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Contents

Foreword

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

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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 *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *E-RAB ID* 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

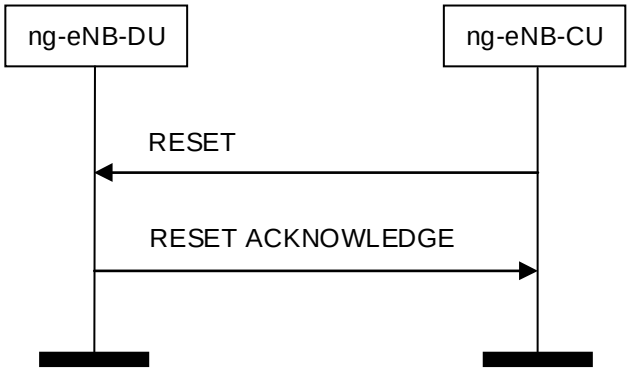

Figure 8.2.1.2.1-1: Reset procedure initiated from the ng-eNB-CU. Successful operation

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

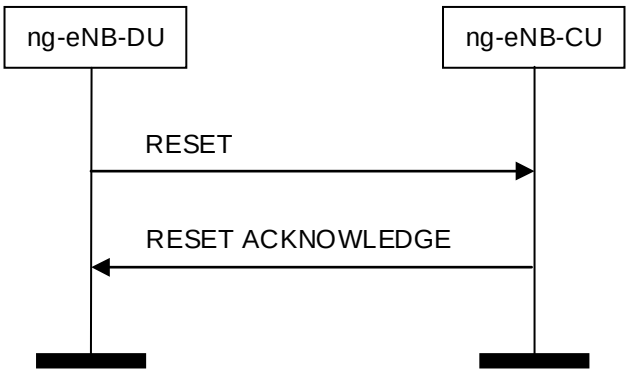

Figure 8.2.1.2.2-1: Reset procedure initiated from the ng-eNB-DU. Successful operation

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

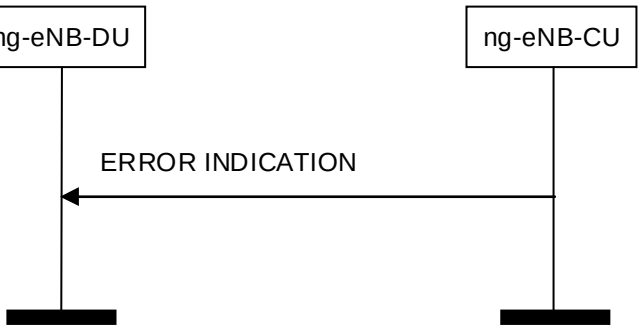

Figure 8.2.2.2-1: Error Indication procedure, ng-eNB-CU originated. Successful operation

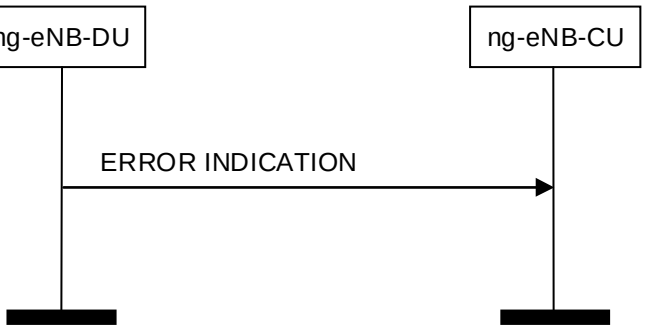

Figure 8.2.2.2-2: Error Indication procedure, ng-eNB-DU originated. Successful operation

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

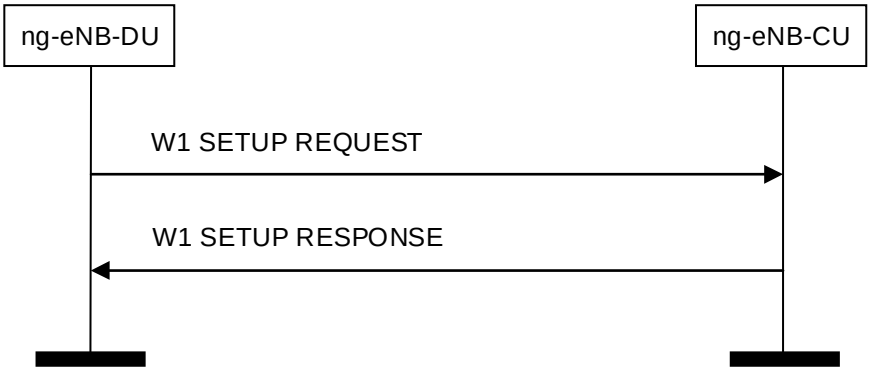

Figure 8.2.3.2-1: W1 Setup procedure: Successful Operation

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

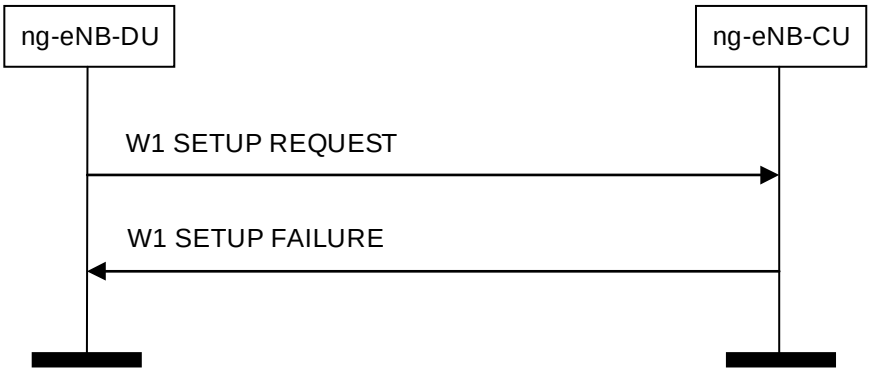

Figure 8.2.3.3-1: W1 Setup procedure: Unsuccessful Operation

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

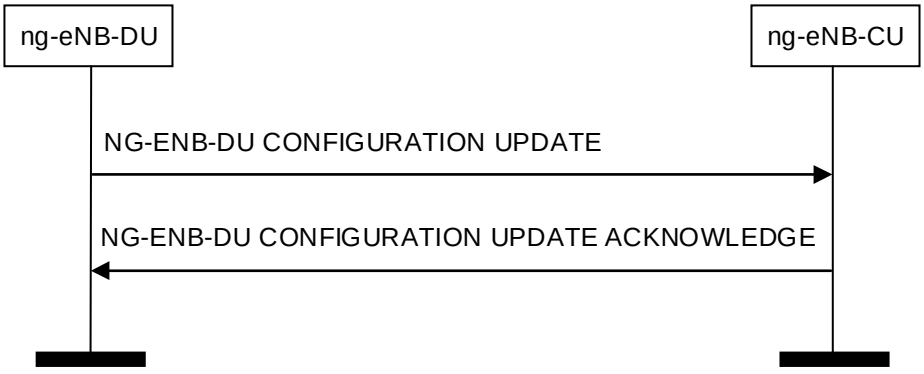

Figure 8.2.4.2-1: ng-eNB-DU Configuration Update procedure: Successful Operation

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 in 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

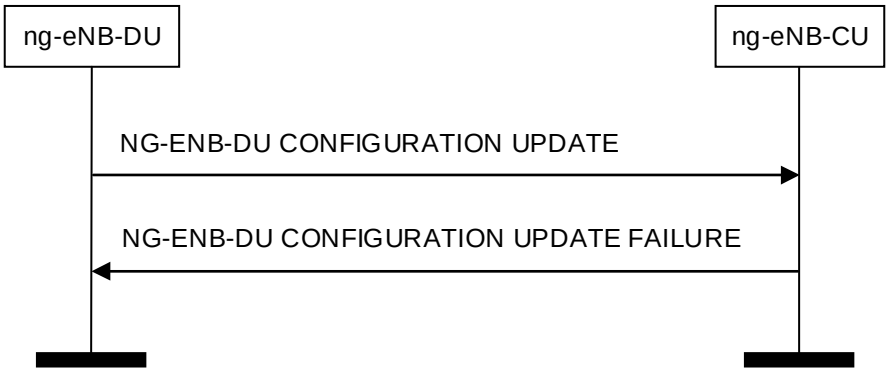

Figure 8.2.4.3-1: ng-eNB-DU Configuration Update procedure: Unsuccessful Operation

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

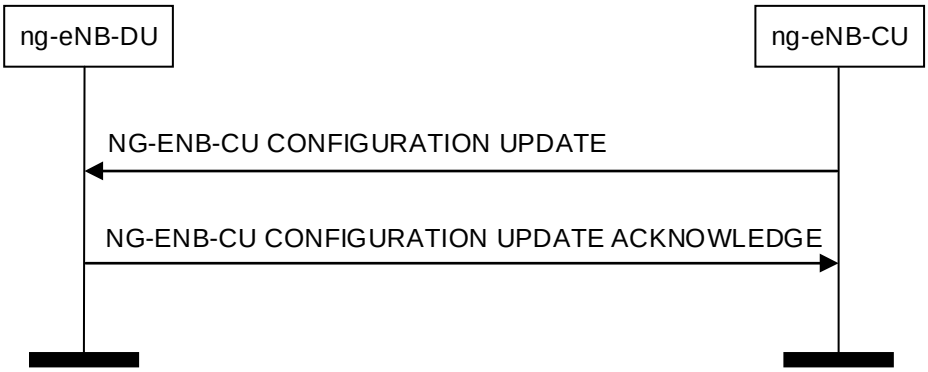

Figure 8.2.5.2-1: ng-eNB-CU Configuration Update procedure: Successful Operation

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

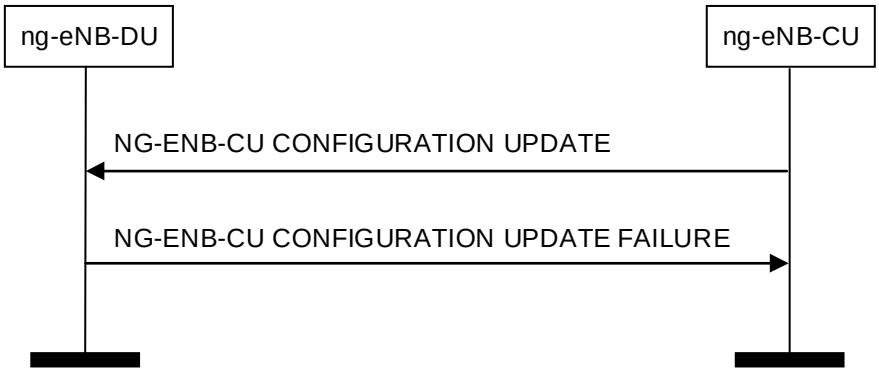

Figure 8.2.5.3-1: ng-eNB-CU Configuration Update: Unsuccessful Operation

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

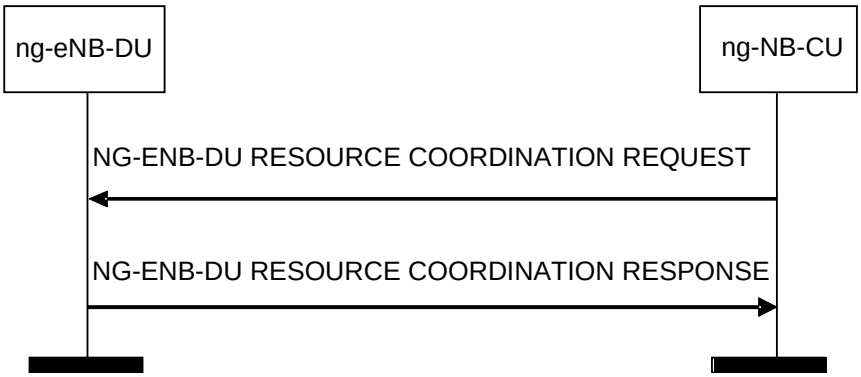

Figure 8.2.6.2-1: ng-eNB-DU Resource Coordination, successful operation

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

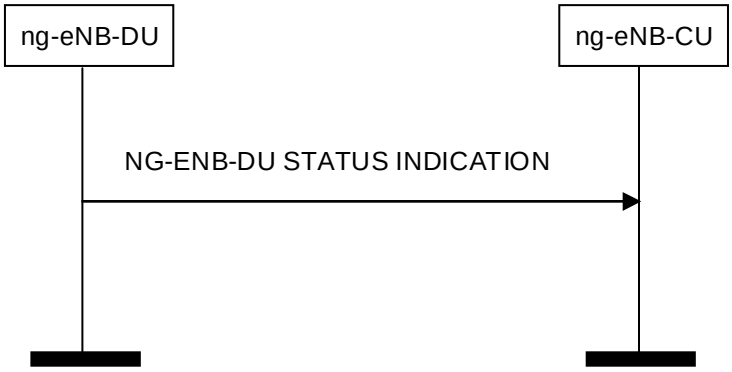

Figure 8.2.7.2-1: ng-eNB-DU Status Indication procedure

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

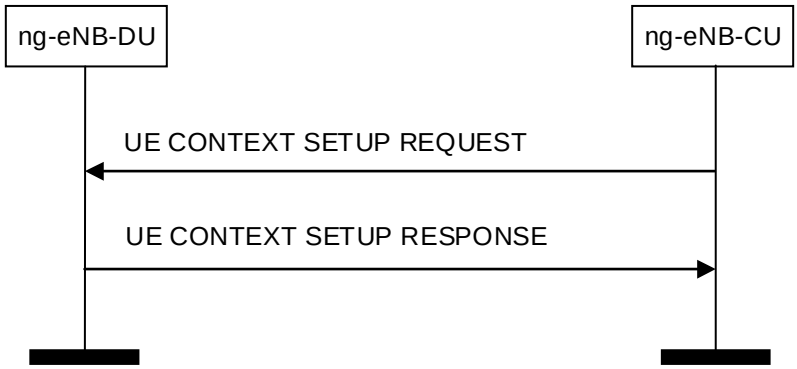

Figure 8.3.1.2-1: UE Context Setup Request procedure: Successful Operation

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

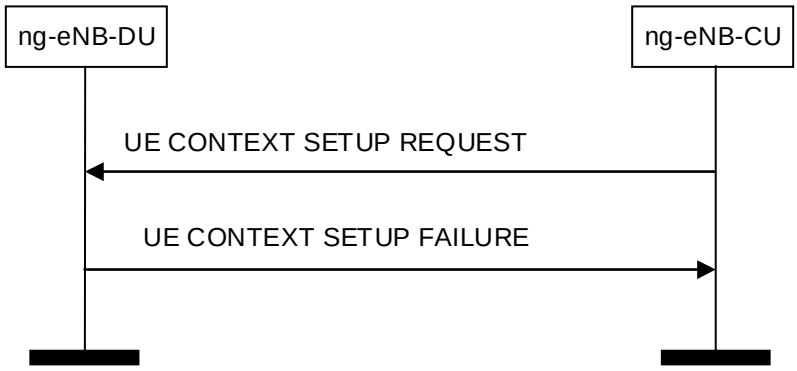

Figure 8.3.1.3-1: UE Context Setup Request procedure: unsuccessful Operation

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

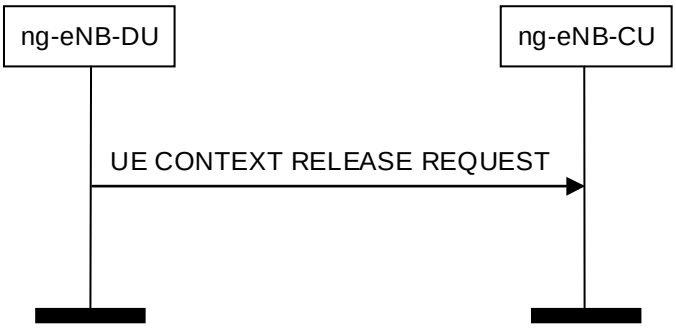

Figure 8.3.2.2-1: UE Context Release (ng-eNB-DU initiated) procedure. Successful operation

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

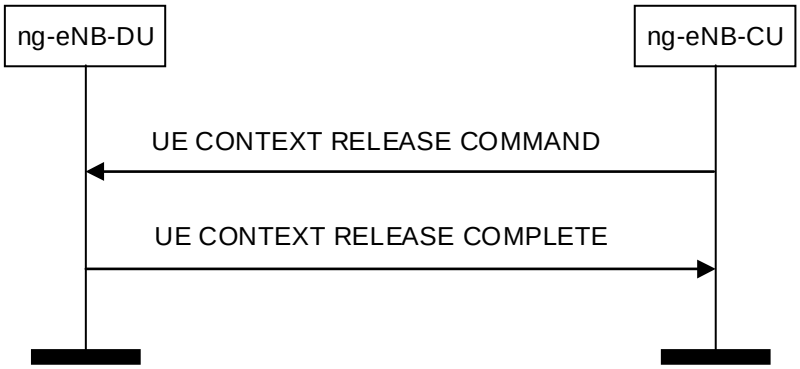

Figure 8.3.3.2-1: UE Context Release (ng-eNB-CU initiated) procedure. Successful operation

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 W1AP 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 W1AP 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

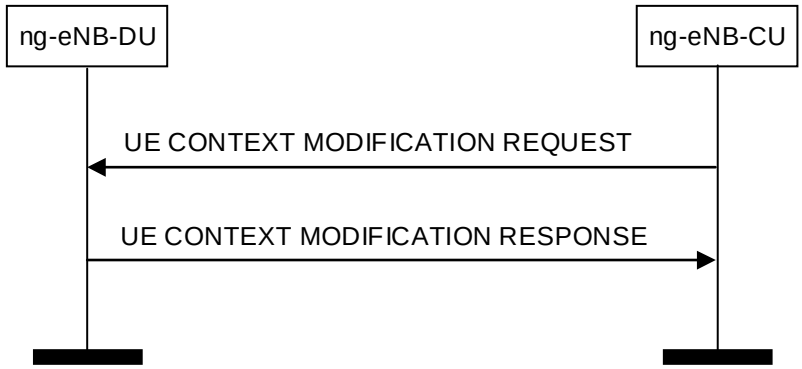

Figure 8.3.4.2-1: UE Context Modification procedure. Successful operation

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.

For MN in NGEN-DC, if the *SCG Indicator* IE is included in the UE CONTEXT MODIFICATION REQUEST message and it is set to “released”, the ng-eNB-DU shall, if applicable, consider the SCG is removed.

8.3.4.3 Unsuccessful Operation

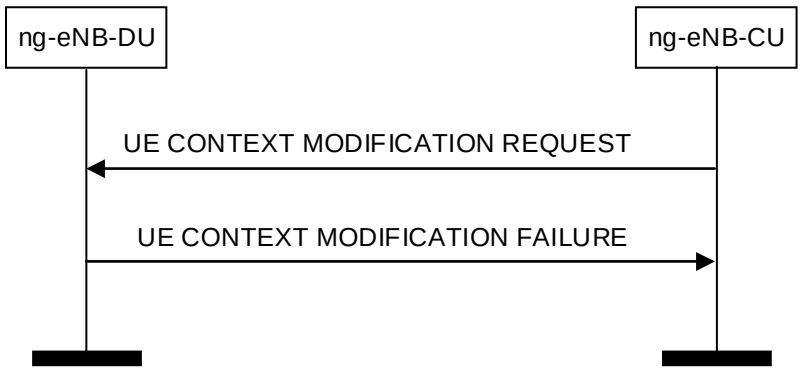

Figure 8.3.4.3-1: UE Context Modification procedure. Unsuccessful operation

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

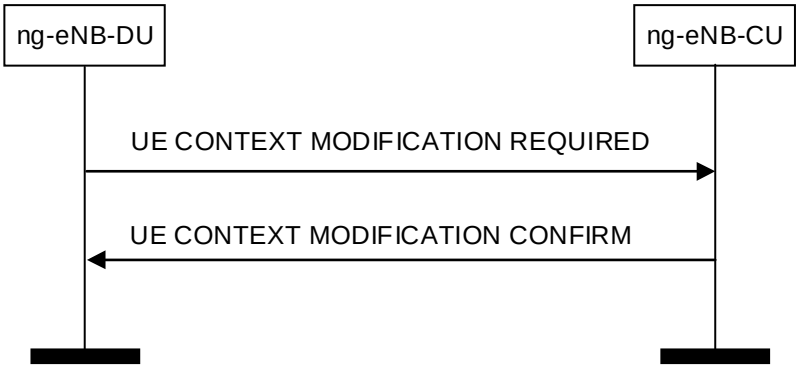

Figure 8.3.5.2-1: UE Context Modification Required procedure. Successful operation

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

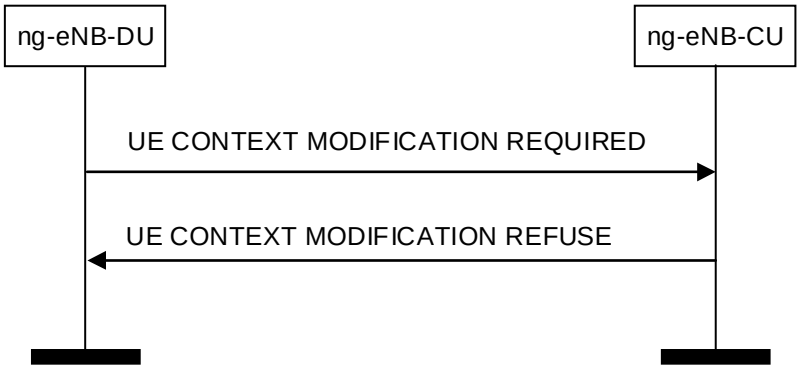

Figure 8.3.5.2A-1: UE Context Modification Required procedure. Unsuccessful operation.

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 by 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 W1AP 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 W1AP 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 W1AP ID* IE in the DL RRC MESSAGE TRANSFER message and the *old ng-eNB-DU UE W1AP ID* IE is included, it shall release the old ng-eNB-DU UE W1AP ID and the related configurations associated with the old ng-eNB-DU UE W1AP 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

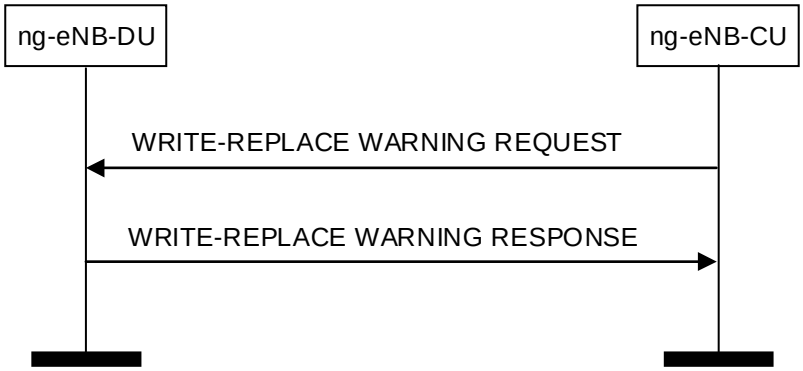

Figure 8.5.1.2-1: Write-Replace Warning procedure: successful operation

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.

If the *Notification Information* IE is included in the *PWS System Information* IE in the WRITE-REPLACE WARNING REQUEST message, the ng-eNB-DU shall use this information to avoid that duplications trigger new broadcast or replace existing broadcast.

If the ng-eNB-DU receives a WRITE-REPLACE WARNING REQUEST message with the *Notification Information* IE in the *PWS System Information* IE which are different from those of ongoing broadcast warning messages, and if the *SIB Type* IE is set to "12", the ng-eNB-DU shall broadcast the received warning message concurrently with other ongoing messages.

If the ng-eNB-DU receives a WRITE-REPLACE WARNING REQUEST message with the *Notification Information* IE in the *PWS System Information* IE which are different from those of ongoing broadcast warning messages, and if the

SIB Type IE is set to the value other than "12", the ng-eNB-DU shall use the newly received one to replace the ongoing broadcast warning message with the same value of *SIB Type* IE.

If the *SIB Type* IE in the *PWS System Information* IE in the WRITE-REPLACE WARNING REQUEST message is set to "12" and if a value "0" is received in the *Number of Broadcast Requested* IE and if the *Repetition Period* IE is different from "0", the ng-eNB-DU shall broadcast the received warning message indefinitely.

If *Additional SIB Message List* IE is included in *PWS System Information* IE, the ng-eNB-DU shall store all SIB message(s) in *PWS System Information* IE, and consider that the first segment of public warning message is included in *SIB message* IE, and the remaining segments are listed in *Additional SIB Message List* IE in segmentation sequence order.

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

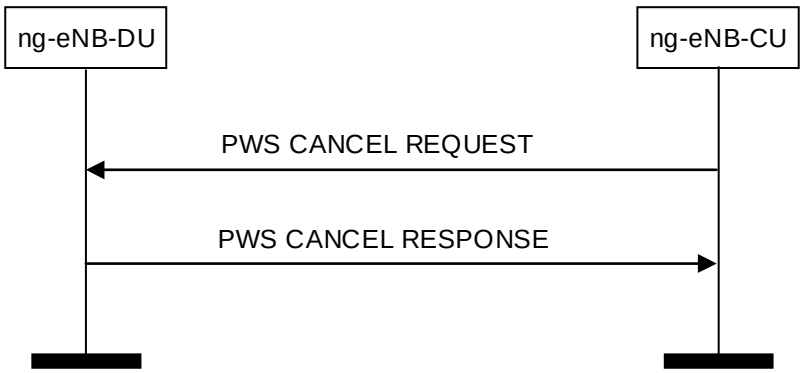

Figure 8.5.2.2-1: PWS Cancel procedure: successful operation

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.

If the *Cancel-All Warning Messages Indicator* IE is present in the PWS CANCEL REQUEST message, then the ng-eNB-DU shall stop broadcasting and discard all warning messages for the area as indicated in the *Cell Broadcast To Be Cancelled List* IE or in all the cells of the ng-eNB-DU if the *Cell Broadcast To Be Cancelled List* IE is not included. The ng-eNB-DU shall acknowledge the PWS CANCEL REQUEST message by sending the PWS CANCEL RESPONSE message, and shall, if there is area to report where an ongoing broadcast was stopped successfully, include the *Cell Broadcast Cancelled List* IE with the *Number of Broadcasts* IE set to 0.

If the *Cell Broadcast To Be Cancelled List* IE is not included in the PWS CANCEL REQUEST message, the ng-eNB-DU shall stop broadcasting and discard the warning message identified by the *Message Identifier* IE and the *Serial Number* IE in the *Notification Information* IE in all of the cells in the ng-eNB-DU.

If an area included in the *Cell Broadcast To Be Cancelled List* IE in the PWS CANCEL REQUEST message does not appear in the *Cell Broadcast Cancelled List* IE in the PWS CANCEL RESPONSE, the ng-eNB-CU shall consider that the ng-eNB-DU had no ongoing broadcast to stop for the public warning message identified, if present, by the *Notification Information* IE in that area.

If the *Cell Broadcast Cancelled List* IE is not included in the PWS CANCEL RESPONSE message, the ng-eNB-CU shall consider that the ng-eNB-DU had no ongoing broadcast to stop for the public warning message identified by the *Notification Information* IE.

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

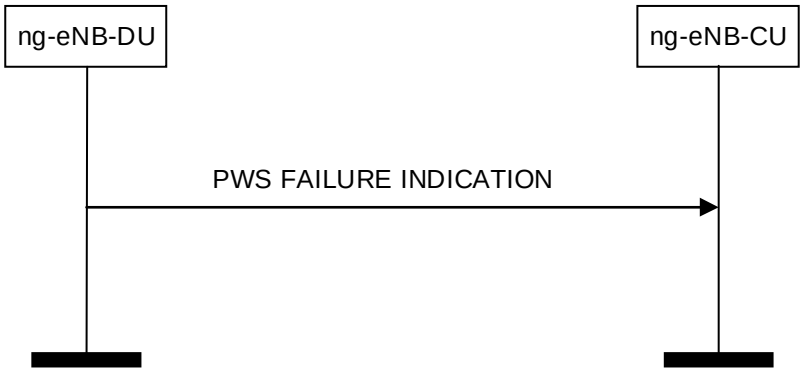

Figure 8.5.4.2-1: PWS failure indication

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

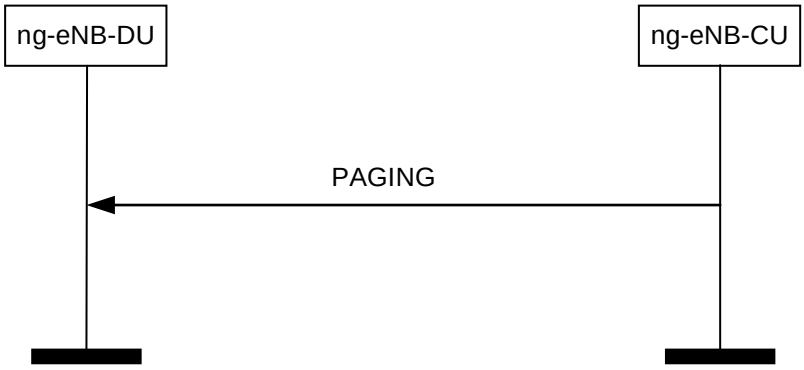

Figure 8.6.1.2-1: Paging procedure. Successful operation.

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.. <maxCellinng-eNBDU>*			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-eNBDU	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.. <maxCellinng-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 *Available PLMN List* 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-eNBDU>*			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-eNBDU>*			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-eNBDU>*			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-eNBDU>*			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-eNBDU	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.. <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 *Available PLMN List* 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 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 *Available PLMN List* 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	C-ifDRBSetup		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 *DRB to Be Setup List* 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 *MR-DC Resource Coordination Information* 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 *DL-DCCH-Message* IE as defined in clause 6.2 of TS 36.331 [2] encapsulated in a PDCP PDU, or the *DL-CCCH-Message* 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 *RRC-Container* 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 *MR-DC Resource Coordination Information* IE as defined in TS 38.423 [7] for NGEN-DC and NE-DC cases.	YES	ignore
RRC Reconfiguration Complete Indicator	O		9.3.1.28		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.. <maxnoofSCells>*			EACH	ignore
>>SCell ID	M		E-UTRAN CGI 9.3.1.12	SCell Identifier in ng-eNB	-	
>>SCellIndex	M		INTEGER (1..31)		-	
SCell To Be Removed List		*0..1*			YES	ignore
>SCell to Be Removed Item IEs		*1 .. <maxnoofSCells>*			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..<maxnoofSRBs>*			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 .. <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		-	
>>>>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	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 .. <maxnoofDRBs>*			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 .. <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.	-	
>>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.. <maxnoofSRBs>*			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 .. <maxnoofDRBs>*			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
SCG Indicator	O		ENUMERATED (released, …)		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 *MR-DC Resource Coordination Information* 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 .. <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.	-	
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		-	
>>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 .. <maxnoofSRBs>*			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 .. <maxnoofDRBs>*			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 .. <maxnoofSCells>*			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 .. <maxnoofDRBs>*			EACH	ignore
>>DRB ID	M		9.3.1.8		-	
>>Cause	O		9.3.1.2		-	
Inactivity Monitoring Response	O		ENUMERATED (Not-supported, ...)		YES	reject
C-RNTI	O		9.3.1.29	C-RNTI allocated at the ng-eNB-DU	YES	ignore
SRB Setup List		*0..1*			YES	ignore
>SRB Setup Item		*1 .. <maxnoofSRBs>*			EACH	ignore
>>SRB ID	M		9.3.1.7		-	
SRB Modified List		*0..1*			YES	ignore
>SRB Modified Item		*1 .. <maxnoofSRBs>*			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 *MR-DC Resource Coordination Information* 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-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 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 *MR-DC Resource Coordination Information* 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 RRCConnectionReconfiguration 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 *UL-CCCH-Message* IE as defined in clause 6.2 of TS 36.331 [2].	YES	reject
DU to CU RRC Container	O		OCTET STRING	*RadioResourceConfigDedicated* 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 RRCConnectionReestablishment 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 *DL-DCCH-Message* IE as defined in clause 6.2 of TS 36.331 [2] encapsulated in a PDCP PDU, or the *DL-CCCH-Message* 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 *UL-DCCH-Message* 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.. <maxCellinng-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-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.

9.2.4.3 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
Cell Broadcast To Be Cancelled List		*0..1*			YES	reject
>Cell Broadcast to Be Cancelled Item IEs		*1.. <maxCellinng-eNBDU>*			EACH	reject
>>E-UTRAN CGI	M		9.3.1.12		-	
Cancel-all Warning Messages Indicator	O			ENUMERATED (true, ...)	YES	reject
Notification Information	M			This IE is ignored If the *Cancel-all Warning Messages Indicator* IE is included.	YES	reject
>Message Identifier	M		9.3.1.67			
>Serial Number	M		9.3.1.68			

Range bound	Explanation
maxCellinng-eNBDU	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		*0..1*			YES	reject
>PWS failed E-UTRAN CGI 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.

9.2.5 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 W1AP 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 unknow.

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].	-	
Notification Information	M				YES	ignore
>Message Identifier	M		9.3.1.67		-	
>Serial Number	M		9.3.1.68		-	
Additional SIB Message List	O		9.3.1.69	Additional SIB messages containing different segments of a public warning message if segmentation is applied, as defined in TS 36.331 [2].	Yes	reject

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 *SRB-Identity* 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 *DRB-Identity* 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		*1..<maxnoofBPLMNs>*		Broadcast PLMNs in SIB1 associated to the E-UTRAN cell Identity in the *E-UTRAN CGI* IE.	-	
>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 *MeasurementTimingConfiguration* inter-node message defined in TS 36.331 [2].	-	
RANAC	O		RAN Area Code 9.3.1.45		YES	ignore
Cell Type	O		9.3.1.62		YES	ignore

Broadcast PLMN Identity Info List		*0..<maxnoofBPLMNs>*		This IE corresponds to the *cellAccessRelatedInfoList-5GC* IE in *SIB1* as specified in TS 36.331 [2]. All PLMN Identities and associated information contained in the *cellAccessRelatedInfoList-5GC* IE are included and provided in the same order as broadcast in SIB1.	YES	ignore
>PLMN Identity List	M		Available PLMN List 9.3.1.47	Broadcast PLMN IDs in SIB1 associated to the *E-UTRAN Cell Identity* IE.	-	
>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.

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))	- 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 -The PLMN identity consists of 3 digits from MCC followed by either -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..<maxnoof*E-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				
>>Index to RAT/Frequency Selection Priority	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..<maxnoofSliceItems>*		
>S-NSSAI	M		9.3.1.32	

Range bound	Explanation
maxnoofSliceItems	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 (2..32, ...)	Indicates a certain SIB block, e.g. 2 means sibType2, 3 for sibType3, etc. Values 2, 3, 8 and 16 are not applicable in this version of the specification.
>>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				-	
>Non-dynamic 5QI					-	
>>Non Dynamic 5QI Descriptor	M		9.3.1.38		-	
>Dynamic 5QI					-	
>>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 *Delay Critical* IE is set to "delay critical" and shall be ignored otherwise.

Condition	Explanation
ifGBRflow	This IE shall be present if the *GBR QoS Flow Information* IE is present in the *QoS Flow Level QoS Parameters* 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 *Service State* 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 *EUTRA-Mode-Info*	M				-	
>FDD					-	
>>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 *UL EARFCN* IE is present.	-	
>>>DL Transmission Bandwidth	M		E-UTRA Transmission Bandwidth 9.3.1.59		-	
>TDD					-	
>>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 void

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 *MeasurementTimingConfiguration* 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
MeasGapSharingConfig	O		OCTET STRING	MeasGapSharingConfig as defined in TS 38.331 [8].	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 *CN UE paging identity*	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.

9.3.1.67 Message Identifier

This IE identifies the warning message.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Message Identifier	M		BIT STRING (SIZE(16))	This IE is set by the 5GC, transferred to the UE by the NG-RAN node.

9.3.1.68 Serial Number

This IE identifies a particular message from the source and type indicated by the Message Identifier and is altered every time the message with a given Message Identifier is changed.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Serial Number	M		BIT STRING (SIZE(16))	This IE is set by the 5GC, transferred to the UE by the NG-RAN node.

9.3.1.69 Additional SIB Message List

This IE indicates the list of additional SIB messages containing all the remaining segments of a public warning message if segmentation is applied to such message.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Additional SIB Message List Item IEs		*1..* <maxnoofAdditionalSIBs >		
>Additional SIB	M		OCTET STRING	SIB message containing one segment of a public warning message, as defined in TS 36.331 [2].

Range bound	Explanation
maxnoofAdditionalSIBs	Maximum no. of additional segments of a public warning message. Value is 63.

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) w1ap (3) version1 (1) w1ap-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,
    DLRRCMessageTransfer,
    ULRRCMessageTransfer,
    NGENBDUResourceCoordinationRequest,
    NGENBDUResourceCoordinationResponse,
    PrivateMessage,
    UEInactivityNotification,
    InitialULRRCMessageTransfer,
    Paging,
    Notify,
    WriteReplaceWarningRequest,
    WriteReplaceWarningResponse,
    PWSCancelRequest,
    PWSCancelResponse,
    PWSRestartIndication,
    PWSFailureIndication,
    NGENBDUStatusIndication,
    UEContextModificationRefuse

FROM W1AP-PDU-Contents
    id-Reset,
    id-W1Setup,
    id-ngeNBDUConfigurationUpdate,
    id-ngeNBCUConfigurationUpdate,
    id-UEContextSetup,
    id-UEContextRelease,
    id-UEContextModification,
    id-UEContextModificationRequired,
    id-ErrorIndication,
    id-UEContextReleaseRequest,
    id-DLRRCMessageTransfer,
    id-ULRRCMessageTransfer,
    id-NGENBDUResourceCoordination,
    id-privateMessage,
    id-UEInactivityNotification,
    id-InitialULRRCMessageTransfer,
    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         |
    dLRRCMessageTransfer            |
    uLRRCMessageTransfer            |
    uEInactivityNotification        |
    privateMessage                  |
    initialULRRCMessageTransfer     |
    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
}


initialULRRCMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      InitialULRRCMessageTransfer
    PROCEDURE CODE          id-InitialULRRCMessageTransfer
    CRITICALITY             ignore
}

dLRRCMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DLRRCMessageTransfer
    PROCEDURE CODE          id-DLRRCMessageTransfer
    CRITICALITY             ignore
}

uLRRCMessageTransfer W1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ULRRCMessageTransfer
    PROCEDURE CODE          id-ULRRCMessageTransfer
    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 W1AP.
--
-- **************************************************************

W1AP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) w1ap (3) version1 (1) w1ap-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-W1AP-ID,
    NGENB-DU-UE-W1AP-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-associatedLogicalW1-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,
    NotificationInformation,
    EUTRA-NR-CellResourceCoordinationReq-Container,
    EUTRA-NR-CellResourceCoordinationReqAck-Container,
    RequestType,
    PLMN-Identity,
    BitRate,
    NGENBDUOverloadInformation,
    ResourceCoordinationTransferInformation,
    IgnoreResourceCoordinationRequestContainer,
    SCGIndicator
```

```
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-NotificationInformation,
    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-DUtoCURRCInformation,
    id-ngeNB-CU-UE-W1AP-ID,
    id-ngeNB-DU-UE-W1AP-ID,
    id-ngeNB-DU-ID,
    id-ngeNB-DU-Served-Cells-List,
    id-InactivityMonitoringRequest,
    id-InactivityMonitoringResponse,
    id-oldngeNB-DU-UE-W1AP-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-DUtoCURRCContainer,
    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-IgnoreResourceCoordinationRequestContainer,
    id-SCGIndicator,
    maxCellinngeNBDU,
    maxnoofCandidateSpCells,
    maxnoofDRBs,
    maxnoofErrors,
    maxnoofIndividualW1ConnectionsToReset,
    maxnoofPotentialSpCells,
    maxnoofSCells,
    maxnoofSRBs,
    maxnoofPagingCells,
    maxnoofTNLAssociations,
    maxCellineNB,
    maxnoofUEIDs


FROM W1AP-Constants;


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

-- ************************************************************
--
-- Reset
--
-- ************************************************************

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

ResetIEs W1AP-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 W1AP-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 W1AP-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
--
-- **************************************************************

W1SetupFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {W1SetupFailureIEs} },
    ...
}

W1SetupFailureIEs W1AP-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 W1AP-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 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   }|
    { 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 W1AP-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 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   }|
    { 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 W1AP-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 W1AP-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 W1AP-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 W1AP-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 W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID                     CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                        PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                     CRITICALITY ignore  TYPE NGENB-DU-UE-W1AP-ID
                        PRESENCE optional   }|
    { ID id-SpCell-ID                               CRITICALITY reject  TYPE EUTRANCGI
                        PRESENCE mandatory  }|
    { ID id-ServCellIndex                           CRITICALITY reject  TYPE ServCellIndex
                    PRESENCE mandatory  }|
    { ID id-CUtoDURRCInformation                    CRITICALITY reject  TYPE CUtoDURRCInformation
                    PRESENCE mandatory}|
    { ID id-Candidate-SpCell-List                   CRITICALITY ignore  TYPE Candidate-SpCell-List
                        PRESENCE optional   }|
    { ID id-DRXCycle                                CRITICALITY ignore  TYPE DRXCycle
                    PRESENCE optional   }|
    { ID id-SCell-ToBeSetup-List                    CRITICALITY ignore  TYPE SCell-ToBeSetup-List
                    PRESENCE optional   }|
    { ID id-SRBs-ToBeSetup-List                     CRITICALITY reject  TYPE SRBs-ToBeSetup-List
                    PRESENCE optional   }|
    { ID id-DRBs-ToBeSetup-List                     CRITICALITY reject  TYPE DRBs-ToBeSetup-List
                    PRESENCE optional   }|
    { ID id-InactivityMonitoringRequest             CRITICALITY reject  TYPE
InactivityMonitoringRequest                 PRESENCE optional   }|
    { ID id-RAT-FrequencyPriorityInformation        CRITICALITY reject  TYPE RAT-
FrequencyPriorityInformation                PRESENCE optional   }|
    { ID id-RRCContainer                            CRITICALITY ignore  TYPE RRCContainer
                    PRESENCE optional   }|
    { ID id-ServingPLMN                             CRITICALITY ignore  TYPE PLMN-Identity
                    PRESENCE optional   }|
    { ID id-NGENB-DU-UE-AMBR-UL                     CRITICALITY ignore  TYPE BitRate
                    PRESENCE conditional }|
    { ID id-ResourceCoordinationTransferInformation CRITICALITY ignore  TYPE
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                     CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                        PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                     CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
                        PRESENCE mandatory  }|
    { ID id-DUtoCURRCInformation                    CRITICALITY reject  TYPE DUtoCURRCInformation
                    PRESENCE mandatory }|
    { ID id-C-RNTI                                  CRITICALITY ignore  TYPE C-RNTI
                    PRESENCE optional   }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer   PRESENCE optional   }|
    { ID id-DRBs-Setup-List                         CRITICALITY ignore  TYPE DRBs-Setup-List
                    PRESENCE optional   }|
    { ID id-SRBs-FailedToBeSetup-List               CRITICALITY ignore  TYPE SRBs-FailedToBeSetup-
List                PRESENCE optional   }|
    { ID id-DRBs-FailedToBeSetup-List               CRITICALITY ignore  TYPE DRBs-FailedToBeSetup-
List                PRESENCE optional   }|
    { ID id-SCell-FailedtoSetup-List                CRITICALITY ignore  TYPE SCell-FailedtoSetup-
List                PRESENCE optional   }|
    { ID id-InactivityMonitoringResponse            CRITICALITY reject  TYPE
InactivityMonitoringResponse                PRESENCE optional   }|
    { ID id-SRBs-Setup-List                         CRITICALITY ignore  TYPE 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-W1AP-ID         CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { 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   }|
    { ID id-Potential-SpCell-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-W1AP-ID CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID    PRESENCE mandatory
    }|
    { ID id-ngeNB-DU-UE-W1AP-ID CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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 W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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-W1AP-ID          CRITICALITY ignore  TYPE NGENB-DU-UE-W1AP-ID
    PRESENCE optional   },
    ...
}

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

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


UEContextReleaseCompleteIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID         CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID         CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
    PRESENCE mandatory  },
    ...
}

-- **************************************************************
--
-- UE Context Modification ELEMENTARY PROCEDURE
--
-- **************************************************************
```

```
-- **************************************************************
--
-- UE CONTEXT MODIFICATION REQUEST
--
-- **************************************************************

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

UEContextModificationRequestIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID                     CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                        PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                     CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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                  CRITICALITY ignore  TYPE SCell-ToBeRemoved-List
                    PRESENCE optional }|
    { ID id-SRBs-ToBeSetupMod-List                  CRITICALITY reject  TYPE SRBs-ToBeSetupMod-List
                    PRESENCE optional   }|
    { ID id-DRBs-ToBeSetupMod-List                  CRITICALITY reject  TYPE DRBs-ToBeSetupMod-List
                    PRESENCE optional   }|
    { ID id-DRBs-ToBeModified-List                  CRITICALITY reject  TYPE DRBs-ToBeModified-List
                    PRESENCE optional   }|
    { ID id-SRBs-ToBeReleased-List                  CRITICALITY reject  TYPE SRBs-ToBeReleased-List
                    PRESENCE optional   }|
    { ID id-DRBs-ToBeReleased-List                  CRITICALITY reject  TYPE DRBs-ToBeReleased-List
                    PRESENCE optional   }|
    { ID id-InactivityMonitoringRequest             CRITICALITY reject  TYPE
InactivityMonitoringRequest                 PRESENCE optional   }|
    { ID id-NGENB-DU-UE-AMBR-UL                     CRITICALITY ignore  TYPE BitRate
                    PRESENCE optional   }|
    { ID id-RAT-FrequencyPriorityInformation        CRITICALITY reject  TYPE RAT-
FrequencyPriorityInformation                PRESENCE optional   }|
    { ID id-ResourceCoordinationTransferInformation CRITICALITY ignore  TYPE
ResourceCoordinationTransferInformation PRESENCE optional   }|
    { ID id-SCGIndicator                                CRITICALITY ignore  TYPE SCGIndicator
                        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-W1AP-ID                    CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                          PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                    CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
                          PRESENCE mandatory  }|
    { ID id-ResourceCoordinationTransferContainer   CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer   PRESENCE optional   }|
    { ID id-DUtoCURRCInformation                   CRITICALITY reject  TYPE DUtoCURRCInformation
                          PRESENCE optional}|
    { ID id-DRBs-SetupMod-List                     CRITICALITY ignore  TYPE DRBs-SetupMod-List
                          PRESENCE optional}|
    { ID id-DRBs-Modified-List                     CRITICALITY ignore  TYPE DRBs-Modified-List
                          PRESENCE optional}|
    { ID id-SRBs-FailedToBeSetupMod-List           CRITICALITY ignore  TYPE SRBs-
FailedToBeSetupMod-List             PRESENCE optional   }|
    { ID id-DRBs-FailedToBeSetupMod-List           CRITICALITY ignore  TYPE DRBs-
FailedToBeSetupMod-List             PRESENCE optional   }|
    { ID id-SCell-FailedtoSetupMod-List            CRITICALITY ignore  TYPE SCell-FailedtoSetupMod-
List                PRESENCE optional   }|
    { ID id-DRBs-FailedToBeModified-List           CRITICALITY ignore  TYPE DRBs-
FailedToBeModified-List             PRESENCE optional   }|
    { ID id-InactivityMonitoringResponse           CRITICALITY reject  TYPE
InactivityMonitoringResponse                PRESENCE optional   }|
    { ID id-C-RNTI                                 CRITICALITY ignore  TYPE C-RNTI
                          PRESENCE optional   }|
    { ID id-SRBs-SetupMod-List                     CRITICALITY ignore  TYPE SRBs-SetupMod-List
                          PRESENCE optional   }|
    { ID id-SRBs-Modified-List                     CRITICALITY ignore  TYPE 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



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

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

UEContextModificationFailureIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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-W1AP-ID                          CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                                PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                          CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
                                PRESENCE mandatory  }|
    { ID id-ResourceCoordinationTransferContainer        CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer       PRESENCE optional   }|
    { ID id-DUtoCURRCInformation                         CRITICALITY reject  TYPE
DUtoCURRCInformation                              PRESENCE optional}|
    { ID id-DRBs-Required-ToBeModified-List              CRITICALITY reject  TYPE DRBs-Required-
ToBeModified-List               PRESENCE optional}|
    { ID id-SRBs-Required-ToBeReleased-List              CRITICALITY reject  TYPE SRBs-Required-
ToBeReleased-List               PRESENCE optional}|
    { ID id-DRBs-Required-ToBeReleased-List              CRITICALITY reject  TYPE DRBs-Required-
ToBeReleased-List               PRESENCE optional}|
    { ID id-Cause                                        CRITICALITY ignore  TYPE Cause
                                PRESENCE mandatory  },
    ...
}

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 W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID                          CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                                    PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                          CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
                                    PRESENCE mandatory  }|
    { ID id-ResourceCoordinationTransferContainer        CRITICALITY ignore  TYPE
ResourceCoordinationTransferContainer       PRESENCE optional   }|
    { ID id-DRBs-ModifiedConf-List                       CRITICALITY ignore  TYPE DRBs-ModifiedConf-
List                            PRESENCE optional}|
    { ID id-RRCContainer                                 CRITICALITY ignore  TYPE RRCContainer
                                PRESENCE optional   }|
    { ID id-ResourceCoordinationTransferInformation      CRITICALITY ignore  TYPE
ResourceCoordinationTransferInformation PRESENCE optional   },
    ...
}
```

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


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

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


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


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

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

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

WriteReplaceWarningRequestIEs W1AP-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 W1AP-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 W1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID                   CRITICALITY reject TYPE TransactionID
    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   }|
    { ID id-NotificationInformation                 CRITICALITY reject TYPE NotificationInformation
                        PRESENCE mandatory  },
    ...
}

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 W1AP-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 W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID                         CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                            PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                         CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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
--
-- **************************************************************

InitialULRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ InitialULRRCMessageTransferIEs}},
    ...
}

InitialULRRCMessageTransferIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-DU-UE-W1AP-ID     CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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-DUtoCURRCContainer      CRITICALITY reject  TYPE DUtoCURRCContainer     PRESENCE
optional    }|
    { ID id-TransactionID           CRITICALITY ignore  TYPE TransactionID  PRESENCE mandatory  },
    ...
}


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

-- **************************************************************
--
-- DL RRC Message Transfer
--
-- **************************************************************

DLRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ DLRRCMessageTransferIEs}},
    ...
}

DLRRCMessageTransferIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID    PRESENCE mandatory
    }|
    { ID id-ngeNB-DU-UE-W1AP-ID CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID    PRESENCE mandatory
    }|
    { ID id-oldngeNB-DU-UE-W1AP-ID                      CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
                            PRESENCE optional   }|
    { ID id-SRBID                                       CRITICALITY reject  TYPE SRBID
                            PRESENCE mandatory  }|
    { ID id-RRCContainer                                CRITICALITY reject  TYPE RRCContainer
                            PRESENCE mandatory  },
    ...
}
-- **************************************************************
--
-- UL RRC Message Transfer ELEMENTARY PROCEDURE
--
```

```
-- **************************************************************

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

ULRRCMessageTransfer ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       {{ ULRRCMessageTransferIEs}},
    ...
}

ULRRCMessageTransferIEs W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID             CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-ID
    PRESENCE mandatory  }|
    { ID id-SRBID                           CRITICALITY reject  TYPE SRBID
    PRESENCE mandatory  }|
    { ID id-RRCContainer                    CRITICALITY reject  TYPE RRCContainer
    PRESENCE mandatory  },
    ...
}

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

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

PrivateMessage-IEs W1AP-PRIVATE-IES ::= {
    ...
}


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

-- **************************************************************
--
-- Paging
--
-- **************************************************************

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

PagingIEs W1AP-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 W1AP-PROTOCOL-IES ::= {
    { ID id-ngeNB-CU-UE-W1AP-ID                CRITICALITY reject  TYPE NGENB-CU-UE-W1AP-ID
                PRESENCE mandatory  }|
    { ID id-ngeNB-DU-UE-W1AP-ID                CRITICALITY reject  TYPE NGENB-DU-UE-W1AP-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 W1AP-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 W1AP-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 W1AP-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
--
-- **************************************************************

W1AP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) w1ap (3) version1 (1) w1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    id-NotificationInformation,
    id-AdditionalSIBMessageList,
    maxEARFCN,
    maxnoofAdditionalSIBs,
    maxnoofErrors,
    maxnoofBPLMNs,
    maxnoofDLUPTNLInformation,
    maxnoofE-UTRANCellBands,
    maxnoofULUPTNLInformation,
    maxnoofQoSFlows,
    maxnoofSliceItems,
    maxnoofSIBTypes,
    maxCellineNB,
    maxnoofExtendedBPLMNs,
    maxBandsEutra

FROM W1AP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage

FROM W1AP-CommonDataTypes

    ProtocolExtensionContainer{},
    W1AP-PROTOCOL-EXTENSION,
    ProtocolIE-SingleContainer{},
```

```
    W1AP-PROTOCOL-IES

FROM W1AP-Containers;

-- A

AdditionalSIBMessageList ::= SEQUENCE (SIZE(1..maxnoofAdditionalSIBs)) OF AdditionalSIBMessageList-
Item

AdditionalSIBMessageList-Item ::= SEQUENCE {
    additionalSIB           OCTET STRING,
    iE-Extensions       ProtocolExtensionContainer { { AdditionalSIBMessageList-Item-ExtIEs} }
OPTIONAL
}

AdditionalSIBMessageList-Item-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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

AveragingWindow  ::= INTEGER (0..4095, ...)

-- B

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

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

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

BPLMN-ID-Info-Item ::= SEQUENCE {
    pLMN-Identity-List          AvailablePLMNList,
    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 W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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

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

Cause-ExtIEs W1AP-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-w1ap-id,
    unknown-or-already-allocated-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,
    ...
}

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

```
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    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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


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

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

DRBs-ModifiedConf-Item  ::= SEQUENCE {
    dRBID                           DRBID,
    uLUPTNLInformation-ToBeSetup-List       ULUPTNLInformation-ToBeSetup-List,
    iE-Extensions   ProtocolExtensionContainer { { DRBs-ModifiedConf-ItemExtIEs } } OPTIONAL,
    ...
}

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

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

DRB-Notify-ItemExtIEs   W1AP-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 ::= {
    {ID id-MeasGapSharingConfig     CRITICALITY ignore  EXTENSION MeasGapSharingConfig      PRESENCE
optional},

    ...
}

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

EUTRANCGI ::= SEQUENCE {
    pLMN-Identity           PLMN-Identity,
    eUTRACellIdentity       E-UTRACellIdentity,
    iE-Extensions           ProtocolExtensionContainer { {EUTRANCGI-ExtIEs} } OPTIONAL,
    ...
}

EUTRANCGI-ExtIEs W1AP-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 W1AP-PROTOCOL-IES ::= {
    ...
}


E-UTRACellIdentity ::= 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     W1AP-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 W1AP-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 W1AP-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  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

FreqBandEutraItem ::= SEQUENCE {
    freqBandIndicatorEutra      INTEGER (1.. maxBandsEutra),
    iE-Extensions               ProtocolExtensionContainer { {FreqBandEutraItem-ExtIEs} } OPTIONAL,
    ...
}

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


NGENB-CUSystemInformation::= SEQUENCE {
    sibtypetobeupdatedlist  SEQUENCE (SIZE(1.. maxnoofSIBTypes)) OF SibtypetobeupdatedListItem,
    iE-Extensions                   ProtocolExtensionContainer { { NGENB-CUSystemInformation-
ExtIEs} } OPTIONAL,
    ...
}

NGENB-CUSystemInformation-ExtIEs W1AP-PROTOCOL-EXTENSION ::= {
    ...
}


NGENB-CU-UE-W1AP-ID ::= INTEGER (0..4294967295)

NGENB-DU-UE-W1AP-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    W1AP-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 W1AP-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 W1AP-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

MeasGapSharingConfig ::= OCTET STRING

MeasurementTimingConfiguration ::= OCTET STRING

MessageIdentifier ::= BIT STRING (SIZE (16))

-- 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,...}

NotificationInformation ::= SEQUENCE {
    message-Identifier  MessageIdentifier,
    serialNumber        SerialNumber,
    iE-Extensions       ProtocolExtensionContainer { { NotificationInformationExtIEs} } OPTIONAL,
    ...
}

NotificationInformationExtIEs       W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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,
    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 ::= {
    {ID id-NotificationInformation      CRITICALITY ignore  EXTENSION NotificationInformation
    PRESENCE mandatory}|
    {ID id-AdditionalSIBMessageList     CRITICALITY reject  EXTENSION AdditionalSIBMessageList
    PRESENCE optional},
    ...
}


-- 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, ...)

SCGIndicator    ::= ENUMERATED {released, ...}
```

```
SIBType-PWS ::=INTEGER (6..8,...)

SelectedBandCombinationIndex ::= OCTET STRING

SelectedFeatureSetEntryIndex ::= OCTET STRING

SerialNumber ::= BIT STRING (SIZE (16))

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,
    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   W1AP-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   W1AP-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   W1AP-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 W1AP-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   W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SliceSupportList ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF SliceSupportItem

SliceSupportItem ::= SEQUENCE {
    sNSSAI  SNSSAI,
    iE-Extensions               ProtocolExtensionContainer { { SliceSupportItem-ExtIEs } }
    OPTIONAL,
    ...
}

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

SNSSAI ::= SEQUENCE {
    sST         OCTET STRING (SIZE(1)),
    sD          OCTET STRING (SIZE(3))  OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { SNSSAI-ExtIEs } }    OPTIONAL,
    ...
}

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

SRBs-FailedToBeSetupMod-Item    ::= SEQUENCE {
    sRBID       SRBID,
    cause       Cause       OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-FailedToBeSetupMod-ItemExtIEs } }
    OPTIONAL,
    ...
}

SRBs-FailedToBeSetupMod-ItemExtIEs  W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-Modified-Item ::= SEQUENCE {
    sRBID                           SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Modified-ItemExtIEs } } OPTIONAL,
    ...
}

SRBs-Modified-ItemExtIEs    W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-Required-ToBeReleased-Item ::= SEQUENCE {
    sRBID   SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Required-ToBeReleased-ItemExtIEs } }
    OPTIONAL,
    ...
}

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

SRBs-Setup-Item ::= SEQUENCE {
    sRBID                           SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-Setup-ItemExtIEs } }    OPTIONAL,
    ...
}

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

SRBs-SetupMod-Item ::= SEQUENCE {
    sRBID                       SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-SetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

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

SRBs-ToBeReleased-Item  ::= SEQUENCE {
    sRBID           SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeReleased-ItemExtIEs } } OPTIONAL,
    ...
}

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

SRBs-ToBeSetup-Item ::= SEQUENCE {
    sRBID           SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeSetup-ItemExtIEs } }    OPTIONAL,
    ...
}
```

```
SRBs-ToBeSetup-ItemExtIEs   W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

SRBs-ToBeSetupMod-Item  ::= SEQUENCE {
    sRBID   SRBID,
    iE-Extensions   ProtocolExtensionContainer { { SRBs-ToBeSetupMod-ItemExtIEs } } OPTIONAL,
    ...
}

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

TransmissionActionIndicator ::= ENUMERATED {stop, ..., restart }

TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

-- U

UE-associatedLogicalW1-ConnectionItem ::= SEQUENCE {
    ngeNB-CU-UE-W1AP-ID     NGENB-CU-UE-W1AP-ID  OPTIONAL,
    ngeNB-DU-UE-W1AP-ID     NGENB-DU-UE-W1AP-ID  OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { UE-associatedLogicalW1-
ConnectionItemExtIEs} } OPTIONAL,
    ...
}

UE-associatedLogicalW1-ConnectionItemExtIEs W1AP-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 W1AP-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     W1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UPTransportLayerInformation     ::= CHOICE {
    gTPTunnel                   GTPTunnel,
    choice-extension            ProtocolIE-SingleContainer { { UPTransportLayerInformation-ExtIEs} }
}

UPTransportLayerInformation-ExtIEs W1AP-PROTOCOL-IES ::= {
    ...
}
-- V

-- W

-- X

-- Y

-- Z

END
-- ASN1STOP
```

9.4.6 Common Definitions

```
-- ASN1START
-- **************************************************************
--
-- Common definitions
--
-- **************************************************************

W1AP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) w1ap (3) version1 (1) w1ap-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, unsuccessfull-outcome }

END
-- ASN1STOP
```

9.4.7 Constant Definitions

```
-- ASN1START
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************

W1AP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) w1ap (3) version1 (1) w1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    ProcedureCode,
    ProtocolIE-ID

FROM W1AP-CommonDataTypes;


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

id-Reset                                    ProcedureCode ::= 0
id-W1Setup                                  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-DLRRCMessageTransfer                     ProcedureCode ::= 12
id-ULRRCMessageTransfer                     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
maxnoofIndividualW1ConnectionsToReset   INTEGER ::= 65536
maxCellinngeNBDU                        INTEGER ::= 512
maxnoofSCells                           INTEGER ::= 32
maxnoofSRBs                             INTEGER ::= 8
maxnoofDRBs                             INTEGER ::= 64
maxnoofULUPTNLInformation               INTEGER ::= 2
maxnoofDLUPTNLInformation               INTEGER ::= 2
maxnoofBPLMNs                           INTEGER ::= 6
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
maxCellineNB                            INTEGER ::= 256
maxnoofExtendedBPLMNs                   INTEGER ::= 6
maxnoofUEIDs                            INTEGER ::= 65536
maxBandsEutra                           INTEGER ::= 256
maxnoofAdditionalSIBs                   INTEGER ::= 63

-- **************************************************************
--
-- 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-W1AP-ID                                  ProtocolIE-ID ::= 21
id-ngeNB-DU-UE-W1AP-ID                                  ProtocolIE-ID ::= 22
id-ngeNB-DU-ID                                          ProtocolIE-ID ::= 23
id-ngeNB-DU-Served-Cells-List                           ProtocolIE-ID ::= 24
id-oldngeNB-DU-UE-W1AP-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-associatedLogicalW1-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-DUtoCURRCContainer                                    ProtocolIE-ID ::= 66
id-DRB-Notify-List                                       ProtocolIE-ID ::= 67
id-NotficationControl                                    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-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
id-NotificationInformation                               ProtocolIE-ID ::= 89
id-AdditionalSIBMessageList                              ProtocolIE-ID ::= 90
id-MeasGapSharingConfig                                  ProtocolIE-ID ::= 91
id-SCGIndicator                                          ProtocolIE-ID ::= 92


END
-- ASN1STOP
```

9.4.8 Container Definitions

```
-- ASN1START
-- **************************************************************
--
-- Container definitions
--
-- **************************************************************

W1AP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) w1ap (3) version1 (1) w1ap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    Criticality,
    Presence,
    PrivateIE-ID,
```

```
    ProtocolExtensionID,
    ProtocolIE-ID

FROM W1AP-CommonDataTypes
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs

FROM W1AP-Constants;

-- **************************************************************
--
-- Class Definition for Protocol IEs
--
-- **************************************************************

W1AP-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
--
-- **************************************************************

W1AP-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 {W1AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
    SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField {W1AP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
    id                  W1AP-PROTOCOL-EXTENSION.&id             ({ExtensionSetParam}),
    criticality         W1AP-PROTOCOL-EXTENSION.&criticality    ({ExtensionSetParam}{@id}),
    extensionValue      W1AP-PROTOCOL-EXTENSION.&Extension      ({ExtensionSetParam}{@id})
}

-- ************************************************************
--
-- Container for Private IEs
--
-- ************************************************************

PrivateIE-Container {W1AP-PRIVATE-IES : IEsSetParam } ::=
    SEQUENCE (SIZE (1.. maxPrivateIEs)) OF
    PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field {W1AP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
    id                  W1AP-PRIVATE-IES.&id                ({IEsSetParam}),
    criticality         W1AP-PRIVATE-IES.&criticality       ({IEsSetParam}{@id}),
```

```
    value               W1AP-PRIVATE-IES.&Value             ({IEsSetParam}{@id})
}

END
-- ASN1STOP
```

9.5 Message Transfer Syntax

W1AP 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#100	R3-183555				BL TS submission for approval.	
2019-08	RAN3#105	R3-184888				Capture the agreed main W1 AP procedures: R3-194563, R3-194564, R3-194565	0.1.0
2019-10	RAN3#105-Bis	R3-196137				Add the stage3 paging procedure	0.1.0
2019-10	RAN3#105-Bis	R3-196136				Add Warning message transmission related procedures with corresponding tabular	0.1.0
2019-10	RAN3#105-Bis	R3-196192				Add RRC message Transfer related procedures with corresponding tabular	0.1.0
2019-11	RAN3#106	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
2020-09	RP-89-e	RP-201948	0003	1	F	Corrections to encoding PLMNs in served cell information	16.3.0
2020-09	RP-89-e	RP-201948	0004	-	F	Miscellaneous clean-ups to 37.473	16.3.0
2020-09	RP-89-e	RP-201948	0005	1	F	Correction on PWS related procedure	16.3.0
2021-03	RP-91-e	RP-210235	0006	1	F	CR to 37.473 on miscellaneous corrections	16.4.0
2021-06	RP-92-e	RP-211314	0007	2	F	CR to 37.473 on MeasGapSharingConfig	16.5.0
2021-06	RP-92-e	RP-211314	0008	2	F	Stage-3 CR on SCG release over W1 (Rel-16)	16.5.0

History

Document history		
V16.2.0	September 2020	Publication
V16.3.0	November 2020	Publication
V16.4.0	April 2021	Publication
V16.5.0	August 2021	Publication