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Xw application protocol (XwAP)
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Contents

Foreword

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

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1 Scope

The present document specifies the signalling procedures of the control plane between an eNB and WLAN Termination (WT). The Xw Application Protocol (XwAP) supports the functions of Xw interface by signalling procedures defined in this document.

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 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[3] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)".

[4] 3GPP TS 36.462: “Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw signalling support”

[5] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER) ".

[6] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[7] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".

[8] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".

[9] 3GPP TS 36.401: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Architecture description".

[10] Wi-Fi Alliance® Technical Committee, Hotspot 2.0 Technical Task Group Hotspot 2.0 (Release 2) Technical Specification Version 3.11.

[11] IEEE Std 802.11™-2012, IEEE Standard for Information technology-Telecommunications and information exchange between systems-Local and metropolitan area network.

[12] 3GPP TR 25.921: "Guidelines and principles for protocol description and error handling”

[13] 3GPP TS 23.203: "Numbering, addressing and identification"

[14] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access"

[15] 3GPP TS 36.464: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN) and Wireless LAN (WLAN); Xw data transport"

[16] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunnelling Protocol User Plane (GTPv1-U)"

[17] 3GPP TS 33.401: "3GPP System Architecture Evolution (SAE); Security architecture"

[18] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions 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: XwAP protocol consists of Elementary Procedures (EPs). An XwAP Elementary Procedure is a unit of interaction between an eNB and WT. An EP consists of an initiating message and possibly a response message. Two kinds of EPs are used:

- **Class 1:** Elementary Procedures with response (success or failure),
- **Class 2:** Elementary Procedures without response.

eNB UE XwAP ID: Defined in TS 36.401 [9].

E-RAB: Defined in TS 36.401 [9].

LWA bearer: Defined in TS 36.300 [2].

LWIP-SeGW: Defined in TS 33.401 [17].

UE-associated signalling: Refers to XwAP messages associated to one UE, and which use the respective UE-associated logical Xw connection.

UE-associated logical Xw connection: The UE-associated logical Xw connection transports UE-associated signalling. The identities WT UE XwAP ID and eNB UE XwAP ID are used to identify the particular UE-associated logical Xw connection that a message relates to.

WLAN Termination: Defined in TS 36.300 [2].

WT UE XwAP ID: Defined in TS 36.401 [9].

3.2 Abbreviations

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

AC	Access Category
DL	Downlink
eNB	E-UTRAN NodeB
EP	Elementary Procedure
EPC	Evolved Packet Core
E-RAB	E-UTRAN Radio Access Bearer
E-UTRAN	Evolved UTRAN
IE	Information Element
IKE	Internet Key Exchange
LWA	LTE/WLAN Aggregation
LWIP	LTE/WLAN Radio Level Integration with IPsec Tunnel
LWIP-SeGW	LWIP Security GateWay
PDCP	Packet Data Convergence Protocol

RCLWI	RAN Controlled LTE-WLAN Interworking
SN	Sequence Number
TAC	Tracking Area Code
UE	User Equipment
UL	Uplink
WT	WLAN Termination
Xw UP	Xw User Plane

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 initiating 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 section 10.

4.2 Forwards and backwards compatibility

The forwards and backwards compatibility of the protocol is assured by a 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 sub clause 9.2 enclosed by quotation marks, e.g. "Value".

5 XwAP services

5.1 General

The present clause describes the services offered between an eNB and WT.

5.2 XwAP procedures

The Xw interface XwAP procedures may be UE-associated or non UE-associated. UE-associated XwAP procedures are used to handle the configuration and modification to support LWA or LWIP for a specific UE. Non UE-associated procedures support LWA, RCLWI and/or LWIP, and are not related to a specific UE.

5.3 Parallel transactions

Unless explicitly indicated in the procedure specification, at any instance in time one protocol peer shall have a maximum of one ongoing XwAP procedure related to a certain UE.

6 Services expected from signalling transport

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

Xw signalling transport is described in TS 36.462 [4].

7 Functions of XwAP

The XwAP protocol provides the following functions:

- Setting up the Xw. This function is used to exchange the necessary data for the eNB and the WT to set up the Xw interface and implicitly perform an Xw Reset.
- WT Configuration Update. This function allows updating of application level data needed for the eNB and the WT to interoperate correctly on the Xw interface.
- WLAN Status Reporting. This function allows the eNB to configure reporting of load-related information from the WT.
- LTE-WLAN Aggregation. This function allows the eNB to request a WT to provide radio resources for LWA operation for a certain UE while keeping responsibility for that UE.
- LTE-WLAN Radio Level Integration with IPsec Tunnel. This function allows the eNB to request a WT to provide tunnel resources for LWIP operation for a certain UE while keeping responsibility for that UE.
- Reporting of General Error Situations. This function allows reporting of general error situations, for which function specific error messages have not been defined.
- Resetting the Xw. This function is used to reset the Xw interface.

The mapping between the above functions and Xw EPs is shown in the table below.

Table 7-1: Mapping between XwAP functions and XwAP EPs

Function	Elementary Procedure(s)
WLAN Status Reporting	a) WT Status Reporting Initiation b) WT Status Reporting
Setting up the Xw	Xw Setup
WT Configuration Update	WT Configuration Update
LTE-WLAN Aggregation	a) WT Addition Preparation b) WT Association Confirmation c) eNB Initiated WT Modification d) WT Initiated WT Modification e) eNB Initiated WT Release f) WT Initiated WT Release
LTE-WLAN Radio Level Integration with IPsec Tunnel	a) LWIP Addition Preparation b) eNB Initiated LWIP Modification c) eNB Initiated LWIP Release d) WT Initiated LWIP Release
Reporting of General Error Situations	Error Indication
Resetting the Xw	Reset

8 XwAP procedures

8.1 Elementary procedures

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

Table 8.1-1: Class 1 Elementary Procedures

Elementary Procedure	Initiating Message	Successful Outcome	Unsuccessful Outcome
		Response message	Response message
Xw Setup	Xw SETUP REQUEST	Xw SETUP RESPONSE	Xw SETUP FAILURE
WT Configuration Update	WT CONFIGURATION UPDATE	WT CONFIGURATION UPDATE ACKNOWLEDGE	WT CONFIGURATION UPDATE FAILURE
WT Status Reporting Initiation	WT STATUS REQUEST	WT STATUS RESPONSE	WT STATUS FAILURE
WT Addition Preparation	WT ADDITION REQUEST	WT ADDITION REQUEST ACKNOWLEDGE	WT ADDITION REQUEST REJECT
eNB Initiated WT Modification	WT MODIFICATION REQUEST	WT MODIFICATION REQUEST ACKNOWLEDGE	WT MODIFICATION REQUEST REJECT
WT Initiated WT Modification	WT MODIFICATION REQUIRED	WT MODIFICATION CONFIRM	WT MODIFICATION REFUSE
WT Initiated WT Release	WT RELEASE REQUIRED	WT RELEASE CONFIRM	
Reset	RESET REQUEST	RESET RESPONSE	
LWIP Addition Preparation	LWIP ADDITION REQUEST	LWIP ADDITION REQUEST ACKNOWLEDGE	LWIP ADDITION REQUEST REJECT
eNB Initiated LWIP Modification	LWIP MODIFICATION REQUEST	LWIP MODIFICATION REQUEST ACKNOWLEDGE	LWIP MODIFICATION REQUEST REJECT
WT Initiated LWIP Release	LWIP RELEASE REQUIRED	LWIP RELEASE CONFIRM	

Table 8.1-2: Class 2 Elementary Procedures

Elementary Procedure	Initiating Message
WT Status Reporting	WT STATUS REPORT
Error Indication	ERROR INDICATION
WT Association Confirmation	WT ASSOCIATION CONFIRMATION
eNB Initiated WT Release	WT RELEASE REQUEST
eNB Initiated LWIP Release	LWIP RELEASE REQUEST

8.2 Xw Setup

8.2.1 General

The purpose of the Xw Setup procedure is to exchange application level configuration data needed for the eNB and the WT to interoperate correctly over the Xw interface. This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also resets the Xw interface.

The procedure uses non-UE-associated signalling.

8.2.2 Successful Operation

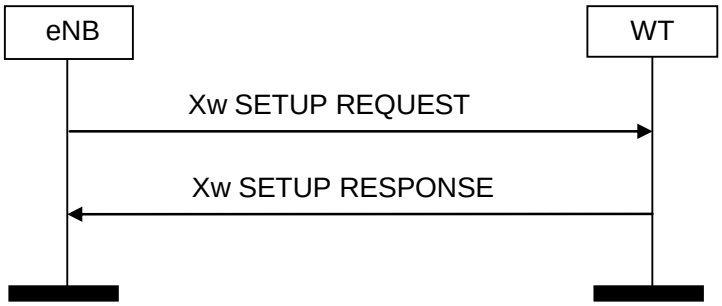

Figure 8.2.2-1: Xw Setup, successful operation

An eNB initiates the procedure by sending the Xw SETUP REQUEST message to a candidate WT. The candidate WT replies with the Xw SETUP RESPONSE message. The candidate WT shall reply with a list of relevant WLAN identifiers.

If the *WLAN Usage* IE is included in the *WLAN Information* IE, the eNB shall consider that the relevant WLAN identifier(s) may be used for both LWA and LWIP, or for LWIP only; otherwise, the relevant WLAN identifier(s) may be used for LWA only.

If the *Neighbour eNB Information* IE is included in the Xw SETUP RESPONSE message, the eNB shall consider the included information as the list of eNBs to which the WT is connected.

8.2.3 Unsuccessful Operation

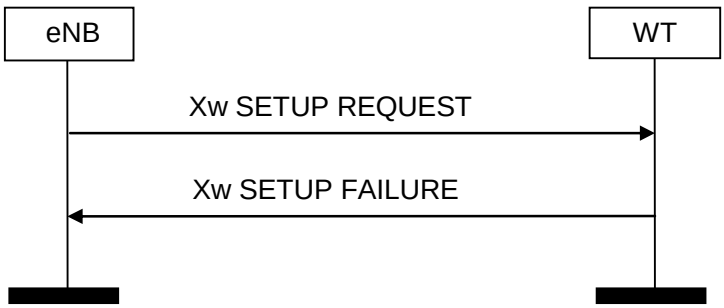

Figure 8.2.3-1: Xw Setup, unsuccessful operation

If the candidate WT cannot accept the setup, it shall respond with an Xw SETUP FAILURE message with an appropriate cause value.

If the Xw SETUP FAILURE message includes the *Time To Wait* IE the initiating eNB shall wait at least for the indicated time before reinitiating the Xw Setup procedure towards the same WT.

8.2.4 Abnormal Conditions

If the first message received for a specific TNL association is not an Xw SETUP REQUEST, Xw SETUP RESPONSE, or Xw SETUP FAILURE message, then this shall be treated as a logical error.

8.3 WT Configuration Update

8.3.1 General

The purpose of the WT Configuration Update procedure is to update application level configuration data needed for an eNB and a WT to interoperate correctly over the Xw interface.

The procedure uses non-UE-associated signalling.

8.3.2 Successful Operation

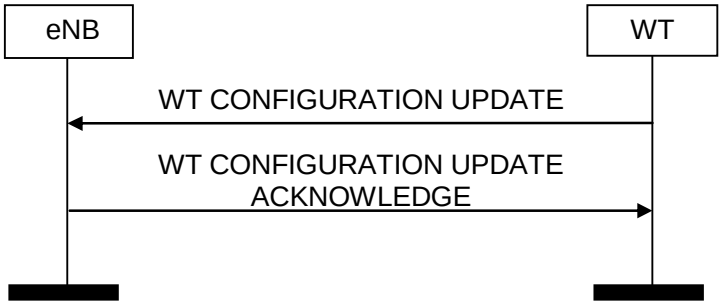

Figure 8.3.2-1: WT Configuration Update, successful operation

A WT initiates the procedure by sending a WT CONFIGURATION UPDATE message to an eNB. Such message shall include an appropriate set of up-to-date configuration data, including, but not limited to, relevant lists of added, modified and deleted WLAN identifiers that the WT has just taken into operational use.

If the *WLAN Usage* IE is included in the *WLAN Information* IE, the eNB shall consider that the relevant WLAN identifier(s) may be used for both LWA and LWIP, or for LWIP only; otherwise, the relevant WLAN identifier(s) may be used for LWA only.

If the *Neighbour eNB Information* IE is included in the WT CONFIGURATION UPDATE message, the eNB shall consider the included information as the full updated list of eNBs to which the WT is connected.

8.3.3 Unsuccessful Operation

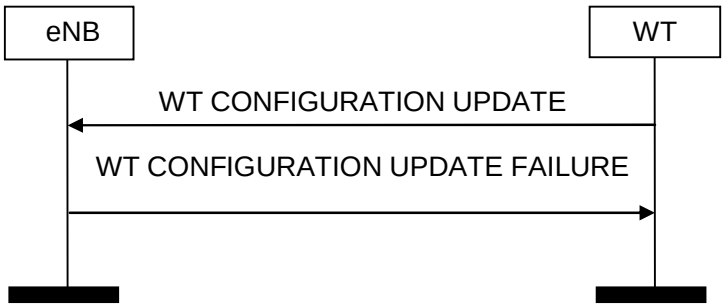

Figure 8.3.3-1: WT Configuration Update, successful operation

If the eNB cannot accept the update, it shall respond with a WT CONFIGURATION UPDATE FAILURE message with an appropriate cause value.

If the WT CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE the WT shall wait at least for the indicated time before reinitiating the WT Configuration Update procedure towards the same eNB. Both nodes shall continue to operate the Xw with their existing configuration data.

8.3.4 Abnormal Conditions

Not applicable.

8.4 WT Status Reporting Initiation

8.4.1 General

This procedure is used by an eNB to request the reporting of load measurements to a WT.

The procedure uses non-UE-associated signalling.

8.4.2 Successful Operation

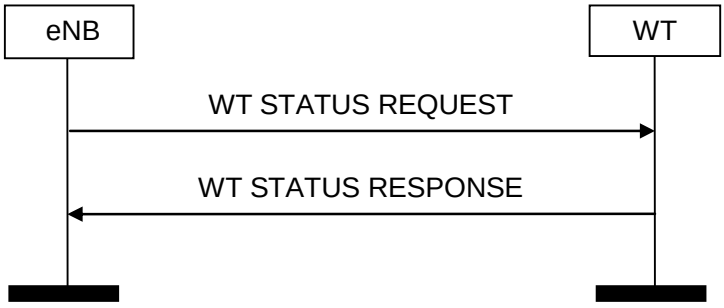

Figure 8.4.2-1: WT Status Reporting Initiation procedure, successful operation

The procedure is initiated with a WT STATUS REQUEST message sent from the eNB to the WT. Upon receipt, the WT shall initiate the requested measurement according to the parameters given in the request in case the *Registration Request* IE is set to "start" and shall stop all measurements and terminate the reporting in case the *Registration Request* IE is set to “stop".

If the *Registration Request* IE is set to "start" then the *Report Characteristics* IE shall be included in WT STATUS REQUEST message.

The *Report Characteristics* IE indicates the type of objects WT shall perform measurements on.

For each BSS, the WT shall include in the WT STATUS REPORT message:

- the *BSS Load* IE, if the first bit, “BSS Load” of the *Report Characteristics* IE included in the WT STATUS REQUEST message is set to 1;
- the *WAN Metrics* IE, if the second bit, “WAN Metrics” of the *Report Characteristics* IE included in the WT STATUS REQUEST message is set to 1;
- the *Available Channel Utilization* IE, if the third bit, “Available Channel Utilization” of the *Report Characteristics* IE included in the WT STATUS REQUEST message is set to 1.

If the *Reporting Periodicity* IE is included in the WT STATUS REQUEST message, the WT shall use its value as the time interval between two subsequent WT STATUS REPORT messages.

If the WT is capable to provide all requested resource status information, it shall initiate the measurement as requested by the eNB, and respond with the WT STATUS RESPONSE message.

If the WT is capable to provide some but not all of the requested resource status information and the *Partial Success Indicator* IE is present in the WT STATUS REQUEST, it shall initiate the measurement for the admitted measurement objects and include the *Measurement Initiation Result* IE in the WT STATUS RESPONSE message.

If the WT received a WT STATUS REQUEST message which includes the *Registration Request* IE set to "stop", it shall ignore the *Report Characteristics*, the *BSS To Report List*, the *Reporting Periodicity*, and the *Partial Success Indicator* IEs.

8.4.3 Unsuccessful Operation

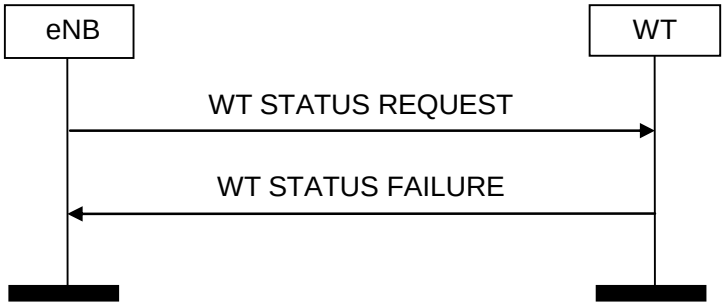

Figure 8.4.3-1: WT Status Reporting Initiation procedure, unsuccessful operation

If none of the requested measurements can be initiated, the WT shall send a WT STATUS FAILURE message. The *Cause* IE shall be set to an appropriate value for each requested measurement object. The eNB may include the *Complete Failure Cause Information* IE in the WT STATUS FAILURE message.

8.4.4 Abnormal Conditions

If the eNB does not receive either WT STATUS RESPONSE message or WT STATUS FAILURE message, the eNB may reinitiate the WT Status Reporting Initiation procedure towards the WT, provided that the content of the new WT STATUS REQUEST message is identical to the content of the previously unacknowledged WT STATUS REQUEST message.

If the eNB receives the WT STATUS RESPONSE message including the *Measurement Initiation Result* IE containing no admitted measurements, the eNB shall consider the procedure as failed.

If the *Registration Request* IE is set to "start" and the *Report Characteristics* IE bitmap is set to "0" (all bits are set to "0") in the WT STATUS REQUEST message, then the WT shall initiate a WT STATUS FAILURE message, the cause shall be set to appropriate value e.g. "ReportCharacteristicsEmpty".

If the *Registration Request* IE is set to "start" and the *Reporting Periodicity* IE value is not specified, then the WT shall initiate a WT STATUS FAILURE message, the cause shall be set to appropriate value e.g. "No Report Periodicity".

If the WT received a WT STATUS REQUEST message which includes the *Registration Request* IE set to "start" and the *eNB Measurement ID* IE corresponding to an existing on-going load measurement reporting, then the WT shall initiate a WT STATUS FAILURE message, the cause shall be set to appropriate value e.g. "ExistingMeasurement ID".

If the *Registration Request* IE is set to "stop" and the WT STATUS REQUEST message does not contain *WT Measurement ID* IE, the WT shall consider the procedure as failed and respond with the WT STATUS FAILURE message, the cause shall be set to appropriate value e.g. "Unknown Measurement ID".

8.5 WT Status Reporting

8.5.1 General

This procedure is initiated by the WT to report the result of measurements admitted by the WT following a successful WT Status Reporting Initiation procedure.

The procedure uses non-UE-associated signalling.

8.5.2 Successful Operation

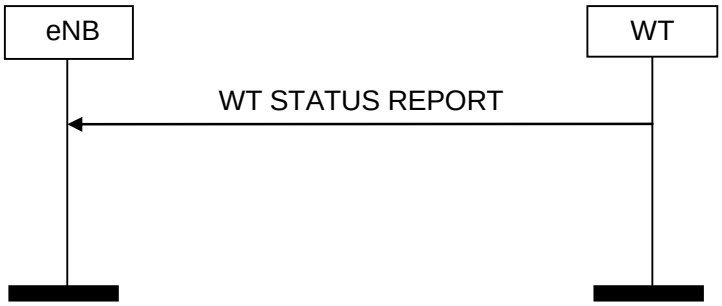

Figure 8.5.2-1: WT Status Reporting procedure, successful operation

The WT shall report the results of the admitted measurements in the WT STATUS REPORT message. The admitted measurements are the measurements that were successfully initiated during the preceding WT Status Reporting Initiation procedure.

8.5.3 Unsuccessful Operation

Not applicable.

8.5.4 Abnormal Conditions

Not applicable.

8.6 Error Indication

8.6.1 General

The Error Indication procedure is initiated by a node 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 which used UE-associated signalling, then the Error Indication procedure uses UE-associated signalling. Otherwise the procedure uses non UE-associated signalling.

8.6.2 Successful Operation

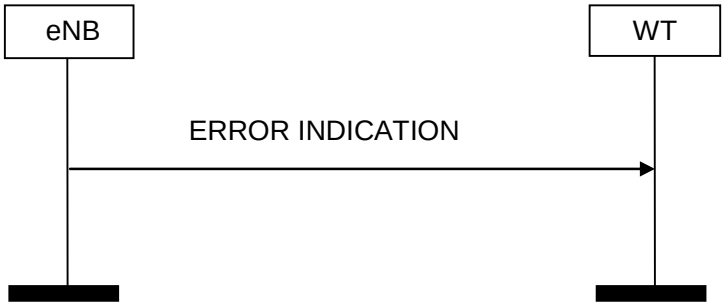

Figure 8.6.2-1: Error Indication procedure, eNB originated. Successful operation.

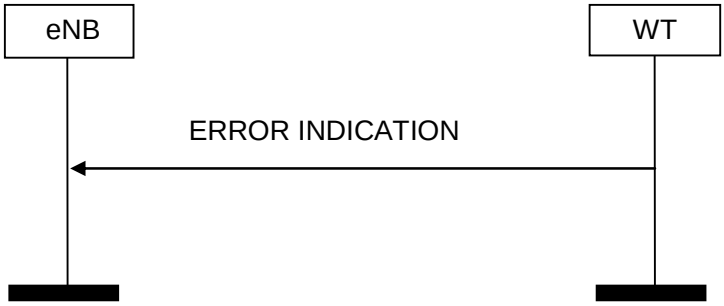

Figure 8.6.2-2: Error Indication procedure, WT originated. Successful operation.

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 either the *Cause* IE or the *Criticality Diagnostics* IE. In case the Error Indication procedure is triggered by UE associated signalling, the *eNB UE XwAP ID* IE and the WT *UE XwAP ID* IE shall be included in the ERROR INDICATION message. If one or both of *eNB UE XwAP ID* IE and the *WT UE XwAP ID* IE are not correct, the cause shall be set to an appropriate value, e.g., “Unknown eNB UE XwAP ID”, “Unknown WT UE XwAP ID” or “Unknown pair of UE XwAP ID”.

8.6.3 Unsuccessful Operation

Not applicable.

8.6.4 Abnormal Conditions

Not applicable.

8.7 Reset

8.7.1 General

The purpose of the Reset procedure is to align the resources in the eNB and in the WT in the event of an abnormal failure. The procedure resets the Xw interface. This procedure does not affect the application level configuration data exchanged during, e.g., the Xw Setup procedure.

The procedure uses non UE-associated signalling.

8.7.2 Successful Operation

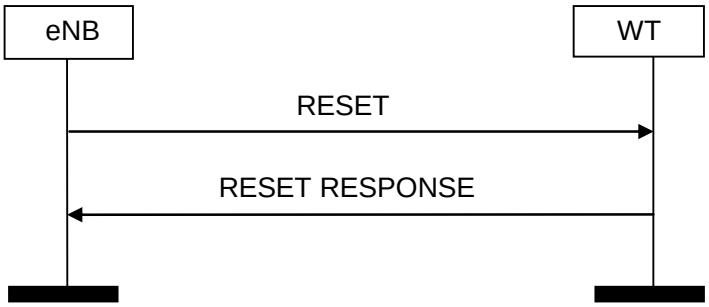

Figure 8.7.2-1: Reset, eNB-initiated. Successful operation.

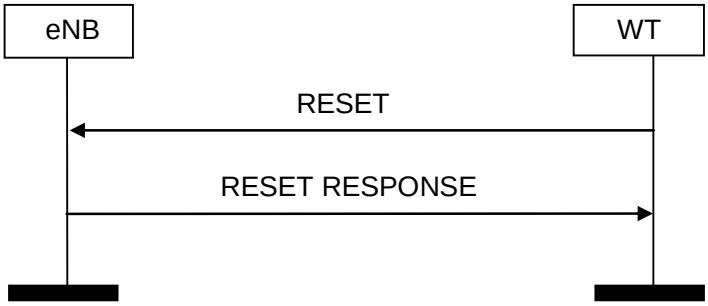

Figure 8.7.2-2: Reset, WT-initiated. Successful operation.

The procedure is initiated with a RESET message sent from the initiating node. Upon receipt of this message, the receiving node shall abort any other ongoing procedures (except another Reset procedure) over Xw with the initiating node. The receiving node shall delete all the context information related to the initiating node, except the application level configuration data exchanged during Xw Setup or WT Configuration Update procedures, and release the corresponding resources. After completing the release of the resources, the receiving node shall respond with a RESET RESPONSE message.

8.7.3 Unsuccessful Operation

Not applicable.

8.7.4 Abnormal Conditions

If Reset procedure is ongoing and the receiving node receives the RESET message from the peer entity on the same Xw interface, the receiving node shall respond with the RESET RESPONSE message as described in 8.7.2.

8.8 WT Addition Preparation

8.8.1 General

The purpose of the WT Addition Preparation procedure is to request the WT to allocate resources for LWA operation for a specific UE.

The procedure uses UE-associated signalling and, in case of successful operation, establishes a new UE-associated logical Xw-connection.

8.8.2 Successful Operation

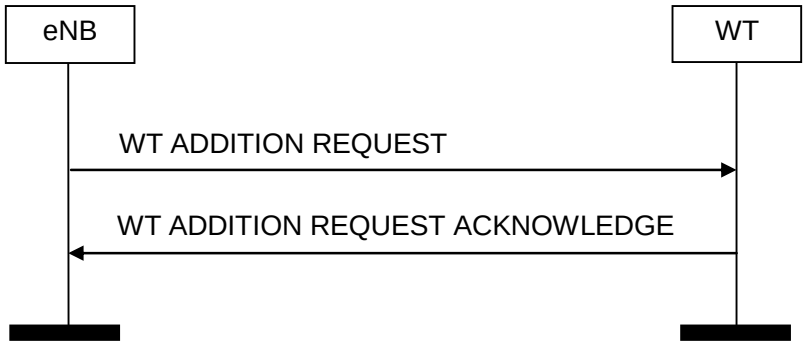

Figure 8.8.2-1: WT Addition Preparation, successful operation

The eNB initiates the procedures by sending the WT ADDITION REQUEST message to the WT.

The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *E-RAB Level QoS Parameters* IE shall follow the principles described for the E-RAB Setup Procedure in TS 36.413 [8].

NOTE: Due to inherent features of the WLAN radio interface, it may not always be possible to guarantee a bit rate. If the *GBR QoS Information* IE is present in the WT ADDITION REQUEST, the WT may accept the request even though it may not be able to guarantee the bit rate signalled in the *GBR QoS Information* IE. The eNB may therefore need to monitor the bit rate of offloaded GBR bearers.

If the WT ADDITION REQUEST message contains the *Serving PLMN* IE, the WT may take it into account for the allocation of resources for LWA.

If the WT ADDITION REQUEST message contains the *WT UE XwAP ID* IE, the WT shall use the included information to identify the UE.

If the *DRB-Identity* IE is present in an item in the *E-RABs To Be Added List* IE in the WT ADDITION REQUEST message, the WT shall consider that the respective LWA bearer is configured for uplink.

At reception of the WT ADDITION REQUEST message the WT shall:

- use the information included in the *Mobility Set* IE as the WLAN Mobility Set configured for LWA, as defined in TS 36.300 [2];
- store the *WLAN Security Information* IE, if included, and use it to establish the required security relation towards the UE.

The WT shall report to the eNB, in the WT ADDITION REQUEST ACKNOWLEDGE message, the result for all the requested E-RABs in the following way:

- A list of E-RABs which are successfully established shall be included in the *E-RABs Admitted To Be Added List* IE.
- A list of E-RABs which failed to be established shall be included in the *E-RABs Not Admitted List* IE.

For each admitted uplink E-RAB to be added, the WT may include the *LWA WLAN AC* IE in the WT ADDITION REQUEST ACKNOWLEDGE message, and, if included, the eNB shall use the respective information as the LWA WLAN Access Category to be forwarded to the UE, as specified in TS 36.300 [2].

If the WT ADDITION REQUEST ACKNOWLEDGE message contains the *WT MAC Address* IE, the eNB shall, if supported, communicate this information to the UE.

8.8.3 Unsuccessful Operation

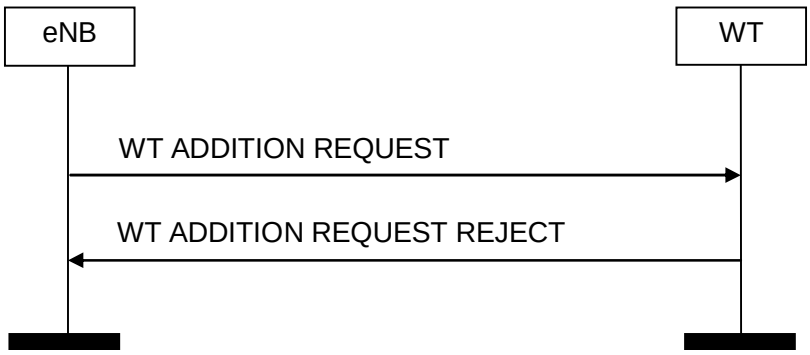

Figure 8.8.3-1: WT Addition Preparation, unsuccessful operation

If the WT is not able to accept at least one of the bearers or a failure occurs during the WT Addition Preparation, the WT sends the WT ADDITION REQUEST REJECT message with an appropriate cause value to the eNB.

8.8.4 Abnormal Conditions

If the WT receives a WT ADDITION REQUEST message containing multiple *E-RAB ID* IEs (in the *E-RABs To Be Added List* IE) set to the same value, the WT shall consider the establishment of the corresponding E-RAB as failed.

If the WT receives a WT ADDITION REQUEST message containing an *E-RAB Level QoS Parameters* IE which contains a *QCI* IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the *GBR QoS Information* IE, the WT shall consider the establishment of the corresponding E-RAB as failed.

If the WT receives a WT ADDITION REQUEST message containing the *WT UE XwAP ID* IE but it is not able to identify the UE, it shall reply with the WT ADDITION REQUEST REJECT message with an appropriate cause value.

8.9 eNB Initiated WT Modification

8.9.1 General

This procedure is used to enable an eNB to request a WT to modify the UE context at the WT.

The procedure uses UE-associated signalling.

8.9.2 Successful Operation

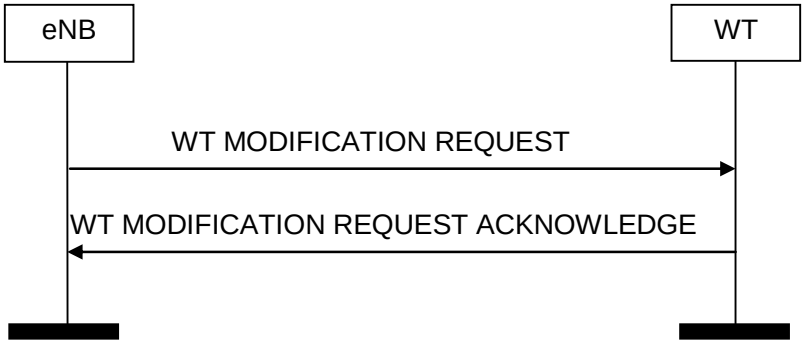

Figure 8.9.2-1: eNB initiated WT Modification, successful operation

The eNB initiates the procedure by sending the WT MODIFICATION REQUEST message to the WT.

The WT MODIFICATION REQUEST message may contain within the *UE Context Information* IE:

- E-RABs to be added within the *E-RABs To Be Added Item* IE;
- E-RABs to be modified within the *E-RABs To Be Modified Item* IE;
- E-RABs to be released within the *E-RABs To Be Released Item* IE;
- WLAN security information in the *WLAN Security Information* IE.

If the *WLAN Security Information* IE is included in the WT MODIFICATION REQUEST message the WT shall store the information contained in this IE, and use it to establish the required security relation towards the UE.

The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *E-RAB Level QoS Parameters* IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [8].

NOTE: Due to inherent features of the WLAN radio interface, it may not always be possible to guarantee a bit rate. If the *GBR QoS Information* IE is present in the WT MODIFICATION REQUEST, the WT may accept the request even though it may not be able to guarantee the bit rate signalled in the *GBR QoS Information* IE. The eNB may therefore need to monitor the bit rate of offloaded GBR bearers.

If the *DRB-Identity* IE is present in an item in the *E-RABs To Be Added List* IE in the WT MODIFICATION REQUEST message, the WT shall consider that the respective LWA bearer is configured for uplink.

If the WT MODIFICATION REQUEST message contains the *Serving PLMN* IE, the WT may take it into account for the allocation of resources for LWA.

If at least one of the requested modifications is admitted by the WT, the WT shall modify the related part of the UE context accordingly and send the WT MODIFICATION REQUEST ACKNOWLEDGE message back to the eNB.

The WT shall include the E-RABs for which resources have been either added or modified or released at the WT either in the *E-RABs Admitted To Be Added List* IE or the *E-RABs Admitted To Be Modified List* IE or the *E-RABs Admitted To Be Released List* IE. The WT shall include the E-RABs that have not been admitted in the *E-RABs Not Admitted List* IE with an appropriate cause value.

For each admitted uplink E-RAB to be added or modified, the WT may include the *LWA WLAN AC* IE in the WT MODIFICATION REQUEST ACKNOWLEDGE message, and, if included, the eNB shall use the respective information as the LWA WLAN Access Category to be forwarded to the UE, as specified in TS 36.300 [2].

For each E-RAB to be modified, if the WT MODIFICATION REQUEST message includes the *eNB GTP Tunnel Endpoint* IE in the *E-RABs To Be Modified Item* IE, the WT shall act as specified in TS 36.300 [2].

For each E-RAB to be released, if the DL Forwarding GTP Tunnel Endpoint IE is included within the E-RABs To Be Released Item IE in the WT MODIFICATION REQUEST message, the WT may perform data forwarding of downlink packets for that bearer.

If the *E-RAB level QoS parameter* IE is included in the WT MODIFICATION REQUEST message for an E-RAB to be modified, the WT shall allocate respective resources as described in TS 36.300 [2].

For an E-RAB to be modified, the WT may include in the WT MODIFICATION REQUEST ACKNOWLEDGE message the *WT GTP Tunnel Endpoint* IE.

If the *Mobility Set* IE is included in the WT MODIFICATION REQUEST message, the WT shall use the information included in this IE as the WLAN Mobility Set configured for LWA, as defined in TS 36.300 [2].

8.9.3 Unsuccessful Operation

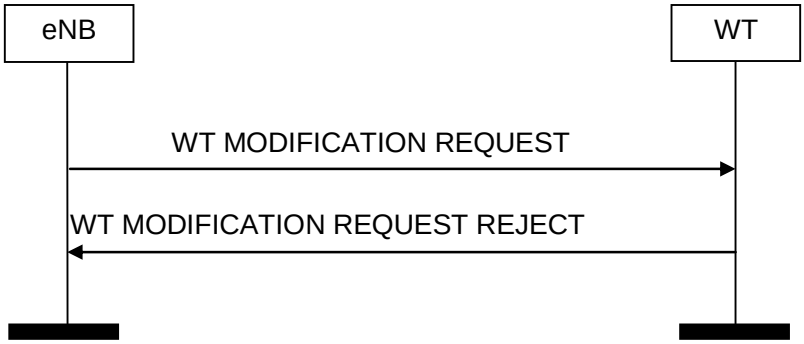

Figure 8.9.3-1: eNB initiated WT Modification, unsuccessful operation

If the WT does not admit any modification requested by the eNB, or a failure occurs during the eNB initiated WT Modification, the WT shall send the WT MODIFICATION REQUEST REJECT message to the eNB. The message shall contain the *Cause* IE with an appropriate value.

8.9.4 Abnormal Conditions

If the WT receives a WT MODIFICATION REQUEST message containing multiple *E-RAB ID* IEs (in the *E-RABs To Be Added List* IE and/or the *E-RABs To Be Modified List* IE) set to the same value, the WT shall not admit the action requested for the corresponding E-RABs.

If the WT receives a WT MODIFICATION REQUEST message containing multiple *E-RAB ID* IEs (in the *E-RAB To Be Released List* IE) set to the same value, the WT shall initiate the release of one corresponding E-RAB and ignore the duplication of the instances of the selected corresponding E-RABs.

If the WT receives a WT MODIFICATION REQUEST message containing a *E-RAB Level QoS Parameters* IE which contains a *QCI* IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the *GBR QoS Information* IE, the WT shall not admit the corresponding E-RAB.

Interaction with the WT initiated WT Modification procedure:

If the eNB, after having initiated the eNB initiated WT Modification procedure, receives the WT MODIFICATION REQUIRED message, the eNB shall refuse the WT initiated WT Modification procedure with an appropriate cause value in the *Cause* IE.

8.10 WT Initiated WT Modification

8.10.1 General

This procedure is used by the WT to modify the UE context in the WT. In particular, in this Release of the specification, this procedure is used to request to the eNB the release of LWA bearers, or change their WT GTP Tunnel Endpoints.

The procedure uses UE-associated signalling.

8.10.2 Successful Operation

Figure 8.10.2-1: WT initiated WT Modification, successful operation

The WT initiates the procedure by sending the WT MODIFICATION REQUIRED message to the eNB.

The WT MODIFICATION REQUIRED message may contain

- E-RABs to be released within the *E-RABs To Be Released Item* IE;
- E-RABs to be modified within the *E-RABs To Be Modified Item* IE.

If the *WT GTP Tunnel Endpoint* IE is present in the *E-RABs To Be Modified Item* IE for a particular E-RAB, the eNB shall use this information to change the Xw transport bearer associated to the concerned E-RAB.

For each uplink E-RAB to be modified, the WT may include the *LWA WLAN AC* IE in the WT MODIFICATION REQUIRED message, and, if included, the eNB shall use the respective information as the LWA WLAN Access Category to be forwarded to the UE, as specified in TS 36.300 [2].

If the eNB is able to perform at least one of the modifications requested by the WT, the eNB shall send the WT MODIFICATION CONFIRM message to the WT with the appropriate information in the *E-RABs Confirmed To Be Released List* and/or *E-RABs Confirmed To Be Modified List* IEs. For each E-RAB to be released, if the *DL Forwarding GTP Tunnel Endpoint* IE is included within the *E-RABs Confirmed To Be Released Item* IE in the WT MODIFICATION CONFIRM message, the WT may perform data forwarding of downlink packets for that bearer.

8.10.3 Unsuccessful Operation

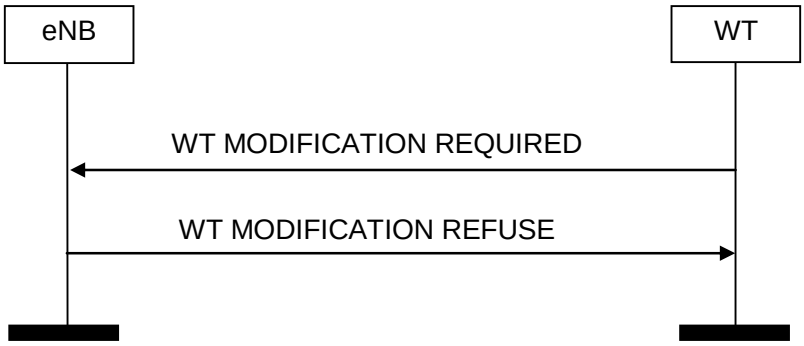

Figure 8.10.3-1: WT initiated WT Modification, unsuccessful operation

In case none of the requested modifications can be performed successfully the eNB shall respond with the WT MODIFICATION REFUSE message to the WT with an appropriate cause value in the *Cause* IE.

8.10.4 Abnormal Conditions

If the value received in the *E-RAB ID* IE of any of the *E-RABs To Be Released Item* IE or of the *E-RABs To Be Modified Item* IE is not known at the eNB, the eNB shall regard the procedure as failed and may take appropriate actions like triggering the eNB initiated WT Release procedure.

Interaction with the eNB initiated WT Modification Preparation procedure:

If the WT, after having initiated the WT initiated WT Modification procedure, receives the WT MODIFICATION REQUEST message, the WT shall

- regard the WT initiated WT Modification Procedure as failed,
- be prepared to receive the WT MODIFICATION REFUSE message from the eNB, and
- continue with the eNB initiated WT Modification procedure as specified in Section 8.9.

8.11 eNB Initiated WT Release

8.11.1 General

The eNB initiated WT Release procedure is triggered by the eNB to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

8.11.2 Successful Operation

Figure 8.11.2-1: eNB initiated WT Release, successful operation

The eNB initiates the procedure by sending the WT RELEASE REQUEST message. Upon reception of the WT RELEASE REQUEST message the WT shall stop providing user data to the UE. The eNB may provide appropriate information within the *Cause* IE.

For each E-RAB, if the *DL Forwarding GTP Tunnel Endpoint* IE is included within the *E-RABs To Be Released Item* IE in the WT RELEASE REQUEST message, the WT may perform data forwarding of downlink packets for that bearer.

Upon reception of the WT RELEASE REQUEST message containing the *UE Context Kept Indicator* IE set to "True", the WT shall, if supported, only initiate the release of the resources related to the UE-associated signaling connection between the eNB and the WT.

8.11.3 Unsuccessful Operation

Not applicable.

8.11.4 Abnormal Conditions

Not applicable.

8.12 WT Initiated WT Release

8.12.1 General

This procedure is triggered by the WT to initiate the release of the resources for a specific UE.

The procedure uses UE-associated signalling.

8.12.2 Successful Operation

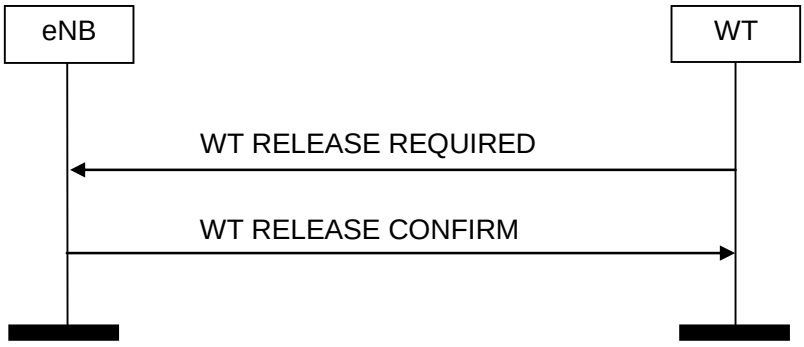

Figure 8.12.2-1: WT initiated WT Release, successful operation

The WT initiates the procedure by sending the WT RELEASE REQUIRED message to the eNB.

Upon reception of the WT RELEASE REQUIRED message, the eNB replies with the WT RELEASE CONFIRM message. For each E-RAB, if the *DL Forwarding GTP Tunnel Endpoint* IE is included within the *E-RABs To Be Released Item* IE in the WT RELEASE CONFIRM message, the WT may perform data forwarding of downlink packets for that bearer.

The WT may start data forwarding and stop providing user data to the UE upon reception of the WT RELEASE CONFIRM message.

8.12.3 Unsuccessful Operation

Not applicable.

8.12.4 Abnormal Conditions

Not applicable.

8.13 WT Association Confirmation

8.13.1 General

This procedure is initiated by the WT to give confirmation to the eNB that a certain UE successfully associated with the WLAN following a successful WT Addition Preparation procedure.

The procedure uses UE-associated signalling.

8.13.2 Successful Operation

Figure 8.13.2-1: WT Association Confirm procedure, successful operation

The WT initiates the procedure by sending the WT ASSOCIATION CONFIRMATION message to the eNB.

Upon reception of the WT ASSOCIATION CONFIRMATION message, the eNB shall consider that the UE is associated with the WLAN, and that user plane data for that UE may be sent to the WT.

8.13.3 Unsuccessful Operation

Not applicable.

8.13.4 Abnormal Conditions

Not applicable.

8.14 LWIP Addition Preparation

8.14.1 General

The purpose of the LWIP Addition Preparation procedure is to request the WT to configure tunnel resources for LWIP operation for a specific UE.

The procedure uses UE-associated signalling and, in case of successful operation, establishes a new UE-associated logical Xw-connection.

8.14.2 Successful Operation

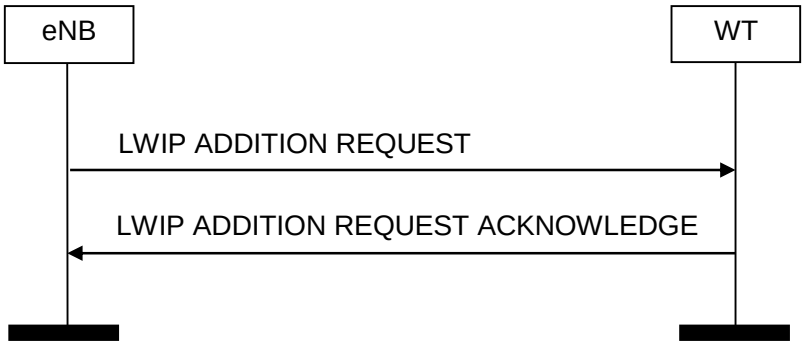

Figure 8.14.2-1: LWIP Addition Preparation, successful operation

The eNB initiates the procedures by sending the LWIP ADDITION REQUEST message to the WT.

At reception of the LWIP ADDITION REQUEST message the WT shall use the received information to configure resources for LWIP for the UE, as defined in TS 36.300 [2].

If the LWIP ADDITION REQUEST message contains the *Serving PLMN* IE, the WT may take it into account for the allocation of resources for LWIP.

If the LWIP ADDITION REQUEST message contains the *Mobility Set* IE, the WT shall use the included information as described in TS 36.300 [2].

If the LWIP ADDITION REQUEST message contains the *eNB GTP Tunnel Endpoint* IE, the WT shall use the included information to configure the LWIP user plane for the UE.

The WT shall respond to the eNB with the LWIP ADDITION REQUEST ACKNOWLEDGE message.

If the *LWIP-SeGW GTP Tunnel Endpoint* IE is included in the LWIP ADDITION REQUEST ACKNOWLEDGE message, the eNB shall use the included information to configure the LWIP user plane for the UE.

8.14.3 Unsuccessful Operation

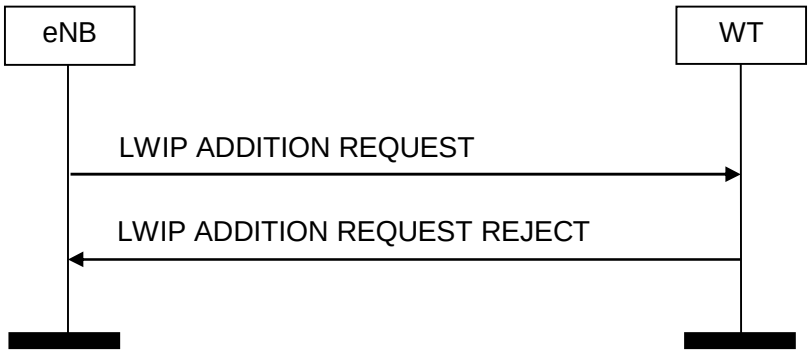

Figure 8.14.3-1: LWIP Addition Preparation, unsuccessful operation

If the WT is not able to configure tunnel resources for LWIP operation for the UE or a failure occurs during the LWIP Addition Preparation, the WT sends the LWIP ADDITION REQUEST REJECT message with an appropriate cause value to the eNB.

8.14.4 Abnormal Conditions

Not applicable.

8.15 eNB Initiated LWIP Modification

8.15.1 General

This procedure is used to enable an eNB to request a WT to modify the UE context for LWIP at the WT.

The procedure uses UE-associated signalling.

8.15.2 Successful Operation

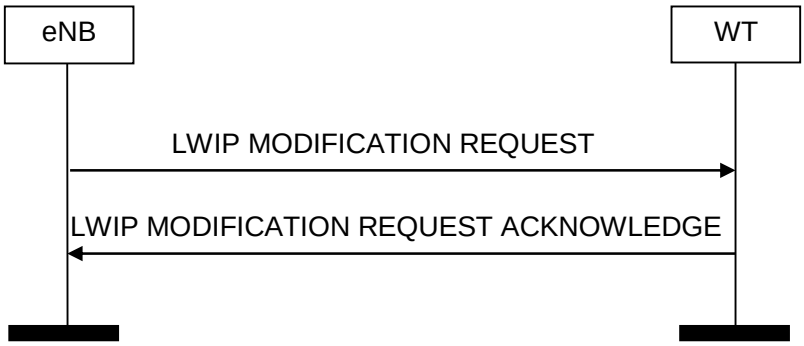

Figure 8.15.2-1: eNB initiated LWIP Modification, successful operation

The eNB initiates the procedure by sending the LWIP MODIFICATION REQUEST message to the WT.

If the LWIP MODIFICATION REQUEST message contains the *Serving PLMN* IE, the WT may take it into account for the allocation of resources for LWIP.

If the *Mobility Set* IE is included in the LWIP MODIFICATION REQUEST message, the WT shall use the information included in this IE as defined in TS 36.300 [2].

If at least one of the requested modifications is admitted by the WT, the WT shall modify the related part of the UE context accordingly and send the LWIP MODIFICATION REQUEST ACKNOWLEDGE message back to the eNB.

8.15.3 Unsuccessful Operation

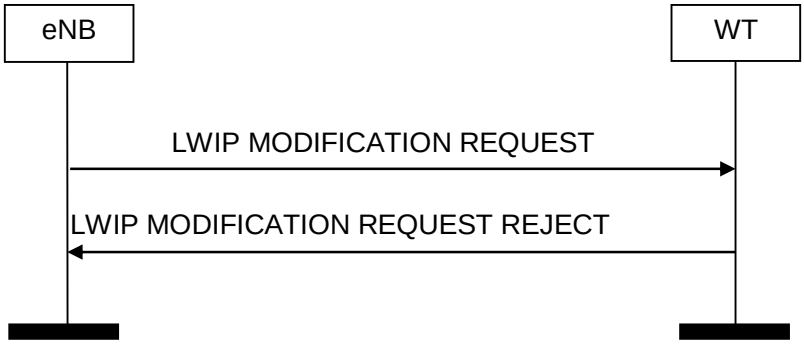

Figure 8.15.3-1: eNB initiated LWIP Modification, unsuccessful operation

If the WT does not admit any modification requested by the eNB, or a failure occurs during the eNB initiated LWIP Modification, the WT shall send the LWIP MODIFICATION REQUEST REJECT message to the eNB. The message shall contain the *Cause* IE with an appropriate value.

8.15.4 Abnormal Conditions

Not applicable.

8.16 eNB Initiated LWIP Release

8.16.1 General

The eNB initiated LWIP Release procedure is triggered by the eNB to initiate the release of tunnel resources for LWIP operation for a specific UE.

The procedure uses UE-associated signalling.

8.16.2 Successful Operation

Figure 8.16.2-1: eNB initiated LWIP Release, successful operation

The eNB initiates the procedure by sending the LWIP RELEASE REQUEST message. Upon reception of the LWIP RELEASE REQUEST message the WT shall release LWIP tunnel resources for the UE. The eNB may provide appropriate information within the *Cause* IE.

8.16.3 Unsuccessful Operation

Not applicable.

8.16.4 Abnormal Conditions

Not applicable.

8.17 WT Initiated LWIP Release

8.17.1 General

This procedure is triggered by the WT to initiate the release of tunnel resources for LWIP operation for a specific UE.

The procedure uses UE-associated signalling.

8.17.2 Successful Operation

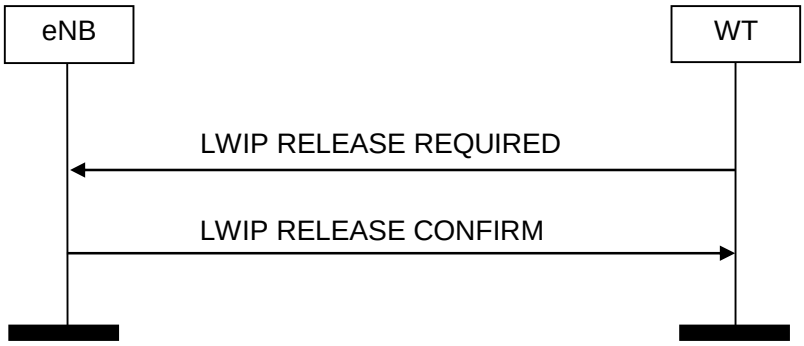

Figure 8.17.2-1: WT initiated LWIP Release, successful operation

The WT initiates the procedure by sending the LWIP RELEASE REQUIRED message to the eNB.

Upon reception of the LWIP RELEASE REQUIRED message, the eNB replies with the LWIP RELEASE CONFIRM message.

The WT may stop providing user data for LWIP operation to the UE upon reception of the LWIP RELEASE CONFIRM message.

8.17.3 Unsuccessful Operation

Not applicable.

8.17.4 Abnormal Conditions

Not applicable.

9 Elements for XwAP Communication

9.0 General

Sub clauses 9.1 and 9.2 describe the structure of the messages and information elements required for the XwAP protocol in tabular format. Sub clause 9.3 provides the corresponding ASN.1 definition.

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 36.413 [8].

NOTE: The messages have been defined in accordance to the guidelines specified in TR 25.921 [12].

9.1 Message Functional Definition and Content

9.1.1 Xw SETUP REQUEST

This message is sent by an eNB to a WT to transfer the initialization information for a TNL association.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Global eNB ID	M		9.2.2		YES	reject

9.1.2 Xw SETUP RESPONSE

This message is sent by a WT to a requesting eNB to transfer the initialization information for a TNL association.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
WT ID	M		9.2.6		YES	reject
WLAN Identifier List		*1*		List of identifiers supported by the WT	YES	reject
>WLAN Identifier Item		*1..<maxnoofWLANIdentifierItems>*				
>>WLAN Information	M		9.2.7			
Neighbour eNB Information		*0..< maxnoofeNBNeighbours >*				
>Global eNB ID	M		9.2.2			
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofWLANIdentifierItems	Maximum number of WLAN Identifier Items. The value is 4096.
maxnoofeNBNeighbours	Maximum number of eNBs a WT can connect to. The value is 256

9.1.3 Xw SETUP FAILURE

This message is sent by the WT to indicate Xw Setup failure.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore
Time To Wait	O		9.2.29		YES	ignore

9.1.4 WT CONFIGURATION UPDATE

This message is sent by a WT to an eNB to transfer updated information for a TNL association.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
WLAN Identifiers To Add List		*0..1*		List of identifiers added by the WT	GLOBAL	reject
>WLAN Identifiers To Add Item		*1..< maxnoofWLANIdentifierItems>*				
>>WLAN Information	M		9.2.7			
WLAN Identifiers To Modify List		*0..1*		List of identifiers modified by the WT	GLOBAL	reject
>WLAN Identifiers To Modify Item		*1..< maxnoofWLANIdentifierItems>*				
>>WLAN Information	M		9.2.7			
WLAN Identifiers To Delete List		*0..1*		List of identifiers deleted by the WT	GLOBAL	reject
>WLAN Identifiers To Delete Item		*1..< maxnoofWLANIdentifierItems >*				
>>Old BSSID	M		BSSID 9.2.8			
WLAN Identifiers To Delete Extension List		*0..1*		List of identifiers deleted by the WT	GLOBAL	reject
>WLAN Identifiers To Delete extension Item		*1..<maxnoofWLANIdentifierItems >*				
>>Old SSID	O		SSID 9.2.9			
>>Old HESSID	O		HESSID 9.2.10			
Neighbour eNB Information		*0..< maxnoofeNBNeighbours >*				
>Global eNB ID	M		9.2.2			

Range bound	Explanation
maxnoofWLANIdentifierItems	Maximum number of WLAN Identifier Items. The value is 4096.
maxnoofeNBNeighbours	Maximum number of eNBs a WT can connect to. The value is 256

9.1.5 WT CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by an eNB to a WT to acknowledge update of information for a TNL association.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.6 WT CONFIGURATION UPDATE FAILURE

This message is sent by an eNB to a WT to indicate WT Configuration Update Failure.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore
Time To Wait	O		9.2.29		YES	ignore

9.1.7 WT STATUS REQUEST

This message is sent by an eNB to a WT to initiate the requested measurement according to the parameters given in the message.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB Measurement ID	M		INTEGER (1..4095,...)	Allocated by the eNB	YES	reject
WT Measurement ID	C-ifRegistrationRequestStop		INTEGER (1..4095,...)	Allocated by the WT	YES	ignore
Registration Request	M		ENUMERATED(start, stop, …)	A value set to “stop”, indicates a request to stop all BSS measurements.	YES	reject
Report Characteristics	O		BITSTRING (SIZE(32))	Each position in the bitmap indicates measurement object the WT is requested to report. First Bit = BSS Load, Second Bit = WAN Metrics, Third bit = Available Channel Utilization. Other bits shall be ignored by the WT.	YES	reject
BSS To Report List		*1*		List of BSSs for which measurement is needed	YES	ignore
>BSS To Report Item		*1 .. <maxnoofBSSs>*			EACH	ignore
>>BSSID	M		9.2.8		–	–
Reporting Periodicity	O		ENUMERATED(10ms, 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s, …)		YES	ignore
Partial Success Indicator	O		ENUMERATED(partial success allowed, …)	Included if partial success is allowed	YES	ignore

Range bound	Explanation
maxnoofBSSs	Maximum number of BSS Items in a list. The value is 4096.

Condition	Explanation
ifRegistrationRequestStop	This IE shall be present if the *Registration Request* IE is set to the value “stop”.

9.1.8 WT STATUS RESPONSE

This message is sent by the WT to indicate that the requested measurement, for all or for a subset of the measurement objects included in the measurement request, is successfully initiated.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB Measurement ID	M		INTEGER (1..4095,...)	Allocated by the eNB	YES	reject
WT Measurement ID	M		INTEGER (1..4095,...)	Allocated by the WT	YES	reject
Measurement Initiation Result List		*0..1*		List of all BSSs in which measurement objects were requested, included when indicating partial success	YES	ignore
>Measurement Initiation Result Item		*1 .. <maxnoofBSSs>*			EACH	ignore
>>BSSID	M		9.2.8		–	–
>>Measurement Failure Cause List		*0..1*		Indicates that WT could not initiate the measurement for at least one of the requested measurement objects in the BSS	–	–
>>>Measurement Failure Cause Item		*1 .. <maxnoofFailed MeasObjects>*			EACH	ignore
>>>>Measurement Failed Report Characteristics	M		BITSTRING (SIZE(32))	Each position in the bitmap indicates measurement object that failed to be initiated in the WT. First Bit = BSS Load, Second Bit = WAN Metrics, Third Bit = Available Channel Utilization. Other bits shall be ignored by the eNB.	–	–
>>>>Cause	M		9.2.4	Failure cause for measurement objects for which the measurement cannot be initiated	–	–
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofBSSs	Maximum number of BSSs Items in a list. The value is 4096.
maxnoofFailedMeasObjects	Maximum number of measurement objects that can fail per measurement. Value is 32.

9.1.9 WT STATUS FAILURE

This message is sent by the WT to indicate that none of the requested measurements can be initiated.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB Measurement ID	M		INTEGER (1..4095,...)	Allocated by the eNB	YES	reject
WT Measurement ID	M		INTEGER (1..4095,...)	Allocated by the WT	YES	reject
Complete Failure Cause Information List		*0..1*		Complete list of failure causes for all requested cells	YES	ignore
>Complete Failure Cause Information Item		*1 .. <maxnoofBSSs>*			EACH	ignore
>>BSSID	M		9.2.8		–	–
>>Measurement Failure Cause List		*1*			–	–
>>>Measurement Failure Cause Item		*1 .. <maxnoofFailed MeasObjects>*			EACH	ignore
>>>>Measurement Failed Report Characteristics	M		BITSTRING (SIZE(32))	Each position in the bitmap indicates measurement object that failed to be initiated in the WT. First Bit = BSS Load, Second Bit = WAN Metrics, Third Bit = Available Channel Utilization. Other bits shall be ignored by the eNB.	–	–
>>>>Cause	M		9.2.4	Failure cause for measurements that cannot be initiated	–	–
Cause	M		9.2.4	Ignored by the receiver when the *Complete Failure Cause Information* IE is included	YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofBSSs	Maximum number of BSS Items in a list. The value is 4096.
maxnoofFailedMeasObjects	Maximum number of measurement objects that can fail per measurement. Value is 32.

9.1.10 WT STATUS REPORT

This message is sent by the WT to the eNB to report the results of the requested measurements.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	ignore
eNB Measurement ID	M		INTEGER (1..4095,...)	Allocated by the eNB	YES	reject
WT Measurement ID	M		INTEGER (1..4095,...)	Allocated by the WT	YES	reject
BSS Measurement Result List		*1*			YES	ignore
>BSS Measurement Result Item		*1 .. <maxnoofBSSs>*			EACH	ignore
>>BSSID	M		9.2.8			
>>BSS Load	O		9.2.11			
>>WAN Metrics	O		9.2.12			
>>Available Channel Utilization	O		9.2.26			

Range bound	Explanation
maxnoofBSSs	Maximum number of BSS Items in a list. The value is 4096.

9.1.11 ERROR INDICATION

This message is used to indicate that some error has been detected in the originating node.

Direction: eNB → WT and WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	ignore
eNB UE XwAP ID	O		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	O		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Cause	O		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.12 RESET

This message is used to request the Xw interface to be reset.

Direction: eNB → WT and WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Cause	M		9.2.4		YES	ignore

9.1.13 RESET RESPONSE

This message is sent as a response to a RESET message.

Direction: WT → eNB and eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.14 WT ADDITION REQUEST

This message is sent by the eNB to the WT to request the preparation of resources for LTE-WLAN aggregation for a specific UE.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
UE Identity	M		9.2.16		YES	reject
WLAN Security Information	O		9.2.27		YES	reject
Serving PLMN	O		PLMN Identity 9.2.3	The serving PLMN for the UE.	YES	ignore
E-RABs To Be Added List		*1*			YES	reject
>E-RABs To Be Added Item		*1 .. <maxnoof Bearers>*			EACH	reject
>>E-RAB ID	M		9.2.18		–	–
>>E-RAB Level QoS Parameters	M		9.2.19	Includes necessary QoS parameters	–	–
>> eNB GTP Tunnel Endpoint	M		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the eNB	–	–
>>DRB-Identity	O		9.2.33	Mapping between DRB and E-RAB ID for UL bearers.	YES	reject
Mobility Set	M		9.2.28		YES	reject
WT UE XwAP ID	O		UE XwAP ID 9.2.24	Previously assigned by the WT	YES	reject

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.15 WT ADDITION REQUEST ACKNOWLEDGE

This message is sent by the WT to confirm to the eNB about the WT addition preparation.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
E-RABs Admitted To Be Added List		*1*			YES	ignore
>E-RABs Admitted To Be Added Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
>>WT GTP Tunnel Endpoint	M		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the WT.	–	–
>>LWA WLAN AC	O		9.2.34		YES	ignore
E-RABs Not Admitted List	O		E-RAB List 9.2.23	A value for *E-RAB ID* shall only be present once in *E-RABs Admitted List* IE and in *E-RABs Not Admitted List* IE.	YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore
WT MAC Address	O		9.2.35		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.16 WT ADDITION REQUEST REJECT

This message is sent by the WT to inform the eNB that the WT Addition Preparation procedure has failed.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.17 WT MODIFICATION REQUEST

This message is sent by the eNB to the WT to request the modification of WT resources for a specific UE.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	M		9.2.4		YES	ignore
Serving PLMN	O		PLMN Identity 9.2.3	The serving PLMN for the UE.	YES	ignore
UE Context Information		*0..1*			YES	reject
>WLAN Security Information	O		9.2.27			
>E-RABs To Be Added List		*0..1*			–	–
>>E-RABs To Be Added Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
>>>E-RAB Level QoS Parameters	M		9.2.19	Includes necessary QoS parameters	–	–
>>> eNB GTP Tunnel Endpoint	M		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the eNB	–	–
>>>DRB-Identity	O		9.2.33	Mapping between DRB and E-RAB ID for UL bearers.	YES	reject
>E-RABs To Be Modified List		*0..1*			–	–
>>E-RABs To Be Modified Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
>>>E-RAB Level QoS Parameters	O		9.2.19	Includes QoS parameters to be modified	–	–
>>> eNB GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the eNB	–	–
>E-RABs To Be Released List		*0..1*			–	–
>>E-RABs To Be Released Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
>>>DL Forwarding GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Identifies the Xw transport bearer used for forwarding of DL PDUs	–	–
Mobility Set	O		9.2.28		YES	reject

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.18 WT MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the WT to the eNB to confirm the modification of the WT resources for a specific UE.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
E-RABs Admitted List		*0..1*			YES	ignore
>E-RABs Admitted To Be Added List		*0..1*			–	–
>>E-RABs Admitted To Be Added Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
>>>WT GTP Tunnel Endpoint	M		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the WT.	–	–
>>>LWA WLAN AC	O		9.2.34		YES	ignore
>E-RABs Admitted To Be Modified List		*0..1*			–	–
>>E-RABs Admitted To Be Modified Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
>>>WT GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the WT.	–	–
>>>LWA WLAN AC	O		9.2.34		YES	ignore
>E-RABs Admitted To Be Released List		*0..1*			–	–
>>E-RABs Admitted To Be Released Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>>E-RAB ID	M		9.2.18		–	–
E-RABs Not Admitted List	O		E-RAB List 9.2.23	A value for *E-RAB ID* shall only be present once in *E-RABs Admitted List* IE and in *E-RABs Not Admitted List* IE.	YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.19 WT MODIFICATION REQUEST REJECT

This message is sent by the WT to inform the eNB that the eNB initiated WT Modification procedure has failed.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.20 WT MODIFICATION REQUIRED

This message is sent by the WT to the eNB to request the release or modification of LWA bearers for a specific UE.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	M		9.2.4		YES	ignore
E-RABs To Be Released List		*0..1*			YES	ignore
>E-RABs To Be Released Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
>>Cause	M		9.2.4		–	–
E-RABs To Be Modified List		*0..1*			–	–
>E-RABs To Be Modified Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
>>WT GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the WT	–	–
>>LWA WLAN AC	O		9.2.34		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.21 WT MODIFICATION CONFIRM

This message is sent by the eNB to inform the WT that the WT initiated WT Modification procedure was successful.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
E-RABs Confirmed To Be Released List		*0..1*			–	–
>E-RABs Confirmed To Be Released Item		1 .. <*maxnoof Bearers*>			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
>>DL Forwarding GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Identifies the Xw transport bearer used for forwarding of DL PDUs	–	–
E-RABs Confirmed To Be Modified List		*0..1*			–	–
>E-RABs Confirmed To Be Modified Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.22 WT MODIFICATION REFUSE

This message is sent by the eNB to inform the WT that the WT initiated WT Modification procedure has failed.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.23 WT RELEASE REQUEST

This message is sent by the eNB to the WT to request the release of all resources for a specific UE at the WT.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	ignore
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	O		9.2.4		YES	ignore
E-RABs To Be Released List		*0..1*			YES	ignore
>E-RABs To Be Released Item		*1 .. <maxnoof Bearers>*			EACH	ignore
>>E-RAB ID	M		9.2.18		–	–
>>DL Forwarding GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Identifies the Xw transport bearer. used for forwarding of DL PDUs	–	–
UE Context Kept Indicator	O		9.2.32		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.24 WT RELEASE REQUIRED

This message is sent by the WT to request the release of all resources for a specific UE at the WT.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	M		9.2.4		YES	ignore

9.1.25 WT RELEASE CONFIRM

This message is sent by the eNB to confirm the release of all resources for a specific UE at the WT.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
E-RABs to be Released List		*0..1*			YES	ignore
>E-RABs To Be Released Item		*1 .. <maxnoof Bearers>*			–	–
>>E-RAB ID	M		9.2.18		–	–
>>DL Forwarding GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Identifies the Xw transport bearer used for forwarding of DL PDUs	–	–
Criticality Diagnostics	O		9.2.5		YES	ignore

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256

9.1.26 WT ASSOCIATION CONFIRMATION

This message is sent by the WT to the eNB to confirm that a certain UE successfully associated with the WLAN.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	ignore
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore

9.1.27 LWIP ADDITION REQUEST

This message is sent by the eNB to the WT to request the configuration of tunnel resources for LWIP operation for a specific UE.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
UE Identity	M		9.2.16		YES	reject
LWIP-SeGW Security Information	M		9.2.30			
Serving PLMN	O		PLMN Identity 9.2.3	The serving PLMN for the UE.	YES	ignore
eNB GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the eNB	YES	reject
Mobility Set	O		9.2.28		YES	reject

9.1.28 LWIP ADDITION REQUEST ACKNOWLEDGE

This message is sent by the WT to confirm to the eNB about the LWIP addition preparation.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
LWIP-SeGW GTP Tunnel Endpoint	O		GTP Tunnel Endpoint 9.2.22	Endpoint of the Xw transport bearer at the WT	YES	reject
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.29 LWIP ADDITION REQUEST REJECT

This message is sent by the WT to inform the eNB that the LWIP Addition Preparation procedure has failed.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.30 LWIP MODIFICATION REQUEST

This message is sent by the eNB to the WT to request the modification of tunnel resources for LWIP operation for a specific UE.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	M		9.2.4		YES	ignore
Serving PLMN	O		PLMN Identity 9.2.3	The serving PLMN for the UE.	YES	ignore
Mobility Set	O		9.2.28		YES	reject

9.1.31 LWIP MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the WT to the eNB to confirm the modification of tunnel resources for LWIP operation for a specific UE.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.32 LWIP MODIFICATION REQUEST REJECT

This message is sent by the WT to inform the eNB that the eNB initiated LWIP Modification procedure has failed.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Cause	M		9.2.4		YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.1.33 LWIP RELEASE REQUEST

This message is sent by the eNB to the WT to request the release of all tunnel resources for LWIP operation for a specific UE at the WT.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	ignore
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	O		9.2.4		YES	ignore

9.1.34 LWIP RELEASE REQUIRED

This message is sent by the WT to request the release of all tunnel resources for LWIP operation for a specific UE at the WT.

Direction: WT → eNB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	reject
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	reject
Cause	M		9.2.4		YES	ignore

9.1.35 LWIP RELEASE CONFIRM

This message is sent by the eNB to confirm the release of all tunnel resources for LWIP operation for a specific UE at the WT.

Direction: eNB → WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1		YES	reject
eNB UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the eNB	YES	ignore
WT UE XwAP ID	M		UE XwAP ID 9.2.24	Assigned by the WT	YES	ignore
Criticality Diagnostics	O		9.2.5		YES	ignore

9.2 Information Element definitions

9.2.0 General

When specifying information elements which are to be represented by bit strings, 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 bit strings from other specifications, the first bit of the bit string contains the first bit of the concerned information.

9.2.1 Message Type

This IE uniquely identifies the message being sent. It is mandatory for all messages.

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

9.2.2 Global eNB ID

This IE is used to globally identify an eNB (see TS 36.401 [9]).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PLMN Identity	M		9.2.3	
CHOICE *eNB ID*	M			
>Macro eNB ID				
>>Macro eNB ID	M		BIT STRING (20)	Equal to the *Macro eNB ID* IE contained in *Global eNB ID* IE as defined in sub clause 9.2.1.37 of TS 36.413 [8]..
>Other eNB ID				
>>Other eNB ID	M		Protocol IE Container	
>Short Macro eNB ID				
>>Short Macro eNB ID	M		BIT STRING (SIZE(18))	Equal to the *Short Macro eNB ID* IE contained in *Global eNB ID* IE as defined in sub clause 9.2.1.37 of TS 36.413 [8].
>Long Macro eNB ID				
>>Long Macro eNB ID	M		BIT STRING (SIZE(21))	Equal to the *Long Macro eNB ID* IE contained in *Global eNB ID* IE as defined in sub clause 9.2.1.37 of TS 36.413 [8].

9.2.3 PLMN Identity

This IE 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).

9.2.4 Cause

The purpose of this IE is to indicate the reason for a particular event for the whole 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 (Unknown eNB UE XwAP ID, Unknown WT UE XwAP ID, Unknown Pair of UE XwAP ID, WLAN not Available, Security Failure, ReportCharacteristicsEmpty, ExistingMeasurement ID, Unknown Measurement ID, Measurement Temporarily not Available, Unspecified, Multiple E-RAB ID instances, Switch Off Ongoing, Not supported QCI value, Measurement not supported for the object, Reduce Load, Resource Optimisation, Target not Allowed, No Radio Resources Available, Invalid QoS combination, Procedure cancelled, Radio Connection With UE Lost, Failure in the Radio Interface Procedure, ..., No Report Periodicity, Wrong WLAN Interworking Mode)	
>Transport Layer				
>>Transport Layer Cause	M		ENUMERATED (Transport Resource Unavailable, Unspecified, ...)	
>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,Unspecified,Abstract Syntax Error (Falsely Constructed Message), ...)	
>Misc				
>>Miscellaneous Cause	M		ENUMERATED (Control Processing Overload, Hardware Failure,O&M Intervention,Not enough User Plane Processing Resources,Unspecified, ...)	

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

Radio Network Layer cause	Meaning
WLAN not Available	The concerned WLAN is not available.
Unknown eNB UE XwAP ID	The action failed because the eNB UE XwAP ID is unknown.
Unknown WT UE XwAP ID	The action failed because the WT UE XwAP ID is unknown.
Unknown Pair of UE XwAP ID	The action failed because the pair of UE XwAP IDs is unknown.
Security Failure	The action is requested (or a previous request by the receiving node failed) due to a failure in security procedures.
ReportCharacteristicsEmpty	The action failed because there is no characteristic reported.
Existing Measurement ID	The action failed because Measurement ID is already used.
Unknown Measurement ID	The action failed because some eNB or WT Measurement ID is unknown.
Measurement Temporarily not Available	The WT can temporarily not provide the requested measurement object.
Multiple E-RAB ID Instances	The action failed because multiple instances of the same E-RAB had been provided to the WT.
Switch Off Ongoing	The reason for the action is an ongoing switch off i.e. either the sending node, or nodes whose actions the sending node triggers or monitors, will be switched off and not be available. It aids the receiving node in taking subsequent actions.
Not supported QCI value	The action failed because the requested QCI is not supported.
Unspecified	Sent when none of the above cause values applies but still the cause is Radio Network Layer related.
Measurement not Supported For The Object	At least one of the concerned BSS(s) does not support the requested measurement.
Reduce Load	The action is requested in order to reduce load in an element controlled by the sending node.
Resource Optimisation	The reason for requesting this action is to improve the load distribution.
Target not Allowed	Requested action towards the indicated target is not allowed for the UE in question.
No Radio Resources Available	The action failed because of insufficient radio resources in the requested node.
Invalid QoS combination	The action was failed because of invalid QoS combination.
Procedure cancelled	The sending node cancelled the procedure due to other urgent actions to be performed.
Radio Connection With UE Lost	The action is requested due to losing the radio connection to the UE.
Failure in the Radio Interface Procedure	Radio interface procedure has failed.
No Report Periodicity	The action failed because the periodicity is not defined.
Wrong WLAN Interworking Mode	The WT cannot support the requested WLAN interworking mode (LWA or LWIP), or it cannot handle a procedure related to one of the modes, or the requested mode is not configured for the UE.

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

Protocol cause	Meaning
Abstract Syntax Error (Reject)	The received message included an abstract syntax error and the concerned criticality indicated "reject" (see sub clause 10.3 of TS 36.413 [8]).
Abstract Syntax Error (Ignore and Notify)	The received message included an abstract syntax error and the concerned criticality indicated "ignore and notify" (see sub clause 10.3 of TS 36.413 [8]).
Abstract Syntax Error (falsely constructed message)	The received message contained IEs or IE groups in wrong order or with too many occurrences (see sub clause 10.3 of TS 36.413 [8]).
Message not Compatible with Receiver State	The received message was not compatible with the receiver state (see sub clause 10.4 of TS 36.413 [8]).
Semantic Error	The received message included a semantic error (see sub clause 10.4 of TS 36.413 [8]).
Transfer Syntax Error	The received message included a transfer syntax error (see sub clause 10.2 of TS 36.413 [8]).
Unspecified	Sent when none of the above cause values applies but still the cause is Protocol related

Miscellaneous cause	Meaning
Control Processing Overload	eNB or WT control processing overload
Hardware Failure	eNB or WT hardware failure
Not enough User Plane Processing Resources	eNB or WT has insufficient user plane processing resources available.
O&M Intervention	Operation and Maintenance intervention
Unspecified	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

9.2.5 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the eNB and the WT 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.

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).
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"' shall not be used.
>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.

9.2.6 WT ID

This IE is used to identify a WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *WT ID Type*	M			
>WT ID Type 1				
>>PLMN ID	M		PLMN Identity 9.2.3	
>>Short WT ID	M		BIT STRING (24)	
>WT ID Type 2				
>>Long WT ID	M		BIT STRING (48)	

9.2.7 WLAN Information

This IE contains WLAN configuration information that an eNB may need for the Xw interface. It shall contain at least one of the *BSS Item*, the *SSID*, and/or the *HESSID* IEs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
BSS Item	O					
>BSSID	M		9.2.8			
>WLAN Operating Class	O		INTEGER (0..255)	Indicates the Operating Class of WLAN as defined in IEEE 802.11™ [11].		
>WLAN Country Code	O		ENUMERATED (unitedStates, europe, japan, global, …)	Indicates the country code of WLAN as defined in IEEE 802.11™ [11].		
>Maximum Capacity	O		Bit Rate 9.2.17	The maximum supported data rate corresponding to this BSSID.		
>WLAN Band Information List		*0..1*				
>>WLAN Band Information Item		*1..<maxnoofBands>*			EACH	ignore
>>>WLAN Band Information			9.2.13			
SSID	O		9.2.9			
HESSID	O		9.2.10			
WLAN Usage	O		9.2.31		YES	reject

Range bound	Explanation
maxnoofBands	Maximum number of WLAN Band Information Items per BSSID. The value of maxnoofBands is 256.

9.2.8 BSSID

This IE contains the BSSID.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
BSSID	M		OCTET STRING (SIZE(6))	Includes the BSSID field as defined in subclause 8.2.4.3.4 of IEEE 802.11™ [11].

9.2.9 SSID

This IE contains the SSID.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SSID	M		OCTET STRING (SIZE(1..32))	Includes the SSID field as defined in subclause 8.4.2.2 of IEEE 802.11™ [11].

9.2.10 HESSID

This IE contains the HESSID.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
HESSID	M		OCTET STRING (SIZE(6))	Includes the HESSID field as defined in subclause 8.4.2.94 of IEEE 802.11™ [11].

9.2.11 BSS Load

This IE contains the BSS Load.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Channel Utilization	M		9.2.14	Channel Utilization field of the BSS Load element defined in subclause 8.4.2.30 of IEEE 802.11™ [11].
Station Count	O		9.2.25	The *stationcount* field of the BSS Load element defined in subclause 8.4.2.30 of IEEE 802.11™ [11].

9.2.12 WAN Metrics

This IE contains the WAN Metrics.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
WAN Backhaul Rate DL	M		WLAN Backhaul Rate 9.2.15	Downlink Speed field of the WAN Metrics element defined in subclause 4.4 of Hotspot 2.0 (Release 2) [10]
WAN Backhaul Rate UL	M		WLAN Backhaul Rate 9.2.15	Uplink Speed field of the WAN Metrics element defined in subclause 4.4 of Hotspot 2.0 (Release 2) [10]
WAN Backhaul Load DL	M		Channel Utilization 9.2.14	Downlink Load field of the WAN Metrics element defined in subclause 4.4 of Hotspot 2.0 (Release 2) [10]
WAN Backhaul Load UL	M		Channel Utilization 9.2.14	Uplink Load field of the WAN Metrics element defined in subclause 4.4 of Hotspot 2.0 (Release 2) [10]

9.2.13 WLAN Band Information

This IE describes the WLAN band information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *WLAN Band Information*				
>Band				
>>WLAN Band	M		ENUMERATED (band2dot4, band5, …, band60)	Indicates the band of the WLAN as defined in IEEE 802.11™ [11].
>Channel Number				
>>WLAN Channel Number	M		INTEGER (0..255)	Indicates the WLAN channel number as defined in IEEE 802.11™ [11].

9.2.14 Channel Utilization

This IE indicates the utilization level of a channel.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Channel Utilization	M		INTEGER (0..255)	

9.2.15 WLAN Backhaul Rate

This IE identifies a WLAN Backhaul Rate.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
WLAN Backhaul Rate	M		ENUMERATED (r0, r4, r8, r16, r32, r64, r128, r256, r512, r1024, r2048, r4096, r8192, r16384, r32768, r65536, r131072, r262144, r524288, r1048576, r2097152, r4194304, r8388608, r16777216, r33554432, r67108864, r134217728, r268435456, r536870912, r1073741824, r2147483648, r4294967296)	

9.2.16 UE Identity

This IE represents the WLAN MAC address of the UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UE Identity	M		OCTET STRING (SIZE(6))	This corresponds to the WLAN MAC address of the UE

9.2.17 Bit Rate

This IE indicates the number of bits delivered 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 E-RAB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Bit Rate	M		INTEGER (0..10,000,000,000)	The unit is: bit/s

9.2.18 E-RAB ID

This IE uniquely identifies an E-RAB for a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
E-RAB ID	M		INTEGER (0..15, ...)	

9.2.19 E-RAB Level QoS Parameters

This IE defines the QoS to be applied to an E-RAB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
QCI	M		INTEGER (0..255)	QoS Class Identifier defined in TS 23.401 [14]. Logical range and coding specified in TS 23.203 [13].	–	–
Allocation and Retention Priority	M		9.2.20		–	–
GBR QoS Information	O		9.2.21	This IE applies to GBR bearers only and shall be ignored otherwise.	–	–

9.2.20 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 [14]). **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)	**Descr.:** 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.

9.2.21 GBR QoS Information

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

NOTE: The WT shall regard the *GBR QoS Information* IE as an E-RAB level parameter for E-RABs configured with the LWA bearer, although the bit rates signalled by the eNB are typically not equal to the bit rates signalled by the MME for that E-RAB (see TS 36.300 [2]).

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
E-RAB Maximum Bit Rate Downlink	M		Bit Rate 9.2.17	Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [14].	–	–
E-RAB Guaranteed Bit Rate Downlink	M		Bit Rate 9.2.17	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 [14].	–	–

9.2.22 GTP Tunnel Endpoint

The *GTP Tunnel Endpoint* IE identifies an Xw transport bearer associated to an E-RAB. 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 Xw user plane transport (see TS 36.464 [15]). The GTP Tunnel Endpoint Identifier is to be used for the user plane transport between the eNB and the WT.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Transport Layer Address	M		BIT STRING (1..160, ...)	For details on the Transport Layer Address, see TS 36.464 [15]	–	–
GTP TEID	M		OCTET STRING (4)	For details and range, see TS 29.281 [16]	–	–

9.2.23 E-RAB List

The IE contains a list of E-RAB identities with a cause value. It is used for example to indicate not admitted bearers.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
E-RAB List Item		*1..<maxnoofBearers>*			EACH	ignore
>E-RAB ID	M		9.2.18		–	–
>Cause	M		9.2.4		–	–

Range bound	Explanation
maxnoofBearers	Maximum no. of E-RABs. Value is 256.

9.2.24 UE XwAP ID

This information element uniquely identifies a UE over the Xw interface within a WT or an eNB.

The eNB UE XwAP ID is allocated by the eNB, and the WT UE XwAP ID is allocated by the WT.

The usage of this IE is defined in TS 36.401 [9].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UE XwAP ID	M		OCTET STRING (SIZE(3))	

9.2.25 Station Count

The *Station Count* IE indicates the total number of stations associated with the BSS.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Station Count	M		INTEGER (0..65535)	Defined in subclause 8.4.2.30 of IEEE 802.11™ [11]

9.2.26 Available Channel Utilization

The *Available Channel Utilization* IE indicates the amount of WLAN channel utilization time that is available for LWA services relative to the total channel busy time period, as defined in [11]. The available channel utilization should be measured and reported so that the minimum channel utilization time needed for existing services is reserved according to implementation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Capacity Value	M		INTEGER (0..100)	Value 0 shall indicate no available channel utilization time, and 100 shall indicate that all the channel utilization time is available. Available Channel Utilization should be measured on a linear scale.	-	-

9.2.27 WLAN Security Information

The *WLAN Security Information* IE is used to establish WLAN security as defined in TS 33.401 [17].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
WT Security Key	M		BIT STRING (SIZE(256))	The S-K_{WT} which is provided by the eNB, see TS 33.401 [17].

9.2.28 Mobility Set

The *Mobility Set* IE contains the mobility set configured for a UE, as defined in TS 36.300 [2]. It shall contain at least one of the *BSSID*, the *SSID*, and/or the *HESSID* IEs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Mobility Set Item		*1..<maxnoofMobility SetItems>*		
>BSSID	O		9.2.8	
>SSID	O		9.2.9	
>HESSID	O		9.2.10	

Range bound	Explanation
maxnoofMobilitySetItems	Maximum number of mobility set items in the Mobility Set. The value is 1024.

9.2.29 Time To Wait

This IE defines the minimum allowed waiting times.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Time To Wait	M		ENUMERATED(1s, 2s, 5s, 10s, 20s, 60s, …)	

9.2.30 LWIP-SeGW Security Information

This IE contains security information for the LWIP IPSec tunnel, as defined in TS 33.401 [17].

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
LWIP-PSK	M		BIT STRING (SIZE(256))	
IKE Initiator Identity	M		OCTET STRING	

9.2.31 WLAN Usage

This IE identifies the usage of the given WLAN identifier(s).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
WLAN Usage	M		ENUMERATED (LWA and LWIP, LWIP only, ...)	

9.2.32 UE Context Kept Indicator

This IE indicates that the UE Context at the WT is kept in case of inter-eNB handover without WT Change procedure, as specified in TS 36.300 [2].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UE Context Kept Indicator	M		ENUMERATED (True, …)	

9.2.33 DRB-Identity

This IE uniquely identifies the DRB for a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB-Identity	M		INTEGER (1..32,...)	Corresponds to the DRB Identity as defined in TS 36.331 [18]

9.2.34 LWA WLAN AC

This IE identifies the Access Category for uplink LWA.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
LWA WLAN AC	M		ENUMERATED (ac-bk, ac-be, ac-vi, ac-vo)	Corresponds to the Access Categories as defined in TS 36.331 [18]

9.2.35 WT MAC Address

This IE represents the WT MAC address on the network interface towards the WLAN.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
WT MAC Address	M		OCTET STRING (SIZE(6))	This corresponds to the WT MAC Address

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

9.3.1 General

XwAP ASN.1 definition conforms to ITU-T Rec. X.680 [6] and ITU-T Rec. X.681 [7].

Sub clause 9.3 presents the Abstract Syntax of the XwAP protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this sub clause and the tabular format in sub clause 9.1 and 9.2, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, in which the tabular format shall take precedence.

The ASN.1 definition specifies the structure and content of XwAP messages. XwAP 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 an XwAP 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 in which 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 have different IE IDs.

If an XwAP 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.

9.3.2 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 inter-operability.

- 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.

9.3.3 Elementary Procedure Definitions

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

```
--
-- Elementary Procedure definitions for XwAP
--
-- **************************************************************

XwAP-PDU-Descriptions  {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-PDU-Descriptions (0)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    Criticality,
    ProcedureCode

FROM XwAP-CommonDataTypes


    ErrorIndication,
    LWIPAdditionRequest,
    LWIPAdditionRequestAcknowledge,
    LWIPAdditionRequestReject,
    LWIPModificationRequest,
    LWIPModificationRequestAcknowledge,
    LWIPModificationRequestReject,
    LWIPReleaseRequest,
    LWIPReleaseRequired,
    LWIPReleaseConfirm,
    PrivateMessage,
    Reset,
    ResetResponse,
    XwSetupRequest,
    XwSetupResponse,
    XwSetupFailure,
    WTAdditionRequest,
    WTAdditionRequestAcknowledge,
    WTAdditionRequestReject,
    WTAssociationConfirmation,
    WTConfigurationUpdate,
    WTConfigurationUpdateAcknowledge,
    WTConfigurationUpdateFailure,
    WTModificationRequest,
    WTModificationRequestAcknowledge,
    WTModificationRequestReject,
    WTModificationRequired,
    WTModificationConfirm,
```

```
    WTModificationRefuse,
    WTReleaseRequest,
    WTReleaseRequired,
    WTReleaseConfirm,
    WTStatusRequest,
    WTStatusResponse,
    WTStatusFailure,
    WTStatusReport

FROM XwAP-PDU-Contents

    id-eNBInitiatedWTModification,
    id-eNBInitiatedWTRelease,
    id-errorIndication,
    id-privateMessage,
    id-reset,
    id-xwSetup,
    id-wTAdditionPreparation,
    id-wTAssociationConfirmation,
    id-wTConfigurationUpdate,
    id-wTInitiatedWTModification,
    id-wTInitiatedWTRelease,
    id-wTStatusReporting,
    id-wTStatusReportingInitiation,
    id-lWIPAdditionPreparation,
    id-eNBInitiatedLWIPModification,
    id-eNBInitiatedLWIPRelease,
    id-wTInitiatedLWIPRelease

FROM XwAP-Constants;


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

XWAP-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
--
-- ***************************************************************

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

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

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

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

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

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


XWAP-ELEMENTARY-PROCEDURES-CLASS-1 XWAP-ELEMENTARY-PROCEDURE ::= {
    xwSetup                                     |
    wTConfigurationUpdate                       |
    wTStatusReportingInitiation                 |
    reset                                       |
    wTAdditionPreparation                       |
    eNBInitiatedWTModification                  |
    wTInitiatedWTModification                   |
    wTInitiatedWTRelease                        |
    lWIPAdditionPreparation                     |
    eNBInitiatedLWIPModification                |
```

```
    wTInitiatedLWIPRelease                      ,

    ...
}

XWAP-ELEMENTARY-PROCEDURES-CLASS-2 XWAP-ELEMENTARY-PROCEDURE ::= {
    wTStatusReporting                           |
    errorIndication                             |
    eNBInitiatedWTRelease                       |
    wTAssociationConfirmation                   |
    privateMessage                              |
    eNBInitiatedLWIPRelease                     ,
    ...
}

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

xwSetup                     XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      XwSetupRequest
    SUCCESSFUL OUTCOME      XwSetupResponse
    UNSUCCESSFUL OUTCOME    XwSetupFailure
    PROCEDURE CODE          id-xwSetup
    CRITICALITY             reject
}

wTConfigurationUpdate       XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTConfigurationUpdate
    SUCCESSFUL OUTCOME      WTConfigurationUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    WTConfigurationUpdateFailure
    PROCEDURE CODE          id-wTConfigurationUpdate
    CRITICALITY             reject
}

wTStatusReportingInitiation XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTStatusRequest
    SUCCESSFUL OUTCOME      WTStatusResponse
    UNSUCCESSFUL OUTCOME    WTStatusFailure
    PROCEDURE CODE          id-wTStatusReportingInitiation
    CRITICALITY             reject
}

wTStatusReporting           XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTStatusReport
    PROCEDURE CODE          id-wTStatusReporting
    CRITICALITY             ignore
}

errorIndication             XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ErrorIndication
    PROCEDURE CODE          id-errorIndication
```

```
    CRITICALITY             ignore
}

reset                       XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Reset
    SUCCESSFUL OUTCOME      ResetResponse
    PROCEDURE CODE          id-reset
    CRITICALITY             reject
}

wTAdditionPreparation       XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTAdditionRequest
    SUCCESSFUL OUTCOME      WTAdditionRequestAcknowledge
    UNSUCCESSFUL OUTCOME    WTAdditionRequestReject
    PROCEDURE CODE          id-wTAdditionPreparation
    CRITICALITY             reject
}

eNBInitiatedWTModification  XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTModificationRequest
    SUCCESSFUL OUTCOME      WTModificationRequestAcknowledge
    UNSUCCESSFUL OUTCOME    WTModificationRequestReject
    PROCEDURE CODE          id-eNBInitiatedWTModification
    CRITICALITY             reject
}

wTInitiatedWTModification   XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTModificationRequired
    SUCCESSFUL OUTCOME      WTModificationConfirm
    UNSUCCESSFUL OUTCOME    WTModificationRefuse
    PROCEDURE CODE          id-wTInitiatedWTModification
    CRITICALITY             reject
}

eNBInitiatedWTRelease       XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTReleaseRequest
    PROCEDURE CODE          id-eNBInitiatedWTRelease
    CRITICALITY             ignore
}

wTInitiatedWTRelease        XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTReleaseRequired
    SUCCESSFUL OUTCOME      WTReleaseConfirm
    PROCEDURE CODE          id-wTInitiatedWTRelease
    CRITICALITY             reject
}

wTAssociationConfirmation   XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      WTAssociationConfirmation
    PROCEDURE CODE          id-wTAssociationConfirmation
    CRITICALITY             ignore
}

privateMessage              XWAP-ELEMENTARY-PROCEDURE ::= {
```

```
    INITIATING MESSAGE      PrivateMessage
    PROCEDURE CODE          id-privateMessage
    CRITICALITY             ignore
}

lWIPAdditionPreparation     XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      LWIPAdditionRequest
    SUCCESSFUL OUTCOME      LWIPAdditionRequestAcknowledge
    UNSUCCESSFUL OUTCOME    LWIPAdditionRequestReject
    PROCEDURE CODE          id-lWIPAdditionPreparation
    CRITICALITY             reject
}
eNBInitiatedLWIPModification    XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE          LWIPModificationRequest
    SUCCESSFUL OUTCOME          LWIPModificationRequestAcknowledge
    UNSUCCESSFUL OUTCOME        LWIPModificationRequestReject
    PROCEDURE CODE              id-eNBInitiatedLWIPModification
    CRITICALITY                 reject
}

eNBInitiatedLWIPRelease     XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      LWIPReleaseRequest
    PROCEDURE CODE          id-eNBInitiatedLWIPRelease
    CRITICALITY             ignore
}

wTInitiatedLWIPRelease      XWAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      LWIPReleaseRequired
    SUCCESSFUL OUTCOME      LWIPReleaseConfirm
    PROCEDURE CODE          id-wTInitiatedLWIPRelease
    CRITICALITY             reject
}

END
```

9.3.4 PDU Definitions

```
-- **************************************************************
--
-- PDU definitions for XwAP.
--
-- **************************************************************

XwAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

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

IMPORTS

    BSSMeasurementResult-List,
    BSSToReport-List,
    Cause,
    CompleteFailureCauseInformation-List,
    CriticalityDiagnostics,
    DRB-Identity,
    ENBNeighbour-List,
    E-RAB-ID,
    E-RAB-List,
    E-RAB-QoS-Parameters,
    Global-ENB-ID,
    GTPtunnelEndpoint,
    LWA-WLAN-AC,
    Measurement-ID,
    MeasurementInitiationResult-List,
    MobilitySet,
    PartialSuccessIndicator,
    PLMN-Identity,
    Registration-Request,
    ReportCharacteristics,
    ReportingPeriodicity,
    UE-ContextKeptIndicator,
    UE-Identity,
    UE-XwAP-ID,
    WLANIdentifier-List,
    WLANIdentifiersToDelete-List,
    WLANIdentifiersToDeleteExtension-List,
    WLANSecurityInfo,
    WT-MAC-Address,
    WTID,
    TimeToWait,
    LWIP-SeGWSecurityInfo

FROM XwAP-IEs

    PrivateIE-Container{},
    ProtocolExtensionContainer{},
    ProtocolIE-Container{},
    ProtocolIE-ContainerList{},
    ProtocolIE-ContainerPair{},
    ProtocolIE-ContainerPairList{},
    ProtocolIE-SingleContainer{},
    XWAP-PRIVATE-IES,
    XWAP-PROTOCOL-EXTENSION,
    XWAP-PROTOCOL-IES,
    XWAP-PROTOCOL-IES-PAIR
FROM XwAP-Containers
```

```
id-BSSMeasurementResult-List,
id-BSSToReport-List,
id-Cause,
id-CompleteFailureCauseInformation-List,
id-UE-ContextInformationWTModReq,
id-UE-ContextKeptIndicator,
id-CriticalityDiagnostics,
id-DRB-Identity,
id-ENB-Measurement-ID,
id-ENB-UE-XwAP-ID,
id-eNBNeighbour-List,
id-E-RABs-Admitted-ToBeAdded-Item,
id-E-RABs-Admitted-ToBeAdded-List,
id-E-RABs-Admitted-ToBeAdded-ModAckItem,
id-E-RABs-Admitted-ToBeAdded-ModAckList,
id-E-RABs-Admitted-ToBeModified-ModAckItem,
id-E-RABs-Admitted-ToBeModified-ModAckList,
id-E-RABs-Admitted-ToBeReleased-ModAckItem,
id-E-RABs-Admitted-ToBeReleased-ModAckList,
id-E-RABs-Confirmed-ToBeModified-ModReqdList,
id-E-RABs-Confirmed-ToBeModified-ModReqdItem,
id-E-RABs-Confirmed-ToBeReleased-ModReqdList,
id-E-RABs-Confirmed-ToBeReleased-ModReqdItem,
id-E-RABs-NotAdmitted-List,
id-E-RABs-ToBeAdded-Item,
id-E-RABs-ToBeAdded-List,
id-E-RABs-ToBeAdded-ModReqItem,
id-E-RABs-ToBeModified-ModReqItem,
id-E-RABs-ToBeModified-ModReqdList,
id-E-RABs-ToBeModified-ModReqdItem,
id-E-RABs-ToBeReleased-ModReqItem,
id-E-RABs-ToBeReleased-List-RelConf,
id-E-RABs-ToBeReleased-RelConfItem,
id-E-RABs-ToBeReleased-List-RelReq,
id-E-RABs-ToBeReleased-RelReqItem,
id-E-RABs-ToBeReleased-ModReqdList,
id-E-RABs-ToBeReleased-ModReqdItem,
id-Global-ENB-ID,
id-LWA-WLAN-AC,
id-MeasurementInitiationResult-List,
id-MobilitySet,
id-PartialSuccessIndicator,
id-ServingPLMN,
id-Registration-Request,
id-ReportCharacteristics,
id-ReportingPeriodicity,
id-UE-Identity,
id-WLANIdentifier-List,
id-WLANIdentifiersToAdd-List,
id-WLANIdentifiersToDelete-List,
id-WLANIdentifiersToDeleteExtension-List,
id-WLANIdentifiersToModify-List,
```

```
    id-WLANSecurityInfo,
    id-WT-MAC-Address,
    id-WTID,
    id-WT-Measurement-ID,
    id-WT-UE-XwAP-ID,
    id-TimeToWait,
    id-LWIP-SeGWSecurityInfo,
    id-eNBGTPtunnelEndpoint,
    id-LWIP-SeGWGTPtunnelEndpoint,
    maxnoofBearers
FROM XwAP-Constants;


-- ****************************************************************
--
-- Xw SETUP ELEMENTARY PROCEDURE
--
-- ****************************************************************

-- ****************************************************************
--
-- Xw Setup Request
--
-- ****************************************************************

XwSetupRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {XwSetupRequestIEs} },
    ...
}

XwSetupRequestIEs XWAP-PROTOCOL-IES ::= {
    { ID id-Global-ENB-ID   CRITICALITY reject  TYPE Global-ENB-ID      PRESENCE mandatory  },
    ...
}

-- ****************************************************************
--
-- Xw Setup Response
--
-- ****************************************************************

XwSetupResponse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {XwSetupResponseIEs} },
    ...
}

XwSetupResponseIEs XWAP-PROTOCOL-IES ::= {
    { ID id-WTID                    CRITICALITY reject  TYPE WTID                       PRESENCE mandatory}|
    { ID id-WLANIdentifier-List     CRITICALITY reject  TYPE WLANIdentifier-List        PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional}|
    { ID id-eNBNeighbour-List       CRITICALITY reject  TYPE ENBNeighbour-List      PRESENCE optional},
    ...
}
```

```
-- **************************************************************
--
-- Xw Setup Failure
--
-- **************************************************************

XwSetupFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {XwSetupFailureIEs} },
    ...
}

XwSetupFailureIEs XWAP-PROTOCOL-IES ::= {
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional}|
    { ID id-TimeToWait              CRITICALITY ignore  TYPE TimeToWait         PRESENCE optional },
    ...
}

-- **************************************************************
--
-- WT CONFIGURATION UPDATE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Configuration Update
--
-- **************************************************************

WTConfigurationUpdate ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {WTConfigurationUpdateIEs} },
    ...
}

WTConfigurationUpdateIEs XWAP-PROTOCOL-IES ::= {
    { ID id-WLANIdentifiersToAdd-List               CRITICALITY reject  TYPE WLANIdentifier-List                    PRESENCE optional}|
    { ID id-WLANIdentifiersToModify-List            CRITICALITY reject  TYPE WLANIdentifier-List                    PRESENCE optional}|
    { ID id-WLANIdentifiersToDelete-List            CRITICALITY reject  TYPE WLANIdentifiersToDelete-List           PRESENCE optional}|
    { ID id-WLANIdentifiersToDeleteExtension-List   CRITICALITY reject  TYPE WLANIdentifiersToDeleteExtension-List  PRESENCE optional}|
    { ID id-eNBNeighbour-List                   CRITICALITY reject  TYPE ENBNeighbour-List                      PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT Configuration Update Acknowledge
--
-- **************************************************************

WTConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {WTConfigurationUpdateAcknowledgeIEs} },
    ...
}
```

```
WTConfigurationUpdateAcknowledgeIEs XWAP-PROTOCOL-IES ::= {
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT Configuration Update Failure
--
-- **************************************************************

WTConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {WTConfigurationUpdateFailureIEs} },
    ...
}

WTConfigurationUpdateFailureIEs XWAP-PROTOCOL-IES ::= {
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional}|
    { ID id-TimeToWait              CRITICALITY ignore  TYPE TimeToWait         PRESENCE optional },
...
}

-- **************************************************************
--
-- WT STATUS REPORTING INITIATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Status Request
--
-- **************************************************************

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

WTStatusRequest-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-Measurement-ID      CRITICALITY reject  TYPE Measurement-ID             PRESENCE mandatory}|
    { ID id-WT-Measurement-ID       CRITICALITY ignore  TYPE Measurement-ID             PRESENCE conditional}|
-- The IE shall be present if the Registration Request IE is set to “Stop”--
    { ID id-Registration-Request    CRITICALITY reject  TYPE Registration-Request       PRESENCE mandatory}|
    { ID id-ReportCharacteristics   CRITICALITY reject  TYPE ReportCharacteristics      PRESENCE optional}|
    { ID id-BSSToReport-List        CRITICALITY ignore  TYPE BSSToReport-List           PRESENCE mandatory}|
    { ID id-ReportingPeriodicity    CRITICALITY ignore  TYPE ReportingPeriodicity       PRESENCE optional}|
    { ID id-PartialSuccessIndicator CRITICALITY ignore  TYPE PartialSuccessIndicator    PRESENCE optional},
    ...
}
```

```
-- **************************************************************
--
-- WT Status Response
--
-- **************************************************************

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

WTStatusResponse-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-Measurement-ID                  CRITICALITY reject  TYPE Measurement-ID                      PRESENCE mandatory}|
    { ID id-WT-Measurement-ID                   CRITICALITY reject  TYPE Measurement-ID                      PRESENCE mandatory}|
    { ID id-MeasurementInitiationResult-List    CRITICALITY ignore  TYPE MeasurementInitiationResult-List    PRESENCE optional}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics              PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT Status Failure
--
-- **************************************************************

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

WTStatusFailure-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-Measurement-ID                      CRITICALITY reject  TYPE Measurement-ID                        PRESENCE mandatory}|
    { ID id-WT-Measurement-ID                       CRITICALITY reject  TYPE Measurement-ID                        PRESENCE mandatory}|
    { ID id-CompleteFailureCauseInformation-List    CRITICALITY ignore  TYPE CompleteFailureCauseInformation-List  PRESENCE optional}|
    { ID id-Cause                                   CRITICALITY ignore  TYPE Cause                                 PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics                PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT STATUS REPORTING ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Status Report
--
-- **************************************************************

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

```
}

WTStatusReport-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-Measurement-ID          CRITICALITY reject  TYPE Measurement-ID                PRESENCE mandatory}|
    { ID id-WT-Measurement-ID           CRITICALITY reject  TYPE Measurement-ID                PRESENCE mandatory}|
    { ID id-BSSMeasurementResult-List   CRITICALITY ignore  TYPE BSSMeasurementResult-List      PRESENCE mandatory},
    ...
}

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

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

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

ErrorIndication-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID              CRITICALITY ignore  TYPE UE-XwAP-ID                    PRESENCE optional}|
    { ID id-WT-UE-XwAP-ID               CRITICALITY ignore  TYPE UE-XwAP-ID                    PRESENCE optional}|
    { ID id-Cause                       CRITICALITY ignore  TYPE Cause                         PRESENCE optional}|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics        PRESENCE optional},
    ...
}

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

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

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

Reset-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-Cause       CRITICALITY ignore  TYPE Cause          PRESENCE mandatory},
    ...
```

```
}

-- **************************************************************
--
-- Reset Response
--
-- **************************************************************

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

ResetResponse-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT ADDITION PREPARATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Addition Request
--
-- **************************************************************

WTAdditionRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {WTAdditionRequestIEs} },
    ...
}

WTAdditionRequestIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY reject  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-UE-Identity             CRITICALITY reject  TYPE UE-Identity               PRESENCE mandatory}|
    { ID id-WLANSecurityInfo        CRITICALITY reject  TYPE WLANSecurityInfo          PRESENCE optional}|
    { ID id-ServingPLMN             CRITICALITY ignore  TYPE PLMN-Identity             PRESENCE optional}|
    { ID id-E-RABs-ToBeAdded-List   CRITICALITY reject  TYPE E-RABs-ToBeAdded-List     PRESENCE mandatory}|
    { ID id-MobilitySet             CRITICALITY reject  TYPE MobilitySet               PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID           CRITICALITY reject  TYPE UE-XwAP-ID                PRESENCE optional},
    ...
}

E-RABs-ToBeAdded-List ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeAdded-ItemIEs} }

E-RABs-ToBeAdded-ItemIEs    XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeAdded-Item   CRITICALITY reject  TYPE E-RABs-ToBeAdded-Item  PRESENCE mandatory},
    ...
}

E-RABs-ToBeAdded-Item ::= SEQUENCE {
```

```
    e-RAB-ID                        E-RAB-ID,
    e-RAB-QoS-Parameters            E-RAB-QoS-Parameters,
    eNB-GTPtunnelEndpoint           GTPtunnelEndpoint,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeAdded-ItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeAdded-ItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-DRB-Identity    CRITICALITY reject  EXTENSION DRB-Identity  PRESENCE optional},
    ...
}


-- **************************************************************
--
-- WT Addition Request Acknowledge
--
-- **************************************************************

WTAdditionRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTAdditionRequestAcknowledgeIEs} },
    ...
}

WTAdditionRequestAcknowledgeIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                      CRITICALITY ignore  TYPE UE-XwAP-ID                       PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                       CRITICALITY ignore  TYPE UE-XwAP-ID                       PRESENCE mandatory}|
    { ID id-E-RABs-Admitted-ToBeAdded-List      CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-List   PRESENCE mandatory}|
    { ID id-E-RABs-NotAdmitted-List             CRITICALITY ignore  TYPE E-RAB-List                       PRESENCE optional}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics           PRESENCE optional}|
    { ID id-WT-MAC-Address              CRITICALITY ignore  TYPE WT-MAC-Address                PRESENCE optional},
    ...
}

E-RABs-Admitted-ToBeAdded-List ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Admitted-ToBeAdded-ItemIEs} }

E-RABs-Admitted-ToBeAdded-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Admitted-ToBeAdded-Item  CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-Item    PRESENCE mandatory}
}

E-RABs-Admitted-ToBeAdded-Item ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-ItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-Admitted-ToBeAdded-ItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-LWA-WLAN-AC CRITICALITY ignore  EXTENSION LWA-WLAN-AC   PRESENCE optional},
    ...
}


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

```
--
-- WT Addition Request Reject
--
-- **************************************************************

WTAdditionRequestReject ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTAdditionRequestRejectIEs} },
    ...
}

WTAdditionRequestRejectIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional},
    ...
}


-- **************************************************************
--
-- eNB INITIATED WT MODIFICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Modification Request
--
-- **************************************************************

WTModificationRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationRequestIEs} },
    ...
}

WTModificationRequestIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                  CRITICALITY reject  TYPE UE-XwAP-ID                         PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                   CRITICALITY reject  TYPE UE-XwAP-ID                         PRESENCE mandatory}|
    { ID id-Cause                           CRITICALITY ignore  TYPE Cause                              PRESENCE mandatory}|
    { ID id-ServingPLMN                     CRITICALITY ignore  TYPE PLMN-Identity                      PRESENCE optional}|
    { ID id-UE-ContextInformationWTModReq   CRITICALITY reject  TYPE UE-ContextInformationWTModReq      PRESENCE optional}|
    { ID id-MobilitySet                     CRITICALITY reject  TYPE MobilitySet                        PRESENCE optional},
    ...
}

UE-ContextInformationWTModReq ::= SEQUENCE {
    wLANSecurityInfo                    WLANSecurityInfo                    OPTIONAL,
    e-RABs-ToBeAdded                    E-RABs-ToBeAdded-List-ModReq        OPTIONAL,
    e-RABs-ToBeModified                 E-RABs-ToBeModified-List-ModReq     OPTIONAL,
    e-RABs-ToBeReleased                 E-RABs-ToBeReleased-List-ModReq     OPTIONAL,
    iE-Extensions                       ProtocolExtensionContainer { { UE-ContextInformationWTModReqExtIEs} } OPTIONAL,
    ...
}
```

```
UE-ContextInformationWTModReqExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RABs-ToBeAdded-List-ModReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeAdded-ModReqItemIEs} }

E-RABs-ToBeAdded-ModReqItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeAdded-ModReqItem CRITICALITY ignore  TYPE E-RABs-ToBeAdded-ModReqItem    PRESENCE mandatory},
    ...
}

E-RABs-ToBeAdded-ModReqItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    e-RAB-QoS-Parameters            E-RAB-QoS-Parameters,
    eNB-GTPtunnelEndpoint           GTPtunnelEndpoint,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeAdded-ModReqItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeAdded-ModReqItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-DRB-Identity    CRITICALITY reject  EXTENSION DRB-Identity  PRESENCE optional},
    ...
}

E-RABs-ToBeModified-List-ModReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeModified-ModReqItemIEs} }

E-RABs-ToBeModified-ModReqItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeModified-ModReqItem  CRITICALITY ignore  TYPE E-RABs-ToBeModified-ModReqItem    PRESENCE mandatory},
    ...
}

E-RABs-ToBeModified-ModReqItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    e-RAB-QoS-Parameters            E-RAB-QoS-Parameters        OPTIONAL,
    eNB-GTPtunnelEndpoint           GTPtunnelEndpoint           OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeModified-ModReqItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeModified-ModReqItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RABs-ToBeReleased-List-ModReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeReleased-ModReqItemIEs} }

E-RABs-ToBeReleased-ModReqItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeReleased-ModReqItem  CRITICALITY ignore  TYPE E-RABs-ToBeReleased-ModReqItem    PRESENCE mandatory},
    ...
}

E-RABs-ToBeReleased-ModReqItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    dL-GTPtunnelEndpoint            GTPtunnelEndpoint                                               OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeReleased-ModReqItemExtIEs} }  OPTIONAL,
```

```
    ...
}

E-RABs-ToBeReleased-ModReqItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- **************************************************************
--
-- WT Modification Request Acknowledge
--
-- **************************************************************

WTModificationRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationRequestAcknowledgeIEs} },
    ...
}

WTModificationRequestAcknowledgeIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                          CRITICALITY ignore  TYPE UE-XwAP-ID                                 PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                           CRITICALITY ignore  TYPE UE-XwAP-ID                                 PRESENCE mandatory}|
    { ID id-E-RABs-Admitted-ToBeAdded-ModAckList    CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-ModAckList       PRESENCE optional}|
    { ID id-E-RABs-Admitted-ToBeModified-ModAckList CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeModified-ModAckList    PRESENCE optional}|
    { ID id-E-RABs-Admitted-ToBeReleased-ModAckList CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeReleased-ModAckList    PRESENCE optional}|
    { ID id-E-RABs-NotAdmitted-List                 CRITICALITY ignore  TYPE E-RAB-List                                 PRESENCE optional}|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics                     PRESENCE optional},
    ...
}

E-RABs-Admitted-ToBeAdded-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Admitted-ToBeAdded-
ModAckItemIEs} }

E-RABs-Admitted-ToBeAdded-ModAckItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Admitted-ToBeAdded-ModAckItem    CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-ModAckItem      PRESENCE mandatory}
}

E-RABs-Admitted-ToBeAdded-ModAckItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-Admitted-ToBeAdded-ModAckItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-Admitted-ToBeAdded-ModAckItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-LWA-WLAN-AC CRITICALITY ignore  EXTENSION LWA-WLAN-AC   PRESENCE optional},
    ...
}

E-RABs-Admitted-ToBeModified-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Admitted-ToBeModified-
ModAckItemIEs} }

E-RABs-Admitted-ToBeModified-ModAckItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Admitted-ToBeModified-ModAckItem     CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeModified-ModAckItem  PRESENCE mandatory}
```

```
}

E-RABs-Admitted-ToBeModified-ModAckItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint                       OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-Admitted-ToBeModified-ModAckItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-Admitted-ToBeModified-ModAckItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-LWA-WLAN-AC CRITICALITY ignore  EXTENSION LWA-WLAN-AC   PRESENCE optional},
    ...
}

E-RABs-Admitted-ToBeReleased-ModAckList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Admitted-ToBeReleased-
ModAckItemIEs} }

E-RABs-Admitted-ToBeReleased-ModAckItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Admitted-ToBeReleased-ModAckItem     CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeReleased-ModAckItem    PRESENCE mandatory}
}

E-RABs-Admitted-ToBeReleased-ModAckItem ::= SEQUENCE {
    e-RAB-ID                    E-RAB-ID,
    iE-Extensions               ProtocolExtensionContainer { {E-RABs-Admitted-ToBeReleased-ModAckItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-Admitted-ToBeReleased-ModAckItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- **************************************************************
--
-- WT Modification Request Reject
--
-- **************************************************************

WTModificationRequestReject ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationRequestRejectIEs} },
    ...
}

WTModificationRequestRejectIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY ignore  TYPE UE-XwAP-ID                 PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID           CRITICALITY ignore  TYPE UE-XwAP-ID                 PRESENCE mandatory}|
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                      PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics     PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT INITIATED WT MODIFICATION ELEMENTARY PROCEDURE
```

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

-- **************************************************************
--
-- WT Modification Required
--
-- **************************************************************

WTModificationRequired ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationRequiredIEs} },
    ...
}

WTModificationRequiredIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                  CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                   CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-Cause                           CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory}|
    { ID id-E-RABs-ToBeReleased-ModReqdList CRITICALITY ignore  TYPE E-RABs-ToBeReleased-ModReqdList PRESENCE optional}|
    { ID id-E-RABs-ToBeModified-ModReqdList CRITICALITY ignore  TYPE E-RABs-ToBeModified-ModReqdList PRESENCE optional},
    ...
}

E-RABs-ToBeReleased-ModReqdList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeReleased-ModReqdItemIEs} }

E-RABs-ToBeReleased-ModReqdItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeReleased-ModReqdItem CRITICALITY ignore  TYPE E-RABs-ToBeReleased-ModReqdItem PRESENCE mandatory},
    ...
}

E-RABs-ToBeReleased-ModReqdItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    cause                           Cause,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeReleased-ModReqdItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeReleased-ModReqdItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RABs-ToBeModified-ModReqdList ::= SEQUENCE (SIZE (1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeModified-ModReqdItemIEs} }

E-RABs-ToBeModified-ModReqdItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeModified-ModReqdItem CRITICALITY ignore  TYPE E-RABs-ToBeModified-ModReqdItem PRESENCE mandatory},
    ...
}

E-RABs-ToBeModified-ModReqdItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint               OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeModified-ModReqdItemExtIEs} } OPTIONAL,
    ...
}
```

```
E-RABs-ToBeModified-ModReqdItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-LWA-WLAN-AC CRITICALITY ignore  EXTENSION LWA-WLAN-AC   PRESENCE optional},
    ...
}

-- **************************************************************
--
-- WT Modification Confirm
--
-- **************************************************************

WTModificationConfirm ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationConfirmIEs} },
    ...
}

WTModificationConfirmIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                          CRITICALITY ignore  TYPE UE-XwAP-ID                                PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                           CRITICALITY ignore  TYPE UE-XwAP-ID                                PRESENCE mandatory}|
    { ID id-E-RABs-Confirmed-ToBeReleased-ModReqdList   CRITICALITY ignore  TYPE E-RABs-Confirmed-ToBeReleased-ModReqdList  PRESENCE optional}|
    { ID id-E-RABs-Confirmed-ToBeModified-ModReqdList   CRITICALITY ignore  TYPE E-RABs-Confirmed-ToBeModified-ModReqdList  PRESENCE optional}|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics                    PRESENCE optional},
    ...
}

E-RABs-Confirmed-ToBeReleased-ModReqdList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Confirmed-ToBeReleased-
ModReqdItemIEs} }

E-RABs-Confirmed-ToBeReleased-ModReqdItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Confirmed-ToBeReleased-ModReqdItem   CRITICALITY ignore  TYPE E-RABs-Confirmed-ToBeReleased-ModReqdItem  PRESENCE mandatory},
    ...
}

E-RABs-Confirmed-ToBeReleased-ModReqdItem ::= SEQUENCE {
    e-RAB-ID                    E-RAB-ID,
    dL-GTPtunnelEndpoint        GTPtunnelEndpoint                                                   OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { {E-RABs-Confirmed-ToBeReleased-ModReqdItemExtIEs} }  OPTIONAL,
    ...
}

E-RABs-Confirmed-ToBeReleased-ModReqdItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RABs-Confirmed-ToBeModified-ModReqdList ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-Confirmed-ToBeModified-
ModReqdItemIEs} }

E-RABs-Confirmed-ToBeModified-ModReqdItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-Confirmed-ToBeModified-ModReqdItem   CRITICALITY ignore  TYPE E-RABs-Confirmed-ToBeModified-ModReqdItem     PRESENCE mandatory},
    ...
}

E-RABs-Confirmed-ToBeModified-ModReqdItem ::= SEQUENCE {
```

```
    e-RAB-ID                        E-RAB-ID,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-Confirmed-ToBeModified-ModReqdItemExtIEs} }  OPTIONAL,
    ...
}

E-RABs-Confirmed-ToBeModified-ModReqdItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- WT Modification Refuse
--
-- **************************************************************

WTModificationRefuse ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTModificationRefuseIEs} },
    ...
}

WTModificationRefuseIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID           CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional},
    ...
}


-- **************************************************************
--
-- eNB INITIATED WT RELEASE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Release Request
--
-- **************************************************************

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

WTReleaseRequest-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                      CRITICALITY reject  TYPE UE-XwAP-ID                      PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                       CRITICALITY reject  TYPE UE-XwAP-ID                      PRESENCE mandatory}|
    { ID id-Cause                               CRITICALITY ignore  TYPE Cause                           PRESENCE optional}|
    { ID id-E-RABs-ToBeReleased-List-RelReq     CRITICALITY ignore  TYPE E-RABs-ToBeReleased-List-RelReq  PRESENCE optional}|
    { ID id-UE-ContextKeptIndicator             CRITICALITY ignore  TYPE UE-ContextKeptIndicator          PRESENCE optional},
    ...
}
```

```
E-RABs-ToBeReleased-List-RelReq ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeReleased-RelReqItemIEs} }

E-RABs-ToBeReleased-RelReqItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeReleased-RelReqItem      CRITICALITY ignore  TYPE E-RABs-ToBeReleased-RelReqItem    PRESENCE mandatory},
    ...
}

E-RABs-ToBeReleased-RelReqItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint                                                   OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeReleased-RelReqItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeReleased-RelReqItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- **************************************************************
--
-- WT INITIATED WT RELEASE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Release Required
--
-- **************************************************************

WTReleaseRequired ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTReleaseRequiredIEs} },
    ...
}

WTReleaseRequiredIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID      CRITICALITY reject  TYPE UE-XwAP-ID     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID       CRITICALITY reject  TYPE UE-XwAP-ID     PRESENCE mandatory}|
    { ID id-Cause               CRITICALITY ignore  TYPE Cause          PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- WT Release Confirm
--
-- **************************************************************

WTReleaseConfirm ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { WTReleaseConfirmIEs} },
    ...
}
```

```
WTReleaseConfirmIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                      CRITICALITY ignore  TYPE UE-XwAP-ID                          PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                       CRITICALITY ignore  TYPE UE-XwAP-ID                          PRESENCE mandatory}|
    { ID id-E-RABs-ToBeReleased-List-RelConf    CRITICALITY ignore  TYPE E-RABs-ToBeReleased-List-RelConf    PRESENCE optional}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics              PRESENCE optional},
    ...
}

E-RABs-ToBeReleased-List-RelConf ::= SEQUENCE (SIZE(1..maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RABs-ToBeReleased-RelConfItemIEs} }

E-RABs-ToBeReleased-RelConfItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-E-RABs-ToBeReleased-RelConfItem     CRITICALITY ignore  TYPE E-RABs-ToBeReleased-RelConfItem     PRESENCE mandatory},
    ...
}

E-RABs-ToBeReleased-RelConfItem ::= SEQUENCE {
    e-RAB-ID                        E-RAB-ID,
    wT-GTPtunnelEndpoint            GTPtunnelEndpoint                                                   OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RABs-ToBeReleased-RelConfItemExtIEs} } OPTIONAL,
    ...
}

E-RABs-ToBeReleased-RelConfItemExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- **************************************************************
--
-- WT ASSOCIATION CONFIRMATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- WT Association Confirmation
--
-- **************************************************************

WTAssociationConfirmation ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {WTAssociationConfirmationIEs} },
    ...
}

WTAssociationConfirmationIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID  CRITICALITY ignore  TYPE UE-XwAP-ID     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID   CRITICALITY ignore  TYPE UE-XwAP-ID     PRESENCE mandatory},
    ...
}


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

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

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

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


-- **************************************************************
--
-- LWIP ADDITION PREPARATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- LWIP Addition Request
--
-- **************************************************************

LWIPAdditionRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { {LWIPAdditionRequestIEs} },
    ...
}

LWIPAdditionRequestIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY reject  TYPE UE-XwAP-ID               PRESENCE mandatory}|
    { ID id-UE-Identity             CRITICALITY reject  TYPE UE-Identity              PRESENCE mandatory}|
    { ID id-LWIP-SeGWSecurityInfo   CRITICALITY reject  TYPE LWIP-SeGWSecurityInfo    PRESENCE mandatory}|
    { ID id-ServingPLMN             CRITICALITY ignore  TYPE PLMN-Identity            PRESENCE optional}|
    { ID id-eNBGTPtunnelEndpoint    CRITICALITY reject  TYPE GTPtunnelEndpoint        PRESENCE optional}|
    { ID id-MobilitySet             CRITICALITY reject  TYPE MobilitySet              PRESENCE optional},
    ...
}

-- **************************************************************
--
-- LWIP Addition Request Acknowledge
--
-- **************************************************************

LWIPAdditionRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPAdditionRequestAcknowledgeIEs} },
    ...
}

LWIPAdditionRequestAcknowledgeIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                    CRITICALITY ignore  TYPE UE-XwAP-ID                    PRESENCE mandatory}|
```

```
    { ID id-WT-UE-XwAP-ID                       CRITICALITY ignore  TYPE UE-XwAP-ID                       PRESENCE mandatory}|
    { ID id-LWIP-SeGWGTPtunnelEndpoint          CRITICALITY reject  TYPE GTPtunnelEndpoint               PRESENCE optional}|
    { ID id-E-RABs-Admitted-ToBeAdded-List      CRITICALITY ignore  TYPE E-RABs-Admitted-ToBeAdded-List  PRESENCE optional}|
    { ID id-E-RABs-NotAdmitted-List             CRITICALITY ignore  TYPE E-RAB-List                       PRESENCE optional}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics           PRESENCE optional},
    ...
}

-- **************************************************************
--
-- LWIP Addition Request Reject
--
-- **************************************************************

LWIPAdditionRequestReject ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPAdditionRequestRejectIEs} },
    ...
}

LWIPAdditionRequestRejectIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional},
    ...
}


-- **************************************************************
--
-- eNB INITIATED LWIP MODIFICATION ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- LWIP Modification Request
--
-- **************************************************************

LWIPModificationRequest ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPModificationRequestIEs} },
    ...
}

LWIPModificationRequestIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                  CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                   CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-Cause                           CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory}|
    { ID id-ServingPLMN                     CRITICALITY ignore  TYPE PLMN-Identity                  PRESENCE optional}|
    { ID id-MobilitySet                     CRITICALITY reject  TYPE MobilitySet                    PRESENCE optional},
    ...
}
```

```
-- **************************************************************
--
-- LWIP Modification Request Acknowledge
--
-- **************************************************************

LWIPModificationRequestAcknowledge ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPModificationRequestAcknowledgeIEs} },
    ...
}

LWIPModificationRequestAcknowledgeIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                          CRITICALITY ignore  TYPE UE-XwAP-ID                          PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                           CRITICALITY ignore  TYPE UE-XwAP-ID                          PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics                  CRITICALITY ignore  TYPE CriticalityDiagnostics              PRESENCE optional},
    ...
}


-- **************************************************************
--
-- LWIP Modification Request Reject
--
-- **************************************************************

LWIPModificationRequestReject ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPModificationRequestRejectIEs} },
    ...
}

LWIPModificationRequestRejectIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID          CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID           CRITICALITY ignore  TYPE UE-XwAP-ID                PRESENCE mandatory}|
    { ID id-Cause                   CRITICALITY ignore  TYPE Cause                     PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics  CRITICALITY ignore  TYPE CriticalityDiagnostics    PRESENCE optional},
    ...
}


-- **************************************************************
--
-- eNB INITIATED LWIP RELEASE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- LWIP Release Request
--
-- **************************************************************

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

```
}

LWIPReleaseRequest-IEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                      CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                       CRITICALITY reject  TYPE UE-XwAP-ID                     PRESENCE mandatory}|
    { ID id-Cause                               CRITICALITY ignore  TYPE Cause                          PRESENCE optional},
    ...
}


-- **************************************************************
--
-- WT INITIATED LWIP RELEASE ELEMENTARY PROCEDURE
--
-- **************************************************************

-- **************************************************************
--
-- LWIP Release Required
--
-- **************************************************************

LWIPReleaseRequired ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPReleaseRequiredIEs} },
    ...
}

LWIPReleaseRequiredIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID      CRITICALITY reject  TYPE UE-XwAP-ID     PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID       CRITICALITY reject  TYPE UE-XwAP-ID     PRESENCE mandatory}|
    { ID id-Cause               CRITICALITY ignore  TYPE Cause          PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- LWIP Release Confirm
--
-- **************************************************************

LWIPReleaseConfirm ::= SEQUENCE {
    protocolIEs         ProtocolIE-Container       { { LWIPReleaseConfirmIEs} },
    ...
}

LWIPReleaseConfirmIEs XWAP-PROTOCOL-IES ::= {
    { ID id-ENB-UE-XwAP-ID                      CRITICALITY ignore  TYPE UE-XwAP-ID                         PRESENCE mandatory}|
    { ID id-WT-UE-XwAP-ID                       CRITICALITY ignore  TYPE UE-XwAP-ID                         PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics             PRESENCE optional},
    ...
}


END
```

9.3.5 Information Element definitions

```
-- **************************************************************
--
-- Information Element Definitions
--
-- **************************************************************

XwAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    id-BSSMeasurementResult-Item,
    id-BSSToReport-Item,
    id-E-RAB-Item,
    id-CompleteFailureCauseInformation-Item,
    id-MeasurementInitiationResult-Item,
    id-MeasurementFailureCause-Item,
    id-wLANBandInformation,
    id-WLANIdentifier-Item,
    id-WLANIdentifiersToDelete-Item,
    id-WLANIdentifiersToDeleteExtension-Item,
    id-WLANUsage,
    id-eNBNeighbour-Item,

    maxnoofBands,
    maxnoofBearers,
    maxnoofBSSs,
    maxnoofErrors,
    maxnoofFailedMeasObjects,
    maxnoofMobilitySetItems,
    maxnoofWLANIdentifierItems,
    maxnoofeNBNeighbours
FROM XwAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage
FROM XwAP-CommonDataTypes

    ProtocolExtensionContainer{},
    XWAP-PROTOCOL-EXTENSION,
    ProtocolIE-SingleContainer{},
    XWAP-PROTOCOL-IES
FROM XwAP-Containers;
```

```
-- A

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

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

AvailableChUtilization ::= SEQUENCE {
    capacityValue               CapacityValue,
    iE-Extensions               ProtocolExtensionContainer { { AvailableChUtilization-ExtIEs} } OPTIONAL,
    ...
}

AvailableChUtilization-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- B

BitRate ::= INTEGER (0..10000000000)

BSSID ::= OCTET STRING (SIZE(6))

BSSLoad ::= SEQUENCE {
    channelUtilization      ChannelUtilization,
    stationCount            StationCount        OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { {BSSLoad-Item-ExtIEs} }    OPTIONAL,
    ...
}

BSSLoad-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

BSS-Item ::= SEQUENCE {
    bSSID                       BSSID,
    wLANOperatingClass          WLANOperatingClass          OPTIONAL,
    wLANCountryCode             WLANCountryCode             OPTIONAL,
    maximumCapacity             BitRate                     OPTIONAL,
    wLANBandInformationList     WLANBandInformationList     OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { {BSS-Item-ExtIEs} } OPTIONAL,
    ...
}

BSS-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}

BSSMeasurementResult-List ::= SEQUENCE (SIZE (1..maxnoofBSSs)) OF ProtocolIE-SingleContainer { {BSSMeasurementResult-ItemIEs} }

BSSMeasurementResult-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-BSSMeasurementResult-Item   CRITICALITY ignore  TYPE BSSMeasurementResult-Item  PRESENCE mandatory},
    ...
}

BSSMeasurementResult-Item ::= SEQUENCE {
    bSSID                   BSSID,
    bSSLoad                 BSSLoad                 OPTIONAL,
    wANMetrics              WANMetrics              OPTIONAL,
    availableChUtilization  AvailableChUtilization  OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { {BSSMeasurementResult-Item-ExtIEs} }        OPTIONAL,
    ...
}

BSSMeasurementResult-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

BSSToReport-List ::= SEQUENCE (SIZE (1.. maxnoofBSSs)) OF ProtocolIE-SingleContainer { {BSSToReport-ItemIEs} }

BSSToReport-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-BSSToReport-Item    CRITICALITY ignore  TYPE BSSToReport-Item   PRESENCE mandatory}
}

BSSToReport-Item ::= SEQUENCE {
    bSSID                               BSSID,
    iE-Extensions                       ProtocolExtensionContainer { {BSSToReport-Item-ExtIEs} } OPTIONAL,
    ...
}

BSSToReport-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}


-- C

CapacityValue ::= INTEGER (0..100)

Cause ::= CHOICE {
    radioNetwork        CauseRadioNetwork,
    transport           CauseTransport,
    protocol            CauseProtocol,
    misc                CauseMisc,
    ...
}

CauseMisc ::= ENUMERATED {
    control-processing-overload,
    hardware-failure,
```

```
    om-intervention,
    not-enough-user-plane-processing-resources,
    unspecified,
    ...
}

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

CauseRadioNetwork ::= ENUMERATED {
    unknown-eNB-UE-XwAP-ID,
    unknown-WT-UE-XwAP-ID,
    unknown-pair-of-UE-XwAP-ID,
    wLAN-not-available,
    security-failure,
    reportCharacteristicsEmpty,
    existing-Measurement-ID,
    unknown-Measurement-ID,
    measurement-temporarily-not-available,
    unspecified,
    multiple-E-RAB-ID-instances,
    switch-off-ongoing,
    not-supported-QCI-value,
    measurement-not-supported-for-the-object,
    reduce-load,
    resource-optimisation,
    target-not-allowed,
    no-radio-resources-available,
    invalid-QoS-combination,
    procedure-cancelled,
    radio-connection-with-UE-lost,
    failure-in-the-radio-interface-procedure,
    ...,
    no-report-periodicity,
    wrong-wlan-interworking-mode
}

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

ChannelUtilization ::= INTEGER (0..255)
```

```
CompleteFailureCauseInformation-List ::= SEQUENCE (SIZE (1..maxnoofBSSs)) OF ProtocolIE-SingleContainer { {CompleteFailureCauseInformation-ItemIEs}
}

CompleteFailureCauseInformation-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-CompleteFailureCauseInformation-Item    CRITICALITY ignore  TYPE CompleteFailureCauseInformation-Item   PRESENCE mandatory}
}

CompleteFailureCauseInformation-Item ::= SEQUENCE {
    bSSID                                   BSSID,
    measurementFailureCause-List            MeasurementFailureCause-List,
    iE-Extensions                           ProtocolExtensionContainer { { CompleteFailureCauseInformation-Item-ExtIEs} }OPTIONAL,
    ...
}

CompleteFailureCauseInformation-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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


-- D

DRB-Identity ::= INTEGER (1..32, ...)

-- E

ENB-ID ::= CHOICE {
    macroENB-ID         BIT STRING (SIZE(20)),
```

```
    otherENB-ID         ProtocolIE-SingleContainer { {OtherENB-IDIEs} },
    ...,
    short-macroENB-ID       BIT STRING (SIZE(18)),
    long-macroENB-ID            BIT STRING (SIZE(21))
}

ENBNeighbour-List ::= SEQUENCE (SIZE (0.. maxnoofeNBNeighbours)) OF ProtocolIE-SingleContainer { { ENBNeighbour-ItemIEs} }

ENBNeighbour-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-eNBNeighbour-Item   CRITICALITY ignore  TYPE ENBNeighbour-Item  PRESENCE mandatory},
    ...
}

ENBNeighbour-Item ::= SEQUENCE {
     glogal-eNB-ID          Global-ENB-ID,
    iE-Extensions           ProtocolExtensionContainer { { ENBNeighbour-Item-ExtIEs} }  OPTIONAL,
    ...
}

ENBNeighbour-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RAB-ID ::= INTEGER (0..15, ...)

E-RAB-List ::= SEQUENCE (SIZE(1.. maxnoofBearers)) OF ProtocolIE-SingleContainer { {E-RAB-ItemIEs} }

E-RAB-ItemIEs   XWAP-PROTOCOL-IES ::= {
    { ID id-E-RAB-Item   CRITICALITY ignore     TYPE E-RAB-Item     PRESENCE mandatory },
    ...
}

E-RAB-Item ::= SEQUENCE {
    e-RAB-ID                    E-RAB-ID,
    cause                       Cause,
    iE-Extensions               ProtocolExtensionContainer { {E-RAB-Item-ExtIEs} } OPTIONAL,
    ...
}

E-RAB-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

E-RAB-QoS-Parameters ::= SEQUENCE {
    qCI                             QCI,
    allocationRetentionPriority     AllocationAndRetentionPriority,
    gbrQosInformation               GBR-QosInformation                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {E-RAB-QoS-Parameters-ExtIEs} }  OPTIONAL,
    ...
}

E-RAB-QoS-Parameters-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
-- G

GBR-QosInformation ::= SEQUENCE {
    e-RAB-MaximumBitrateDL          BitRate,
    e-RAB-GuaranteedBitrateDL       BitRate,
    iE-Extensions                   ProtocolExtensionContainer { { GBR-QosInformation-ExtIEs} } OPTIONAL,
    ...
}

GBR-QosInformation-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

Global-ENB-ID ::= SEQUENCE {
    pLMNidentity            PLMN-Identity,
    eNB-ID                  ENB-ID,
    iE-Extensions           ProtocolExtensionContainer { {GlobalENB-ID-ExtIEs} }        OPTIONAL,
    ...
}

GlobalENB-ID-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

GTPtunnelEndpoint ::= SEQUENCE {
    transportLayerAddress           TransportLayerAddress,
    gTP-TEID                        GTP-TEID,
    iE-Extensions                   ProtocolExtensionContainer { {GTPtunnelEndpoint-ExtIEs} } OPTIONAL,
    ...
}

GTPtunnelEndpoint-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

GTP-TEID    ::= OCTET STRING (SIZE (4))

-- H

HESSID ::= OCTET STRING (SIZE(6))

-- I

IKE-Initiator-Identity ::= OCTET STRING

-- L

LWA-WLAN-AC ::= ENUMERATED {
    ac-bk, ac-be, ac-vi, ac-vo, ...
}

LWIP-SeGWSecurityInfo ::= SEQUENCE {
```

```
    lWIP-PSK                    LWIP-PSK,
    iKE-Initiator-Identity      IKE-Initiator-Identity,
    iE-Extensions               ProtocolExtensionContainer { {LWIP-SeGWSecurityInfo-ExtIEs} }     OPTIONAL,
    ...
}

LWIP-SeGWSecurityInfo-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

LWIP-PSK ::= BIT STRING(SIZE(256))

-- M

Measurement-ID ::= INTEGER (1..4095, ...)

MeasurementInitiationResult-List ::= SEQUENCE (SIZE (1.. maxnoofBSSs)) OF ProtocolIE-SingleContainer { { MeasurementInitiationResult-ItemIEs} }

MeasurementInitiationResult-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-MeasurementInitiationResult-Item    CRITICALITY ignore  TYPE MeasurementInitiationResult-Item  PRESENCE mandatory}
}

MeasurementInitiationResult-Item ::= SEQUENCE {
    bSSID                               BSSID,
    measurementFailureCause-List        MeasurementFailureCause-List    OPTIONAL,
    iE-Extensions                       ProtocolExtensionContainer { { MeasurementInitiationResult-Item-ExtIEs} }   OPTIONAL,
    ...
}

MeasurementInitiationResult-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

MeasurementFailureCause-List ::= SEQUENCE (SIZE (1..maxnoofFailedMeasObjects)) OF ProtocolIE-SingleContainer { { MeasurementFailureCause-ItemIEs} }

MeasurementFailureCause-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-MeasurementFailureCause-Item    CRITICALITY ignore  TYPE MeasurementFailureCause-Item    PRESENCE mandatory}
}

MeasurementFailureCause-Item ::= SEQUENCE {
    measurementFailedReportCharacteristics          ReportCharacteristics,
    cause                                           Cause,
    iE-Extensions                                   ProtocolExtensionContainer { { MeasurementFailureCause-Item-ExtIEs} }OPTIONAL,
    ...
}

MeasurementFailureCause-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

MobilitySet ::= SEQUENCE (SIZE (1..maxnoofMobilitySetItems)) OF MobilitySetItem

MobilitySetItem ::= SEQUENCE {
    bSSID               BSSID               OPTIONAL,
```

```
    sSID                SSID                OPTIONAL,
    hESSID              HESSID              OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer  { { MobilitySetItem-ExtIEs } }  OPTIONAL,
    ...
}

MobilitySetItem-ExtIEs  XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- O
OtherENB-IDIEs  XWAP-PROTOCOL-IES ::= {
    ...
}

-- P

PartialSuccessIndicator ::= ENUMERATED {
    partial-success-allowed, ...
}

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)

-- Q

QCI ::= INTEGER (0..255)


-- R

Registration-Request ::= ENUMERATED {
    start,
    stop,
    ...
}

ReportCharacteristics ::= BIT STRING (SIZE (32))

ReportingPeriodicity ::= ENUMERATED {
    ms10, ms50, ms100, ms200, ms500, s1, s5, s10, ...
}
```

```
-- S

SSID ::= OCTET STRING (SIZE (1..32))

StationCount ::= INTEGER (0..65535)

-- T

TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))

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

TimeToWait ::= ENUMERATED {
    v1s,
    v2s,
    v5s,
    v10s,
    v20s,
    v60s,
    ...
}


-- U

UE-ContextKeptIndicator ::= ENUMERATED {
    true,
    ...
}

UE-Identity ::= OCTET STRING (SIZE (6))

UE-XwAP-ID ::= OCTET STRING (SIZE (3))

-- W

WANMetrics ::= SEQUENCE {
    wAN-Backhaul-Rate-DL        WLAN-Backhaul-Rate,
    wAN-Backhaul-Rate-UL        WLAN-Backhaul-Rate,
    wANBackhaulLoad-DL  ChannelUtilization,
    wANBackhaulLoad-UL  ChannelUtilization,
    iE-Extensions               ProtocolExtensionContainer { { WANMetrics-Item-ExtIEs} }    OPTIONAL,
    ...
}

WANMetrics-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
WLAN-Backhaul-Rate ::= ENUMERATED {r0, r4, r8, r16, r32, r64, r128, r256, r512, r1024, r2048, r4096, r8192, r16384, r32768, r65536, r131072,
r262144, r524288, r1048576, r2097152, r4194304, r8388608, r16777216, r33554432, r67108864, r134217728, r268435456, r536870912, r1073741824,
r2147483648, r4294967296}

WLANband  ::= ENUMERATED {band2dot4, band5, ..., band60}

WLANBandInformationList ::= SEQUENCE (SIZE (1..maxnoofBands)) OF ProtocolIE-SingleContainer { { WLANBandInformation-ItemIEs} }

WLANBandInformation-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-wLANBandInformation    CRITICALITY ignore   TYPE WLANBandInformation    PRESENCE mandatory},
    ...
}

WLANBandInformation ::= CHOICE {
    band               WLANband,
    channelnumber      WLANchannelnumber,
    ...
}

WLANchannelnumber ::= INTEGER (0..255)

WLANOperatingClass ::= INTEGER (0..255)

WLANCountryCode ::= ENUMERATED {
    unitedStates,
    europe,
    japan,
    global,
    ...
}

WLANIdentifier-List ::= SEQUENCE (SIZE (1.. maxnoofWLANIdentifierItems)) OF ProtocolIE-SingleContainer { { WLANIdentifier-ItemIEs} }

WLANIdentifier-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-WLANIdentifier-Item CRITICALITY ignore  TYPE WLANIdentifier-Item    PRESENCE mandatory},
    ...
}

WLANIdentifier-Item ::= SEQUENCE {
    wLANInformation         WLANInformation,
    iE-Extensions           ProtocolExtensionContainer { { WLANIdentifier-Item-ExtIEs} }    OPTIONAL,
    ...
}

WLANIdentifier-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

WLANIdentifiersToDelete-List ::= SEQUENCE (SIZE (1.. maxnoofWLANIdentifierItems)) OF ProtocolIE-SingleContainer { { WLANIdentifiersToDelete-
ItemIEs} }

WLANIdentifiersToDelete-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-WLANIdentifiersToDelete-Item    CRITICALITY ignore  TYPE WLANIdentifiersToDelete-Item PRESENCE mandatory}
}
```

```
WLANIdentifiersToDelete-Item ::= SEQUENCE {
    bSSID                                       BSSID,
    iE-Extensions                               ProtocolExtensionContainer { { WLANIdentifiersToDelete-Item-ExtIEs} }OPTIONAL,
    ...
}

WLANIdentifiersToDelete-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

WLANIdentifiersToDeleteExtension-List ::= SEQUENCE (SIZE (1.. maxnoofWLANIdentifierItems)) OF ProtocolIE-SingleContainer { {
WLANIdentifiersToDeleteExtension-ItemIEs} }

WLANIdentifiersToDeleteExtension-ItemIEs XWAP-PROTOCOL-IES ::= {
    { ID id-WLANIdentifiersToDeleteExtension-Item   CRITICALITY ignore  TYPE WLANIdentifiersToDeleteExtension-Item  PRESENCE mandatory}
}

WLANIdentifiersToDeleteExtension-Item ::= SEQUENCE {
    sSID                    SSID            OPTIONAL,
    hESSID                  HESSID          OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { { WLANIdentifiersToDeleteExtension-Item-ExtIEs} }OPTIONAL,
    ...
}

WLANIdentifiersToDeleteExtension-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

WLANInformation ::= SEQUENCE {
    bSS-Item        BSS-Item    OPTIONAL,
    sSID            SSID        OPTIONAL,
    hESSID          HESSID      OPTIONAL,
    iE-Extensions   ProtocolExtensionContainer { { WLANInformation-ExtIEs} }    OPTIONAL,
    ...
}

WLANInformation-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    { ID id-WLANUsage   CRITICALITY reject  EXTENSION   WLANUsage   PRESENCE optional},
    ...
}

WLANSecurityInfo ::= SEQUENCE {
    wT-Security-Key     BIT STRING (SIZE(256)),
    iE-Extensions       ProtocolExtensionContainer { { WLANSecurityInfo-Item-ExtIEs} }  OPTIONAL,
    ...
}

WLANSecurityInfo-Item-ExtIEs XWAP-PROTOCOL-EXTENSION ::= {
    ...
}

WLANUsage ::=   ENUMERATED {
    lWAandLWIP,
```

```
    lWIPonly,
    ...
}


WT-MAC-Address ::= OCTET STRING (SIZE (6))

WTID ::= CHOICE {
    wTID-Type1          WTID-Type1,
    wTID-Type2          WTID-Long-Type2,
    ...
}

WTID-Type1 ::= SEQUENCE {
    pLMN-Identity                   PLMN-Identity,
    shortWTID                       BIT STRING (SIZE(24)),
    ...
}

WTID-Long-Type2 ::= BIT STRING (SIZE(48))


END
```

9.3.6 Common definitions

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

XwAP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-CommonDataTypes (3) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs

FROM XwAP-Constants;
```

```
-- **************************************************************
--
-- Common Data Types
--
-- **************************************************************

Criticality ::= ENUMERATED { reject, ignore, notify }

Presence ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID ::= CHOICE {
    local               INTEGER (0.. maxPrivateIEs),
    global              OBJECT IDENTIFIER
}

ProcedureCode ::= INTEGER (0..255)

ProtocolExtensionID ::= INTEGER (0.. maxProtocolExtensions)

ProtocolIE-ID ::= INTEGER (0.. maxProtocolIEs)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome }
END
```

9.3.7 Constant definitions

```
-- **************************************************************
--
-- Constant definitions
--
-- **************************************************************
XwAP-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

IMPORTS
    ProcedureCode,
    ProtocolIE-ID

FROM XwAP-CommonDataTypes;
```

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

id-xwSetup                                  ProcedureCode ::= 0
id-wTConfigurationUpdate                    ProcedureCode ::= 1
id-wTStatusReportingInitiation              ProcedureCode ::= 2
id-wTStatusReporting                        ProcedureCode ::= 3
id-errorIndication                          ProcedureCode ::= 4
id-reset                                    ProcedureCode ::= 5
id-wTAdditionPreparation                    ProcedureCode ::= 6
id-eNBInitiatedWTModification               ProcedureCode ::= 7
id-wTInitiatedWTModification                ProcedureCode ::= 8
id-eNBInitiatedWTRelease                    ProcedureCode ::= 9
id-wTInitiatedWTRelease                     ProcedureCode ::= 10
id-wTAssociationConfirmation                ProcedureCode ::= 11
id-privateMessage                           ProcedureCode ::= 12
id-lWIPAdditionPreparation                  ProcedureCode ::= 13
id-eNBInitiatedLWIPModification             ProcedureCode ::= 14
id-eNBInitiatedLWIPRelease                  ProcedureCode ::= 15
id-wTInitiatedLWIPRelease                   ProcedureCode ::= 16

-- **************************************************************
--
-- Extension constants
--
-- **************************************************************

maxPrivateIEs                           INTEGER ::= 65535
maxProtocolExtensions                   INTEGER ::= 65535
maxProtocolIEs                          INTEGER ::= 65535


-- **************************************************************
--
-- Lists
--
-- **************************************************************

maxnoofBands                                INTEGER ::= 256
maxnoofBearers                              INTEGER ::= 256
maxnoofBSSs                                 INTEGER ::= 4096
maxnoofErrors                               INTEGER ::= 256
maxnoofFailedMeasObjects                    INTEGER ::= 32
maxnoofMobilitySetItems                     INTEGER ::= 1024
maxnoofWLANIdentifierItems                  INTEGER ::= 4096
maxnoofeNBNeighbours                            INTEGER ::= 256


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

```
-- IEs
--
-- ********************************************************************

id-BSSMeasurementResult-Item                        ProtocolIE-ID ::= 0
id-BSSMeasurementResult-List                        ProtocolIE-ID ::= 1
id-BSSToReport-Item                                 ProtocolIE-ID ::= 2
id-BSSToReport-List                                 ProtocolIE-ID ::= 3
id-Cause                                            ProtocolIE-ID ::= 4
id-CompleteFailureCauseInformation-Item             ProtocolIE-ID ::= 5
id-CompleteFailureCauseInformation-List             ProtocolIE-ID ::= 6
id-CriticalityDiagnostics                           ProtocolIE-ID ::= 7
id-ENB-Measurement-ID                               ProtocolIE-ID ::= 8
id-Global-ENB-ID                                    ProtocolIE-ID ::= 9
id-MeasurementFailureCause-Item                     ProtocolIE-ID ::= 10
id-MeasurementInitiationResult-Item                 ProtocolIE-ID ::= 11
id-MeasurementInitiationResult-List                 ProtocolIE-ID ::= 12
id-PartialSuccessIndicator                          ProtocolIE-ID ::= 13
id-Registration-Request                             ProtocolIE-ID ::= 14
id-ReportCharacteristics                            ProtocolIE-ID ::= 15
id-ReportingPeriodicity                             ProtocolIE-ID ::= 16
id-WLANIdentifier-Item                              ProtocolIE-ID ::= 17
id-WLANIdentifier-List                              ProtocolIE-ID ::= 18
id-WLANIdentifiersToAdd-List                        ProtocolIE-ID ::= 19
id-WLANIdentifiersToDelete-Item                     ProtocolIE-ID ::= 20
id-WLANIdentifiersToDelete-List                     ProtocolIE-ID ::= 21
id-WLANIdentifiersToModify-List                     ProtocolIE-ID ::= 22
id-WTID                                             ProtocolIE-ID ::= 23
id-WT-Measurement-ID                                ProtocolIE-ID ::= 24
id-ENB-UE-XwAP-ID                                   ProtocolIE-ID ::= 25
id-WT-UE-XwAP-ID                                    ProtocolIE-ID ::= 26
id-BSS-Item                                         ProtocolIE-ID ::= 27
id-E-RABs-ToBeAdded-List                            ProtocolIE-ID ::= 28
id-E-RABs-ToBeAdded-Item                            ProtocolIE-ID ::= 29
id-UE-Identity                                      ProtocolIE-ID ::= 30
id-WLANSecurityInfo                                 ProtocolIE-ID ::= 31
id-E-RABs-Admitted-ToBeAdded-List                   ProtocolIE-ID ::= 32
id-E-RABs-Admitted-ToBeAdded-Item                   ProtocolIE-ID ::= 33
id-E-RABs-NotAdmitted-List                          ProtocolIE-ID ::= 34
id-E-RAB-Item                                       ProtocolIE-ID ::= 35
id-UE-ContextInformationWTModReq                    ProtocolIE-ID ::= 36
id-E-RABs-ToBeAdded-ModReqItem                      ProtocolIE-ID ::= 37
id-E-RABs-ToBeModified-ModReqItem                   ProtocolIE-ID ::= 38
id-E-RABs-ToBeReleased-ModReqItem                   ProtocolIE-ID ::= 39
id-E-RABs-Admitted-ToBeAdded-ModAckList             ProtocolIE-ID ::= 40
id-E-RABs-Admitted-ToBeAdded-ModAckItem             ProtocolIE-ID ::= 41
id-E-RABs-Admitted-ToBeModified-ModAckList          ProtocolIE-ID ::= 42
id-E-RABs-Admitted-ToBeModified-ModAckItem          ProtocolIE-ID ::= 43
id-E-RABs-Admitted-ToBeReleased-ModAckList          ProtocolIE-ID ::= 44
id-E-RABs-Admitted-ToBeReleased-ModAckItem          ProtocolIE-ID ::= 45
id-E-RABs-ToBeReleased-ModReqdList                  ProtocolIE-ID ::= 46
id-E-RABs-ToBeReleased-ModReqdItem                  ProtocolIE-ID ::= 47
id-E-RABs-ToBeReleased-List-RelReq                  ProtocolIE-ID ::= 48
id-E-RABs-ToBeReleased-RelReqItem                   ProtocolIE-ID ::= 49
```

```
id-E-RABs-ToBeReleased-List-RelConf                    ProtocolIE-ID ::= 50
id-E-RABs-ToBeReleased-RelConfItem                     ProtocolIE-ID ::= 51
id-E-RABs-Confirmed-ToBeReleased-ModReqdList           ProtocolIE-ID ::= 52
id-E-RABs-Confirmed-ToBeReleased-ModReqdItem           ProtocolIE-ID ::= 53
id-MobilitySet                                         ProtocolIE-ID ::= 54
id-ServingPLMN                                         ProtocolIE-ID ::= 55
id-E-RABs-ToBeModified-ModReqdList                     ProtocolIE-ID ::= 56
id-E-RABs-ToBeModified-ModReqdItem                     ProtocolIE-ID ::= 57
id-E-RABs-Confirmed-ToBeModified-ModReqdList           ProtocolIE-ID ::= 58
id-E-RABs-Confirmed-ToBeModified-ModReqdItem           ProtocolIE-ID ::= 59
id-wLANBandInformation                                 ProtocolIE-ID ::= 60
id-WLANIdentifiersToDeleteExtension-Item               ProtocolIE-ID ::= 61
id-WLANIdentifiersToDeleteExtension-List               ProtocolIE-ID ::= 62
id-TimeToWait                                          ProtocolIE-ID ::= 63
id-UE-ContextKeptIndicator                             ProtocolIE-ID ::= 64
id-DRB-Identity                                        ProtocolIE-ID ::= 65
id-LWA-WLAN-AC                                         ProtocolIE-ID ::= 66
id-eNBNeighbour-List                                   ProtocolIE-ID ::= 67
id-eNBNeighbour-Item                                   ProtocolIE-ID ::= 68
id-LWIP-SeGWSecurityInfo                               ProtocolIE-ID ::= 69
id-eNBGTPtunnelEndpoint                                ProtocolIE-ID ::= 70
id-LWIP-SeGWGTPtunnelEndpoint                          ProtocolIE-ID ::= 71
id-WLANUsage                                           ProtocolIE-ID ::= 72
id-WT-MAC-Address                                      ProtocolIE-ID ::= 73

END
```

9.3.8 Container definitions

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

XwAP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
eps-Access (21) modules (3) xwap (8) version1 (1) xwap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

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

```
    ProtocolExtensionID,
    ProtocolIE-ID
FROM XwAP-CommonDataTypes

    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs
FROM XwAP-Constants;

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

XWAP-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
--
-- ************************************************************

XWAP-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
```

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

XWAP-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
--
-- **************************************************************

XWAP-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 { XWAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-SingleContainer { XWAP-PROTOCOL-IES : IEsSetParam} ::=
    ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field { XWAP-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {
    id              XWAP-PROTOCOL-IES.&id               ({IEsSetParam}),
    criticality     XWAP-PROTOCOL-IES.&criticality      ({IEsSetParam}{@id}),
    value           XWAP-PROTOCOL-IES.&Value            ({IEsSetParam}{@id})
}
```

```
-- **************************************************************
--
-- Container for Protocol IE Pairs
--
-- **************************************************************

ProtocolIE-ContainerPair { XWAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-FieldPair {{IEsSetParam}}

ProtocolIE-FieldPair { XWAP-PROTOCOL-IES-PAIR : IEsSetParam} ::= SEQUENCE {
    id                  XWAP-PROTOCOL-IES-PAIR.&id                  ({IEsSetParam}),
    firstCriticality    XWAP-PROTOCOL-IES-PAIR.&firstCriticality    ({IEsSetParam}{@id}),
    firstValue          XWAP-PROTOCOL-IES-PAIR.&FirstValue          ({IEsSetParam}{@id}),
    secondCriticality   XWAP-PROTOCOL-IES-PAIR.&secondCriticality   ({IEsSetParam}{@id}),
    secondValue         XWAP-PROTOCOL-IES-PAIR.&SecondValue         ({IEsSetParam}{@id})
}

-- **************************************************************
--
-- Container Lists for Protocol IE Containers
--
-- **************************************************************

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, XWAP-PROTOCOL-IES : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
    ProtocolIE-SingleContainer {{IEsSetParam}}

ProtocolIE-ContainerPairList {INTEGER : lowerBound, INTEGER : upperBound, XWAP-PROTOCOL-IES-PAIR : IEsSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
    ProtocolIE-ContainerPair {{IEsSetParam}}

-- **************************************************************
--
-- Container for Protocol Extensions
--
-- **************************************************************

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

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

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

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

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

9.4 Message transfer syntax

XwAP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Rec. X.691 [5].

10 Handling of unknown, unforeseen and erroneous protocol data

Clause 10 of TS 36.413 [8] is applicable for the purposes of the present document, with the following addition to the handling of AP IDs specified in clause 10.6.

If a node receives a message (other than the first or first returned messages) that includes AP ID(s) identifying a logical connection which is known to the node (for the same Xw interface), but was established for the LWIP operation whereas the message relates to LWA operation (or vice-versa), the node shall behave as if the AP ID(s) identify a logical connection which is unknown to the node. If the node subsequently initiates an Error Indication procedure as part of the error handling described in clause 10.6 of TS 36.413 [8], it shall include an appropriate cause value such as "Wrong WLAN Interworking Mode".

Annex A (informative): Change history

TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	New
					Initial skeleton	0.0.1
					Inclusion of text proposals agreed at RAN WG3#89bis	0.0.2
					Editorial revisions and corrections	0.0.3
					Inclusion of text proposals agreed at RAN WG3#90	0.0.4
RAN#70					Presentation to RAN#70 for information	1.0.0
					Editorial revisions and corrections	1.1.0
					Inclusion of text proposals agreed at RAN WG3 Adhoc NBIoT	1.2.0
					Editorial revisions and corrections	1.3.0
					Inclusion of text proposals agreed at RAN WG3#91	1.4.0
RAN#71					Presentation to RAN#71 for approval	2.0.0
RAN#71					Upgraded to Rel-13 and placed under change control	13.0.0
RAN#72	RP-161046	3	2	F	Addition of measurement configuration	13.1.0
RAN#72	RP-161046	4	1	F	Correction on RESET procedure	13.1.0
RAN#72	RP-161046	5		F	Correction on WT Initiated WT Modification	13.1.0
RAN#72	RP-161046	7	2	F	Correction on WT configuration update	13.1.0
RAN#72	RP-161046	8	2	F	Correction on Global eNB ID	13.1.0
RAN#72	RP-161043	12		F	Correction to WT-Initiated WT Modification	13.1.0
RAN#72	RP-161046	14	3	F	Xw-AP corrections	13.1.0
RAN#72	RP-161046	17	1	F	Rapporteur updates to TS 36.463	13.1.0
RAN#74	RP-162336	0027	2	B	Correction on the reinitiating waiting time in Xw	14.0.0

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-03	RP-75	RP-170535	0032		B	XwAP Support for Inter-eNB Mobility without WT Change	14.1.0
2017-03	RP-75	RP-170535	0033		B	Introduction of WLAN band indication	14.1.0
2017-03	RP-75	RP-170535	0034		B	Uplink bearer identification	14.1.0
2017-03	RP-75	RP-170535	0035		B	WT Notifying neighbour eNB information on Xw	14.1.0
2017-03	RP-75	RP-170542	0036		B	Introduction of New types of eNB ID	14.1.0
2017-03	RP-75	RP-170543	0031	4	B	LWIP Addition and Modification	14.1.0
2017-03	RP-75	RP-170535	0032		B	XwAP Support for Inter-eNB Mobility without WT Change	14.1.0
2017-03	RP-75	RP-170535	0033		B	Introduction of WLAN band indication	14.1.0
2017-03	RP-75	RP-170331	0037		B	Xw support for WT MAC address signalling	14.1.0
2017-06	RP-76	RP-171326	0038	1	F	Corrections on inter-WLAN interworking mode error handling	14.2.0
2017-06	RP-76	RP-171324	0039	1	F	Rapporteur update for TS 36.463	14.2.0

History

Document history		
V14.1.0	April 2017	Publication
V14.2.0	August 2017	Publication