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Core Network and Interoperability Testing (INT);
5G NGAP Conformance Testing for the N2 interface;
(3GPP™ Release 16);
Part 2: Test Suite Structure (TSS) and Test Purposes (TP)

Reference
DTS/INT-00198

Keywords
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Core Network and Interoperability Testing (INT).

The present document is part 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [2].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document provides the Test Suite Structure (TSS) and Test Purposes (TP) for the test specification for the NGAP protocol on the N2 interface as specified in ETSI TS 138 413 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [i.2] and ETSI ETS 300 406 [i.3].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 138 413 (V16.14.0): "5G; NG-RAN; NG Application Protocol (NGAP) (3GPP TS 38.413 version 16.14.0 Release 16) ".

[2] ETSI TS 103 920-1: "Core Network and Interoperability Testing (INT); 5G NGAP Conformance Testing for the N2 interface; (3GPPTM Release 16); Part 1: Protocol Implementation Conformance Statement (PICS)".

[3] ETSI TS 123 502 (V16.15.0): "5G; Procedures for the 5G System (5GS) (3GPP TS 23.502 version 16.15.0 Release 16)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

[i.2] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[i.3] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in ETSI TS 138 413 [1] and the following apply:

Abstract Test Method (ATM): Refer to ISO/IEC 9646-1 [i.1].

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [i.1].

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [i.1].

Test Purpose (TP): Refer to ISO/IEC 9646-1 [i.1].

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 138 413 [1] and the following apply:

TS	Test System
TSS	Test Suite Structure

4 Test configurations

4.1 Introduction

Test purposes of the present document address the 5G functional entities gNB and AMF that are accessible via the standardized N2 interface.

4.2 Test configuration using the N2 interface

The N2 interface is located between the gNB and the AMF. Following configurations are simplified to highlight tested interface and involved entities. Overall network infrastructure is shown under clause 4.3.

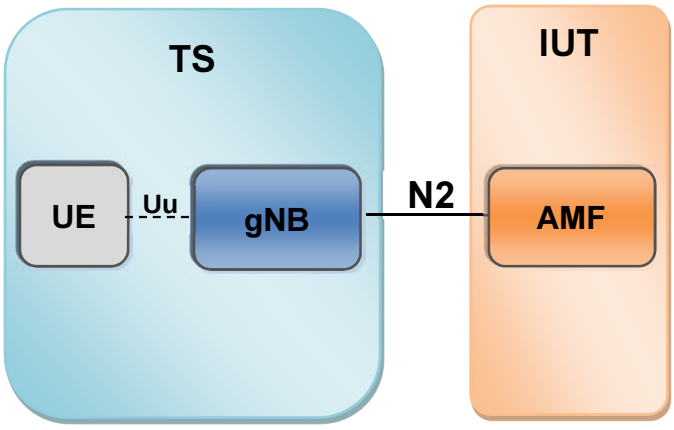

Figure 1: Test configuration CF_AMF_N2

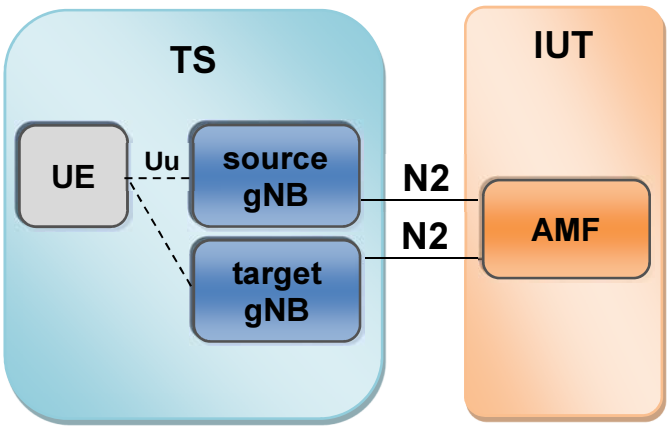

Figure 2: Test configuration CF_AMF_2N2

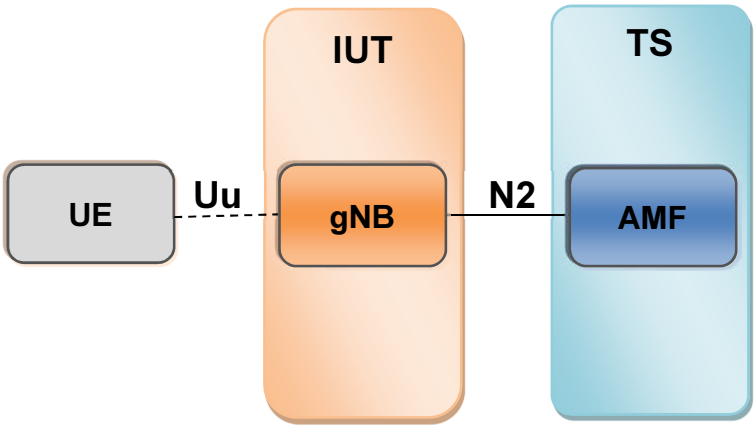

Figure 3: Test configuration CF_GNB_N2

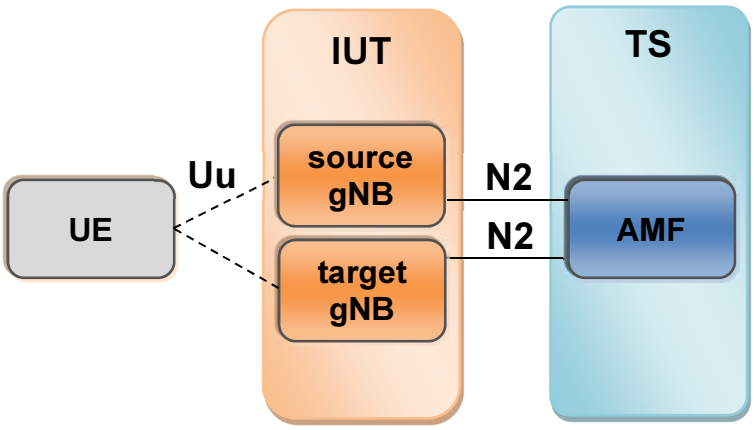

Figure 4: Test configuration CF_GNB_2N2

4.3 Network infrastructure

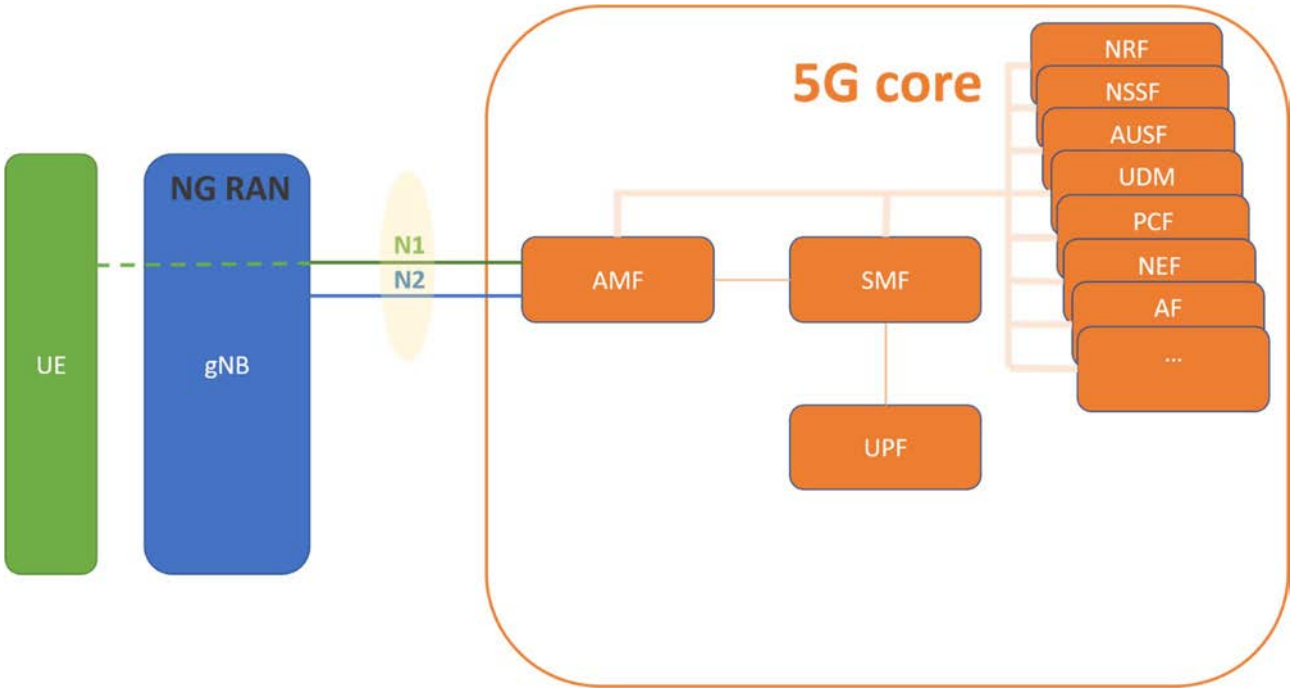

Figure 5: Network architecture

5 Test Suite Structure (TSS) and Test Purposes (TP)

5.1 Test Suite Structure

5.1.1 TP naming convention

TPs are numbered, starting at 01, within each group. Groups are organized according to the TSS.

Table 1: TP identifier naming convention scheme

Identifier: **<TP>_<iut>_<scope>_<nn>**			
<tp>	=	Test Purpose:	fixed to "TP"
<interface or protocol>			Interface or protocol: NGAP
<iut>	=	type of IUT:	GNB or AMF
<scope>	=	group	PDU PDU Session Management Procedures
			CMP Context Management procedures
			MMP UE Mobility Management Procedures
			PAG Paging
			NAS Transport of NAS Messages Procedures
			IMP Interface Management Procedures
			CTP Configuration Transfer Procedures
			WTP Warning Message Transmission Procedures
			NTP NRPPa transport Procedures
			TRP Trace Procedures
			LRP Location Reporting Procedures
			UBP UE TNLA Binding Procedures
			URP UE Radio Capability Management Procedures
			DRP Data Usage Reporting Procedures
			RIP RIM Information Transfer Procedures
<nn>	=	sequential number	(01 to 99)

5.1.2 Test strategy

As the base specification in ETSI TS 138 413 [1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification ETSI TS 103 920-1 [2].

5.1.3 TP structure

Each TP has been written in a manner which is consistent with all other TPs. The intention of this is to make the TPs more readable and checkable. A particular structure has been used which is illustrated in Table 2. Table 2 should be read in conjunction with any TP, i.e. use a TP as an example to facilitate the full comprehension of Table 2.

Table 2: Structure of a single TP

TP part	Text	Example
Header	**<Identifier>** **<clause number in base ETSI TS 138 413 [1]>** **<PICS reference>**	**see Table 1** **clause 8.3.11.2** **A.3/3.1**
Summary	*Short free text description of the test objective*	Verify that the IUT can send a HANDOVER REQUIRED message containing mandatory IEs due to UE mobility management procedure.
Configuration	*Test configuration as described in clause 4.2*	CFG_GNB_01
Initial condition (optional)	*Free text description of the condition that the IUT has reached before the test purpose applies.*	
Start point	Ensure that the IUT in the <state> *see ETSI TS 138 413 [1], clause 8.1* *and/or further actions before stimulus* *if the action is sending/receiving* *see below for message structure*	Handover Preparation having sent a HANDOVER_REQUIRED
Stimulus	<**trigger**>, *see below for message structure* *or* <goal>	on receipt of a HANDOVER_COMMAND (see note 2)
Reaction	<**action**>. *if the action is sending* *see below for message structure* <next action>, *etc.*	sends, saves, does, etc.
Message structure	<message type> *a)* containing a(n) <IE name> IE (see note 4) *b)* indicating <coding of the field> and *back to a) or b) (see note 3)*	Message exchange, etc. (see note 2)

NOTE 1: Text in italics will not appear in TPs and text between <> is filled in for each TP and may differ from one TP to the next.

NOTE 2: All messages are considered as "valid and compatible" unless otherwise specified in the test purpose. This includes the presence of all mandatory IEs as specified in ETSI TS 138 413 [1].

NOTE 3: An IE can be embedded into another IE. This is expressed by indentations, e.g. if Message1 contains IE1 and IE2 where IE1 has IE3 embedded this will be expressed like this:

```
sends/receives Message 1
    containing IE1
        containing IE3
            indicating ...
    containing IE2
        indicating ...
```

NOTE 4: IE value fields used for e.g. identification or address should be equal in the scope of TP if not stated otherwise.

5.2 Test Purposes

5.2.1 PICS references

All PICS items referred to in this clause are as specified in ETSI TS 103 920-1 [2] unless indicated otherwise by another numbered reference. PICS items are only meant for test selection, therefore only PICS items with status optional or conditional are explicitly mentioned.

5.2.2 N2 interface

5.2.2.1 gNB Role

5.2.2.1.1 Test selection

The IUT takes the role of the gNB; PICS A.2/1.

5.2.2.1.2 PDU Session Management Procedures

TP Id	TP_NGAP_GNB_PDU_01
Test Objective	Verify that the NG-RAN node successfully processes a PDU SESSION RESOURCE SETUP REQUEST containing mandatory IEs and answers with PDU SESSION RESOURCE SETUP RESPONSE for successfully established PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.2, 9.2.1.1 and 9.2.1.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_1
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_SETUP_REQUEST containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Setup_Request_List containing
              PDU_Session_Resource_Setup_Request_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Setup_Request_Transfer containing
                  UL_NG_U_UP_TNL,
                  PDU_SessionType,
                  QoSFlowSetupRequestList containing
                    QoSFlowSetupRequestItem containing
                      QoSFlowIndicator,
                      QoSFlowLevelQoSParameters
        from the AMF entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_SETUP_RESPONSE containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Setup_Response_List containing
              PDU_Session_Resource_Setup_Response_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                PDU_Session_Resource_Setup_Response_Transfer containing
                  DL_QoS_Flow_per_TNL_Information
         to the AMF entity
       }
   }
```

TP Id	TP_NGAP_GNB_PDU_02
Test Objective	Verify that the NG-RAN node reports the establishment of the corresponding PDU session as failed if a PDU SESSION RESOURCE SETUP REQUEST containing several PDU Session ID IEs set to the same value.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.4, 9.2.1.1 and 9.2.1.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_1

Initial Conditions

```
with {
the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_SETUP_REQUEST containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Setup_Request_List containing
              PDU_Session_Resource_Setup_Request_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Setup_Request_Transfer containing
                  UL_NG_U_UP_TNL,
                  PDU_SessionType,
                  QoSFlowSetupRequestList containing
                    QoSFlowSetupRequestItem containing
                      QoSFlowIndicator,
                      QoSFlowLevelQoSParameters,
              PDU_Session_Resource_Setup_Request_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Setup_Request_Transfer containing
                  UL_NG_U_UP_TNL,
                  PDU_SessionType,
                  QoSFlowSetupRequestList containing
                    QoSFlowSetupRequestItem containing
                      QoSFlowIndicator,
                      QoSFlowLevelQoSParameters
        from the AMF entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_SETUP_RESPONSE containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Failed_to_Setup_List containing
              DU_Session_Resource_Failed_to_Setup_Item containing
                PDU_SessionId,
                PDU_Session_Resource_Setup_Unsuccessful_Transfer containing
                  Cause indicating value MultiplePDUSessionIDInstances
         to the AMF entity
    }
}
```

TP Id	TP_NGAP_GNB_PDU_03
Test Objective	Verify that the NG-RAN node reports the establishment of the new PDU session as failed if a PDU SESSION RESOURCE SETUP REQUEST containing a PDU Session ID IE set to value that identifies an active PDU Session.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.4, 9.2.1.1 and 9.2.1.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_1
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedPDUsessionWithSameId
        }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_SETUP_REQUEST containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Setup_Request_List containing
              PDU_Session_Resource_Setup_Request_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Setup_Request_Transfer containing
                  UL_NG_U_UP_TNL,
                  PDU_SessionType,
                  QoSFlowSetupRequestList containing
                    QoSFlowSetupRequestItem containing
                      QoSFlowIndicator,
                      QoSFlowLevelQoSParameters
        from the AMF entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_SETUP_RESPONSE containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Failed_to_Setup_List containing
              DU_Session_Resource_Failed_to_Setup_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                PDU_Session_Resource_Setup_Unsuccessful_Transfer containing
                  Cause indicating value MultiplePDUSessionIDInstances
         to the AMF entity
    }
}
```

TP Id	TP_NGAP_GNB_PDU_04
Test Objective	Verify that the NG-RAN node reports the establishment of the corresponding PDU session as failed if a PDU SESSION RESOURCE SETUP REQUEST containing a QoS Flow Setup Request List IE in the PDU Session Resource Setup Request Transfer IE including at least one Non-GBR QoS flow but the PDU Session Aggregate Maximum Bit Rate IE is not present.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.4, 9.2.1.1 and 9.2.1.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_1
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_SETUP_REQUEST containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Setup_Request_List containing
              PDU_Session_Resource_Setup_Request_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Setup_Request_Transfer containing
                  UL_NG_U_UP_TNL,
                  PDU_SessionType,
                  QoSFlowSetupRequestList containing
                    QoSFlowSetupRequestItem containing
                      QoSFlowIndicator indicating value Non_GBR_QoS,
                      QoSFlowLevelQoSParameters,
```

```
            not UEAggregateMaximumBitRate
        from the AMF entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_SETUP_RESPONSE containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Failed_to_Setup_List containing
              DU_Session_Resource_Failed_to_Setup_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                PDU_Session_Resource_Setup_Unsuccessful_Transfer containing
                  Cause indicating value InvalidQoSCombination
         to the AMF entity
    }
}
```

TP Id	TP_NGAP_GNB_PDU_05
Test Objective	Verify that the NG-RAN node successfully processes a PDU SESSION RESOURCE RELEASE COMMAND containing mandatory IEs and answers with PDU SESSION RESOURCE RELEASE RESPONSE to release PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.2.2, 9.2.1.3 and 9.2.1.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_2
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_RELEASE_COMMAND containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_To_Release_List containing
              PDU_Session_Resource_To_Release_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                S_NSSAI,
                PDU_Session_Resource_Release_Command_Transfer containing
                  Cause indicating value PX_Cause //normal_release
        from the AMF entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_RELEASE_RESPONSE containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Released_List containing
              PDU_Session_Resource_Released_Item containing
                PDU_SessionId indicating value PX_PDU_ID,
                PDU_Session_Resource_Release_Response_Transfer
         to the AMF entity
    }
}
```

TP Id	TP_NGAP_GNB_PDU_06
Test Objective	Verify that the NG-RAN node successfully processes a PDU SESSION RESOURCE RELEASE COMMAND containing multiple PDU Session ID IEs set to the same value and ignore the duplication.
Reference	ETSI TS 138 413 [1], clauses 8.2.2.2, 9.2.1.3 and 9.2.1.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_2
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

ensure that {
  when {
  the IUT receives a PDU_SESSION_RESOURCE_RELEASE_COMMAND containing
  AMF_UE_NGAP_ID,
  RAN_UE_NGAP_ID,
  PDU_Session_Resource_To_Release_List containing
  PDU_Session_Resource_To_Release_Item containing
  PDU_SessionId indicating value PX_PDU_ID,
  S_NSSAI,
  PDU_Session_Resource_Release_Command_Transfer containing
  Cause indicating value PX_Cause //normal_release
  ,
  PDU_Session_Resource_To_Release_Item containing
  PDU_SessionId indicating value PX_PDU_ID,
  S_NSSAI,
  PDU_Session_Resource_Release_Command_Transfer containing
  Cause indicating value PX_Cause //normal_release
  from the AMF entity
  }
  then {
  the IUT sends a PDU_SESSION_RESOURCE_RELEASE_RESPONSE containing
  AMF_UE_NGAP_ID,
  RAN_UE_NGAP_ID,
  PDU_Session_Resource_Released_List containing
  PDU_Session_Resource_Released_Item containing
  PDU_SessionId indicating value PX_PDU_ID,
  PDU_Session_Resource_Release_Response_Transfer
  to the AMF entity
  }
}

TP Id	TP_NGAP_GNB_PDU_07
Test Objective	Verify that the NG-RAN node successfully processes a PDU SESSION RESOURCE MODIFY REQUEST containing mandatory IEs and answers with PDU SESSION RESOURCE MODIFY RESPONSE for successfully modified PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.3.2, 9.2.1.5 and 9.2.1.6
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
  }	

Expected Behaviour	

ensure that {
  when {
  the IUT receives a PDU_SESSION_RESOURCE_MODIFY_REQUEST containing
  AMF_UE_NGAP_ID,
  RAN_UE_NGAP_ID,
  PDU_Session_Resource_Modify_Request_List containing
  PDU_Session_Resource_Modify_Request_Item containing
  PDU_SessionId indicating value PX_PDU_ID,
  PDU_Session_Resource_Modify_Request_Transfer containing
  QoSFlowAddorModifyRequestList containing
  QoSFlowAddorModifyRequestItem containing
  QoSFlowIdentifier
  from the AMF entity
  }
  then {
  the IUT sends a PDU_SESSION_RESOURCE_MODIFY_RESPONSE containing
  AMF_UE_NGAP_ID,
  RAN_UE_NGAP_ID,
  PDU_Session_Resource_Modify_Response_List containing
  PDU_Session_Resource_Modify_Response_Item containing
  PDU_SessionId indicating value PX_PDU_ID,
  PDU_Session_Resource_Modify_Response_Transfer containing
  QoSFlowAddorModifyResponsetList containing
  QoSFlowAddorModifyResponsetItem containing
  QoSFlowIdentifier
  to the AMF entity
  }
}	

TP Id	TP_NGAP_GNB_PDU_08
Test Objective	Verify that the IUT can send a PDU_SESSION_RESOURCE_NOTIFY that already established QoS flow or PDU session for given UE are released.
Reference	ETSI TS 138 413 [1], clauses 8.2.4.2 and 9.2.1.7
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU session resource notify procedure
}
then {
the IUT sends a PDU_SESSION_RESOURCE_NOTIFY containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Notify_List containing
PDU_Session_Resource_Notify_Item
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_PDU_09
Test Objective	Verify that the IUT can send a PDU_SESSION_RESOURCE_MODIFY_INDICATION to request modification of established PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.5.2 and 9.2.1.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_5
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU session resource modify indicationy procedure
}
then {
the IUT sends a PDU_SESSION_RESOURCE_MODIFY_INDICATION containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Modify_Indication_List containing
PDU_Session_Resource_Modify_Indication_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Indication_Transfer containing
DLQoSFlowperTNLInformation
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_PDU_10
Test Objective	Verify that the NG-RAN node reports the modification of the corresponding PDU session as failed if a PDU SESSION RESOURCE MODIFY REQUEST contains several PDU Session ID IEs set to the same value.
Reference	ETSI TS 138 413 [1], clauses 8.2.3.4, 9.2.1.5 and 9.2.1.6
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/1_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedPDUsession
}	

Expected Behaviour

ensure that {
when {
the IUT receives a PDU_SESSION_RESOURCE_MODIFY_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Modify_Request_List containing
PDU_Session_Resource_Modify_Request_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Request_Transfer containing
QoSFlowAddorModifyRequestList containing
QoSFlowAddorModifyRequestItem containing
QoSFlowIdentifier,
PDU_Session_Resource_Modify_Request_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Request_Transfer containing
QoSFlowAddorModifyRequestList containing
QoSFlowAddorModifyRequestItem containing
QoSFlowIdentifier
from the AMF entity
}
then {
the IUT sends a PDU_SESSION_RESOURCE_MODIFY_RESPONSE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Failed_to_Modify_Response_List containing
PDU_Session_Resource_Failed_to_Modify_Response_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Unsuccessful_Transfer containing
Cause indicating value MultiplePDUSessionIDInstances
to the AMF entity
}
}

5.2.2.1.3 UE Context Management Procedures

TP Id	TP_NGAP_GNB_CMP_01
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST containing optional PDU Session Resource Setup Request List field mandatory IEs and answers with INITIAL CONTEXT SETUP RESPONSE with successfully established UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
GUAMI containing
PLMN_Identity,
AMF_Region_ID,
AMF_Set_ID,
AMF_Pointer,
PDU_Session_Resource_Setup_Request_List containing
PDU_Session_Resource_Setup_Request_Item containing
PDU_SessionId indicating value PX_PDU_ID,
S_NSSAI containing
SST,
PDU_Session_Resource_Setup_Request_Transfer,
Allowed_NSSAI containing
Allowed_NSSAI_List containing
Allowed_NSSAI_Item containing
S_NSSAI containing
SST,
UE_Security_Capabilities containing
NR_Encryption_Algorithms,
NR_Integrity_Protection_Algorithms,
E_UTRA_Encryption_Algorithms,
E_UTRA_Integrity_Protection_Algorithms,	

```
                        Security_Key
                    from the AMF entity
                }
                then {
                    the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        PDU_Session_Resource_Setup_Response_List containing
                            PDU_SessionId,
                            PDU_Session_Resource_Setup_Response_Transfer
                     to the AMF entity
                }
            }
```

TP Id	TP_NGAP_GNB_CMP_02
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST containing mandatory IEs and answers with INITIAL CONTEXT SETUP RESPONSE with successfully established UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1
Initial Conditions	

```
with {
            the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        GUAMI containing
                            PLMN_Identity,
                            AMF_Region_ID,
                            AMF_Set_ID,
                            AMF_Pointer,
                        Allowed_NSSAI containing
                            Allowed_NSSAI_List containing
                                Allowed_NSSAI_Item containing
                                    S_NSSAI containing
                                        SST,
                               UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                        Security_Key
                    from the AMF entity
                }
                then {
                    the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID
                     to the AMF entity
                   }
            }
```

TP Id	TP_NGAP_GNB_CMP_03
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST with optional field Trace Activation and answers with an INITIAL CONTEXT SETUP RESPONSE with successfully established UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1
Initial Conditions	

```
with {
            the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer,
                            PDU_Session_Resource_Setup_Request_List containing
                                PDU_Session_Resource_Setup_Request_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                            SST,
                                    PDU_Session_Resource_Setup_Request_Transfer,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms
                                ,
                            Security_Key,
                            Trace_Activation containing
                                   NG_RAN_Trace_ID,
                                   Interfaces_to_Trace,
                                   Trace_Depth,
                                   Trace_Collection_Entity_IP_Address
                        from the AMF entity
                    }
                    then {
                        the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Setup_Response_List containing
                                PDU_SessionId,
                                PDU_Session_Resource_Setup_Response_Transfer
                         to the AMF entity
                       }
                   }
```

TP Id	TP_NGAP_GNB_CMP_04
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST with optional field Mobility Restriction List and answers with INITIAL CONTEXT SETUP RESPONSE with successfully established UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer,
                            PDU_Session_Resource_Setup_Request_List containing
                                PDU_Session_Resource_Setup_Request_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                            SST,
                                    PDU_Session_Resource_Setup_Request_Transfer,
```

```
                        Allowed_NSSAI containing
                            Allowed_NSSAI_List containing
                                Allowed_NSSAI_Item containing
                                    S_NSSAI containing
                                        SST,
                        UE_Security_Capabilities containing
                            NR_Encryption_Algorithms,
                            NR_Integrity_Protection_Algorithms,
                            E_UTRA_Encryption_Algorithms,
                            E_UTRA_Integrity_Protection_Algorithms,
                        Security_Key,
                        Mobility_Restriction_List containing
                            Serving_PLMN
                    from the AMF entity
                }
                then {
                    the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        PDU_Session_Resource_Setup_Response_List containing
                            PDU_SessionId,
                            PDU_Session_Resource_Setup_Response_Transfer
                     to the AMF entity
                   }
               }
```

TP Id	TP_NGAP_GNB_CMP_05
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST with different optional fields and answers with INITIAL CONTEXT SETUP RESPONSE with successfully established UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1
Initial Conditions	

```
with {
            the UE isRegisteredTo the AMF
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        GUAMI containing
                            PLMN_Identity,
                            AMF_Region_ID,
                            AMF_Set_ID,
                            AMF_Pointer,
                        PDU_Session_Resource_Setup_Request_List containing
                            PDU_Session_Resource_Setup_Request_Item containing
                                PDU_SessionId indicating value PX_PDU_ID,
                                S_NSSAI containing
                                        SST,
                                PDU_Session_Resource_Setup_Request_Transfer,
                        Allowed_NSSAI containing
                            Allowed_NSSAI_List containing
                                Allowed_NSSAI_Item containing
                                    S_NSSAI containing
                                        SST,
                        UE_Security_Capabilities containing
                            NR_Encryption_Algorithms,
                            NR_Integrity_Protection_Algorithms,
                            E_UTRA_Encryption_Algorithms,
                            E_UTRA_Integrity_Protection_Algorithms,
                        Security_Key,
                        UE_Radio_Capability,
                        Index_to_RAT_Frequency_Selection_Priority,
                        Masked_IMEISV,
                        NAS_PDU,
                        Emergency_Fallback_Indicator,
                        RRC_Inactive_Transition_Report_Request,
                        Redirection_for_Voice_EPS_Fallback,
                        Location_Reporting_Request_Type containing
                            Event_Type,
                            Report_Area,
```

```
                        SRVCC_Operation_Possible,
                        IAB_Authorized,
                        Enhanced_Coverage_Restriction,
                        Extended_Connected_Time,
                        UE Differentiation Information containing
                            Periodic_Communication_Indicator,
                            Periodic_Time,
                        NR_UE_Sidelink_Aggregate_Maximum_Bit_Rate,
                        LTE_UE_Sidelink_Aggregate_Maximum_Bit_Rate,
                        UE_Radio_Capability_ID
                    from the AMF entity
                }
                then {
                    the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        PDU_Session_Resource_Setup_Response_List containing
                            PDU_SessionId,
                            PDU_Session_Resource_Setup_Response_Transfer
                     to the AMF entity
                   }
               }
```

TP Id	TP_NGAP_GNB_CMP_06
Test Objective	Verify that the NG-RAN node successfully processes an INITIAL CONTEXT SETUP REQUEST containing mandatory IEs and answers with INITIAL CONTEXT SETUP RESPONSE with failed PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.3.1.2, 9.2.2.1 and 9.2.2.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_1
Initial Conditions	

```
with {
            the UE isRegisteredTo the AMF and
            the UE hasEstablishedContextInproperly
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        GUAMI containing
                            PLMN_Identity,
                            AMF_Region_ID,
                            AMF_Set_ID,
                            AMF_Pointer,
                        PDU_Session_Resource_Setup_Request_List containing
                            PDU_Session_Resource_Setup_Request_Item containing
                                PDU_SessionId indicating value PX_PDU_ID,
                                S_NSSAI containing
                                    SST,
                                PDU_Session_Resource_Setup_Request_Transfer,
                        Allowed_NSSAI containing
                            Allowed_NSSAI_List containing
                                Allowed_NSSAI_Item containing
                                    S_NSSAI containing
                                        SST,
                           UE_Security_Capabilities containing
                            NR_Encryption_Algorithms,
                            NR_Integrity_Protection_Algorithms,
                            E_UTRA_Encryption_Algorithms,
                            E_UTRA_Integrity_Protection_Algorithms,
                        Security_Key
                    from the AMF entity
                }
                then {
                    the IUT sends an INITIAL_CONTEXT_SETUP_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        PDU_Session_Resource_Failed_to_Setup_List containing
                            PDU_SessionId indicating value PX_PDU_ID,
                            PDU_Session_Resource_Setup_Unsuccessful_Transfer
                     to the AMF entity
                   }
               }
```

TP Id	TP_NGAP_GNB_CMP_07
Test Objective	Verify that the NG-RAN node successfully requests the AMF to release the UE-associated logical NG-connection.
Reference	ETSI TS 138 413 [1], clauses 8.3.2.2 and 9.2.2.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_2
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a UE context release request
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RELEASE_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Cause
                        to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_CMP_08
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT RELEASE COMMAND that contains both the AMF UE NGAP ID IE and the RAN UE NGAP ID IE and answers with UE CONTEXT RELEASE COMPLETE with successfully release UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.3, 9.2.2.6 and 9.2.2.5
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a UE_CONTEXT_RELEASE_COMMAND containing
                            CHOICE_UE_NGAP_IDs containing
                                UE_NGAP_ID_pair containing
                                    AMF_UE_NGAP_ID,
                                    RAN_UE_NGAP_ID
                        from the AMF entity
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RELEASE_COMPLETE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID
                         to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_CMP_09
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT RELEASE COMMAND where only the AMF UE NGAP ID IE is available and answers with UE CONTEXT RELEASE COMPLETE with successfully release UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.3, 9.2.2.6 and 9.2.2.5
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

ensure that {
when {
the IUT receives a UE_CONTEXT_RELEASE_COMMAND containing
CHOICE_UE_NGAP_IDs containing
AMF_UE_NGAP_ID containing
AMF_UE_NGAP_ID
from the AMF entity
}
then {
the IUT sends a UE_CONTEXT_RELEASE_COMPLETE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the AMF entity
}
}

TP Id	TP_NGAP_GNB_CMP_10
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT MODIFICATION REQUEST containing mandatory IEs and answers with UE CONTEXT MODIFICATION FAILURE because the UE is no longer available.
Reference	ETSI TS 138 413 [1], clauses 8.3.4.3, 9.2.2.7 and 9.2.2.9
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_4
Initial Conditions	

with {
the UE isNoLongerAvailable
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_CONTEXT_MODIFICATION_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
from the AMF entity
}
then {
the IUT sends a UE_CONTEXT_MODIFICATION_FAILURE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Cause
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_CMP_11
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT MODIFICATION REQUEST containing mandatory IEs after the preparation of a handover and answers with UE CONTEXT MODIFICATION RESPONSE with successfully modify UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.4.2, 9.2.2.7 and 9.2.2.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext and
the GNB alreadyPreparedHandover
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_CONTEXT_MODIFICATION_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
from the AMF entity
}
then {
the IUT sends a UE_CONTEXT_MODIFICATION_RESPONSE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the AMF entity	

```
                }
            }
```

TP Id	TP_NGAP_GNB_CMP_12
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT MODIFICATION REQUEST containing optional fields Security Key and Security Capabilities and answers with UE CONTEXT MODIFICATION RESPONSE with successfully modify UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.4.2, 9.2.2.7 and 9.2.2.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_4

Initial Conditions

```
with {
            the UE isRegisteredTo the AMF and
            the UE hasEstablishedInitialContext
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives a UE_CONTEXT_MODIFICATION_REQUEST containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        Security_Key,
                        UE_Security_Capabilities containing
                            NR_Encryption_Algorithms,
                            NR_Integrity_Protection_Algorithms,
                            E_UTRA_Encryption_Algorithms,
                            E_UTRA_Integrity_Protection_Algorithms
                    from the AMF entity
                }
                then {
                    the IUT sends a UE_CONTEXT_MODIFICATION_RESPONSE containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID
                     to the AMF entity
                }
            }
```

TP Id	TP_NGAP_GNB_CMP_13
Test Objective	Verify that the NG-RAN node successfully processes a UE CONTEXT MODIFICATION REQUEST containing different optional fields and answers with UE CONTEXT MODIFICATION RESPONSE with successfully modify UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.4.2, 9.2.2.7 and 9.2.2.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_4

Initial Conditions

```
with {
            the UE isRegisteredTo the AMF and
            the UE hasEstablishedInitialContext
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives a UE_CONTEXT_MODIFICATION_REQUEST containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        RAN_Paging_Priority,
                        Index_to_RAT_Frequency_Selection_Priority,
                        UE_Aggregate_Maximum_Bit_Rate containing
                            UE_Aggregate_Maximum_Bit_Rate_Downlink,
                            UE_Aggregate_Maximum_Bit_Rate_Uplink,
                         UE_Security_Capabilities containing
                            NR_Encryption_Algorithms,
                            NR_Integrity_Protection_Algorithms,
                            E_UTRA_Encryption_Algorithms,
                            E_UTRA_Integrity_Protection_Algorithms,
                        Emergency_Fallback_Indicator,
                        New_GUAMI containing
                            PLMN_Identity,
                            AMF_Region_ID,
                            AMF_Set_ID,
                            AMF_Pointer,
                        IAB_Authorized,
```

```
                            PC5_QoS_Parameters containing
                                PC5_QoS_Flow_List containing
                                    PC5_QoS_Flow_Item containing
                                        PQI,
                                UE_Radio_Capability_ID,
                                RG_Level_Wireline_Access_Characteristics
                            from the AMF entity
                        }
                        then {
                            the IUT sends a UE_CONTEXT_MODIFICATION_RESPONSE containing
                                AMF_UE_NGAP_ID,
                                RAN_UE_NGAP_ID
                             to the AMF entity
                        }
                    }
```

TP Id	TP_NGAP_GNB_CMP_14
Test Objective	Verify that the IUT can send an RRC INACTIVE TRANSITION REPORT that contains mandatory IEs
Reference	ETSI TS 138 413 [1], clauses 8.3.5 and 9.2.2.10
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/2_5
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE isTransitioningTo the RRC_INACTIVE
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate an RRC inactive transition report
                    }
                    then {
                        the IUT sends an RRC_INACTIVE_TRANSITION_REPORT containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            RRC_State,
                            User_Location_Information
                        to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_CMP_15
Test Objective	Verify that the IUT can send a RAN CP Relocation Indication that contains mandatory IEs.
Reference	ETSI TS 138 413 [1], clauses 8.3.8.2 and 9.2.2.13
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1_2 and PICS_A3/2_8
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a RAN CP relocation indication procedure
                    }
                    then {
                        the IUT sends a RAN_CP_RELOCATION_INDICATION containing
                            RAN_UE_NGAP_ID,
                            5G_S_TMSI containing
                                AMF_Set_ID,
                                AMF_Pointer,
                                5G_TMSI,
                            E_ULTRA_CGI containing
                                PLMN_Identity,
                                E_UTRA_Cell_Identity,
                            TAI containing
                                PLMN_Identity,
                                TAC,
                            UL_CP_Security_Information containing
                                UL_NAS_MAC,
```

```
                            UL_NAS_Count
                        to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_CMP_16
Test Objective	Verify that the IUT can send a UE CONTEXT SUSPEND REQUEST containing mandatory IEs
Reference	ETSI TS 138 413 [1], clauses 8.3.11.2 and 9.2.2.16
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1_2 and PICS_A3/2_11
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a UE context suspend request
                    }
                    then {
                        the IUT sends a UE_CONTEXT_SUSPEND_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID
                        to the AMF entity
                        }
                }
```

TP Id	TP_NGAP_GNB_CMP_17
Test Objective	Verify that the IUT can send a UE CONTEXT RESUME REQUEST containing mandatory IEs
Reference	ETSI TS 138 413 [1], clauses 8.3.12.2 and 9.2.2.19
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1_2 and PICS_A3/2_12
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasSuspendedContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a UE context resume request
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RESUME_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            RRC_Resume_Cause
                        to the AMF entity
                    }
                }
```

5.2.2.1.4 UE Mobility Management Procedures

TP Id	TP_NGAP_GNB_MMP_01
Test Objective	Verify that the IUT can send a HANDOVER REQUIRED message containing mandatory IEs.
Reference	ETSI TS 138 413 [1], clauses 8.4.1.2 and 9.2.3.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_1
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate the initiation "of a Handover Required procedure"
                    }
                    then {
                        the IUT sends a HANDOVER_REQUIRED containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            Target_ID,
                            PDU_Session_Resource_List containing
                                PDU_Session_Resource_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    Handover_Required_Transfer,
                            Source_to_Target_Transparent_Container
                        to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_MMP_02
Test Objective	Verify that the GNB node successfully processes a HANDOVER REQUEST message that contains mandatory IEs and answers with HANDOVER REQUEST ACKNOWLEDGE to acknowledge the handover.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.2, 9.2.3.4, 9.2.3.5, 9.3.4.1 and 9.3.4.11
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_2

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_REQUEST containing
                            AMF_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            UE_Aggregate_Maximum_Bit_Rate,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            Security_Context containing
                                Next_Hop_Chaining_Count,
                                Next_Hop_NH,
                            PDU_Session_Resource_Setup_List containing
                                PDU_Session_Resource_Setup_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    Handover_Request_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        PDU_Session_Type,
                                        QoS_Flow_Setup_Request_List containing
                                            QoS_Flow_Setup_Request_Item containing
                                                QoS_Flow_Identifier,
                                                QoS_Flow_Level_QoS_Parameter,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Source_to_Target_Transparent_Container,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer
                        from the AMF entity
```

```
                    }
                    then {
                        the IUT sends a HANDOVER_REQUEST_ACKNOWLEDGE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Admitted_List containing
                                PDU_Session_Resource_Admitted_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    Handover_Request_Acknowledge_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        QoS_Flow_Setup_Response_List containing
                                            QoS_Flow_Item_with_Data_Forwarding containing
                                                QoS_Flow_Identifier,
                                    Target_to_Source_Transparent_Container
                             to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_MMP_03
Test Objective	Verify that the GNB node successfully processes a HANDOVER REQUEST message that contains mandatory IEs and answers with HANDOVER REQUEST FAILURE because the UE is not longer available.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.3, 9.2.3.4, 9.2.3.6 and 9.3.4.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_2
Initial Conditions	

```
with {
                the UE isNoLongerAvailable
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_REQUEST containing
                            AMF_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            UE_Aggregate_Maximum_Bit_Rate containing
                                UE_Aggregate_Maximum_Bit_Rate_Downlink,
                                UE_Aggregate_Maximum_Bit_Rate_Uplink,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                           Security_Context containing
                                Next_Hop_Chaining_Count,
                                Next_Hop_NH,
                            PDU_Session_Resource_Setup_List containing
                                PDU_Session_Resource_Setup_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    Handover_Request_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        PDU_Session_Type,
                                        QoS_Flow_Setup_Request_List containing
                                            QoS_Flow_Setup_Request_Item containing
                                                QoS_Flow_Identifier,
                                                QoS_Flow_Level_QoS_Parameter,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Source_to_Target_Transparent_Container,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
```

```
                            AMF_Pointer
                        from the AMF entity
                    }
                    then {
                        the IUT sends a HANDOVER_FAILURE containing
                            AMF_UE_NGAP_ID,
                            Cause
                         to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_MMP_04
Test Objective	Verify that the GNB node successfully processes a HANDOVER REQUEST message that contains optional IEs and answers with HANDOVER REQUEST ACKNOWLEDGE to acknowledge the handover.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.2, 9.2.3.4, 9.2.3.5, 9.3.4.1 and 9.3.4.11
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_2

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_REQUEST containing
                            AMF_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            UE_Aggregate_Maximum_Bit_Rate containing
                                UE_Aggregate_Maximum_Bit_Rate_Downli,
                            Core_Network_Assistance_Information_for_RRC_INACTIVE containing
                                UE_Identity_Index_Value containing
                                    CHOICE_UE_Identity_Index_Value containing
                                        Index_Length_10 containing
                                            Index_Length_10,
                                Periodic_Registration_Update_Timer,
                                TAI_List_for_RRC_Inactive containing
                                    TAI_List_for_RRC_Inactive_Item containing
                                        TAI containing
                                            PLMN_Identity,
                                            TAC,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            Security_Context containing
                                Next_Hop_Chaining_Count,
                                Next_Hop_NH,
                            New_Security_Context_Indicator,
                            NASC containing
                                NAS_PDU,
                            PDU_Session_Resource_Setup_List containing
                                PDU_Session_Resource_Setup_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    Handover_Request_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        PDU_Session_Type,
                                        QoS_Flow_Setup_Request_List containing
                                            QoS_Flow_Setup_Request_Item containing
                                                QoS_Flow_Identifier,
                                                QoS_Flow_Level_QoS_Parameter,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Trace_Activiation containing
                                NG_RAN_TRACE_ID,
```

```
                                Interfaces_to_Trace,
                                Trace_Depth,
                                Trace_Collection_Entity_IP_Address containing
                                    Transport_Layer_Address,
                            Source_to_Target_Transparent_Container,
                            RRC_Inactive_Transition_Report_Request,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer,
                            Redirection_for_Voice_EPS_Fallback,
                            CN_Assisted_RAN_Parameters_Tuning,
                            SRVCC_Operation_Possible,
                            Enhanced_Coverage_Restriction,
                            UE_Differentiation_Information,
                            NR_V2X_Services_Authorized,
                            LTE_V2X_Services_Authorized,
                            NR_UE_Sidelink_Aggregate_Maximum_Bit_Rate,
                            LTE_UE_Sidelink_Aggregate_Maximum_Bit_Rate,
                            PC5_QoS_Parameters containing
                                PC5_QoS_Flow_List containing
                                    PC5_QoS_Flow_Item containing
                                        PQI,
                                        PC5_Flow_Bit_Rates containing
                                            Guaranteed_Flow_Bit_Rate,
                                            Maximum_Flow_Bit_Rate,
                            CE_mode_B_Restricted,
                            UE_User_Plane_CIoT_Support_Indicator,
                            Management_Based_MDT_PLMN_List containing
                                PLMN_Identity,
                            UE_Radio_Capability_ID,
                            Extended_Connected_Time
                        from the AMF entity
                    }
                    then {
                        the IUT sends a HANDOVER_REQUEST_ACKNOWLEDGE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Admitted_List containing
                                PDU_Session_Resource_Admitted_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    Handover_Request_Acknowledge_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        QoS_Flow_Setup_Response_List containing
                                            QoS_Flow_Item_with_Data_Forwarding containing
                                                QoS_Flow_Identifier,
                                Target_to_Source_Transparent_Container
                             to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_MMP_05
Test Objective	Verify that the GNB node successfully processes a HANDOVER REQUEST message that contains optional IEs within the Handover Request Transfer IEs and answers with correct HANDOVER REQUEST ACKNOWLEDGE.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.2, 9.2.3.4, 9.2.3.5, 9.3.4.1 and 9.3.4.11
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_2
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_REQUEST containing
                            AMF_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            UE_Aggregate_Maximum_Bit_Rate containing
                                UE_Aggregate_Maximum_Bit_Rate_Downlink,
```

```
                                UE_Aggregate_Maximum_Bit_Rate_Uplink,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            Security_Context containing
                                Next_Hop_Chaining_Count,
                                Next_Hop_NH,
                            PDU_Session_Resource_Setup_List containing
                                PDU_Session_Resource_Setup_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    Handover_Request_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        Data_Forwarding_Not_Possible indicating value "data
forwarding not possible",
                                        Security_Indication containing
                                            Integrity_Protection_Indication indicating value
preferred,
                                            Confidentiality_Protection_Indication indicating value
preferred,
                                            Maximum_Integrity_Protected_Data_Rate_Uplink
indicating value max_UE_rate,
                                        PDU_Session_Type,
                                        QoS_Flow_Setup_Request_List containing
                                            QoS_Flow_Setup_Request_Item containing
                                                QoS_Flow_Identifier,
                                                QoS_Flow_Level_QoS_Parameter,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Source_to_Target_Transparent_Container,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer
                        from the AMF entity
                    }
                    then {
                        the IUT sends a HANDOVER_REQUEST_ACKNOWLEDGE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Admitted_List containing
                                PDU_Session_Resource_Admitted_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    Handover_Request_Acknowledge_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        DL Forwarding UP TNL Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        Security_Result containing
                                            Integrity_Protection_Result indicating value
performed,
                                            Confidentiality_Protection_Result indicating value
performed,
                                        QoS_Flow_Setup_Response_List containing
                                            QoS_Flow_Item_with_Data_Forwarding containing
                                                QoS_Flow_Identifier,
                                Target_to_Source_Transparent_Container
                            to the AMF entity
                        }
                    }
```

TP Id	TP_NGAP_GNB_MMP_06
Test Objective	Verify that the GNB node successfully processes a HANDOVER REQUEST message for an intra-system handover and answers with HANDOVER REQUEST ACKNOWLEDGE to acknowledge the handover.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.2, 9.2.3.4, 9.2.3.5, 9.3.4.1 and 9.3.4.11
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_2

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_REQUEST containing
                            AMF_UE_NGAP_ID,
                            Handover_Typ,
                            Cause,
                            UE_Aggregate_Maximum_Bit_Rate containing
                                UE_Aggregate_Maximum_Bit_Rate_Downlink,
                                UE_Aggregate_Maximum_Bit_Rate_Uplink,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            Security_Context containing
                                Next_Hop_Chaining_Count,
                                Next_Hop_NH,
                            PDU_Session_Resource_Setup_List containing
                                PDU_Session_Resource_Setup_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    Handover_Request_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        PDU_Session_Type,
                                        QoS_Flow_Setup_Request_List containing
                                            QoS_Flow_Setup_Request_Item containing
                                                QoS_Flow_Identifier,
                                                QoS_Flow_Level_QoS_Parameter,
                                        Direct_Forwarding_Path_Availability indicating value
"direct path available",
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Source_to_Target_Transparent_Container containing
                                RRC_Container,
                                PDU_Session_Resource_Information_List containing
                                    PDU_Session_Resource_Information_Item containing
                                        PDU_Session_ID indicating value PX_PDU_ID,
                                        QoS_Flow_Information_List containing
                                            QoS_Flow_Information_Item containing
                                                QoS_Flow_Identifier,
                                                DL_Forwarding indicating value "DL forwarding
proposed",
                                                UL_Forwarding indicating value "UL forwarding
proposed",
                                Target_Cell_ID containing
                                    CHOICE_NG_RAN_CGI containing
                                        NR containing
                                            NR_CGI,
                                UE_History_Information containing
                                    CHOICE_UE_History_Information_from_UE containing
                                        NR containing
                                            NR_Mobility_History_Report,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer
                        from the AMF entity
```

```
                    }
                    then {
                        the IUT sends a HANDOVER_REQUEST_ACKNOWLEDGE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Admitted_List containing
                                PDU_Session_Resource_Admitted_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    Handover_Request_Acknowledge_Transfer containing
                                        DL_NG_U_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                GTP_tunnel containing
                                                    Endpoint_IP_Address,
                                        DL_Forwarding_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                    GTP_tunnel containing
                                                        Endpoint_IP_Address,
                                        QoS_Flow_Setup_Response_List containing
                                            QoS_Flow_Item_with_Data_Forwarding containing
                                                QoS_Flow_Identifier,
                                        UL_Forwarding_UP_TNL_Information containing
                                            CHOICE_UP_Transport_Layer_Information containing
                                                    GTP_tunnel containing
                                                        Endpoint_IP_Address,
                                    Target_to_Source_Transparent_Container
                             to the AMF entity
                        }
                    }
```

TP Id	TP_NGAP_GNB_MMP_07
Test Objective	Verify that the AMF node successfully sends a HANDOVER NOTIFICATION message that contains mandatory IEs to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.3.2 and 9.2.3.7
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of a Handover Notify procedure"
}
then {
the IUT sends a HANDOVER_NOTIFY containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
User_Location_Information
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_MMP_08
Test Objective	Verify that the AMF node successfully sends a PATH SWITCH REQUEST message that contains mandatory IEs to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.4.2 and 9.2.3.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext
}	

Expected Behaviour

ensure that {
when {
the IUT indicate the initiation "of a Path Switch Request procedure"
}
then {
the IUT sends a PATH_SWITCH_REQUEST containing
RAN_UE_NGAP_ID,
Source_AMF_UE_NGAP_ID,
User_Location_Information,
UE_Security_Capabilities containing
NR_Encryption_Algorithms,
NR_Integrity_Protection_Algorithms,
E_UTRA_Encryption_Algorithms,
E_UTRA_Integrity_Protection_Algorithms,
PDU_Session_Resources_to_be_Switched_in_Downlink_List containing
PDU_Session_Resources_to_be_Switched_in_Downlink_Item containing
PDU_SessionId indicating value PX_PDU_ID,
Path_Switch_Request_Transfer
to the AMF entity
}
}

TP Id	TP_NGAP_GNB_MMP_09
Test Objective	Verify that the GNB node successfully sends a HANDOVER CANCEL message that contains mandatory IEs to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.5.2 and 9.2.3.11
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_5
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the GNB alreadyPreparedHandover
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of a Handover Cancel procedure"
}
then {
the IUT sends a HANDOVER_CANCEL containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Cause
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_MMP_10
Test Objective	Verify that the NG-RAN node successfully send a UPLINK RAN STATUS TRANSFER message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.6.2 and 9.2.3.13
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_6
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the GNB alreadyPreparedHandover
}	

Expected Behaviour

ensure that {
when {
the IUT indicate the initiation "of a UE Uplink RAN Status Transfer procedure"
}
then {
the IUT sends a UPLINK_RAN_STATUS_TRANSFER containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
RAN_Status_Transfer_Transparent_Container
to the AMF entity
}
}

TP Id	TP_NGAP_GNB_MMP_11
Test Objective	Verify that the NG-RAN node successfully sends a UPLINK RAN EARLY STATUS TRANSFER message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.9.2 and 9.2.3.16
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_9
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the GNB alreadyPreparedHandover
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of an Uplink RAN Early Status Transfer"
}
then {
the IUT sends a UPLINK_RAN_EARLY_STATUS_TRANSFER containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Early_Status_Transfer_Transparent_Container
to the AMF entity
}
}	

5.2.2.1.5 Paging Procedures

Void.

5.2.2.1.6 Transport of NAS Messages Procedures

TP Id	TP_NGAP_GNB_NAS_01
Test Objective	Verify that the IUT can send an INITIAL UE MESSAGE to indicate the initiation of a NAS Transport procedure
Reference	ETSI TS 138 413 [1], clauses 8.6.1.2 and 9.2.5.1 ETSI TS 123 502 [3], clause 4.24.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/5_1
Initial Conditions	

with {
the UE isCMIDLE and
the UE hasEstablishedRRCConnection
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of a NAS Transport procedure"
}
then {
the IUT sends an INITIAL_UE_MESSAGE containing
RAN_UE_NGAP_ID,
NAS_PDU,
User_Location_Information,
RRC_Establishmnet_Cause
to the AMF entity	

```
                }
            }
```

TP Id	TP_NGAP_GNB_NAS_02
Test Objective	Verify that the IUT can send an UPLINK NAS TRANSPORT message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.6.3.2 and 9.2.5.3 ETSI TS 123 502 [3], clause 4.24.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/5_3
Initial Conditions	

```
with {
            the UE isCMCONNECTED in the GNB entity
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT receives an RRC_UL_MESSAGE
                    from the UE entity
                }
                then {
                    the IUT sends an UPLINK_NAS_TRANSPORT containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        NAS_PDU,
                        User_Location_Information
                     to the AMF entity
                }
               }
```

TP Id	TP_NGAP_GNB_NAS_03
Test Objective	Verify that the IUT can send a NAS NON DELIVERY INDICATION message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.6.4.2 and 9.2.5.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/5_4
Initial Conditions	

```
with {
            the UE isNoLongerAvailable to the GNB entity
        }
```

Expected Behaviour

```
ensure that {
                when {
                    the IUT indicate the initiation "of a NAS Non Delivery Indication
procedure"
                }
                then {
                    the IUT sends a NAS_NON_DELIVERY_INDICATION containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        NAS_PDU,
                        Cause
                     to the AMF entity
                }
               }
```

5.2.2.1.7 Interface Management Procedures

TP Id	TP_NGAP_GNB_IMP_01
Test Objective	Verify that the GNB node successfully sends an NG SETUP REQUEST message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.7.1.2 and 9.2.6.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/6_1
Expected Behaviour	

```
ensure that {
                    when {
                        the IUT indicate the initiation "of an NG SETUP REQUEST"
                    }
                    then {
                        the IUT sends an NG_SETUP_REQUEST containing
                            Global_RAN_Node_ID,
                            Supported_TA_List containing
                                Supported_TA_Item containing
                                    TAC,
                                    Broadcast_PLMN_List containing
                                        Broadcast_PLMN_Item containing
                                            PLMN_Identity,
                                            TAI_Slice_Support_List containing
                                                S_NSSAI containing
                                                    SST,
                            Default_Paging_DRX
                         to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_IMP_02
Test Objective	Verify that the IUT can send a RAN CONFIGURATION UPDATE message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.7.2.2 and 9.2.6.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/2 and PICS_A3/6_2
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate the initiation "of a RAN CONFIGURATION UPDATE procedure"
                    }
                    then {
                        the IUT sends a RAN_CONFIGURATION_UPDATE containing
                            Supported_TA_List containing
                                Supported_TA_Item containing
                                    TAC,
                                    Broadcast_PLMN_List containing
                                        Broadcast_PLMN_Item containing
                                            PLMN_Identity,
                                            TAI_Slice_Support_List containing
                                                S_NSSAI containing
                                                    SST
                        to the AMF entity
                    }
                 }
```

TP Id	TP_NGAP_GNB_IMP_03
Test Objective	Verify that the GNB node successfully processes an AMF CONFIGURATION UPDATE message with AMF CONFIGURATION UPDATE ACKNOWLEDGE to acknowledge the update.
Reference	ETSI TS 138 413 [1], clauses 8.7.3.2, 9.2.6.7 and 9.2.6.8
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/6_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE isCMIDLE and
                the UE hasReceivedPAGINGMessage
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an AMF_CONFIGURATION_UPDATE containing
                            Served_GUAMI_List containing
                                Served_GUAMI_Item containing
                                    GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer,
                                PLMN_Support_List containing
                                    PLMN_Support_Item containing
                                        PLMN_Identity,
                                        Slice_Support_List containing
                                              S_NSSAI containing
                                                    SST,
                                AMF_TNL_Association_to_Add_List containing
                                    AMF_TNL_Association_to_Add_item containing
                                        AMF_TNL_Association_Address,
                                        TNL_Address_Weight_Factor,
                                AMF_TNL_Association_to_Update_List containing
                                    AMF_TNL_Association_to_Update_Item containing
                                        AMF_TNL_Association_Address
                            from the AMF entity
                    }
                    then {
                        the IUT sends an AMF_CONFIGURATION_UPDATE_ACKNOWLEDGE containing
                            AMF_TNL_Association_Setup_List containing
                                AMF_TNL_Association_Setup_Item containing
                                    AMF_TNL_Association_Address
                            to the AMF entity
                           }
                }
```

TP Id	TP_NGAP_GNB_IMP_04
Test Objective	Verify that the GNB node can send an AMF CONFIGURATION UPDATE FAILURE.
Reference	ETSI TS 138 413 [1], clauses 8.7.3.2, 9.2.6.7 and 9.2.6.9
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/6_3

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF and
                the UE isCMIDLE and
                the UE hasReceivedPAGINGMessage
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an AMF_CONFIGURATION_UPDATE containing
                            Served_GUAMI_List containing
                                Served_GUAMI_Item containing
                                    GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer,
                                PLMN_Support_List containing
                                    PLMN_Support_Item containing
                                        PLMN_Identity,
                                        Slice_Support_List containing
                                              S_NSSAI containing
                                                    SST,
                                AMF_TNL_Association_to_Add_List containing
                                    AMF_TNL_Association_to_Add_item containing
                                        AMF_TNL_Association_Address,
                                        TNL_Address_Weight_Factor,
                                AMF_TNL_Association_to_Update_List containing
                                    AMF_TNL_Association_to_Update_Item containing
                                        AMF_TNL_Association_Address
                            from the AMF entity
                    }
                    then {
                        the IUT sends an AMF_CONFIGURATION_UPDATE_FAILURE containing
                            Cause
```

```
                        to the AMF entity
                    }
                }
```

TP Id	TP_NGAP_GNB_IMP_05
Test Objective	Verify that the GNB node successfully processes an NG RESET message that contains mandatory IEs and answers with NG RESET ACKNOWLEDGE to acknowledge the reset.
Reference	ETSI TS 138 413 [1], clauses 8.7.4.2.1, 9.2.6.11 and 9.2.6.12
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/6_4
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE isRequestedToDetachfromNetwork
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an NG_RESET containing
                            Cause,
                            CHOICE_Reset_Type containing
                                NG_interface containing
                                    Reset_All
                        from the AMF entity
                        }
                        then {
                            the IUT sends an NG_RESET_ACKNOWLEDGE
                            to the AMF entity
                        }
                }
```

TP Id	TP_NGAP_GNB_IMP_06
Test Objective	Verify that the GNB can send an ERROR INDICATION to the AMF when an error occurs.
Reference	ETSI TS 138 413 [1], clauses 8.7.5.2 and 9.2.6.13
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/6_5
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate an ERROR INDICATION
                        }
                        then {
                            the IUT sends an ERROR_INDICATION
                            to the AMF entity
                        }
                }
```

5.2.2.1.8 Configuration Transfer Procedure

TP Id	TP_NGAP_GNB_CTP_01
Test Objective	Verify that the IUT can send an Uplink RAN Configuration Transfer message to transfer RAN configuration information to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.8.1 and 9.2.7.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/7_1
Expected Behaviour	

```
ensure that {
                    when {
                        the IUT indicate the initiation "of an Uplink RAN Configuration Transfer"
                    }
                    then {
                        the IUT sends an UPLINK_RAN_CONFIGURATION_TRANSFER
                        to the AMF entity
                    }
                  }
```

5.2.2.1.9 Warning Message Transmission Procedures

TP Id	TP_NGAP_GNB_WTP_01
Test Objective	Verify that the NG-RAN node successfully processes a WRITE-REPLACE WARNING REQUEST containing mandatory IEs and answers with WRITE-REPLACE WARNING RESPONSE to start broadcasting of warning messages.
Reference	ETSI TS 138 413 [1], clauses 8.9.1.2 and 9.2.8.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/8_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a WRITE_REPLACE_WARNING_REQUEST containing
Message_Identifier,
Serial_Number,
Repetition_Period,
Number_of_Broadcasts_Requested
from the AMF entity
}
then {
the IUT sends a WRITE_REPLACE_WARNING_RESPONSE containing
Message_Identifier,
Serial_Number
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_WTP_02
Test Objective	Verify that the NG-RAN node successfully processes a WRITE-REPLACE WARNING REQUEST containing Message Identifier IE and/or Serial Number IE different from those in the warning message being broadcast and if Concurent Warning Message Indicator is not present then IUT node answers with WRITE-REPLACE WARNING RESPONSE and replaces the warning message being broadcast with newly received one for that area.
Reference	ETSI TS 138 413 [1], clauses 8.9.1.2 and 9.2.8.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/8_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a WRITE_REPLACE_WARNING_REQUEST containing
Message_Identifier indicating value "different from already being broadcasted",
Serial_Number indicating value "different from already being broadcasted",
Repetition_Period,
Number_of_Broadcasts_Requested,
not Concurent_Warning_Message_Indicator
from the AMF entity
}
then {
the IUT sends a WRITE_REPLACE_WARNING_RESPONSE containing
Message_Identifier,
Serial_Number
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_WTP_03
Test Objective	Verify that the NG-RAN node successfully processes a PWS CANCEL REQUEST containing mandatory IEs and answers with PWS CANCEL RESPONSE to cancel an already ongoing broadcast warning messages in all of the cells in the NG-RAN.
Reference	ETSI TS 138 413 [1], clauses 8.9.2.2 and 9.2.8.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/8_2
Initial Conditions	

with {
the UE isNotRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a PWS_CANCEL_REQUEST containing
Message_Identifier,
Serial_Number
from the AMF entity
}
then {
the IUT sends a PWS_CANCEL_RESPONSE containing
Message_Identifier,
Serial_Number
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_WTP_04
Test Objective	Verify that the IUT can send a PWS RESTART INDICATION to inform AMF that PWS information for some or all cells may be reloaded from the CBC if needed.
Reference	ETSI TS 138 413 [1], clauses 8.9.3.2 and 9.2.8.5
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/8_3
Initial Conditions	

with {
the UE isNotRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PWS restart indication
}
then {
the IUT sends a PWS_RESTART_INDICATION containing
Cell_List_for_Restart,
Global_RAN_Node_ID,
TAI_List_for_Restart,
Emergency_Area_ID_List_for_Restart
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_WTP_05
Test Objective	Verify that the IUT can send a PWS FAILURE INDICATION to inform AMF that ongoing PWS operation for one or more cells has failed.
Reference	ETSI TS 138 413 [1], clauses 8.9.4.2 and 9.2.8.6
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/8_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PWS failure indication
}
then {
the IUT sends a PWS_FAILURE_INDICATION containing
PWS_Failed_Cell_List,
Global_RAN_Node_ID	

```
        to the AMF entity
      }
  }
```

5.2.2.1.10 NRPPa Transport Procedures

TP Id	TP_NGAP_GNB_NTP_01
Test Objective	Verify that the IUT can send an UPLINK_UE_ASSOCIATED_NRPPA_TRANSPORT to carry NRPPA signaling between NG-RAN and LMF(Location Management Functionality).
Reference	ETSI TS 138 413 [1], clauses 8.10.2.2 and 9.2.9.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/9_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an NRPPA transport procedure
}
then {
the IUT sends an UPLINK_UE_ASSOCIATED_NRPPA_TRANSPORT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Routing_ID,
NRPPa_PDU
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_NTP_02
Test Objective	Verify that the IUT can send an UPLINK_NON_UE_ASSOCIATED_NRPPA_TRANSPORT to carry NRPPA signaling between NG-RAN and LMF(Location Management Functionality).
Reference	ETSI TS 138 413 [1], clauses 8.10.2.4 and 9.2.9.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/9_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an NRPPA transport procedure
}
then {
the IUT sends an UPLINK_NON_UE_ASSOCIATED_NRPPA_TRANSPORT containing
Routing_ID,
NRPPa_PDU
to the AMF entity
}
}	

5.2.2.1.11 Trace Procedures

TP Id	TP_NGAP_GNB_TRP_01
Test Objective	Verify that the IUT can send a TRACE_FAILURE_INDICATION to inform AMF that Trace Start procedure has failed due to an interaction with handover procedure.
Reference	ETSI TS 138 413 [1], clauses 8.11.1.2, 8.11.2.2, 9.2.10.1 and 9.2.10.2
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/10_1 and PICS_A3/10_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour

ensure that {
when {
the IUT receives a TRACE_START containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Trace_Activation containing
NG_RAN_Trace_ID,
Interfaces_to_Trace,
Trace_Depth,
Trace_Collection_Entity_IP_Address
from the AMF entity
}
then {
the IUT sends a TRACE_FAILURE_INDICATIONT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NG_RAN_Trace_ID,
Cause
to the AMF entity
}
}

TP Id	TP_NGAP_GNB_TRP_02
Test Objective	Verify that the IUT can send a TRACE_FAILURE_INDICATION to inform AMF that a Deactivate Trace procedure has failed due to an interaction with handover procedure.
Reference	ETSI TS 138 413 [1], clauses 8.11.2.2, 8.11.3.2, 9.2.10.2 and 9.2.10.3
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/10_2 and PICS_A3/10_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a DEACTIVATE_TRACE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NG_RAN_Trace_ID
from the AMF entity
}
then {
the IUT sends a TRACE_FAILURE_INDICATIONT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NG_RAN_Trace_ID,
Cause
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_TRP_03
Test Objective	Verify that the IUT can send a CELL_TRAFFIC_TRACE to send the allocated Trace Recording Session Reference and Trace Reference to AMF.
Reference	ETSI TS 138 413 [1], clauses 8.11.4.2 and 9.2.10.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/10_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a cell traffic trace procedure
}
then {
the IUT sends a CELL_TRAFFIC_TRACE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NG_RAN_Trace_ID,	

```
            NG_RAN_CGI,
            Trace_Colection_Entity_IP_Address
          to the AMF entity
        }
    }
```

5.2.2.1.12 Location Reporting Procedures

TP Id	TP_NGAP_GNB_LRP_01
Test Objective	Verify that the IUT can send a LOCATION REPORTING FAILURE INDICATION message after that contains mandatory IEs receiving a LOCATION REPORTING CONTROL message with two identical Location Reporting Reference IDs.
Reference	ETSI TS 138 413 [1], clauses 8.12.2, 9.2.11.1, 9.2.11.2 and 9.3.1.65
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/11_2
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a LOCATION_REPORTING_CONTROL containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Location_Reporting_Request_Type containing
                                Event_Type indicating value direct,
                                Report_Area indicating value cell,
                                Area_of_Interest_List containing
                                    Area_of_Interest_Item containing
                                        Area_of_Interest,
                                        Location_Reporting_Reference_ID indicating value
PX_REPORTING_REFERENCE_ID,
                                    Area_of_Interest_Item containing
                                        Area_of_Interest,
                                        Location_Reporting_Reference_ID indicating value
PX_REPORTING_REFERENCE_ID
                             from the AMF entity
                    }
                    then {
                        the IUT sends a LOCATION_REPORTING_FAILURE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Cause containing
                                CHOICE_Cause_Group containing
                                    Radio_Network_Layer_Cause indicating value
Multiple_Location_Reporting_Reference_ID_instances
                             to the AMF entity
                    }
                   }
```

TP Id	TP_NGAP_GNB_LRP_02
Test Objective	Verify that the IUT can send a LOCATION REPORT message that contains mandatory IEs to provide the UE's current location.
Reference	ETSI TS 138 413 [1], clauses 8.12.3 and 9.2.11.3
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/11_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a LOCATION_REPORTING_CONTROL containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Location_Reporting_Request_Type containing
                                Event_Type indicating value direct,
                                Report_Area indicating value cell
```

```
                    from the AMF entity
                }
                then {
                    the IUT sends a LOCATION_REPORT containing
                        AMF_UE_NGAP_ID,
                        RAN_UE_NGAP_ID,
                        User_Location_Information,
                        Location_Reporting_Request_Type
                     to the AMF entity
                }
               }
```

5.2.2.1.13 UE TNLA Binding Procedures

Void

5.2.2.1.14 UE Radio Capability Management Procedures

TP Id	TP_NGAP_GNB_URP_01
Test Objective	Verify that the IUT can send a UE_RADIO_CAPABILITY_INFO_INDICATION.
Reference	ETSI TS 138 413 [1], clauses 8.14.1.2 and 9.2.13.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/13_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a UE Radio Capability Management procedure
}
then {
the IUT sends a UE_RADIO_CAPABILITY_INFO_INDICATION containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
UE_Radio_Capability
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_URP_02
Test Objective	Verify that the IUT can send a UE RADIO CAPABILITY CHECK RESPONSE message that contains mandatory IEs to provide the UE radio capabilities.
Reference	ETSI TS 138 413 [1], clauses 8.14.2.2, 9.2.13.2 and 9.2.13.3
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/13_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_RADIO_CAPABILITY_CHECK_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
from the AMF entity
}
then {
the IUT sends a UE_RADIO_CAPABILITY_CHECK_RESPONSE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
IMS_Voice_Support_Indicator
to the AMF entity
}
}	

TP Id	TP_NGAP_GNB_URP_03
Test Objective	Verify that the IUT can send a UE RADIO CAPABILITY ID MAPPING REQUEST.
Reference	ETSI TS 138 413 [1], clauses 8.14.3.2 and 9.2.13.4
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/13_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a UE Radio Capability Management procedure
}
then {
the IUT sends a UE_RADIO_CAPABILITY_ID_MAPPING_REQUEST containing
UE_Radio_Capability_ID
to the AMF entity
}
}	

5.2.2.1.15 Data Usage Reporting Procedures

TP Id	TP_NGAP_GNB_DRP_01
Test Objective	Verify that the IUT can send a SECONDARY RAT DATA USAGE REPORT.
Reference	ETSI TS 138 413 [1], clauses 8.15.1.2 and 9.2.14.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/14_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a Data_Usage_Reporting_procedure
}
then {
the IUT sends a SECONDARY_RAT_DATA_USAGE_REPORT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Secondary_RAT_Usage_List containing
PDU_Session_Resource_Secondary_RAT_Usage_Item containing
PDU_Session_Id,
Secondary_RAT_Data_Usage_Report_Transfer
to the AMF entity
}
}	

5.2.2.1.16 RIM Information Transfer Procedures

TP Id	TP_NGAP_GNB_RIP_01
Test Objective	Verify that the IUT can send a UPLINK RIM INFORMATION TRANSFER.
Reference	ETSI TS 138 413 [1], clauses 8.16.1.2 and 9.2.15.1
Configuration	CF_GNB_N2
PICS Selection	PICS_A2/1 and PICS_A3/15_1
Initial Conditions	

with {
the UE isNotRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a RIM Information Transfer procedure
}
then {
the IUT sends a UPLINK_RIM_INFORMATION_TRANSFER
to the AMF entity	

```
        }
    }
```

5.2.2.2 AMF Role

5.2.2.2.1 Test selection

The IUT takes the role of the AMF; PICS A.2/2.

5.2.2.2.2 PDU Session Management Procedures

TP Id	TP_NGAP_AMF_PDU_01
Test Objective	Verify that the IUT can send a PDU SESSION RESOURCE SETUP REQUEST with at least one PDU session resource list to established PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.2 and 9.2.1.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/1_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU session management procedure
}
then {
the IUT sends a PDU_SESSION_RESOURCE_SETUP_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Setup_Request_List containing
PDU_SessionId,
S_NSSAI,
PDU_Session_Resource_Setup_Request_Transfer
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_PDU_02
Test Objective	Verify that the IUT can send a PDU_SESSION_RESOURCE_RELEASE_COMMAND to release PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.1.2 and 9.2.1.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/1_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU session resource release procedure
}
then {
the IUT sends a PDU_SESSION_RESOURCE_RELEASE_COMMAND containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_To_Release_List containing
PDU_Session_Resource_To_Release_Item containing
PDU_SessionId indicating value PX_PDU_ID,
S_NSSAI,
PDU_Session_Resource_Release_Command_Transfer containing
Cause indicating value PX_Cause
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_PDU_03
Test Objective	Verify that the IUT can send a PDU_SESSION_RESOURCE_MODIFY_REQUEST to modify PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.3.2 and 9.2.1.5
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/1_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU session resource modify procedure
}
then {
the IUT sends a PDU_SESSION_RESOURCE_MODIFY_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Modify_Request_List containing
PDU_Session_Resource_Modify_Request_Item containing
PDU_SessionId indicating value PX_PDU_ID,
QoSFlowAddorModifyRequestList containing
QoSFlowAddorModifyRequestItem containing
QoSFlowIdentifier
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_PDU_04
Test Objective	Verify that the AMF node successfully processes a PDU_SESSION_RESOURCE_MODIFY_INDICATION containing mandatory IEs and answers with PDU_SESSION_RESOURCE_MODIFY_CONFIRM for successfully modified PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.5.2 and 9.2.1.8
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/1_5
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a PDU_SESSION_RESOURCE_MODIFY_INDICATION containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Modify_Indication_List containing
PDU_Session_Resource_Modify_Indication_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Indication_Transfer containing
DLQoSFlowperTNLInformation containing
UPTransportLayerInformation,
AssociatedQoSFlowList containing
AssociatedQoSFlowItem containing
QoSFlowIdentifier indicating value PX_QoS_Flow_ID
from the GNB entity
}
then {
the IUT sends a PDU_SESSION_RESOURCE_MODIFY_CONFIRM containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Modify_Confirm_List containing
PDU_Session_Resource_Modify_Confirm_Item containing
PDU_SessionId indicating value PX_PDU_ID,
PDU_Session_Resource_Modify_Confirm_Transfer containing
QoSFlowModifyConfirmList containing
QoSFlowModifyConfirmItem containing
QoSFlowIdentifier,
UL_NG_U_UP_TNLInformation
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_PDU_05
Test Objective	Verify that the AMF node processes a PDU_SESSION_RESOURCE_MODIFY_INDICATION containing mandatory IEs and answers with PDU_SESSION_RESOURCE_MODIFY_CONFIRM for not successfully modified PDU session.
Reference	ETSI TS 138 413 [1], clauses 8.2.5.2 and 9.2.1.8
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/1_5
Initial Conditions	

```
with {
the UE isRegisteredTo the AMF
       }
```

Expected Behaviour

```
ensure that {
    when {
        the IUT receives a PDU_SESSION_RESOURCE_MODIFY_INDICATION containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Modify_Indication_List containing
              PDU_Session_Resource_Modify_Indication_Item containing
                 PDU_SessionId indicating value PX_PDU_ID,
                 PDU_Session_Resource_Modify_Indication_Transfer containing
                   DLQoSFlowperTNLInformation containing
                     UPTransportLayerInformation,
                     AssociatedQoSFlowList containing
                       AssociatedQoSFlowItem containing
                         QoSFlowIdentifier indicating value PX_QoS_Wrong_Flow_ID
        from the GNB entity
    }
    then {
        the IUT sends a PDU_SESSION_RESOURCE_MODIFY_CONFIRM containing
            AMF_UE_NGAP_ID,
            RAN_UE_NGAP_ID,
            PDU_Session_Resource_Failed_To_Modify_List containing
              PDU_Session_Resource_Failed_To_Modify_Item containing
                 PDU_SessionId indicating value PX_PDU_ID,
                 PDU_Session_Resource_Modify_Indication_Unsuccessful_Transfer containing
                   Cause
         to the GNB entity
       }
   }
```

5.2.2.2.3 UE Context Management Procedures

TP Id	TP_NGAP_AMF_CMP_01
Test Objective	Verify that the IUT can send an INITIAL CONTEXT SETUP REQUEST containing mandatory IEs.
Reference	ETSI TS 138 413 [1], clause 8.3.1.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_1
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a PDU initial context setup procedure
                    }
                    then {
                        the IUT sends an INITIAL_CONTEXT_SETUP_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer,
                            PDU_Session_Resource_Setup_Request_List containing
                                PDU_Session_Resource_Setup_Request_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                            SST,
                                    PDU_Session_Resource_Setup_Request_Transfer,
                            Allowed_NSSAI containing
```

```
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                                UE_Security_Capabilities containing
                                    NR_Encryption_Algorithms,
                                    NR_Integrity_Protection_Algorithms,
                                    E_UTRA_Encryption_Algorithms,
                                    E_UTRA_Integrity_Protection_Algorithms,
                                Security_Key
                            to the GNB entity
                        }
                    }
```

TP Id	TP_NGAP_AMF_CMP_02
Test Objective	Verify that the IUT can send a UE CONTEXT RELEASE COMMAND that contains both the AMF UE NGAP ID IE and the RAN UE NGAP ID IE.
Reference	ETSI TS 138 413 [1], clauses 8.3.3 and 9.2.2.5
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a UE context release command
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RELEASE_COMMAND containing
                            CHOICE_UE_NGAP_IDs containing
                                UE_NGAP_ID_pair containing
                                    AMF_UE_NGAP_ID,
                                    RAN_UE_NGAP_ID,
                            Cause
                        to the GNB entity
                       }
                }
```

TP Id	TP_NGAP_AMF_CMP_03
Test Objective	Verify that the IUT can send a UE CONTEXT RELEASE COMMAND where both the AMF UE NGAP ID IE and the RAN UE NGAP ID IE are not available.
Reference	ETSI TS 138 413 [1], clause 8.3.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_3
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a UE context release command
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RELEASE_COMMAND containing
                            CHOICE_UE_NGAP_IDs containing
                                AMF_UE_NGAP_ID containing
                                    AMF_UE_NGAP_ID,
                            Cause
                        to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_CMP_04
Test Objective	Verify that the IUT can send a UE CONTEXT MODIFICATION REQUEST containing mandatory IEs.
Reference	ETSI TS 138 413 [1], clauses 8.3.4.2 and 9.2.2.7
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_4
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU UE context modification procedure
}
then {
the IUT sends a UE_CONTEXT_MODIFICATION_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_CMP_05
Test Objective	Verify that the IUT can send a CONNECTION ESTABLISHMENT INDICATION that contains mandatory IEs.
Reference	ETSI TS 138 413 [1], clauses 8.3.6.2 and 9.2.2.11
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_6
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PDU UE context modification procedure
}
then {
the IUT sends a CONNECTION_ESTABLISHMENT_INDICATION containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_CMP_06
Test Objective	Verify that the IUT can send an AMF CP RELOCATION INDICATION that contains mandatory IEs.
Reference	ETSI TS 138 413 [1], clauses 8.3.7.2 and 9.2.2.12
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_7
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an AMF CP relocation indication procedure
}
then {
the IUT sends an AMF_CP_RELOCATION_INDICATION containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_CMP_07
Test Objective	Verify that the IUT can successfully request UE information from the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.3.9.2, 8.3.10.2, 9.2.2.14 and 9.2.2.15
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_9 and PICS_A4/2_10
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a RETRIEVE_UE_INFORMATION containing
5G_S_TMSI containing
AMF_Set_ID,
AMF_Pointer,
5G_TMSI
from the GNB entity
}
then {
the IUT sends a UE_INFORMATION_TRANSFER containing
5G_S_TMSI containing
AMF_Set_ID,
AMF_Pointer,
5G_TMSI
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_CMP_08
Test Objective	Verify that the AMF node successfully processes a UE CONTEXT SUSPEND REQUEST containing mandatory IEs and answers with UE CONTEXT SUSPEND REQUEST RESPONSE with successfully suspend UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.11.2, 9.2.2.16 and 9.2.2.17
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_11
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasEstablishedInitialContext
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_CONTEXT_SUSPEND_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
PDU_Session_Resource_Suspend_List containing
PDU_Session_Resource_Suspend_Item containing
PDU_SessionId indicating value PX_PDU_ID,
UE_Context_Suspend_Request_Transfer containing
Suspend_Indicator
from the GNB entity
}
then {
the IUT sends a UE_CONTEXT_SUSPEND_RESPONSE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_CMP_09
Test Objective	Verify that the AMF node successfully processes a UE CONTEXT SUSPEND REQUEST containing mandatory IEs and answers with UE CONTEXT SUSPEND FAILURE with failed suspension.
Reference	ETSI TS 138 413 [1], clauses 8.3.11.3, 9.2.2.16 and 9.2.2.18
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_11
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext and
                the UE hasPendingDataTransmission
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a UE_CONTEXT_SUSPEND_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Suspend_List containing
                                PDU_Session_Resource_Suspend_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                     UE_Context_Suspend_Request_Transfer containing
                                         Suspend_Indicator
                        from the GNB entity
                    }
                    then {
                        the IUT sends a UE_CONTEXT_SUSPEND_FAILURE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Cause
                         to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_CMP_10
Test Objective	Verify that the AMF node successfully processes a UE CONTEXT RESUME REQUEST containing mandatory IEs and answers with UE CONTEXT RESUME RESPONSE with successfully resume UE context.
Reference	ETSI TS 138 413 [1], clauses 8.3.12.3, 9.2.2.19 and 9.2.2.20
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_12
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasSuspendedContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a UE_CONTEXT_RESUME_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            RRC_Resume_Cause

                        from the GNB entity
                    }
                    then {
                        the IUT sends a UE_CONTEXT_RESUME_RESPONSE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID

                        to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_CMP_11
Test Objective	Verify that the AMF node successfully processes a UE CONTEXT RESUME REQUEST containing mandatory IEs and answers with UE CONTEXT RESUME FAILURE with failing to resume UE context.
Reference	ETSI TS 138 413 [1], clause 8.3.12.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/2_12
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE hasSuspendedContext
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_CONTEXT_RESUME_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
RRC_Resume_Cause,
PDU_Session_Resource_Resume_List containing
PDU_Session_Resource_Resume_Item containing
PDU_SessionId indicating value PX_PDU_ID,
UE_Context_Resume_Request_Transfer
from the GNB entity
}
then {
the IUT sends a UE_CONTEXT_RESUME_FAILURE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Cause
to the GNB entity
}
}	

5.2.2.2.4 UE Mobility Management

TP Id	TP_NGAP_AMF_MMP_01
Test Objective	Verify that the AMF node successfully processes a HANDOVER REQUIRED message containing mandatory IEs and answers with HANDOVER COMMAND with successfully handover.
Reference	ETSI TS 138 413 [1], clauses 8.4.1.2, 9.2.3.1 and 9.2.3.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a HANDOVER_REQUIRED containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Handover_Typ,
Cause,
Target_ID,
PDU_Session_Resource_List containing
PDU_Session_Resource_Item containing
PDU_SessionId indicating value PX_PDU_ID,
Handover_Required_Transfer,
Source_to_Target_Transparent_Container
from the GNB entity
}
then {
the IUT sends a HANDOVER_COMMAND containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Handover_Type,
PDU_Session_Resource_Handover_List containing
PDU_Session_Resource_Handover_Item containing
PDU_SessionId indicating value PX_PDU_ID,
Handover_Command_Transfer
to the GNB entity	

```
            }
        }
```

TP Id	TP_NGAP_AMF_MMP_02
Test Objective	Verify that the AMF node successfully processes a HANDOVER REQUIRED message containing mandatory IEs and answers with HANDOVER PREPARATION FAILURE because the UE is not longer available.
Reference	ETSI TS 138 413 [1], clauses 8.4.1.3, 9.2.3.1 and 9.2.3.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_1

Initial Conditions

```
with {
        the UE isNoLongerAvailable
    }
```

Expected Behaviour

```
ensure that {
        when {
            the IUT receives a HANDOVER_REQUIRED containing
                AMF_UE_NGAP_ID,
                RAN_UE_NGAP_ID,
                Handover_Typ,
                Cause,
                Target_ID,
                PDU_Session_Resource_List containing
                    PDU_Session_Resource_Item containing
                        PDU_SessionId,
                        Handover_Required_Transfer,
                Source_to_Target_Transparent_Container
            from the GNB entity
        }
        then {
            the IUT sends a HANDOVER_PREPARATION_FAILURE containing
                AMF_UE_NGAP_ID,
                RAN_UE_NGAP_ID,
                Cause
             to the GNB entity
        }
    }
```

TP Id	TP_NGAP_AMF_MMP_03
Test Objective	Verify that the AMF node successfully sends a HANDOVER REQUEST message that contains mandatory IEs to the GNB.
Reference	ETSI TS 138 413 [1], clauses 8.4.2.2 and 9.2.3.4
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_2

Initial Conditions

```
with {
        the UE isRegisteredTo the AMF
    }
```

Expected Behaviour

```
ensure that {
        when {
                the IUT indicate a Handover Request procedure
            }
        then {
            the IUT sends a HANDOVER_REQUEST containing
                AMF_UE_NGAP_ID,
                RAN_UE_NGAP_ID,
                Handover_Typ,
                Cause,
                UE_Aggregate_Maximum_Bit_Rate containing
                    UE_Aggregate_Maximum_Bit_Rate_Downlink,
                    UE_Aggregate_Maximum_Bit_Rate_Uplink,
                   UE_Security_Capabilities containing
                    NR_Encryption_Algorithms,
                    NR_Integrity_Protection_Algorithms,
                    E_UTRA_Encryption_Algorithms,
                    E_UTRA_Integrity_Protection_Algorithms,
                PDU_Session_Setup_Resource_List containing
                    PDU_Session_Setup_Resource_Item containing
                        PDU_SessionId,
                        S_NSSAI containing
```

```
                                    SST,
                                Handover_Request_Transfer,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
                                        S_NSSAI containing
                                            SST,
                            Source_to_Target_Transparent_Container,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer
                        to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_MMP_04
Test Objective	Verify that the AMF node successfully processes a PATH SWITCH REQUEST message that contains mandatory IEs and answers with PATH SWITCH REQUEST ACKNOWLEDGE to acknowledge the path switch.
Reference	ETSI TS 138 413 [1], clauses 8.4.4.2, 9.2.3.8 and 9.2.3.9
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_4
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a PATH_SWITCH_REQUEST containing
                            RAN_UE_NGAP_ID,
                            Source_AMF_UE_NGAP_ID,
                            User_Location_Information,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            PDU_Session_Resources_to_be_Switched_in_Downlink_List containing
                                PDU_Session_Resources_to_be_Switched_in_Downlink_Item containing
                                    PDU_SessionId,
                                    Path_Switch_Request_Transfer
                            from the GNB entity
                        }
                        then {
                            the IUT sends a PATH_SWITCH_REQUEST_ACKNOWLEDGE containing
                                AMF_UE_NGAP_ID,
                                RAN_UE_NGAP_ID,
                                Security_Context containing
                                    Next_Hop_Chaining_Count,
                                    Next_Hop_NH
                                    ,
                                PDU_Session_Resource_Switched_List containing
                                    PDU_Session_Resource_Switched_Item containing
                                        PDU_SessionId,
                                        Path_Switch_Request_Acknowledge_Transfer
                             to the GNB entity
                        }
                    }
```

TP Id	TP_NGAP_AMF_MMP_05
Test Objective	Verify that the AMF node successfully processes a PATH SWITCH REQUEST message that contains mandatory IEs and two PDU Sessions with same ID and answers with PATH SWITCH REQUEST FAILURE.
Reference	ETSI TS 138 413 [1], clauses 8.4.4.4, 9.2.3.8 and 9.2.3.10
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_4

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF and
                the UE hasEstablishedInitialContext
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a PATH_SWITCH_REQUEST containing
                            RAN_UE_NGAP_ID,
                            Source_AMF_UE_NGAP_ID,
                            User_Location_Information,
                            UE_Security_Capabilities containing
                                    NR_Encryption_Algorithms,
                                    NR_Integrity_Protection_Algorithms,
                                    E_UTRA_Encryption_Algorithms,
                                    E_UTRA_Integrity_Protection_Algorithms,
                            PDU_Session_Resources_to_be_Switched_in_Downlink_List containing
                                PDU_Session_Resources_to_be_Switched_in_Downlink_Item containing
                                    PDU_SessionId,
                                    Path_Switch_Request_Transfer,
                                PDU_Session_Resources_to_be_Switched_in_Downlink_Item containing
                                    PDU_SessionId,
                                    Path_Switch_Request_Transfer
                        from the GNB entity
                    }
                    then {
                        the IUT sends a PATH_SWITCH_REQUEST_FAILURE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            PDU_Session_Resource_Released_List containing
                                PDU_Session_Resource_Released_Item containing
                                    PDU_SessionId,
                                    Path_Switch_Request_Unsuccessful_Transfer containing
                                        Cause
                         to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_MMP_06
Test Objective	Verify that the AMF node successfully processes a HANDOVER CANCEL message that contains mandatory IEs and answers with HANDOVER CANCEL ACKNOWLEDGE to confirm that the ongoing handover was cancelled.
Reference	ETSI TS 138 413 [1], clauses 8.4.5.2, 9.2.3.11 and 9.2.3.12
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_5

Initial Conditions

```
with {
                the UE isRegisteredTo the AMF and
                the GNB alreadyPreparedHandover
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives a HANDOVER_CANCEL containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Cause
                        from the GNB entity
                    }
                    then {
                        the IUT sends a HANDOVER_CANCEL_ACKNOWLEDGE containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID
                         to the GNB entity
```

```
            }
        }
```

TP Id	TP_NGAP_AMF_MMP_07
Test Objective	Verify that the AMF node successfully sends a DOWNLINK RAN STATUS TRANSFER message that contains mandatory IEs.
Reference	ETSI TS 138 413 [1], clause 8.4.6.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_6

Initial Conditions

```
with {
        the UE isRegisteredTo the AMF and
        the GNB alreadyPreparedHandover
    }
```

Expected Behaviour

```
ensure that {
        when {
            the IUT indicate a Downlink RAN Status Transfer procedure
        }
        then {
            the IUT sends a DOWNLINK_RAN_STATUS_TRANSFER containing
                AMF_UE_NGAP_ID,
                RAN_UE_NGAP_ID,
                RAN_Status_Transfer_Transparent_Container containing
                    DRBs_Subject_To_Status_Transfer_List containing
                        DRBs_Subject_To_Status_Transfer_Item containing
                            DRB_ID,
                            CHOICE_UL_DRB_Status containing
                                12_bits containing
                                    UL_COUNT_Value containing
                                        PDCP_SN_Length_12,
                                        HFN_for_PDCP_SN_Length_12,
                            CHOICE_DL_DRB_Status containing
                                12_bits containing
                                    DL_COUNT_Value containing
                                        PDCP_SN_Length_12,
                                        HFN_for_PDCP_SN_Length_12
             to the GNB entity
        }
    }
```

TP Id	TP_NGAP_AMF_MMP_08
Test Objective	Verify that the NG-RAN node successfully sends a Handover Success message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.4.8.2 and 9.2.3.15
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/1 and PICS_A3/3_8

Initial Conditions

```
with {
        the UE isRegisteredTo the AMF and
        the GNB completedHandover
    }
```

Expected Behaviour

```
ensure that {
        when {
            the IUT indicate the initiation "of a UE handover success procedure"
        }
        then {
            the IUT sends a HANDOVER_SUCCESS containing
                AMF_UE_NGAP_ID,
                RAN_UE_NGAP_ID
            to the GNB entity
        }
    }
```

TP Id	TP_NGAP_AMF_MMP_09
Test Objective	Verify that the AMF node successfully sends a DOWNLINK RAN EARLY STATUS TRANSFER message that contains mandatory IEs.
Reference	ETSI TS 138 413 [1], clause 8.4.9.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/3_9
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the GNB alreadyPreparedHandover
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate a Downlink RAN Early Status Transfer procedure
                    }
                    then {
                        the IUT sends a DOWNLINK_RAN_EARLY_STATUS_TRANSFER containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            Early_Status_Transfer_Transparent_Container containing
                                CHOICE_Procedure_Stage containing
                                    First_DL_COUNT containing
                                        DRBs_Subject_To_Early_Status_Transfer_List containing
                                            DRBs_Subject_To_Early_Status_Transfer_Item containing
                                                DRB_ID,
                                                CHOICE_First_DL_COUNT containing
                                                    12_bits containing
                                                        FIRST_DL_COUNT_Value containing
                                                            PDCP_SN_Length_12,
                                                            HFN_for_PDCP_SN_Length_12
                         to the GNB entity
                    }
                }
```

5.2.2.2.5 Paging Procedures

TP Id	TP_NGAP_AMF_PAG_01
Test Objective	Verify that the IUT can send a PAGING message to enable the AMF to page a UE.
Reference	ETSI TS 138 413 [1], clauses 8.5.1.2 and 9.2.4.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/4_1
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate the initiation "of a Paging procedure"
                    }
                    then {
                        the IUT sends a PAGING containing
                            UE_Paging_Identity containing
                                5G_S_TMSI containing
                                    5G_S_TMSI containing
                                        AMF_Set_ID,
                                        AMF_Pointer,
                                        5G_TMSI,
                            TAI_List_for_Paging containing
                                TAI_List_for_Paging_Item containing
                                    TAI containing
                                        PLMN_Identity,
                                        TAC
                        to the GNB entity
                    }
                }
```

5.2.2.2.6 Transport of NAS Messages Procedures

TP Id	TP_NGAP_AMF_NAS_01
Test Objective	Verify that the IUT can send a DOWNLINK NAS TRANSPORT message to carry NAS information over the NG interface.
Reference	ETSI TS 138 413 [1], clauses 8.6.2.2, 9.2.5.1 and 9.2.5.2 ETSI TS 123 502 [3], clause 4.24.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/5_2
Initial Conditions	

with {
the UE isCMCONNECTED and
the GNB hasReceivedNASMessage from the UE entity
}	

Expected Behaviour	

ensure that {
when {
the IUT receives an INITIAL_UE_MESSAGE containing
RAN_UE_NGAP_ID,
NAS_PDU,
User_Location_Information,
RRC_Establishmnet_Cause
from the GNB entity
}
then {
the IUT sends a DOWNLINK_NAS_TRANSPORT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NAS_PDU
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_NAS_02
Test Objective	Verify that the IUT can send a REROUTE NAS REQUEST message to reroute the INITIAL UE MESSAGE message to another AMF.
Reference	ETSI TS 138 413 [1], clauses 8.6.5.2 and 9.2.5.5
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/5_5
Initial Conditions	

with {
the AMF isNotAppropriateToServe the UE
}	

Expected Behaviour	

ensure that {
when {
the IUT receives an INITIAL_UE_MESSAGE containing
RAN_UE_NGAP_ID,
NAS_PDU,
User_Location_Information,
RRC_Establishmnet_Cause
from the GNB entity
}
then {
the IUT sends a REROUTE_NAS_REQUEST containing
RAN_UE_NGAP_ID,
NGAP_Message, // Contains the INITIAL UE MESSAGE
NAS_PDU,
AMF_Set_ID
to the GNB entity
}
}	

5.2.2.2.7 Interface Management Procedures

TP Id	TP_NGAP_AMF_IMP_01
Test Objective	Verify that the AMF node successfully processes an NG SETUP REQEST message that contains mandatory IEs and answers with NG SETUP RESPONSE to acknowledge the setup.
Reference	ETSI TS 138 413 [1], clauses 8.7.1.2, 9.2.6.1 and 9.2.6.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_1
Initial Conditions	

```
with {
                the UE hasEstablishedRRCConnection
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an NG_SETUP_REQUEST containing
                            Global_RAN_Node_ID,
                            Supported_TA_List containing
                                Supported_TA_Item containing
                                TAC,
                                Broadcast_PLMN_List containing
                                    Broadcast_PLMN_Item containing
                                        PLMN_Identity,
                                        TAI_Slice_Support_List containing
                                            S_NSSAI containing
                                                SST,
                            Default_Paging_DRX
                        from the GNB entity
                    }
                    then {
                        the IUT sends an NG_SETUP_RESPONSE containing
                              AMF_Name,
                              Served_GUAMI_List containing
                                  Served_GUAMI_Item containing
                                      GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer,
                              Relative_AMF_Capacity,
                              PLMN_Support_List containing
                                  PLMN_Support_Item containing
                                      PLMN_Identity,
                                      Slice_Support_List containing
                                          S_NSSAI containing
                                                SST,
                                      Extended_Slice_Support_List  containing
                                          S_NSSAI containing
                                                SST
                         to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_IMP_02
Test Objective	Verify that the AMF node successfully decline an NG RESET REQEST message and answers with NG SETUP FAILURE when the AMF is not able to handle the request.
Reference	ETSI TS 138 413 [1], clauses 8.7.1.3, 9.2.6.1 and 9.2.6.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_1
Initial Conditions	

```
with {
                the UE hasEstablishedRRCConnection
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an NG_SETUP_REQUEST containing
                            Global_RAN_Node_ID,
                            Supported_TA_List containing
                                Supported_TA_Item containing
                                TAC,
                                Broadcast_PLMN_List containing
                                    Broadcast_PLMN_Item containing
```

```
                                    PLMN_Identity,
                                    TAI_Slice_Support_List containing
                                        S_NSSAI containing
                                            SST,
                            Default_Paging_DRX
                        from the GNB entity
                    }
                    then {
                        the IUT sends an NG_SETUP_FAILURE containing
                              Cause
                         to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_IMP_03
Test Objective	Verify that the AMF node successfully processes an NG SETUP REQEST message with optional field UE Retention Information and answers with NG SETUP RESPONSE to acknowledge the setup.
Reference	ETSI TS 138 413 [1], clauses 8.7.1.2, 9.2.6.1 and 9.2.6.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_1
Initial Conditions	

```
with {
                the UE hasEstablishedRRCConnection
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an NG_SETUP_REQUEST containing
                            Global_RAN_Node_ID,
                            Supported_TA_List containing
                                Supported_TA_Item containing
                                TAC,
                                Broadcast_PLMN_List containing
                                    Broadcast_PLMN_Item containing
                                        PLMN_Identity,
                                        TAI_Slice_Support_List containing
                                            S_NSSAI containing
                                                SST,
                            Default_Paging_DRX,
                            UE_Retention_Information
                        from the GNB entity
                    }
                    then {
                        the IUT sends an NG_SETUP_RESPONSE containing
                              AMF_Name,
                              Served_GUAMI_List containing
                                  Served_GUAMI_Item containing
                                      GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer,
                              Relative_AMF_Capacity,
                              PLMN_Support_List containing
                                  PLMN_Support_Item containing
                                      PLMN_Identity,
                                      Slice_Support_List containing
                                          S_NSSAI containing
                                                SST,
                                      Extended_Slice_Support_List  containing
                                          S_NSSAI containing
                                                SST,
                              UE_Retention_Information
                         to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_IMP_04
Test Objective	Verify that the AMF node successfully processes an NG SETUP REQEST message with different optional fields and answers with NG SETUP RESPONSE to acknowledge the setup.
Reference	ETSI TS 138 413 [1], clauses 8.7.1.2, 9.2.6.1 and 9.2.6.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_1

Initial Conditions

```
with {
        the UE hasEstablishedRRCConnection
    }
```

Expected Behaviour

```
ensure that {
        when {
            the IUT receives an NG_SETUP_REQUEST containing
                Global_RAN_Node_ID,
                Supported_TA_List containing
                    Supported_TA_Item containing
                    TAC
                    Broadcast_PLMN_List containing
                        Broadcast_PLMN_Item containing
                            PLMN_Identity,
                            TAI_Slice_Support_List containing
                                S_NSSAI containing
                                    SST,
                            NPN_Support,
                            Extended_TAI_Slice_Support_List containing
                                  S_NSSAI containing
                                    SST,
                    Configured_TAC_Indication,
                    RAT_Information,
                Default_Paging_DRX,
                   NB_IoT_Default_Paging_DRX,
                   Extended_RAN_Node_Name containing
                      RAN_Node_Name_Visible
            from the GNB entity
        }
        then {
            the IUT sends an NG_SETUP_RESPONSE containing
                  AMF_Name,
                  Served_GUAMI_List containing
                      Served_GUAMI_Item containing
                          GUAMI containing
                            PLMN_Identity,
                            AMF_Region_ID,
                            AMF_Set_ID,
                            AMF_Pointer,
                  Relative_AMF_Capacity,
                  PLMN_Support_List containing
                      PLMN_Support_Item containing
                          PLMN_Identity,
                          Slice_Support_List containing
                              S_NSSAI containing
                                  SST,
                            NPN_Support,
                              Extended_Slice_Support_List  containing
                                  S_NSSAI containing
                                  SST,
                  Extended_AMFName
             to the GNB entity
        }
    }
```

TP Id	TP_NGAP_AMF_IMP_05
Test Objective	Verify that the AMF node successfully processes a RAN CONFIGURATION UPDATE message with RAN CONFIGURATION UPDATE ACKNOWLEDGE to acknowledge the update.
Reference	ETSI TS 138 413 [1], clauses 8.7.2.2, 9.2.6.4 and 9.2.6.5
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_2

Initial Conditions

```
with {
        the UE isRegisteredTo the AMF
    }
```

Expected Behaviour

ensure that {
when {
the IUT receives a RAN_CONFIGURATION_UPDATE containing
Supported_TA_List containing
Supported_TA_Item containing
TAC,
Broadcast_PLMN_List containing
Broadcast_PLMN_Item containing
PLMN_Identity,
TAI_Slice_Support_List containing
S_NSSAI containing
SST
from the GNB entity
}
then {
the IUT sends a RAN_CONFIGURATION_UPDATE_ACKNOWLEDGE
to the GNB entity
}
}

TP Id	TP_NGAP_AMF_IMP_06
Test Objective	Verify that the AMF node successfully declines a RAN CONFIGURATION UPDATE message with RAN CONFIGURATION UPDATE FAILURE when the AMF is not able to handle the request.
Reference	ETSI TS 138 413 [1], clauses 8.7.2.2, 9.2.6.4 and 9.2.6.6
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a RAN_CONFIGURATION_UPDATE containing
Supported_TA_List containing
Supported_TA_Item containing
TAC,
Broadcast_PLMN_List containing
Broadcast_PLMN_Item containing
PLMN_Identity,
TAI_Slice_Support_List containing
S_NSSAI containing
SST
from the GNB entity
}
then {
the IUT sends a RAN_CONFIGURATION_UPDATE_FAILURE containing
Cause
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_IMP_07
Test Objective	Verify that the IUT can send an AMF CONFIGURATION UPDATE message to the AMF.
Reference	ETSI TS 138 413 [1], clauses 8.7.3.2 and 9.2.6.7
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF and
the UE isCMIDLE and
the UE hasReceivedPAGINGMessage
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of an AMF CONFIGURATION UPDATE procedure"
}
then {
the IUT sends an AMF_CONFIGURATION_UPDATE containing
Served_GUAMI_List containing	

```
                                Served_GUAMI_Item containing
                                    GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer,
                                PLMN_Support_List containing
                                    PLMN_Support_Item containing
                                        PLMN_Identity,
                                        Slice_Support_List containing
                                              S_NSSAI containing
                                                    SST
                            to the GNB entity
                        }
                    }
```

TP Id	TP_NGAP_AMF_IMP_08
Test Objective	Verify that the AMF node successfully processes an NG RESET message that contains mandatory IEs and answers with NG RESET ACKNOWLEDGE to acknowledge the reset.
Reference	ETSI TS 138 413 [1], clauses 8.7.4.2.2, 9.2.6.11 and 9.2.6.12
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_4
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF and
                the UE isRequestedToDetachfromNetwork
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an NG_RESET containing
                            Cause,
                            CHOICE_Reset_Type containing
                                NG_interface containing
                                    Reset_All
                        from the GNB entity
                        }
                        then {
                            the IUT sends an NG_RESET_ACKNOWLEDGE
                            to the GNB entity
                        }
                    }
```

TP Id	TP_NGAP_AMF_IMP_09
Test Objective	Verify that the AMF can send an ERROR INDICATION to the GNB when a error occurs.
Reference	ETSI TS 138 413 [1], clauses 8.7.5.2 and 9.2.6.13
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_5
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT receives an INITIAL_CONTEXT_SETUP_REQUEST containing
                            AMF_UE_NGAP_ID,
                            RAN_UE_NGAP_ID,
                            GUAMI containing
                                PLMN_Identity,
                                AMF_Region_ID,
                                AMF_Set_ID,
                                AMF_Pointer,
                            PDU_Session_Resource_Setup_Request_List containing
                                PDU_Session_Resource_Setup_Request_Item containing
                                    PDU_SessionId indicating value PX_PDU_ID,
                                    S_NSSAI containing
                                        SST,
                                    PDU_Session_Resource_Setup_Request_Transfer,
                            Allowed_NSSAI containing
                                Allowed_NSSAI_List containing
                                    Allowed_NSSAI_Item containing
```

```
                                    S_NSSAI containing
                                        SST,
                            UE_Security_Capabilities containing
                                NR_Encryption_Algorithms,
                                NR_Integrity_Protection_Algorithms,
                                E_UTRA_Encryption_Algorithms,
                                E_UTRA_Integrity_Protection_Algorithms,
                            Security_Key
                            from the GNB entity
                        }
                        then {
                            the IUT sends an ERROR_INDICATION
                            to the GNB entity
                        }
                    }
```

TP Id	TP_NGAP_AMF_IMP_10
Test Objective	Verify that the AMF can send an AMF STATUS INDICATION to the GNB when a error occurs.
Reference	ETSI TS 138 413 [1], clauses 8.7.6.2 and 9.2.6.10
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_6
Initial Conditions	

```
with {
                the UE isRegisteredTo the AMF
            }
```

Expected Behaviour

```
ensure that {
                    when {
                        the IUT indicate an AMF STATUS INDICATION
                    }
                    then {
                        the IUT sends an AMF_STATUS_INDICATION containing
                            Unavailable_GUAMI_List containing
                                Unavailable_GUAMI_Item containing
                                    GUAMI containing
                                        PLMN_Identity,
                                        AMF_Region_ID,
                                        AMF_Set_ID,
                                        AMF_Pointer
                        to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_IMP_11
Test Objective	Verify that the AMF can send an OVERLOAD START to the GNB.
Reference	ETSI TS 138 413 [1], clause 8.7.7.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_7
Expected Behaviour	

```
                ensure that {
                    when {
                        the IUT indicate an OVERLOAD START
                    }
                    then {
                        the IUT sends an OVERLOAD_START containing
                            Overload_Start_NSSAI_List containing
                                Overload_Start_NSSAI_Item containing
                                    Slice_Overload_List containing
                                        S_NSSAI containing
                                            SST
                        to the GNB entity
                    }
                }
```

TP Id	TP_NGAP_AMF_IMP_12
Test Objective	Verify that the AMF can send an OVERLOAD STOP to the GNB.
Reference	ETSI TS 138 413 [1], clauses 8.7.8.2 and 9.2.6.15
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/6_8
Initial Conditions	

with {
the GNB hasReceivedOVERLOADSTARTtMessage
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an OVERLOAD STOP
}
then {
the IUT sends an OVERLOAD_STOP
to the GNB entity
}
}	

5.2.2.2.8 Configuration Transfer Procedure

TP Id	TP_NGAP_AMF_CTP_01
Test Objective	Verify that the IUT can send a DOWNLINK RAN CONFIGURATION TRANSFER message to transfer RAN configuration information to the NG-RAN.
Reference	ETSI TS 138 413 [1], clauses 8.8.2 and 9.2.7.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/7_2
Expected Behaviour	

ensure that {
when {
the IUT indicate the initiation "of a Downlink RAN Configuration Transfer"
}
then {
the IUT sends a DOWNLINK_RAN_CONFIGURATION_TRANSFER
to the GNB entity
}
}	

5.2.2.2.9 Warning Message Transmission Procedures

TP Id	TP_NGAP_AMF_WTP_01
Test Objective	Verify that the IUT can send a WRITE REPLACE WARNING REQUEST to start broadcasting of warning messages.
Reference	ETSI TS 138 413 [1], clauses 8.9.1.2 and 9.2.8.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/8_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a Write message Transmission procedure
}
then {
the IUT sends a WRITE_REPLACE_WARNING_REQUEST containing
Message_Identifier,
Serial_Number,
Repetition_Period,
Number_of_Broadcasts_Requested
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_WTP_02
Test Objective	Verify that the IUT can send a PWS CANCEL REQUEST to cancel broadcasting of warning messages.
Reference	ETSI TS 138 413 [1], clauses 8.9.2.2 and 9.2.8.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/8_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a PWS cancel procedure
}
then {
the IUT sends a PWS_CANCEL_REQUEST containing
Message_Identifier,
Serial_Number
to the GNB entity
}
}	

5.2.2.2.10 NRPPa Transport

TP Id	TP_NGAP_AMF_NTP_01
Test Objective	Verify that the IUT can send a DOWNLINK UE ASSOCIATED NRPPA TRANSPORT to carry NRPPA signaling between NG-RAN and LMF(Location Management Functionality).
Reference	ETSI TS 138 413 [1], clauses 8.10.2.1 and 9.2.9.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/9_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an NRPPA transport procedure
}
then {
the IUT sends a DOWNLINK_UE_ASSOCIATED_NRPPA_TRANSPORT containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Routing_ID,
NRPPa_PDU
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_NTP_02
Test Objective	Verify that the IUT can send a DOWNLINK_NON_UE_ASSOCIATED_NRPPA_TRANSPORT to carry NRPPA signaling between NG-RAN and LMF(Location Management Functionality).
Reference	ETSI TS 138 413 [1], clauses 8.10.2.3 and 9.2.9.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/9_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate an NRPPA transport procedure
}
then {
the IUT sends a DOWNLINK_NON_UE_ASSOCIATED_NRPPA_TRANSPORT containing
Routing_ID,
NRPPa_PDU
to the GNB entity	

```
    }
}
```

5.2.2.2.11 Trace Procedures

TP Id	TP_NGAP_AMF_TRP_01
Test Objective	Verify that the IUT can send a TRACE_START to initiate a trace session for a UE.
Reference	ETSI TS 138 413 [1], clauses 8.11.1.2 and 9.2.10.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/10_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a trace procedure
}
then {
the IUT sends a TRACE_START containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Trace_Activation containing
NG_RAN_Trace_ID,
Interfaces_to_Trace,
Trace_Depth,
Trace_Collection_Entity_IP_Address
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_TRP_02
Test Objective	Verify that the IUT can send a DEACTIVATE_TRACE to deactivate a trace session for a UE.
Reference	ETSI TS 138 413 [1], clauses 8.11.3.2 and 9.2.10.3
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/10_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a deactivate trace procedure
}
then {
the IUT sends a DEACTIVATE_TRACE containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
NG_RAN_Trace_ID
to the GNB entity
}
}	

5.2.2.2.12 Location Reporting

TP Id	TP_NGAP_AMF_LRP_01
Test Objective	Verify that the IUT can send a LOCATION REPORTING CONTROL message that contains mandatory IEs to request a report of the UE's current location.
Reference	ETSI TS 138 413 [1], clauses 8.12.1 and 9.2.11.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/11_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour

ensure that {
when {
the IUT indicate the initiation "of a Location Reporting Control procedure"
}
then {
the IUT sends a LOCATION_REPORTING_CONTROL containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID,
Location_Reporting_Request_Type
 	
to the GNB entity
}
}

5.2.2.2.13 UE TNLA Binding Procedures

TP Id	TP_NGAP_AMF_UBP_01
Test Objective	Verify that the IUT can send a UE TNLA BINDING RELEASE REQUEST to initiate a UE TNLA Binding Release procedure.
Reference	ETSI TS 138 413 [1], clauses 8.13.1.2 and 9.2.12.1
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/12_1
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a UE TNLA BINDING procedure
}
then {
the IUT sends a UE_TNLA_BINDING_RELEASE_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

5.2.2.2.14 UE Radio Capability Management

TP Id	TP_NGAP_AMF_URP_01
Test Objective	Verify that the IUT can send a UE RADIO CAPABILITY CHECK REQUEST to initiate UE Radio Capability Management procedure.
Reference	ETSI TS 138 413 [1], clauses 8.14.2.2 and 9.2.13.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/13_2
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a UE Radio Capability Management procedure
}
then {
the IUT sends a UE_RADIO_CAPABILITY_CHECK_REQUEST containing
AMF_UE_NGAP_ID,
RAN_UE_NGAP_ID
to the GNB entity
}
}	

TP Id	TP_NGAP_AMF_URP_02
Test Objective	Verify that the IUT can send a UE RADIO CAPABILITY ID MAPPING RESPONSE message that contains mandatory IEs to provide the UE radio capabilities id mapping.
Reference	ETSI TS 138 413 [1], clauses 8.14.3.2, 9.2.13.4 and 9.2.13.5
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/13_3
Initial Conditions	

with {
the UE isRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT receives a UE_RADIO_CAPABILITY_ID_MAPPING_REQUEST containing
UE_Radio_Capability_ID
from the GNB entity
}
then {
the IUT sends a UE_RADIO_CAPABILITY_ID_MAPPING_RESPONSE containing
UE_Radio_Capability_ID,
UE_Radio_Capability
to the GNB entity
}
}	

5.2.2.2.15 Data Usage Reporting Procedures

Void.

5.2.2.2.16 RIM Information Transfer Procedures

TP Id	TP_NGAP_AMF_RIP_01
Test Objective	Verify that the IUT can send a DOWNLINK RIM INFORMATION TRANSFER.
Reference	ETSI TS 138 413 [1], clauses 8.16.2.2 and 9.2.15.2
Configuration	CF_AMF_N2
PICS Selection	PICS_A2/2 and PICS_A4/15_2
Initial Conditions	

with {
the UE isNotRegisteredTo the AMF
}	

Expected Behaviour	

ensure that {
when {
the IUT indicate a RIM Information Transfer procedure
}
then {
the IUT sends a DOWNLINK_RIM_INFORMATION_TRANSFER
to the GNB entity
}
}	

Annex A (normative): TDL-TO source files

Each TP in clause 5 above has been written in TDL-TO and thus in a structured manner which is consistent with all other TPs. The TDL-TO text files for all test purposes are released in the ETSI forge repository:

- https://forge.etsi.org/rep/int/5g-core/ngap/-/tree/main/test_purposes.

History

Document history		
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