-du-ue-wlap-id          CRITICALITY reject  TYPE NGENB-DU-UE-WLAP-ID
    PRESENCE mandatory }|
  { ID id-cause                         CRITICALITY ignore  TYPE Cause
    PRESENCE mandatory },
  ...
}

```

```

-- *****
--
-- UE Context Modification Required (ngenb-du initiated) ELEMENTARY PROCEDURE
--
-- *****
--
-- UE CONTEXT MODIFICATION REQUIRED
--
-- *****

```

```

UEContextModificationRequired ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container    { { UEContextModificationRequiredIEs } },
  ...
}

```

```

UEContextModificationRequiredIEs W1AP-PROTOCOL-IES ::= {
  { ID id-ngenb-cu-ue-wlap-id          CRITICALITY reject  TYPE NGENB-CU-UE-WLAP-ID
    PRESENCE mandatory }|
  { ID id-ngenb-du-ue-wlap-id          CRITICALITY reject  TYPE NGENB-DU-UE-WLAP-ID
    PRESENCE mandatory }|
  { ID id-resourcecoordinationtransfercontainer  CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer
  PRESENCE optional }|
  { ID id-du-to-currc-information        CRITICALITY reject  TYPE
DutoCURRCInformation
  PRESENCE optional}|
  { ID id-drb-required-to-be-modified-list  CRITICALITY reject  TYPE DRBs-Required-
ToBeModified-List
  PRESENCE optional}|
}

```

```

    { ID id-SRBs-Required-ToBeReleased-List
ToBeReleased-List          PRESENCE optional}| CRITICALITY reject  TYPE SRBs-Required-
    { ID id-DRBs-Required-ToBeReleased-List
ToBeReleased-List          PRESENCE optional}| CRITICALITY reject  TYPE DRBs-Required-
    { ID id-Cause
                           PRESENCE mandatory }, CRITICALITY ignore  TYPE Cause
    ...
}

DRBs-Required-ToBeModified-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-Required-ToBeModified-
Item

DRBs-Required-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-Required-ToBeReleased-
Item

SRBs-Required-ToBeReleased-List ::= SEQUENCE (SIZE(1..maxnoofSRBs)) OF SRBs-Required-ToBeReleased-
Item

-- *****
--
-- UE CONTEXT MODIFICATION CONFIRM
--
-- *****

UEContextModificationConfirm ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { UEContextModificationConfirmIEs } },
    ...
}

UEContextModificationConfirmIEs WLAB-PROTOCOL-IES ::= {
    { ID id-ngenb-cu-ue-wlab-id
      PRESENCE mandatory }| CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
    { ID id-ngenb-du-ue-wlab-id
      PRESENCE mandatory }| CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID
    { ID id-ResourceCoordinationTransferContainer
      PRESENCE optional }| CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer
    { ID id-DRBs-ModifiedConf-List
      PRESENCE optional}| CRITICALITY ignore  TYPE DRBs-ModifiedConf-
List
    { ID id-RRCContainer
      PRESENCE optional }| CRITICALITY ignore  TYPE RRCContainer
    { ID id-ResourceCoordinationTransferInformation
      PRESENCE optional }| CRITICALITY ignore  TYPE
ResourceCoordinationTransferInformation
    ...
}

DRBs-ModifiedConf-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRBs-ModifiedConf-Item

-- *****
--
-- UE CONTEXT MODIFICATION REFUSE
--
-- *****

UEContextModificationRefuse ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { UEContextModificationRefuseIEs } },
    ...
}

UEContextModificationRefuseIEs WLAB-PROTOCOL-IES ::= {
    { ID id-ngenb-cu-ue-wlab-id
      PRESENCE mandatory }| CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID
    { ID id-ngenb-du-ue-wlab-id
      PRESENCE mandatory }| CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID
    { ID id-Cause
      PRESENCE mandatory }, CRITICALITY ignore  TYPE Cause
    ...
}

-- *****
--
-- WRITE-REPLACE WARNING ELEMENTARY PROCEDURE
--
-- *****

```

```

-- *****
--
-- Write-Replace Warning Request
--
-- *****

WriteReplaceWarningRequest ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {WriteReplaceWarningRequestIEs} },
    ...
}

WriteReplaceWarningRequestIEs Wlap-Protocol-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-PWSSystemInformation   CRITICALITY reject TYPE PWSSystemInformation
      PRESENCE mandatory }|
    { ID id-RepetitionPeriod       CRITICALITY reject TYPE RepetitionPeriod
      PRESENCE mandatory }|
    { ID id-NumberOfBroadcastRequest CRITICALITY reject TYPE NumberOfBroadcastRequest
      PRESENCE mandatory }|
    { ID id-Cells-To-Be-Broadcast-List CRITICALITY reject TYPE Cells-To-Be-Broadcast-List
      PRESENCE optional   },
    ...
}

Cells-To-Be-Broadcast-List ::= SEQUENCE (SIZE(1.. maxCellInNgeNBDU)) OF Cells-To-Be-Broadcast-Item

-- *****
--
-- Write-Replace Warning Response
--
-- *****

WriteReplaceWarningResponse ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {WriteReplaceWarningResponseIEs} },
    ...
}

WriteReplaceWarningResponseIEs Wlap-Protocol-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Cells-Broadcast-Completed-List CRITICALITY reject TYPE Cells-Broadcast-Completed-List
      PRESENCE optional   },
    ...
}

Cells-Broadcast-Completed-List ::= SEQUENCE (SIZE(1.. maxCellInNgeNBDU)) OF Cells-Broadcast-Completed-Item

-- *****
--
-- PWS CANCEL ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- PWS Cancel Request
--
-- *****

PWSCancelRequest ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {PWSCancelRequestIEs} },
    ...
}

PWSCancelRequestIEs Wlap-Protocol-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-NumberOfBroadcastRequest CRITICALITY reject TYPE NumberOfBroadcastRequest
      PRESENCE mandatory }|
    { ID id-Broadcast-To-Be-Cancelled-List CRITICALITY reject TYPE Broadcast-To-Be-Cancelled-List
      PRESENCE optional   }|
    { ID id-Cancel-all-Warning-Messages-Indicator CRITICALITY reject TYPE Cancel-all-Warning-
      Messages-Indicator PRESENCE optional   },
}

```

```

}
...
Broadcast-To-Be-Cancelled-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Broadcast-To-Be-
Cancelled-Item

-- *****
--
-- PWS Cancel Response
--
-- *****

PWSCancelResponse ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { {PWSCancelResponseIEs} },
    ...
}

PWSCancelResponseIEs WLAB-PROTOCOL-IES ::= {
    { ID id-TransactionID                CRITICALITY reject  TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-Cells-Broadcast-Cancelled-List CRITICALITY reject  TYPE Cells-Broadcast-Cancelled-List
      PRESENCE optional }|
    { ID id-CriticalityDiagnostics        CRITICALITY ignore  TYPE CriticalityDiagnostics
      PRESENCE optional } ,
    ...
}

Cells-Broadcast-Cancelled-List ::= SEQUENCE (SIZE(1.. maxCellinngenBDU)) OF Cells-Broadcast-
Cancelled-Item

-- *****
--
-- UE Inactivity Notification ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- UE Inactivity Notification
--
-- *****

UEInactivityNotification ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      {{ UEInactivityNotificationIEs}},
    ...
}

UEInactivityNotificationIEs WLAB-PROTOCOL-IES ::= {
    { ID id-ngenB-CU-UE-WLAP-ID                CRITICALITY reject  TYPE NGENB-CU-UE-WLAP-ID
      PRESENCE mandatory }|
    { ID id-ngenB-DU-UE-WLAP-ID                CRITICALITY reject  TYPE NGENB-DU-UE-WLAP-ID
      PRESENCE mandatory }|
    { ID id-DRB-Activity-List                   CRITICALITY reject  TYPE DRB-Activity-List
      PRESENCE mandatory } ,
    ...
}

DRB-Activity-List ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF DRB-Activity-Item

-- *****
--
-- Initial UL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- INITIAL UL RRC Message Transfer
--
-- *****

InitialULRRCTestMessageTransfer ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      {{ InitialULRRCTestMessageTransferIEs}},
    ...
}

```



```

InitialULRRRCMessageTransferIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenb-DU-UE-WLAB-ID          CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID    PRESENCE
  mandatory }|
  { ID id-EUTRANCGI                    CRITICALITY reject  TYPE EUTRANCGI           PRESENCE mandatory }|
  { ID id-C-RNTI                        CRITICALITY reject  TYPE C-RNTI              PRESENCE mandatory }|
  { ID id-RRCContainer                  CRITICALITY reject  TYPE RRCContainer        PRESENCE mandatory }|
  { ID id-DUtoCURRRCContainer           CRITICALITY reject  TYPE DUtoCURRRCContainer PRESENCE
  optional }|
  { ID id-TransactionID                 CRITICALITY ignore  TYPE TransactionID       PRESENCE mandatory },
  ...
}

-- *****
--
-- DL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- *****
--
-- *****
--
-- DL RRC Message Transfer
--
-- *****

DLRRRCMessageTransfer ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      {{ DLRRRCMessageTransferIEs}},
  ...
}

DLRRRCMessageTransferIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenb-CU-UE-WLAB-ID CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID    PRESENCE mandatory
  }|
  { ID id-ngenb-DU-UE-WLAB-ID CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID    PRESENCE mandatory
  }|
  { ID id-oldngenb-DU-UE-WLAB-ID
    PRESENCE optional }|
  { ID id-SRBID
    PRESENCE mandatory }|
  { ID id-RRCContainer
    PRESENCE mandatory },
  ...
}

-- *****
--
-- UL RRC Message Transfer ELEMENTARY PROCEDURE
--
-- *****
--
-- *****
--
-- UL RRC Message Transfer
--
-- *****

ULRRRCMessageTransfer ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      {{ ULRRRCMessageTransferIEs}},
  ...
}

ULRRRCMessageTransferIEs WLAB-PROTOCOL-IES ::= {
  { ID id-ngenb-CU-UE-WLAB-ID CRITICALITY reject  TYPE NGENB-CU-UE-WLAB-ID    PRESENCE mandatory
  }|
  { ID id-ngenb-DU-UE-WLAB-ID CRITICALITY reject  TYPE NGENB-DU-UE-WLAB-ID    PRESENCE mandatory
  }|
  { ID id-SRBID
    PRESENCE mandatory }|
  { ID id-RRCContainer
    PRESENCE mandatory },
  ...
}

-- *****
--
-- PRIVATE MESSAGE
--
-- *****

```

```

PrivateMessage ::= SEQUENCE {
    privateIEs      PrivateIE-Container {{PrivateMessage-IEs}},
    ...
}

PrivateMessage-IEs WlAP-PRIVATE-IES ::= {
    ...
}

-- *****
--
-- Paging PROCEDURE
--
-- *****
--
-- *****
--
-- Paging
--
-- *****

Paging ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      {{ PagingIEs}},
    ...
}

PagingIEs WlAP-PROTOCOL-IES ::= {
    { ID id-UEIdentityIndexValue      CRITICALITY reject  TYPE UEIdentityIndexValue      PRESENCE
    mandatory }|
    { ID id-PagingIdentity             CRITICALITY reject  TYPE PagingIdentity             PRESENCE
    mandatory }|
    { ID id-PagingDRX                  CRITICALITY ignore  TYPE PagingDRX                  PRESENCE
    optional }|
    { ID id-PagingCell-List            CRITICALITY ignore  TYPE PagingCell-list            PRESENCE
    mandatory },
    ...
}

PagingCell-list ::= SEQUENCE (SIZE(1.. maxnoofPagingCells)) OF PagingCell-Item

-- *****
--
-- Notify
--
-- *****

Notify ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      {{ NotifyIEs}},
    ...
}

NotifyIEs WlAP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-WlAP-ID        CRITICALITY reject  TYPE NGENB-CU-UE-WlAP-ID
    PRESENCE mandatory }|
    { ID id-ngeNB-DU-UE-WlAP-ID        CRITICALITY reject  TYPE NGENB-DU-UE-WlAP-ID
    PRESENCE mandatory }|
    { ID id-DRB-Notify-List            CRITICALITY reject  TYPE DRB-Notify-List
    PRESENCE mandatory },
    ...
}

DRB-Notify-List ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Notify-Item

-- *****
--
-- PWS RESTART INDICATION ELEMENTARY PROCEDURE
--
-- *****
--
-- *****
--
-- PWS Restart Indication
--

```

```
-- *****
PWSRestartIndication ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { { PWSRestartIndicationIEs } },
    ...
}

PWSRestartIndicationIEs WLAB-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID
      PRESENCE mandatory }|
    { ID id-E-UTRAN-CGI-List-For-Restart-List  CRITICALITY reject  TYPE E-UTRAN-CGI-List-For-
Restart-List  PRESENCE mandatory },
    ...
}

E-UTRAN-CGI-List-For-Restart-List ::= SEQUENCE (SIZE(1.. maxCellInngeNBDU))  OF E-UTRAN-CGI-
List-For-Restart-Item

-- *****
--
-- PWS FAILURE INDICATION ELEMENTARY PROCEDURE
--
-- *****
--
-- PWS Failure Indication
--
-- *****

PWSFailureIndication ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { { PWSFailureIndicationIEs } },
    ...
}

PWSFailureIndicationIEs WLAB-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE
mandatory }|
    { ID id-PWS-Failed-E-UTRAN-CGI-List  CRITICALITY reject  TYPE          PWS-Failed-E-UTRAN-CGI-List
PRESENCE optional },
    ...
}

PWS-Failed-E-UTRAN-CGI-List ::= SEQUENCE (SIZE(1.. maxCellInngeNBDU))  OF PWS-Failed-E-UTRAN-
CGI-Item

-- *****
--
-- ngeNB-DU STATUS INDICATION ELEMENTARY PROCEDURE
--
-- *****
--
-- ngeNB-DU Status Indication
--
-- *****

NGENBDUStatusIndication ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {NGENBDUStatusIndicationIEs } },
    ...
}

NGENBDUStatusIndicationIEs WLAB-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE
mandatory }|
    { ID id-NGENBDUOverloadInformation  CRITICALITY reject  TYPE NGENBDUOverloadInformation
PRESENCE mandatory },
    ...
}

END
-- ASN1STOP
```

9.4.5 Information Element Definitions

```

-- ASN1START
-- *****
--
-- Information Element Definitions
--
-- *****

WLAN-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlan (3) version1 (1) wlan-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    maxEARFCN,
    maxnoofErrors,
    maxnoofBPLMNs,
    maxnoofDLUP-TNLInformation,
    maxnoofE-UTRANCellBands,
    maxnoofULUP-TNLInformation,
    maxnoofQoSFlows,
    maxnoofSliceItems,
    maxnoofSIBTypes,
    maxCelllineNB,
    maxnoofExtendedBPLMNs,
    maxBandsEutra,
    maxnoofBPLMNsNRminus1

FROM WLAN-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage

FROM WLAN-CommonDataTypes

    ProtocolExtensionContainer {},
    WLAN-PROTOCOL-EXTENSION,
    ProtocolIE-SingleContainer {},
    WLAN-PROTOCOL-IES

FROM WLAN-Containers;

-- A

AllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel          PriorityLevel,
    pre-emptionCapability  Pre-emptionCapability,
    pre-emptionVulnerability Pre-emptionVulnerability,
    iE-Extensions         ProtocolExtensionContainer { {AllocationAndRetentionPriority-
ExtIEs} } OPTIONAL,
    ...
}

AllocationAndRetentionPriority-ExtIEs WLAN-PROTOCOL-EXTENSION ::= {
    ...
}

Associated-SCell-Item ::= SEQUENCE {
    sCell-ID              EUTRANCGI,
    iE-Extensions         ProtocolExtensionContainer { { Associated-SCell-ItemExtIEs } } OPTIONAL,
    ...
}

Associated-SCell-ItemExtIEs      WLAN-PROTOCOL-EXTENSION ::= {
    ...
}

AvailablePLMNList ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF AvailablePLMNList-Item

AvailablePLMNList-Item ::= SEQUENCE {
    plmnIdentity          PLMN-Identity,
    iE-Extensions         ProtocolExtensionContainer { { AvailablePLMNList-Item-ExtIEs } } OPTIONAL,

```

```

}
...
AvailablePLMNList-Item-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
}
...
AveragingWindow ::= INTEGER (0..4095, ...)

-- B
BitRate ::= INTEGER (0..4000000000000, ...)

BearerTypeChange ::= ENUMERATED {true, ...}

BPLMN-ID-Info-List ::= SEQUENCE (SIZE(1..maxnoofBPLMNsNRminus1)) OF BPLMN-ID-Info-Item

BPLMN-ID-Info-Item ::= SEQUENCE {
  pLMN-Identity-List AvailablePLMNList,
  extended-PLMN-Identity-List ExtendedAvailablePLMN-List OPTIONAL,
  fiveGS-TAC FiveGS-TAC OPTIONAL,
  eUTRA-Cell-ID EUTRA-Cell-ID,
  ranac RANAC OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { BPLMN-ID-Info-ItemExtIEs } } OPTIONAL,
  ...
}

BPLMN-ID-Info-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
}
...

Broadcast-To-Be-Cancelled-Item ::= SEQUENCE {
  eUTRANCGI EUTRANCGI,
  iE-Extensions ProtocolExtensionContainer { { Broadcast-To-Be-Cancelled-ItemExtIEs } }
  OPTIONAL,
  ...
}

Broadcast-To-Be-Cancelled-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
}
...

-- C
Cancel-all-Warning-Messages-Indicator ::= ENUMERATED {true, ...}

Candidate-SpCell-Item ::= SEQUENCE {
  candidate-SpCell-ID EUTRANCGI ,
  iE-Extensions ProtocolExtensionContainer { { Candidate-SpCell-ItemExtIEs } } OPTIONAL,
  ...
}

Candidate-SpCell-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
}
...

Cause ::= CHOICE {
  radioNetwork CauseRadioNetwork,
  transport CauseTransport,
  protocol CauseProtocol,
  misc CauseMisc,
  choice-extension ProtocolIE-SingleContainer { { Cause-ExtIEs } }
}

Cause-ExtIEs WLAB-PROTOCOL-IES ::= {
}
...

CauseMisc ::= ENUMERATED {
  control-processing-overload,
  not-enough-user-plane-processing-resources,
  hardware-failure,
  om-intervention,
  unspecified,
  ...
}

CauseProtocol ::= ENUMERATED {

```

```

    transfer-syntax-error,
    abstract-syntax-error-reject,
    abstract-syntax-error-ignore-and-notify,
    message-not-compatible-with-receiver-state,
    semantic-error,
    abstract-syntax-error-falsely-constructed-message,
    unspecified,
    ...
}

CauseRadioNetwork ::= ENUMERATED {
    unspecified,
    rl-failure-rlc,
    unknown-or-already-allocated-enb-cu-ue-wlap-id,
    unknown-or-already-allocated-enb-du-ue-wlap-id,
    unknown-or-inconsistent-pair-of-ue-wlap-id,
    interaction-with-other-procedure,
    not-supported-qci-Value,
    action-desirable-for-radio-reasons,
    no-radio-resources-available,
    procedure-cancelled,
    normal-release,
    cell-not-available,
    rl-failure-others,
    ue-rejection,
    resources-not-available-for-the-slice,
    amf-initiated-abnormal-release,
    release-due-to-pre-emption,
    multiple-drb-id-instances,
    unknown-drb-id,
    ...
}

CauseTransport ::= ENUMERATED {
    unspecified,
    transport-resource-unavailable,
    ...
}

CellGroupConfig ::= OCTET STRING

Cells-Failed-to-be-Activated-List-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    cause              Cause,
    iE-Extensions      ProtocolExtensionContainer { { Cells-Failed-to-be-Activated-List-
ItemExtIEs } } OPTIONAL,
    ...
}

Cells-Failed-to-be-Activated-List-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-Status-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    service-status      Service-Status,
    iE-Extensions      ProtocolExtensionContainer { { Cells-Status-ItemExtIEs } } OPTIONAL,
    ...
}

Cells-Status-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-To-Be-Broadcast-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    iE-Extensions      ProtocolExtensionContainer { { Cells-To-Be-Broadcast-ItemExtIEs } }
OPTIONAL,
    ...
}

Cells-To-Be-Broadcast-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-Broadcast-Completed-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,

```

```

    iE-Extensions      ProtocolExtensionContainer { { Cells-Broadcast-Completed-ItemExtIEs } }
    OPTIONAL,
    ...
}

Cells-Broadcast-Completed-ItemExtIEs    WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-Broadcast-Cancelled-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    numberOfBroadcasts NumberOfBroadcasts,
    iE-Extensions      ProtocolExtensionContainer { { Cells-Broadcast-Cancelled-ItemExtIEs } }
    OPTIONAL,
    ...
}

Cells-Broadcast-Cancelled-ItemExtIEs    WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-to-be-Activated-List-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    eUTRANPCI          EUTRANPCI                                OPTIONAL,
    ngeNB-CUSystemInformation NGENB-CUSystemInformation      OPTIONAL,
    availablePLMNList  AvailablePLMNList                    OPTIONAL,
    extendedAvailablePLMN-List ExtendedAvailablePLMN-List    OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { Cells-to-be-Activated-List-
ItemExtIEs } }    OPTIONAL,
    ...
}

Cells-to-be-Activated-List-ItemExtIEs    WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Cells-to-be-Deactivated-List-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    iE-Extensions      ProtocolExtensionContainer { { Cells-to-be-Deactivated-List-
ItemExtIEs } }    OPTIONAL,
    ...
}

Cells-to-be-Deactivated-List-ItemExtIEs    WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Cell-Type ::= ENUMERATED {
    verysmall,
    small,
    medium,
    large,
    ...
}

CNUEPagingIdentity ::= CHOICE {
    fiveG-S-TMSI      BIT STRING (SIZE(48)),
    choice-extension   ProtocolIE-SingleContainer { { CNUEPagingIdentity-ExtIEs } }
}

CNUEPagingIdentity-ExtIEs WLAB-PROTOCOL-IES ::= {
    ...
}

CriticalityDiagnostics ::= SEQUENCE {
    procedureCode      ProcedureCode                                OPTIONAL,
    triggeringMessage  TriggeringMessage                          OPTIONAL,
    procedureCriticality Criticality                                OPTIONAL,
    transactionID      TransactionID                              OPTIONAL,
    iEsCriticalityDiagnostics CriticalityDiagnostics-IE-List      OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer {{CriticalityDiagnostics-ExtIEs}}
    OPTIONAL,
    ...
}

CriticalityDiagnostics-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1.. maxnoofErrors)) OF CriticalityDiagnostics-IE-Item

CriticalityDiagnostics-IE-Item ::= SEQUENCE {
    iECriticality          Criticality,
    iE-ID                  ProtocolIE-ID,
    typeOfError            TypeOfError,
    iE-Extensions          ProtocolExtensionContainer {{CriticalityDiagnostics-IE-Item-ExtIEs}}
    OPTIONAL,
    ...
}

CriticalityDiagnostics-IE-Item-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

C-RNTI ::= INTEGER (0..65535, ...)

CUtoDURRCInformation ::= SEQUENCE {
    cG-ConfigInfo          CG-ConfigInfo          OPTIONAL,
    uE-CapabilityRAT-ContainerList UE-CapabilityRAT-ContainerList OPTIONAL,
    measConfig              MeasConfig              OPTIONAL,
    handoverPreparationInformation HandoverPreparationInformation OPTIONAL,
    radioResourceConfigDedicated RadioResourceConfigDedicated OPTIONAL,
    measurementTimingConfiguration MeasurementTimingConfiguration OPTIONAL,
    uEAssistanceInformation UEAssistanceInformation OPTIONAL,
    requestedP-MaxFR1       OCTET STRING           OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { CUtoDURRCInformation-ExtIEs} } OPTIONAL,
    ...
}

CUtoDURRCInformation-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- D

DLUPTNLInformation-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofDLUPTNLInformation)) OF
DLUPTNLInformation-ToBeSetup-Item

DLUPTNLInformation-ToBeSetup-Item ::= SEQUENCE {
    dLUPTNLInformation UPTransportLayerInformation ,
    iE-Extensions      ProtocolExtensionContainer { { DLUPTNLInformation-ToBeSetup-ItemExtIEs } }
    OPTIONAL,
    ...
}

DLUPTNLInformation-ToBeSetup-ItemExtIEs      W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Activity-Item ::= SEQUENCE {
    dRBID          DRBID,
    dRB-Activity   DRB-Activity          OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { DRB-Activity-ItemExtIEs } } OPTIONAL,
    ...
}

DRB-Activity-ItemExtIEs      W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Activity ::= ENUMERATED {active, not-active}

DRBID ::= INTEGER (1..32, ...)

DRBs-FailedToBeModified-Item ::= SEQUENCE {
    dRBID          DRBID,
    cause          Cause          OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { DRBs-FailedToBeModified-ItemExtIEs } }
    OPTIONAL,
    ...
}

DRBs-FailedToBeModified-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {

```



```

}
...
}
DRBs-FailedToBeSetup-Item ::= SEQUENCE {
    dRBID DRBID,
    cause Cause OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { DRBs-FailedToBeSetup-ItemExtIEs } } OPTIONAL,
    ...
}
DRBs-FailedToBeSetup-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-FailedToBeSetupMod-Item ::= SEQUENCE {
    dRBID DRBID,
    cause Cause OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { DRBs-FailedToBeSetupMod-ItemExtIEs } }
    OPTIONAL,
    ...
}
DRBs-FailedToBeSetupMod-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Information ::= SEQUENCE {
    dRB-QoS QoSFlowLevelQoSParameters,
    sNSSAI SNSSAI,
    notificationControl NotificationControl OPTIONAL,
    flows-Mapped-To-DRB-List Flows-Mapped-To-DRB-List,
    iE-Extensions ProtocolExtensionContainer { { DRB-Information-ItemExtIEs } } OPTIONAL
}
DRB-Information-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Modified-Item ::= SEQUENCE {
    dRBID DRBID,
    dLUPTNLInformation-ToBeSetup-List DLUPTNLInformation-ToBeSetup-List,
    rLC-Status RLC-Status OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { DRBs-Modified-ItemExtIEs } } OPTIONAL,
    ...
}
DRBs-Modified-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-ModifiedConf-Item ::= SEQUENCE {
    dRBID DRBID,
    dLUPTNLInformation-ToBeSetup-List DLUPTNLInformation-ToBeSetup-List,
    iE-Extensions ProtocolExtensionContainer { { DRBs-ModifiedConf-ItemExtIEs } } OPTIONAL,
    ...
}
DRBs-ModifiedConf-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Notify-Item ::= SEQUENCE {
    dRBID DRBID,
    notification-Cause Notification-Cause,
    iE-Extensions ProtocolExtensionContainer { { DRB-Notify-ItemExtIEs } } OPTIONAL,
    ...
}
DRB-Notify-ItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Required-ToBeModified-Item ::= SEQUENCE {
    dRBID DRBID,
    dLUPTNLInformation-ToBeSetup-List DLUPTNLInformation-ToBeSetup-List,
    rLC-Status RLC-Status OPTIONAL,

```

```

    iE-Extensions    ProtocolExtensionContainer { { DRBs-Required-ToBeModified-ItemExtIEs } }
    OPTIONAL,
    ...
}

DRBs-Required-ToBeModified-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Required-ToBeReleased-Item ::= SEQUENCE {
    dRBID            DRBID,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-Required-ToBeReleased-ItemExtIEs } }
    OPTIONAL,
    ...
}

DRBs-Required-ToBeReleased-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-Setup-Item ::= SEQUENCE {
    dRBID            DRBID,
    dLUPTNLInformation-ToBeSetup-List      DLUPTNLInformation-ToBeSetup-List,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-Setup-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-Setup-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-SetupMod-Item ::= SEQUENCE {
    dRBID            DRBID,
    dLUPTNLInformation-ToBeSetup-List      DLUPTNLInformation-ToBeSetup-List,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-SetupMod-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-SetupMod-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-ToBeModified-Item ::= SEQUENCE {
    dRBID            DRBID,
    qoSInformation    QoSInformation                OPTIONAL,
    uLUPTNLInformation-ToBeSetup-List      ULUPTNLInformation-ToBeSetup-List,
    dLPDCPSNLength    PDCPSNLength                OPTIONAL,
    uLPDCPSNLength    PDCPSNLength                OPTIONAL,
    bearerTypeChange  BearerTypeChange            OPTIONAL,
    rLCMode            RLCMode                    OPTIONAL,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-ToBeModified-
ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-ToBeModified-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-ToBeReleased-Item ::= SEQUENCE {
    dRBID            DRBID,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-ToBeReleased-ItemExtIEs } }    OPTIONAL,
    ...
}

DRBs-ToBeReleased-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBs-ToBeSetup-Item ::= SEQUENCE {
    dRBID            DRBID,
    qoSInformation    QoSInformation,
    uLUPTNLInformation-ToBeSetup-List      ULUPTNLInformation-ToBeSetup-List,
    rLCMode            RLCMode,
    dLPDCPSNLength    PDCPSNLength,
    uLPDCPSNLength    PDCPSNLength                OPTIONAL,
    iE-Extensions    ProtocolExtensionContainer { { DRBs-ToBeSetup-ItemExtIEs } }    OPTIONAL,

```

```

}
...
DRBs-ToBeSetup-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
}
...

DRBs-ToBeSetupMod-Item ::= SEQUENCE {
  drBID DRBID,
  qoSInformation QoSInformation,
  uLUPTNLInformation-ToBeSetup-List ULUPTNLInformation-ToBeSetup-List,
  rLCMode RLCMode,
  dLPDCPSNLength PDCPSNLength OPTIONAL,
  uLPDCPSNLength PDCPSNLength OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRBs-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
  ...
}

DRBs-ToBeSetupMod-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
}
...

DRXCycle ::= SEQUENCE {
  longDRXCycleLength LongDRXCycleLength,
  shortDRXCycleLength ShortDRXCycleLength OPTIONAL,
  shortDRXCycleTimer ShortDRXCycleTimer OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRXCycle-ExtIEs } } OPTIONAL,
  ...
}

DRXCycle-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
}
...

DRX-Config ::= OCTET STRING

DRX-LongCycleStartOffset ::= INTEGER (0..10239)

DUtoCURRCContainer ::= OCTET STRING

DUtoCURRCInformation ::= SEQUENCE {
  radioResourceConfigDedicated RadioResourceConfigDedicated,
  measGapConfig MeasGapConfig OPTIONAL,
  requestedP-MaxFR1 OCTET STRING OPTIONAL,
  drX-LongCycleStartOffset DRX-LongCycleStartOffset OPTIONAL,
  selectedBandCombinationIndex SelectedBandCombinationIndex OPTIONAL,
  selectedFeatureSetEntryIndex SelectedFeatureSetEntryIndex OPTIONAL,
  ph-InfoSCG Ph-InfoSCG OPTIONAL,
  requestedBandCombinationIndex RequestedBandCombinationIndex OPTIONAL,
  requestedFeatureSetEntryIndex RequestedFeatureSetEntryIndex OPTIONAL,
  drX-Config DRX-Config OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DUtoCURRCInformation-ExtIEs } } OPTIONAL,
  ...
}

DUtoCURRCInformation-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
}
...

Dynamic5QIDescriptor ::= SEQUENCE {
  qoSPriorityLevel INTEGER (1..127),
  packetDelayBudget PacketDelayBudget,
  packetErrorRate PacketErrorRate,
  fiveQI INTEGER (0..255, ...) OPTIONAL,
  delayCritical ENUMERATED {delay-critical, non-delay-critical} OPTIONAL,
  averagingWindow AveragingWindow OPTIONAL,
  maxDataBurstVolume MaxDataBurstVolume OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { Dynamic5QIDescriptor-ExtIEs } }
OPTIONAL,
  ...
}

Dynamic5QIDescriptor-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
  ...
}

```

```

}

-- E

Endpoint-IP-address-and-port ::=SEQUENCE {
    endpointIPAddress      TransportLayerAddress,
    iE-Extensions          ProtocolExtensionContainer { { Endpoint-IP-address-and-port-
ExtIes} } OPTIONAL,
    ...
}

Endpoint-IP-address-and-port-ExtIes WAP-PROTOCOL-EXTENSION ::= {
    ...
}

ExtendedServedPLMNs-List ::= SEQUENCE (SIZE(1.. maxnoofExtendedBPLMNs)) OF ExtendedServedPLMNs-Item

ExtendedServedPLMNs-Item ::= SEQUENCE {
    pLMN-Identity          PLMN-Identity,
    tAISliceSupportList    SliceSupportList    OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { ExtendedServedPLMNs-ItemExtIes} }
OPTIONAL,
    ...
}

ExtendedServedPLMNs-ItemExtIes WAP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-Cell-ID ::= BIT STRING (SIZE(28))

EUTRA-Coex-FDD-Info ::= SEQUENCE {
    uL-EUTRAARFCN          ExtendedEARFCN          OPTIONAL,
    dL-EUTRAARFCN          ExtendedEARFCN,
    uL-Transmission-Bandwidth    EUTRA-Transmission-Bandwidth    OPTIONAL,
    dL-Transmission-Bandwidth    EUTRA-Transmission-Bandwidth,
    iE-Extensions          ProtocolExtensionContainer { {EUTRA-Coex-FDD-Info-ExtIes} }
OPTIONAL,
    ...
}

EUTRA-Coex-FDD-Info-ExtIes WAP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-Coex-Mode-Info ::= CHOICE {
    fDD      EUTRA-Coex-FDD-Info,
    tDD      EUTRA-Coex-TDD-Info,
    ...
}

EUTRA-Coex-TDD-Info ::= SEQUENCE {
    eARFCN          ExtendedEARFCN,
    transmission-Bandwidth    EUTRA-Transmission-Bandwidth,
    subframeAssignment    EUTRA-SubframeAssignment,
    specialSubframe-Info    EUTRA-SpecialSubframe-Info,
    iE-Extensions          ProtocolExtensionContainer { {EUTRA-Coex-TDD-Info-ExtIes} }
OPTIONAL,
    ...
}

EUTRA-Coex-TDD-Info-ExtIes WAP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-CyclicPrefixDL ::= ENUMERATED {
    normal,
    extended,
    ...
}

EUTRA-CyclicPrefixUL ::= ENUMERATED {
    normal,
    extended,
    ...
}

EUTRA-PRACH-Configuration ::= SEQUENCE {
    rootSequenceIndex          INTEGER (0..837),

```

```

    zeroCorrelationIndex          INTEGER (0..15),
    highSpeedFlag                 BOOLEAN,
    prach-FreqOffset              INTEGER (0..94),
    prach-ConfigIndex             INTEGER (0..63)    OPTIONAL, -- present for TDD --
    iE-Extensions                 ProtocolExtensionContainer { {EUTRA-PRACH-Configuration-
ExtIEs} }    OPTIONAL,
    ...
}

EUTRA-PRACH-Configuration-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-SpecialSubframe-Info ::= SEQUENCE {
    specialSubframePatterns      EUTRA-SpecialSubframePatterns,
    cyclicPrefixDL               EUTRA-CyclicPrefixDL,
    cyclicPrefixUL               EUTRA-CyclicPrefixUL,
    iE-Extensions                ProtocolExtensionContainer { { EUTRA-SpecialSubframe-Info-ExtIEs} }
OPTIONAL,
    ...
}

EUTRA-SpecialSubframe-Info-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRA-SpecialSubframePatterns ::= ENUMERATED {
    ssp0,
    ssp1,
    ssp2,
    ssp3,
    ssp4,
    ssp5,
    ssp6,
    ssp7,
    ssp8,
    ssp9,
    ssp10,
    ...
}

EUTRA-SubframeAssignment ::= ENUMERATED {
    sa0,
    sa1,
    sa2,
    sa3,
    sa4,
    sa5,
    sa6,
    ...
}

EUTRA-Transmission-Bandwidth ::= ENUMERATED {
    bw1,
    bw6,
    bw15,
    bw25,
    bw50,
    bw75,
    bw100,
    ...
}

EUTRANQoS ::= SEQUENCE {
    qCI                           QCI,
    allocationAndRetentionPriority AllocationAndRetentionPriority,
    gbrQosInformation             GBR-QosInformation    OPTIONAL,
    iE-Extensions                 ProtocolExtensionContainer { { EUTRANQoS-ExtIEs} }    OPTIONAL,
    ...
}

EUTRANQoS-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ExtendedEARFCN ::= INTEGER (0..maxEARFCN)

```

```

EUTRA-NR-CellResourceCoordinationReq-Container ::= OCTET STRING

EUTRA-NR-CellResourceCoordinationReqAck-Container ::= OCTET STRING

EUTRAFreqInfo ::= SEQUENCE {
    eARFCN          INTEGER (0..maxEARFCN),
    freqBandListEutra SEQUENCE (SIZE(1..maxnoofE-UTRANCellBands)) OF FreqBandEutraItem,
    iE-Extensions  ProtocolExtensionContainer { { EUTRAFreqInfoExtIEs } } OPTIONAL,
    ...
}

EUTRAFreqInfoExtIEs      WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRANCGI ::= SEQUENCE {
    pLMN-Identity          PLMN-Identity,
    eUTRANCellIdentity    E-UTRANCellIdentity,
    iE-Extensions         ProtocolExtensionContainer { {EUTRANCGI-ExtIEs} } OPTIONAL,
    ...
}

EUTRANCGI-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

E-UTRAN-Mode-Info ::= CHOICE {
    fDD      FDD-Info,
    tDD      TDD-Info,
    choice-extension          ProtocolIE-SingleContainer { { E-UTRAN-Mode-Info-ExtIEs } }
}

E-UTRAN-Mode-Info-ExtIEs WLAB-PROTOCOL-IES ::= {
    ...
}

E-UTRANCellIdentity ::= BIT STRING (SIZE(28))

EUTRANPCI ::= INTEGER (0..503)

E-UTRAN-CGI-List-For-Restart-Item ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    iE-Extensions     ProtocolExtensionContainer { { E-UTRAN-CGI-List-For-Restart-ItemExtIEs } }
    OPTIONAL,
    ...
}

E-UTRAN-CGI-List-For-Restart-ItemExtIEs      WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

ExtendedAvailablePLMN-List ::= SEQUENCE (SIZE(1..maxnoofExtendedBPLMNs)) OF ExtendedAvailablePLMN-Item

ExtendedAvailablePLMN-Item ::= SEQUENCE {
    pLMNIdentity          PLMN-Identity,
    iE-Extensions         ProtocolExtensionContainer { { ExtendedAvailablePLMN-Item-ExtIEs } } OPTIONAL
}

ExtendedAvailablePLMN-Item-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

-- F

FDD-Info ::= SEQUENCE {
    uL-EUTRAFreqInfo          EUTRAFreqInfo,
    dL-EUTRAFreqInfo          EUTRAFreqInfo,
    uL-Transmission-Bandwidth Transmission-Bandwidth,
    dL-Transmission-Bandwidth Transmission-Bandwidth,
    iE-Extensions             ProtocolExtensionContainer { {FDD-Info-ExtIEs} } OPTIONAL,
    ...
}

FDD-Info-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

}

Flows-Mapped-To-DRB-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF Flows-Mapped-To-DRB-Item

Flows-Mapped-To-DRB-Item ::= SEQUENCE {
    qoSFlowIdentifier           QoSFlowIdentifier,
    qoSFlowLevelQoSParameters  QoSFlowLevelQoSParameters,
    qoSFlowMappingIndication   QoSFlowMappingIndication OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { Flows-Mapped-To-DRB-
ItemExtIEs} } OPTIONAL,
    ...
}

Flows-Mapped-To-DRB-ItemExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

FreqBandEutraItem ::= SEQUENCE {
    freqBandIndicatorEutra      INTEGER (1.. maxBandsEutra),
    iE-Extensions              ProtocolExtensionContainer { {FreqBandEutraItem-ExtIEs} } OPTIONAL,
    ...
}

FreqBandEutraItem-ExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

-- G

GBR-QoSInformation ::= SEQUENCE {
    e-RAB-MaximumBitrateDL      BitRate,
    e-RAB-MaximumBitrateUL      BitRate,
    e-RAB-GuaranteedBitrateDL   BitRate,
    e-RAB-GuaranteedBitrateUL   BitRate,
    iE-Extensions              ProtocolExtensionContainer { { GBR-QoSInformation-ExtIEs} }
OPTIONAL,
    ...
}

GBR-QoSInformation-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

GBR-QoSFlowInformation ::= SEQUENCE {
    maxFlowBitRateDownlink      BitRate,
    maxFlowBitRateUplink        BitRate,
    guaranteedFlowBitRateDownlink BitRate,
    guaranteedFlowBitRateUplink BitRate,
    maxPacketLossRateDownlink   MaxPacketLossRate OPTIONAL,
    maxPacketLossRateUplink     MaxPacketLossRate OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { GBR-QoSFlowInformation-ExtIEs} }
OPTIONAL,
    ...
}

GBR-QoSFlowInformation-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

NGENB-CUSystemInformation ::= SEQUENCE {
    sibtypetobeupdatedlist SEQUENCE (SIZE(1.. maxnoofSIBTypes)) OF SibtypetobeupdatedListItem,
    iE-Extensions          ProtocolExtensionContainer { { NGENB-CUSystemInformation-
ExtIEs} } OPTIONAL,
    ...
}

NGENB-CUSystemInformation-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

NGENB-CU-UE-WLAB-ID ::= INTEGER (0..4294967295)

NGENB-DU-UE-WLAB-ID ::= INTEGER (0..4294967295)

```

```

NGENB-DU-ID ::= INTEGER (0..68719476735)

NGENB-DU-Served-Cells-Item ::= SEQUENCE {
    served-Cell-Information    Served-Cell-Information,
    ngenB-DU-System-Information NGENB-DU-System-Information OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { NGENB-DU-Served-Cells-ItemExtIEs } }
    OPTIONAL,
    ...
}

NGENB-DU-Served-Cells-ItemExtIEs    WAP-PROTOCOL-EXTENSION ::= {
    ...
}

NGENB-DU-System-Information ::= SEQUENCE {
    mIB-message    MIB-message,
    sIB1-message   SIB1-message,
    sIB2-message   SIB2-message,
    sIB3-message   SIB3-message,
    sIB8-message   SIB8-message,
    sIB16-message  SIB16-message,
    iE-Extensions  ProtocolExtensionContainer { { NGENB-DU-System-Information-
ExtIEs } } OPTIONAL,
    ...
}

NGENB-DU-System-Information-ExtIEs WAP-PROTOCOL-EXTENSION ::= {
    ...
}

NGENBDUOverloadInformation ::= ENUMERATED {overloaded, not-overloaded}

GTP-TEID                ::= OCTET STRING (SIZE (4))

GTPTunnel                ::= SEQUENCE {
    transportLayerAddress TransportLayerAddress,
    gTP-TEID              GTP-TEID,
    iE-Extensions         ProtocolExtensionContainer { { GTPTunnel-ExtIEs } } OPTIONAL,
    ...
}

GTPTunnel-ExtIEs WAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- H

HandoverPreparationInformation ::= OCTET STRING

-- I
IgnoreResourceCoordinationRequestContainer ::= ENUMERATED { true,...}

InactivityMonitoringRequest ::= ENUMERATED { true,...}

InactivityMonitoringResponse ::= ENUMERATED { not-supported,...}

-- J

-- K

-- L

LongDRXCycleLength ::= ENUMERATED
{ms10, ms20, ms32, ms40, ms60, ms64, ms80, ms128, ms160, ms256, ms320, ms512, ms640, ms1024, ms1280,
ms2048, ms2560,...}

-- M

MaxDataBurstVolume ::= INTEGER (0..4095,...)

MaxPacketLossRate ::= INTEGER (0..1000)

MIB-message ::= OCTET STRING

MeasConfig ::= OCTET STRING

MeasGapConfig ::= OCTET STRING

```



```

MeasurementTimingConfiguration ::= OCTET STRING

-- N

NGRANAllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel          PriorityLevel,
    pre-emptionCapability  Pre-emptionCapability,
    pre-emptionVulnerability Pre-emptionVulnerability,
    iE-Extensions         ProtocolExtensionContainer { {NGRANAllocationAndRetentionPriority-
ExtIEs} } OPTIONAL,
    ...
}

NGRANAllocationAndRetentionPriority-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NonDynamic5QIDescriptor ::= SEQUENCE {
    fiveQI                INTEGER (0..255,...),
    qosPriorityLevel       INTEGER (1..127)          OPTIONAL,
    averagingWindow        AveragingWindow          OPTIONAL,
    maxDataBurstVolume     MaxDataBurstVolume       OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { { NonDynamic5QIDescriptor-ExtIEs } }
OPTIONAL,
    ...
}

NonDynamic5QIDescriptor-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Notification-Cause ::= ENUMERATED {fulfilled, not-fulfilled,...}

NotificationControl ::= ENUMERATED {active, not-active,...}

NumberOfBroadcasts ::= INTEGER (0..65535)

NumberOfBroadcastRequest ::= INTEGER (0..65535)

-- O

-- P

PacketDelayBudget ::= INTEGER (0..1023,...)

PacketErrorRate ::= SEQUENCE {
    pER-Scalar            PER-Scalar,
    pER-Exponent          PER-Exponent,
    iE-Extensions         ProtocolExtensionContainer { {PacketErrorRate-ExtIEs} } OPTIONAL,
    ...
}

PacketErrorRate-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PER-Scalar ::= INTEGER (0..9,...)
PER-Exponent ::= INTEGER (0..9,...)

PagingCell-Item ::= SEQUENCE {
    eUTRANCGI            EUTRANCGI,
    iE-Extensions        ProtocolExtensionContainer { { PagingCell-ItemExtIEs } }    OPTIONAL,
    ...
}

PagingCell-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

PagingDRX ::= ENUMERATED {
    v32,
    v64,
    v128,
    v256,

```

```

}
...
}
PagingIdentity ::= CHOICE {
    rANUEPagingIdentity RANUEPagingIdentity,
    cNUEPagingIdentity CNUEPagingIdentity,
    choice-extension ProtocolIE-SingleContainer { { PagingIdentity-ExtIEs } }
}
PagingIdentity-ExtIEs W1AP-PROTOCOL-IES ::= {
    ...
}

PDCP-SN ::= INTEGER (0..4095)
PDCPSNLength ::= ENUMERATED { twelve-bits, eighteen-bits, ... }
PDUSessionID ::= INTEGER (0..255)
Ph-InfoSCG ::= OCTET STRING
PLMN-Identity ::= OCTET STRING (SIZE(3))
Pre-emptionCapability ::= ENUMERATED {
    shall-not-trigger-pre-emption,
    may-trigger-pre-emption
}
Pre-emptionVulnerability ::= ENUMERATED {
    not-pre-emptable,
    pre-emptable
}
PriorityLevel ::= INTEGER { spare (0), highest (1), lowest (14), no-priority (15) } (0..15)
Potential-SpCell-Item ::= SEQUENCE {
    potential-SpCell-ID EUTRANCGI ,
    iE-Extensions ProtocolExtensionContainer { { Potential-SpCell-ItemExtIEs } } OPTIONAL,
    ...
}
Potential-SpCell-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}
PWS-Failed-E-UTRAN-CGI-Item ::= SEQUENCE {
    eUTRANCGI EUTRANCGI,
    numberOfBroadcasts NumberOfBroadcasts,
    iE-Extensions ProtocolExtensionContainer { { PWS-Failed-E-UTRAN-CGI-ItemExtIEs } }
    OPTIONAL,
    ...
}
PWS-Failed-E-UTRAN-CGI-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}
PWSSystemInformation ::= SEQUENCE {
    sIBtype SIBType-PWS,
    sIBmessage OCTET STRING,
    iE-Extensions ProtocolExtensionContainer { { PWSSystemInformationExtIEs } } OPTIONAL,
    ...
}
PWSSystemInformationExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- Q
QCI ::= INTEGER (0..255)
QoS-Characteristics ::= CHOICE {
    non-Dynamic-5QI NonDynamic5QIDescriptor,
    dynamic-5QI Dynamic5QIDescriptor,
    choice-extension ProtocolIE-SingleContainer { { QoS-Characteristics-ExtIEs } }
}

```

```

}

QoS-Characteristics-ExtIEs W1AP-PROTOCOL-IES ::= {
  ...
}

QoSFlowIdentifier ::= INTEGER (0..63)

QoSFlowLevelQoSParameters ::= SEQUENCE {
  qoS-Characteristics          QoS-Characteristics,
  nGRANAllocationRetentionPriority  NGRANAllocationAndRetentionPriority,
  gBR-QoS-Flow-Information      GBR-QoSFlowInformation          OPTIONAL,
  reflective-QoS-Attribute       ENUMERATED {subject-to, ...}          OPTIONAL,
  pduSessionID                  pduSessionID                      OPTIONAL,
  ulPDUSESSIONAggregateMaximumBitRate  BitRate                      OPTIONAL,
  iE-Extensions                  ProtocolExtensionContainer { { QoSFlowLevelQoSParameters-ExtIEs } }
  OPTIONAL,
  ...
}

QoSFlowLevelQoSParameters-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
  ...
}

QoSFlowMappingIndication ::= ENUMERATED {ul,dl,...}

QoSInformation ::= CHOICE {
  eUTRANQoS          EUTRANQoS,
  drb-Information    DRB-Information,
  choice-extension   ProtocolIE-SingleContainer { { QoSInformation-ExtIEs } }
}

QoSInformation-ExtIEs W1AP-PROTOCOL-IES ::= {
  ...
}

-- R

RadioResourceConfigDedicated ::= OCTET STRING

RANAC ::= INTEGER (0..255)

RANUEPagingIdentity ::= SEQUENCE {
  iRNTI          BIT STRING (SIZE(40)),
  iE-Extensions  ProtocolExtensionContainer { { RANUEPagingIdentity-ExtIEs } }  OPTIONAL,
  ...
}

RANUEPagingIdentity-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
  ...
}

RAT-FrequencyPriorityInformation ::= CHOICE {
  eNDC          SubscriberProfileIDforRFP,
  nGRAN        RAT-FrequencySelectionPriority,
  choice-extension  ProtocolIE-SingleContainer { { RAT-FrequencyPriorityInformation-ExtIEs } }
}

RAT-FrequencyPriorityInformation-ExtIEs W1AP-PROTOCOL-IES ::= {
  ...
}

RAT-FrequencySelectionPriority ::= INTEGER (1.. 256, ...)

Reestablishment-Indication ::= ENUMERATED {
  reestablished,
  ...
}

RequestedBandCombinationIndex ::= OCTET STRING

RequestedFeatureSetEntryIndex ::= OCTET STRING

RequestType ::= ENUMERATED {offer, execution, ...}

ResourceCoordinationEUTRACellInfo ::= SEQUENCE {
  eUTRA-Mode-Info          EUTRA-Coex-Mode-Info,

```

```

    eUTRA-PRACH-Configuration          EUTRA-PRACH-Configuration,
    iE-Extensions  ProtocolExtensionContainer { { ResourceCoordinationEUTRACellInfo-ExtIEs } }
    OPTIONAL,
    ...
}

ResourceCoordinationEUTRACellInfo-ExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceCoordinationTransferInformation ::= SEQUENCE {
    meNB-Cell-ID          EUTRA-Cell-ID,
    resourceCoordinationEUTRACellInfo  ResourceCoordinationEUTRACellInfo  OPTIONAL,
    iE-Extensions  ProtocolExtensionContainer { { ResourceCoordinationTransferInformation-
ExtIEs } }  OPTIONAL,
    ...
}

ResourceCoordinationTransferInformation-ExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceCoordinationTransferContainer ::= OCTET STRING

RepetitionPeriod ::= INTEGER (0..131071, ...)

RLCMode ::= ENUMERATED {
    rlc-am,
    rlc-um-bidirectional,
    rlc-um-unidirectional-ul,
    rlc-um-unidirectional-dl,
    ...
}

RLC-Status ::= SEQUENCE {
    reestablishment-Indication  Reestablishment-Indication,
    iE-Extensions  ProtocolExtensionContainer { { RLC-Status-ExtIEs } }  OPTIONAL,
    ...
}

RLC-Status-ExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

RRCContainer ::= OCTET STRING

RRCReconfigurationCompleteIndicator ::= ENUMERATED {
    true,
    failure,
    ...
}

-- S

SCell-FailedtoSetup-Item ::= SEQUENCE {
    sCell-ID          EUTRANCGI,
    cause          Cause          OPTIONAL,
    iE-Extensions  ProtocolExtensionContainer { { SCell-FailedtoSetup-ItemExtIEs } }  OPTIONAL,
    ...
}

SCell-FailedtoSetup-ItemExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-FailedtoSetupMod-Item ::= SEQUENCE {
    sCell-ID          EUTRANCGI,
    cause          Cause          OPTIONAL,
    iE-Extensions  ProtocolExtensionContainer { { SCell-FailedtoSetupMod-ItemExtIEs } }
    OPTIONAL,
    ...
}

SCell-FailedtoSetupMod-ItemExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

}

SCell-ToBeRemoved-Item ::= SEQUENCE {
    sCell-ID          EUTRANCGI,
    iE-Extensions    ProtocolExtensionContainer { { SCell-ToBeRemoved-ItemExtIEs } } OPTIONAL,
    ...
}

SCell-ToBeRemoved-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-ToBeSetup-Item ::= SEQUENCE {
    sCell-ID          EUTRANCGI,
    sCellIndex       SCellIndex,
    iE-Extensions    ProtocolExtensionContainer { { SCell-ToBeSetup-ItemExtIEs } } OPTIONAL,
    ...
}

SCell-ToBeSetup-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCell-ToBeSetupMod-Item ::= SEQUENCE {
    sCell-ID          EUTRANCGI,
    sCellIndex       SCellIndex,
    iE-Extensions    ProtocolExtensionContainer { { SCell-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

SCell-ToBeSetupMod-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SCellIndex ::= INTEGER (1..31, ...)

SIBType-PWS ::= INTEGER (6..8, ...)

SelectedBandCombinationIndex ::= OCTET STRING

SelectedFeatureSetEntryIndex ::= OCTET STRING

CG-ConfigInfo ::= OCTET STRING

ServCellIndex ::= INTEGER (0..31, ...)

Served-Cell-Information ::= SEQUENCE {
    eUTRANCGI          EUTRANCGI,
    eUTRANPCI          EUTRANPCI,
    fiveGS-TAC         FiveGS-TAC OPTIONAL,
    servedPLMNs        ServedPLMNs-List,
    eUTRAN-Mode-Info   E-UTRAN-Mode-Info,
    measurementTimingConfiguration OCTET STRING,
    rANAC              RANAC OPTIONAL,
    extendedServedPLMNs-List ExtendedServedPLMNs-List OPTIONAL,
    cell-Type          Cell-Type OPTIONAL,
    bPLMN-ID-Info-List BPLMN-ID-Info-List OPTIONAL,
    iE-Extensions     ProtocolExtensionContainer { {Served-Cell-Information-ExtIEs} } OPTIONAL,
    ...
}

Served-Cell-Information-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Served-Cells-To-Add-Item ::= SEQUENCE {
    served-Cell-Information Served-Cell-Information,
    ngenB-DU-System-Information NGENB-DU-System-Information OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { Served-Cells-To-Add-ItemExtIEs } } OPTIONAL,
    ...
}

Served-Cells-To-Add-ItemExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Served-Cells-To-Delete-Item ::= SEQUENCE {

```

```

    oldEUTRANCGI          EUTRANCGI,
    iE-Extensions         ProtocolExtensionContainer { { Served-Cells-To-Delete-ItemExtIEs } }
    OPTIONAL,
    ...
}

Served-Cells-To-Delete-ItemExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Served-Cells-To-Modify-Item ::= SEQUENCE {
    oldEUTRANCGI          EUTRANCGI,
    served-Cell-Information  Served-Cell-Information,
    ngenB-DU-System-Information  NGENB-DU-System-Information  OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { { Served-Cells-To-Modify-
ItemExtIEs } }  OPTIONAL,
    ...
}

Served-Cells-To-Modify-ItemExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

Service-State ::= ENUMERATED {
    in-service,
    out-of-service,
    ...
}

Service-Status ::= SEQUENCE {
    service-state          Service-State,
    switchingOffOngoing    ENUMERATED {true, ...}  OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { { Service-Status-ExtIEs } }
    OPTIONAL,
    ...
}

Service-Status-ExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

ServedPLMNs-List ::= SEQUENCE (SIZE(1..maxnoofBPLMNs)) OF ServedPLMNs-Item

ServedPLMNs-Item ::= SEQUENCE {
    plmn-identity          PLMN-Identity,
    tAISliceSupportList    SliceSupportList  OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { { ServedPLMNs-ItemExtIEs } }  OPTIONAL,
    ...
}

ServedPLMNs-ItemExtIEs  WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

ShortDRXCycleLength ::= ENUMERATED {ms2, ms5, ms8, ms10, ms16, ms20, ms32, ms40, ms64, ms80, ms128,
ms160, ms256, ms320, ms512, ms640, ...}

ShortDRXCycleTimer ::= INTEGER (1..16)

SIB1-message ::= OCTET STRING

SIB2-message ::= OCTET STRING

SIB3-message ::= OCTET STRING

SIB8-message ::= OCTET STRING

SIB16-message ::= OCTET STRING

SibtypetobeupdatedListItem ::= SEQUENCE {
    sibtype                INTEGER (2..32,...),
    sibmessage              OCTET STRING,
    valueTag                INTEGER (0..31,...),
    iE-Extensions         ProtocolExtensionContainer { { SibtypetobeupdatedListItem-ExtIEs } }
    OPTIONAL,
    ...
}

```

```

SibtypetobeupdatedListItem-ExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SliceSupportList ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SliceSupportItem

SliceSupportItem ::= SEQUENCE {
  sNSSAI  SNSSAI,
  iE-Extensions  ProtocolExtensionContainer { { SliceSupportItem-ExtIEs } }
  OPTIONAL,
  ...
}

SliceSupportItem-ExtIEs WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SNSSAI ::= SEQUENCE {
  sST  OCTET STRING (SIZE(1)),
  sD  OCTET STRING (SIZE(3)) OPTIONAL,
  iE-Extensions  ProtocolExtensionContainer { { SNSSAI-ExtIEs } }  OPTIONAL,
  ...
}

SNSSAI-ExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SRBID ::= INTEGER (0..3, ...)

SRBs-FailedToBeSetup-Item  ::= SEQUENCE {
  sRBID  SRBID,
  cause  Cause  OPTIONAL,
  iE-Extensions  ProtocolExtensionContainer { { SRBs-FailedToBeSetup-ItemExtIEs } }  OPTIONAL,
  ...
}

SRBs-FailedToBeSetup-ItemExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SRBs-FailedToBeSetupMod-Item  ::= SEQUENCE {
  sRBID  SRBID,
  cause  Cause  OPTIONAL,
  iE-Extensions  ProtocolExtensionContainer { { SRBs-FailedToBeSetupMod-ItemExtIEs } }
  OPTIONAL,
  ...
}

SRBs-FailedToBeSetupMod-ItemExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SRBs-Modified-Item ::= SEQUENCE {
  sRBID  SRBID,
  iE-Extensions  ProtocolExtensionContainer { { SRBs-Modified-ItemExtIEs } }  OPTIONAL,
  ...
}

SRBs-Modified-ItemExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SRBs-Required-ToBeReleased-Item ::= SEQUENCE {
  sRBID  SRBID,
  iE-Extensions  ProtocolExtensionContainer { { SRBs-Required-ToBeReleased-ItemExtIEs } }
  OPTIONAL,
  ...
}

SRBs-Required-ToBeReleased-ItemExtIEs  WlAP-PROTOCOL-EXTENSION ::= {
  ...
}

SRBs-Setup-Item ::= SEQUENCE {
  sRBID  SRBID,
  iE-Extensions  ProtocolExtensionContainer { { SRBs-Setup-ItemExtIEs } }  OPTIONAL,

```

```

}
...
SRBs-Setup-ItemExtIEs    WlAP-PROTOCOL-EXTENSION ::= {
}
...
SRBs-SetupMod-Item ::= SEQUENCE {
    sRBID                SRBID,
    iE-Extensions        ProtocolExtensionContainer { { SRBs-SetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-SetupMod-ItemExtIEs    WlAP-PROTOCOL-EXTENSION ::= {
}
...
SRBs-ToBeReleased-Item ::= SEQUENCE {
    sRBID                SRBID,
    iE-Extensions        ProtocolExtensionContainer { { SRBs-ToBeReleased-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-ToBeReleased-ItemExtIEs    WlAP-PROTOCOL-EXTENSION ::= {
}
...
SRBs-ToBeSetup-Item ::= SEQUENCE {
    sRBID                SRBID,
    iE-Extensions        ProtocolExtensionContainer { { SRBs-ToBeSetup-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-ToBeSetup-ItemExtIEs    WlAP-PROTOCOL-EXTENSION ::= {
}
...
SRBs-ToBeSetupMod-Item ::= SEQUENCE {
    sRBID                SRBID,
    iE-Extensions        ProtocolExtensionContainer { { SRBs-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-ToBeSetupMod-ItemExtIEs    WlAP-PROTOCOL-EXTENSION ::= {
}
...

SubscriberProfileIDforRFP ::= INTEGER (1..256, ...)

-- T

FiveGS-TAC ::= OCTET STRING (SIZE(3))

TDD-Info ::= SEQUENCE {
    eUTRAFreqInfo                EUTRAFreqInfo,
    transmission-Bandwidth        Transmission-Bandwidth,
    iE-Extensions                ProtocolExtensionContainer { {TDD-Info-ExtIEs} } OPTIONAL,
    ...
}

TDD-Info-ExtIEs WlAP-PROTOCOL-EXTENSION ::= {
}
...

TransportLayerAddress        ::= BIT STRING (SIZE(1..160,...))

TransactionID                ::= INTEGER (0..255,...)

Transmission-Bandwidth ::= SEQUENCE {
    eUTRANRB        EUTRA-Transmission-Bandwidth,
    iE-Extensions        ProtocolExtensionContainer { { Transmission-Bandwidth-ExtIEs } }
OPTIONAL,
    ...
}

```



```

Transmission-Bandwidth-ExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

TransmissionActionIndicator ::= ENUMERATED {stop, ..., restart }

TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

-- U

UE-associatedLogicalWl-ConnectionItem ::= SEQUENCE {
    ngeNB-CU-UE-WlAP-ID      NGENB-CU-UE-WlAP-ID  OPTIONAL,
    ngeNB-DU-UE-WlAP-ID      NGENB-DU-UE-WlAP-ID  OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { { UE-associatedLogicalWl-
ConnectionItemExtIEs } } OPTIONAL,
    ...
}

UE-associatedLogicalWl-ConnectionItemExtIEs WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

UEAssistanceInformation ::= OCTET STRING

UE-CapabilityRAT-ContainerList ::= OCTET STRING

UEIdentityIndexValue ::= CHOICE {
    indexLength10            BIT STRING (SIZE (10)),
    choice-extension         ProtocolIE-SingleContainer { { UEIdentityIndexValueChoice-ExtIEs } }
}

UEIdentityIndexValueChoice-ExtIEs WLAB-PROTOCOL-IES ::= {
    ...
}

ULUPTNLInformation-ToBeSetup-List ::= SEQUENCE (SIZE(1..maxnoofULUPTNLInformation)) OF
ULUPTNLInformation-ToBeSetup-Item

ULUPTNLInformation-ToBeSetup-Item ::=SEQUENCE {
    uLUPTNLInformation        UPTransportLayerInformation,
    iE-Extensions            ProtocolExtensionContainer { { ULUPTNLInformation-ToBeSetup-
ItemExtIEs } } OPTIONAL,
    ...
}

ULUPTNLInformation-ToBeSetup-ItemExtIEs      WLAB-PROTOCOL-EXTENSION ::= {
    ...
}

UPTransportLayerInformation ::= CHOICE {
    gTPTunnel                GTP Tunnel,
    choice-extension         ProtocolIE-SingleContainer { { UPTransportLayerInformation-ExtIEs } }
}

UPTransportLayerInformation-ExtIEs WLAB-PROTOCOL-IES ::= {
    ...
}

-- V

-- W

-- X

-- Y

-- Z

END
-- ASN1STOP

```

9.4.6 Common Definitions

```
-- ASN1START
```

```

-- *****
--
-- Common definitions
--
-- *****

WLAN-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlap (3) version1 (1) wlap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

Criticality      ::= ENUMERATED { reject, ignore, notify }

Presence        ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID    ::= CHOICE {
    local          INTEGER (0..65535),
    global         OBJECT IDENTIFIER
}

ProcedureCode   ::= INTEGER (0..255)

ProtocolExtensionID ::= INTEGER (0..65535)

ProtocolIE-ID   ::= INTEGER (0..65535)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome }

END
-- ASN1STOP

```

9.4.7 Constant Definitions

```

-- ASN1START
-- *****
--
-- Constant definitions
--
-- *****

WLAN-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlap (3) version1 (1) wlap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    ProcedureCode,
    ProtocolIE-ID

FROM WLAN-CommonDataTypes;

-- *****
--
-- Elementary Procedures
--
-- *****

id-Reset                ProcedureCode ::= 0
id-WlSetup              ProcedureCode ::= 1
id-ErrorIndication      ProcedureCode ::= 2
id-ngeNBDUConfigurationUpdate ProcedureCode ::= 3
id-ngeNBCUConfigurationUpdate ProcedureCode ::= 4
id-UEContextSetup      ProcedureCode ::= 5
id-UEContextRelease     ProcedureCode ::= 6

```

```

id-UEContextModification                ProcedureCode ::= 7
id-UEContextModificationRequired        ProcedureCode ::= 8
id-UEMobilityCommand                    ProcedureCode ::= 9
id-UEContextReleaseRequest              ProcedureCode ::= 10
id-InitialULRRCMessageTransfer          ProcedureCode ::= 11
id-DLRRRCMessageTransfer                ProcedureCode ::= 12
id-ULRRRCMessageTransfer                ProcedureCode ::= 13
id-privateMessage                       ProcedureCode ::= 14
id-UEInactivityNotification             ProcedureCode ::= 15
id-NGENBDUResourceCoordination          ProcedureCode ::= 16
id-Paging                                ProcedureCode ::= 17
id-Notify                                ProcedureCode ::= 18
id-WriteReplaceWarning                  ProcedureCode ::= 19
id-PWSCancel                            ProcedureCode ::= 20
id-PWSRestartIndication                 ProcedureCode ::= 21
id-PWSFailureIndication                 ProcedureCode ::= 22
id-NGENBDUStatusIndication              ProcedureCode ::= 23

-- *****
--
-- Extension constants
--
-- *****

maxPrivateIEs                           INTEGER ::= 65535
maxProtocolExtensions                    INTEGER ::= 65535
maxProtocolIEs                           INTEGER ::= 65535
-- *****
--
-- Lists
--
-- *****

maxEARFCN                                INTEGER ::= 262143
maxnoofErrors                            INTEGER ::= 256
maxnoofIndividualWlConnectionsToReset    INTEGER ::= 65536
maxCellInngeNBUD                          INTEGER ::= 512
maxnoofSCells                            INTEGER ::= 32
maxnoofSRBs                              INTEGER ::= 8
maxnoofDRBs                              INTEGER ::= 64
maxnoofULUPTNLInformation                 INTEGER ::= 2
maxnoofDLUPTNLInformation                 INTEGER ::= 2
maxnoofBPLMNs                            INTEGER ::= 12
maxnoofCandidateSpCells                   INTEGER ::= 64
maxnoofPotentialSpCells                   INTEGER ::= 64
maxnoofE-UTRANCellBands                  INTEGER ::= 8
maxnoofSIBTypes                           INTEGER ::= 32
maxnoofPagingCells                        INTEGER ::= 512
maxnoofTNLAssociations                    INTEGER ::= 32
maxnoofQoSFlows                           INTEGER ::= 64
maxnoofSliceItems                         INTEGER ::= 1024
maxCellIngeNB                             INTEGER ::= 256
maxnoofExtendedBPLMNs                     INTEGER ::= 6
maxnoofUEIDs                              INTEGER ::= 65536
maxBandsEutra                             INTEGER ::= 256
maxnoofBPLMNsNRminus1                     INTEGER ::= 11

-- *****
--
-- IEs
--
-- *****

id-Cause                                 ProtocolIE-ID ::= 0
id-Cells-Failed-to-be-Activated-List     ProtocolIE-ID ::= 1
id-Cells-to-be-Activated-List            ProtocolIE-ID ::= 2
id-Cells-to-be-Deactivated-List          ProtocolIE-ID ::= 3
id-CriticalityDiagnostics                 ProtocolIE-ID ::= 4
id-CUtoDURRCInformation                   ProtocolIE-ID ::= 5
id-DRBs-FailedToBeModified-List          ProtocolIE-ID ::= 6
id-DRBs-FailedToBeSetup-List              ProtocolIE-ID ::= 7
id-DRBs-FailedToBeSetupMod-List          ProtocolIE-ID ::= 8
id-DRBs-ModifiedConf-List                 ProtocolIE-ID ::= 9
id-DRBs-Modified-List                     ProtocolIE-ID ::= 10
id-DRBs-Required-ToBeModified-List       ProtocolIE-ID ::= 11
id-DRBs-Required-ToBeReleased-List       ProtocolIE-ID ::= 12
id-DRBs-Setup-List                       ProtocolIE-ID ::= 13

```

| | |
|--|----------------------|
| id-DRBs-SetupMod-List | ProtocolIE-ID ::= 14 |
| id-DRBs-ToBeModified-List | ProtocolIE-ID ::= 15 |
| id-DRBs-ToBeReleased-List | ProtocolIE-ID ::= 16 |
| id-DRBs-ToBeSetup-List | ProtocolIE-ID ::= 17 |
| id-DRBs-ToBeSetupMod-List | ProtocolIE-ID ::= 18 |
| id-DRXCycle | ProtocolIE-ID ::= 19 |
| id-DUtoCURRCInformation | ProtocolIE-ID ::= 20 |
| id-ngeNB-CU-UE-WLAP-ID | ProtocolIE-ID ::= 21 |
| id-ngeNB-DU-UE-WLAP-ID | ProtocolIE-ID ::= 22 |
| id-ngeNB-DU-ID | ProtocolIE-ID ::= 23 |
| id-ngeNB-DU-Served-Cells-List | ProtocolIE-ID ::= 24 |
| id-oldngeNB-DU-UE-WLAP-ID | ProtocolIE-ID ::= 25 |
| id-RAT-FrequencyPriorityInformation | ProtocolIE-ID ::= 26 |
| id-ResetType | ProtocolIE-ID ::= 27 |
| id-ResourceCoordinationTransferContainer | ProtocolIE-ID ::= 28 |
| id-RRCContainer | ProtocolIE-ID ::= 29 |
| id-SCell-ToBeRemoved-List | ProtocolIE-ID ::= 30 |
| id-SCell-ToBeSetup-List | ProtocolIE-ID ::= 31 |
| id-SCell-ToBeSetupMod-List | ProtocolIE-ID ::= 32 |
| id-Served-Cells-To-Add-List | ProtocolIE-ID ::= 33 |
| id-Served-Cells-To-Delete-List | ProtocolIE-ID ::= 34 |
| id-Served-Cells-To-Modify-List | ProtocolIE-ID ::= 35 |
| id-SpCell-ID | ProtocolIE-ID ::= 36 |
| id-SRBID | ProtocolIE-ID ::= 37 |
| id-SRBs-FailedToBeSetup-List | ProtocolIE-ID ::= 38 |
| id-SRBs-FailedToBeSetupMod-List | ProtocolIE-ID ::= 39 |
| id-SRBs-Required-ToBeReleased-List | ProtocolIE-ID ::= 40 |
| id-SRBs-ToBeReleased-List | ProtocolIE-ID ::= 41 |
| id-SRBs-ToBeSetup-List | ProtocolIE-ID ::= 42 |
| id-SRBs-ToBeSetupMod-List | ProtocolIE-ID ::= 43 |
| id-TransactionID | ProtocolIE-ID ::= 44 |
| id-TransmissionActionIndicator | ProtocolIE-ID ::= 45 |
| id-UE-associatedLogicalWl-ConnectionListResAck | ProtocolIE-ID ::= 46 |
| id-SCell-FailedtoSetup-List | ProtocolIE-ID ::= 47 |
| id-SCell-FailedtoSetupMod-List | ProtocolIE-ID ::= 48 |
| id-RRCReconfigurationCompleteIndicator | ProtocolIE-ID ::= 49 |
| id-Cells-Status-List | ProtocolIE-ID ::= 50 |
| id-Candidate-SpCell-List | ProtocolIE-ID ::= 51 |
| id-Potential-SpCell-List | ProtocolIE-ID ::= 52 |
| id-C-RNTI | ProtocolIE-ID ::= 53 |
| id-InactivityMonitoringRequest | ProtocolIE-ID ::= 54 |
| id-InactivityMonitoringResponse | ProtocolIE-ID ::= 55 |
| id-DRB-Activity-List | ProtocolIE-ID ::= 56 |
| id-EUTRA-NR-CellResourceCoordinationReq-Container | ProtocolIE-ID ::= 57 |
| id-EUTRA-NR-CellResourceCoordinationReqAck-Container | ProtocolIE-ID ::= 58 |
| id-RequestType | ProtocolIE-ID ::= 59 |
| id-ServCellIndex | ProtocolIE-ID ::= 60 |
| id-EUTRANCGI | ProtocolIE-ID ::= 61 |
| id-PagingCell-List | ProtocolIE-ID ::= 62 |
| id-PagingDRX | ProtocolIE-ID ::= 63 |
| id-UEIdentityIndexValue | ProtocolIE-ID ::= 64 |
| id-PagingIdentity | ProtocolIE-ID ::= 65 |
| id-DUtoCURRCCContainer | ProtocolIE-ID ::= 66 |
| id-DRB-Notify-List | ProtocolIE-ID ::= 67 |
| id-NotificationControl | ProtocolIE-ID ::= 68 |
| id-PWSSystemInformation | ProtocolIE-ID ::= 69 |
| id-RepetitionPeriod | ProtocolIE-ID ::= 70 |
| id-NumberOfBroadcastRequest | ProtocolIE-ID ::= 71 |
| id-Cells-To-Be-Broadcast-List | ProtocolIE-ID ::= 72 |
| id-Cells-Broadcast-Completed-List | ProtocolIE-ID ::= 73 |
| id-Broadcast-To-Be-Cancelled-List | ProtocolIE-ID ::= 74 |
| id-Cells-Broadcast-Cancelled-List | ProtocolIE-ID ::= 75 |
| id-E-UTRAN-CGI-List-For-Restart-List | ProtocolIE-ID ::= 76 |
| id-PWS-Failed-E-UTRAN-CGI-List | ProtocolIE-ID ::= 77 |
| id-ConfirmedUEID | ProtocolIE-ID ::= 78 |
| id-Cancel-all-Warning-Messages-Indicator | ProtocolIE-ID ::= 79 |
| id-NGENB-DU-UE-AMBR-UL | ProtocolIE-ID ::= 80 |
| id-ServingPLMN | ProtocolIE-ID ::= 81 |
| id-NGENBDUOverloadInformation | ProtocolIE-ID ::= 82 |
| id-ResourceCoordinationTransferInformation | ProtocolIE-ID ::= 83 |
| id-Associated-SCell-List | ProtocolIE-ID ::= 84 |
| id-SRBs-Setup-List | ProtocolIE-ID ::= 85 |
| id-SRBs-SetupMod-List | ProtocolIE-ID ::= 86 |
| id-SRBs-Modified-List | ProtocolIE-ID ::= 87 |
| id-IgnoreResourceCoordinationRequestContainer | ProtocolIE-ID ::= 88 |

END

```
-- ASN1STOP
```

9.4.8 Container Definitions

```
-- ASN1START
-- *****
--
-- Container definitions
--
-- *****

WlAP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) wlap (3) version1 (1) wlap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    Criticality,
    Presence,
    PrivateIE-ID,
    ProtocolExtensionID,
    ProtocolIE-ID

FROM WlAP-CommonDataTypes
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs

FROM WlAP-Constants;

-- *****
--
-- Class Definition for Protocol IEs
--
-- *****

WlAP-PROTOCOL-IES ::= CLASS {
    &id                ProtocolIE-ID                UNIQUE,
    &criticality        Criticality,
    &Value,
    &presence           Presence
}
WITH SYNTAX {
    ID                &id
    CRITICALITY        &criticality
    TYPE               &Value
    PRESENCE           &presence
}

-- *****
--
-- Class Definition for Protocol IEs
--
-- *****

WlAP-PROTOCOL-IES-PAIR ::= CLASS {
    &id                ProtocolIE-ID                UNIQUE,
    &firstCriticality  Criticality,
    &FirstValue,
    &secondCriticality Criticality,
    &SecondValue,
    &presence           Presence
}
WITH SYNTAX {
    ID                &id
    FIRST CRITICALITY &firstCriticality
    FIRST TYPE        &FirstValue
    SECOND CRITICALITY &secondCriticality
}
```

```

    SECOND TYPE          &SecondValue
    PRESENCE             &presence
}
-- *****
--
-- Class Definition for Protocol Extensions
--
-- *****

W1AP-PROTOCOL-EXTENSION ::= CLASS {
    &id                  ProtocolExtensionID          UNIQUE,
    &criticality         Criticality,
    &Extension,
    &presence            Presence
}
WITH SYNTAX {
    ID                   &id
    CRITICALITY          &criticality
    EXTENSION            &Extension
    PRESENCE             &presence
}
-- *****
--
-- Class Definition for Private IEs
--
-- *****

W1AP-PRIVATE-IES ::= CLASS {
    &id                  PrivateIE-ID,
    &criticality         Criticality,
    &Value,
    &presence            Presence
}
WITH SYNTAX {
    ID                   &id
    CRITICALITY          &criticality
    TYPE                 &Value
    PRESENCE             &presence
}
-- *****
--
-- Container for Protocol IEs
--
-- *****

ProtocolIE-Container {W1AP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-SingleContainer {W1AP-PROTOCOL-IES : IEsSetParam} ::=
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field {W1AP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
    id                   W1AP-PROTOCOL-IES.&id          ({{IEsSetParam}}),
    criticality          W1AP-PROTOCOL-IES.&criticality  ({{IEsSetParam}}{@id}),
    value                W1AP-PROTOCOL-IES.&Value       ({{IEsSetParam}}{@id})
}
-- *****
--
-- Container for Protocol IE Pairs
--
-- *****

ProtocolIE-ContainerPair {W1AP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair {W1AP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {
    id                   W1AP-PROTOCOL-IES-PAIR.&id      ({{IEsSetParam}}),
    firstCriticality     W1AP-PROTOCOL-IES-PAIR.&firstCriticality ({{IEsSetParam}}{@id}),
    firstValue           W1AP-PROTOCOL-IES-PAIR.&FirstValue ({{IEsSetParam}}{@id}),
    secondCriticality    W1AP-PROTOCOL-IES-PAIR.&secondCriticality ({{IEsSetParam}}{@id}),
    secondValue          W1AP-PROTOCOL-IES-PAIR.&SecondValue ({{IEsSetParam}}{@id})
}

```

```

-- *****
--
-- Container for Protocol Extensions
--
-- *****

ProtocolExtensionContainer {WlAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
  SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField {WlAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
  id                WlAP-PROTOCOL-EXTENSION.&id                ({ExtensionSetParam}),
  criticality       WlAP-PROTOCOL-EXTENSION.&criticality       ({ExtensionSetParam}@id),
  extensionValue    WlAP-PROTOCOL-EXTENSION.&Extension        ({ExtensionSetParam}@id)
}

-- *****
--
-- Container for Private IEs
--
-- *****

PrivateIE-Container {WlAP-PRIVATE-IES : IEsSetParam } ::=
  SEQUENCE (SIZE (1.. maxPrivateIEs)) OF
    PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field {WlAP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
  id                WlAP-PRIVATE-IES.&id                ({IEsSetParam}),
  criticality       WlAP-PRIVATE-IES.&criticality       ({IEsSetParam}@id),
  value            WlAP-PRIVATE-IES.&Value            ({IEsSetParam}@id)
}

END
-- ASN1STOP

```

9.5 Message Transfer Syntax

WlAP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Recommendation X.691 [21].

9.6 Timers

Void

10 Handling of unknown, unforeseen and erroneous protocol data

Clause 10 of TS 38.413 [19] is applicable for the purposes of the present document, with the following additions for non-UE-associated procedures:

- In case of Abstract Syntax Error, when reporting the *Criticality Diagnostics* IE for not comprehended IE/IEgroups or missing IE/IE groups, the *Transaction ID* IE shall also be included.
- In case of Logical Error, when reporting the *Criticality Diagnostics* IE, the *Transaction ID* IE shall also be included.
- In case of Logical Error in a response message of a Class 1 procedure, or failure to comprehend *Transaction ID* IE from a received message, the procedure shall be considered as unsuccessfully terminated or not terminated (e.g., transaction ID unknown in response message), and local error handling shall be initiated.

Annex A (informative): Change History

| Change history | | | | | | | |
|----------------|------------------|-----------|------|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2018-05 | RAN3#10 0 | R3-183555 | | | | BL TS submission for approval. | |
| 2019-08 | RAN3#10 5 | R3-184888 | | | | Capture the agreed main W1 AP procedures: R3-194563, R3-194564, R3-194565 | 0.1.0 |
| 2019-10 | RAN3#10 5-Bis | R3-196137 | | | | Add the stage3 paging procedure | 0.1.0 |
| 2019-10 | RAN3#10 5-Bis | R3-196136 | | | | Add Warning message transmission related procedures with corresponding tabular | 0.1.0 |
| 2019-10 | RAN3#10 5-Bis | R3-196192 | | | | Add RRC message Transfer related procedures with corresponding tabular | 0.1.0 |
| 2019-11 | RAN3#10 6 | R3-197262 | | | | - Terminology change to ng-eNB-CU, ng-eNB-DU (R3-197635) - pCR to 37.473 on ASN.1 completion (R3-197544) - pCR to 37.473 on miscellaneous correction to contexts (R3-197636) | 1.1.0 |
| 2019-12 | RP-86 | RP-192962 | | | | TS submitted to TSG RAN plenary for approval | 1.2.0 |
| 2019-12 | RP-86 | | | | | TS approved TSG RAN plenary | 16.0.0 |
| 2020-03 | RP-86 | | | | | Correction to the specification title (E1AP ==> W1AP) | 16.0.1 |
| 2020-03 | RP-87-e | RP-200429 | 0001 | 2 | F | Miscellaneous corrections to 37.473 | 16.1.0 |
| 2020-07 | RP-88-e | RP-201084 | 0002 | 1 | F | Miscellaneous corrections to 37.473 | 16.2.0 |

History

| Document history | | |
|-------------------------|----------------|-------------|
| V16.2.0 | September 2020 | Publication |
| | | |
| | | |
| | | |
| | | |