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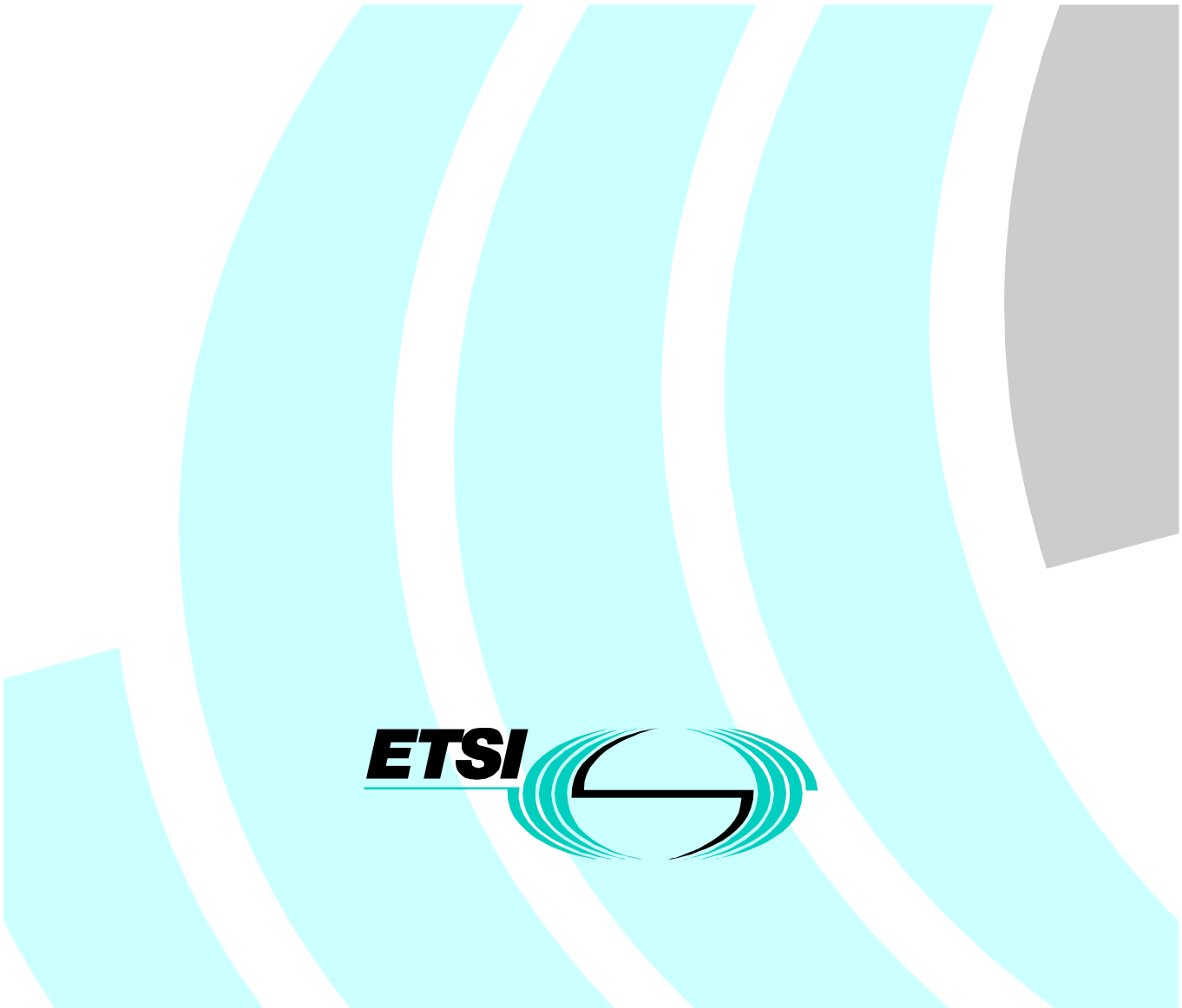
*European Standard (Telecommunications series)*

# Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP); Application transport mechanism; Part 3: Test Suite Structure and Test Purposes (TSS&TP) specification



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***ETSI***

Postal address
F-06921 Sophia Antipolis Cedex - FRANCE

Office address
650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet
secretariat@etsi.fr
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# Contents

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# Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 3 of a multi-part EN covering Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP); Application transport mechanism, as identified below:

Part 1: "Protocol Specification" [ITU-T Recommendation Q.765, modified]";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

**Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification";**

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) specification".

| **Proposed national transposition dates** | |
|---|---|
| Date of latest announcement of this EN (doa): | 3 months after ETSI publication |
| Date of latest publication of new National Standard or endorsement of this EN (dop/e): | 6 months after doa |
| Date of withdrawal of any conflicting National Standard (dow): | 6 months after doa |

# 1 Scope

The present document contains the validation (conformance) test specification for the Application Transport Mechanism defined in EN 301 069-1 [1]. The present document applies only to exchanges having implemented the ISUP v3 protocol specification for the Application Transport Mechanism of the exchange. It is applicable for validation testing of all types of exchanges as defined in the ISUP v3 protocol specification. It does not deal with compatibility testing.

The main body of the present document presents the Test Suite Structure and Test Purposes (TSS&TP) for the Application Transport Mechanism (APM). EN 301 069-2 [9] provides the protocol implementation conformance statements (PICS) for the Application Transport Mechanism defined in compliance with the relevant requirements and in accordance with the guidance given in ISO/IEC 9646-7 [4].

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] EN 301 069-1 (V1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP); Application transport mechanism; Part 1: Protocol specification [ITU-T Recommendation Q.765, modified]".

[2] ISO/IEC 9646-1 (1997): "Information technology - Open Systems Interconnection -Conformance testing methodology and framework - Part 1: General Concepts".

[3] ISO/IEC 9646-3 (1997): "Delivery 6 - Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[4] ISO/IEC 9646-7 (1997): "Information technology - Open Systems Interconnection -Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[5] ITU-T Recommendation E.164 (1988): "The international public telecommunication numbering plan".

[6] ITU-T Recommendation Q.761: "Signalling System No. 7 – ISDN User Part functional description".

[7] ITU-T Recommendation Q.701 (1993): "Functional description of the message transfer part (MTP) of Signalling System No. 7".

[8] ITU-T Recommendation Q.707 (1988): "Testing and maintenance".

[9] EN 301 069-2: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP); Application transport mechanism; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[10] ITU-T Recommendation Q.762: "Signalling System No. 7 – ISDN user part general functions of messages and signals".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

- terms defined in ISDN User Part (ISUP) reference specification EN 301 069-1 [1];
- terms defined in ISO/IEC 9646-1 [2], ISO/IEC 9646-3 [3] and in ISO/IEC 9646-7 [4].

In particular, the following terms apply:

**Abstract Test Case (ATC):** complete and independent specification of the actions required to achieve a specific test purpose, defined at the level of abstraction of a particular Abstract Test Method, starting in a stable testing state and ending in a stable testing state (see ISO/IEC 9646-1 [2], subclause 3.3.3).

**Abstract Test Method (ATM):** description of how an IUT is to be tested, given at an appropriate level of abstraction to make the description independent of any particular realization of a Means of Testing, but with enough detail to enable abstract test cases to be specified for this method (see ISO/IEC 9646-1 [2], subclause 3.3.5).

**Implementation Under Test (IUT):** implementation of one or more OSI protocols in an adjacent user/provider relationship, being part of a real open system which is to be studied by testing (see ISO/IEC 9646-1 [2], subclause 3.3.43).

**ISDN number**: number conforming to the numbering and structure specified in ITU-T Recommendation E.164 [5].

**Means of Testing (MOT):** combination of equipment and procedures that can perform the derivation, selection, parameterization and execution of test cases, in conformance with a reference standardized ATS, and can produce a conformance log (see ISO/IEC 9646-1 [2], subclause 3.3.54).

**point of control and observation:** point within a testing environment where the occurrence of test events is to be controlled and observed, as defined in an Abstract Test Method (see ISO/IEC 9646-1 [2], subclause 3.3.64).

**pre-test condition:** setting or state in the IUT which cannot be achieved by providing stimulus from the test environment.

**Protocol Implementation Conformance Statement (PICS):** statement made by the supplier of a protocol claimed to conform to a given specification, stating which capabilities have been implemented (see ISO/IEC 9646-1 [2], subclause 3.3.39 and subclause 3.3.80).

**Protocol Implementation eXtra Information for Testing (PIXIT):** statement made by a supplier or implementor of an IUT (protocol) which contains or references all of the information related to the IUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the IUT (see ISO/IEC 9646-1 [2], subclause 3.3.41 and subclause 3.3.81).

**System Under Test (SUT):** real open system in which the IUT resides (see ISO/IEC 9646-1 [2], subclause 3.3.103).

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

| | |
|---|---|
| AI | Application Interface |
| APM | Application Transport Mechanism |
| APM_user | Application Transport Mechanism user Protocol Control e.g. PSS1 |
| ASE | Application Service Entity |
| ASP | Abstract Service Primitive |
| ATM | Abstract Test Method |
| ATS | Abstract Test Suite |
| ISDN | Integrated Services Digital Network |
| ISUP | ISDN User Part |
| IUT | Implementation Under Test |

| | |
|---|---|
| LAB | Link AB |
| LAC | Access Signalling PCO |
| LT | Lower Tester |
| MOT | Means Of Testing |
| MTP | Message Transfer Part |
| NNI | Network Nodal Interface |
| PAN | Public Addressed Node |
| PCO | Point of Control and Observation |
| PICS | Protocol Implementation Conformance Statement |
| PIN | Public Initiated Node |
| PIXIT | Protocol Implementation eXtra Information for Testing |
| PSS1 | Private network Q reference point Signalling System number 1 |
| SP | Signalling Point |
| SS7 | Signalling System N°7 |
| SUT | System Under Test |
| TCP | Test Co-ordination Procedures |
| TE_P | Transit Exchange PIN/PAN |
| TP | Test Purpose (context dependent) |
| TSS | Test Suite Structure |
| TSS&TP | Test Suite Structure and Test Purposes |
| TTCN | Tree and Tabular Combined Notation |
| UAX | Acces to the APM-user |
| UCEH | Unidentified Context and Error Handling |
| UT | Upper Tester |
| VPN | Virtual Private Network |

The ISUP message acronyms can be found in table 2 of ITU-T Recommendation Q.762 [10].

The APM primitives acronyms can be found in the different tables of EN 301 069-1 [1].

The following abbreviations apply for ISUP parameters and parameter values.

| | |
|---|---|
| ACI | Application Context Identifier |
| APP | Application Transport Parameter |
| ATII | Application Transport Instruction Indicator |
| PRI | Pre-Release |
| SLR | Segmentation Local Reference |

# 4 Implementation under test and test methods

## 4.1 Identification of the system and implementation under test

The system under test (SUT) is an exchange. The implementation under test (IUT) is the ISUP v3 implementation in this exchange, mainly the part responsible for the Application Transport Mechanism (APM), as shown in figure 1.

The protocol functions for the Application Transport Mechanism relates to the signalling associations with a bearer (ISUP). Therefore the defined ISUP Basic Call and its associated formats and codes are required to support the Application Transport Mechanism. The following main subjects have to be considered in this area:

a) APM-user Protocol Control (APM-user Application Service Element)

b) Application Transport Mechanism Protocol Control (APM Application Service Element)

c) ISUP Basic Call (ISUP Application Service Element)

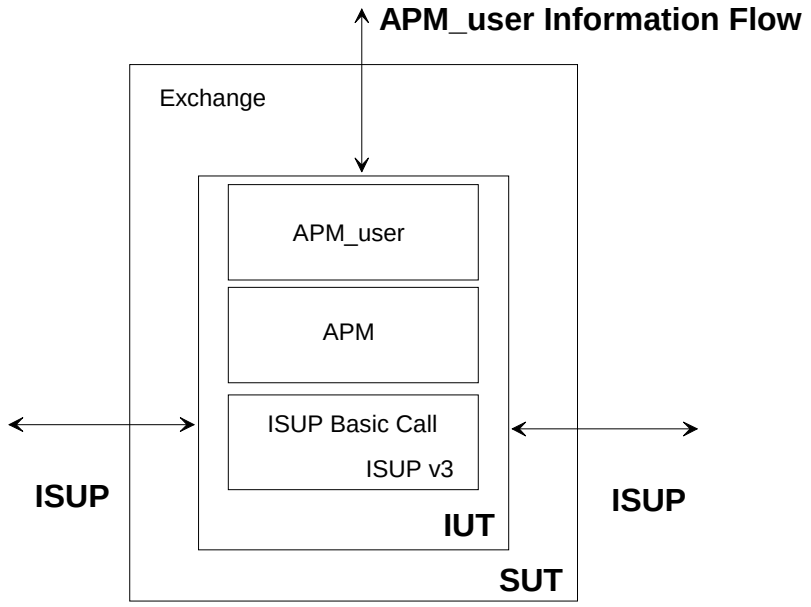


**Figure 1: The system under test**

The APM user primitives or APM user information flow can be observed through the individual reference point defined for each APM user or application process, respectively. In case of a PSS1 ASE (APM-user ASE for the VPN application) for example, the Q reference point is applicable.

The ISUP signalling protocol can be observed on the Signalling System No.7 (SS7) link on the Network Nodal Interface (NNI).

From the ISUP/APM reference standard several types of exchanges (or roles) can be identified:

- Local Exchanges in case of a Public Initiating Node (PIN) or a Public Addressed Node (PAN) with several APM-users
- Transit Exchanges in the role of a PIN or PAN with several APM-users
- National Transit Exchanges as defined in ITU-T Recommendation Q.761 [6].

The National Transit Exchanges pass on the APM messages without checking the messages. In the case of a PIN or PAN the messages related to an APM call are checked according to the corresponding APM user. If the peer APM user does not reside in the exchange, the call is passed on to the destination or to the addressed location (PAN).

## 4.2 ATM and testing configuration for ISUP v3 - Application Transport Mechanism

The Abstract Test Method (ATM) chosen for the Application Transport Mechanism specification is the distributed multi-party test method. The ATM is defined at an appropriate level of abstraction so that the test cases may be specified appropriately, without adding restrictions to the implementation under test.

The ATS is written in concurrent TTCN.

## 4.3 Local exchanges – PIN / PAN

As mentioned above, the IUT can be tested within different configurations. The following text describes the test configuration for the IUT where the software for IUSP V3 and also the APM part reside in a local exchange.

Figure 2 shows the logical test components of the adopted test configuration. The main test component is located on the right side of the IUT; it contains the ISUP part. On the left side there is a parallel test component which covers the APM part.

To observe and control the message flow on the ISUP and APM side for each side, a Point of Control and Observation (PCO) is needed. The PCO for the ISUP link is abbreviated with an 'L' followed by two letters indicating the interface. The naming convention for the PCO, specifying the Upper Tester, is the same but having an 'U' instead of the 'L' as the first character.

There is no defined interface from ISUP (the IUT) towards the APM user side. For testing the primitives specified in EN 301 069-1 [1], which are sent between the APM Application Service Element (ASE) and the APM user ASE, the above mentioned Upper Tester (UT) is needed. It is therefore necessary to make use of an application interface (AI) including a PCO and to use the specified primitive names given in EN 301 069-1 [1] for the abstract service primitives (ASPs) to be used on this PCO.

The LAB PCO is used by the lower tester (LT) to control and observe the ISUP on the signalling to the exchange. The other UAX PCO is needed to check if the expected primitives for the APM user are correctly generated by the exchange. The PDUs on this PCO are chosen at an appropriate level of abstraction.

The test co-ordination procedures (TCP) allow for communication between the testers. The test components are mostly implicitly co-ordinated (asynchronously); the TCPs are only used when it is necessary to obtain the verdict from the parallel test component.

This configuration to test the local exchanges is presented in figure 2.

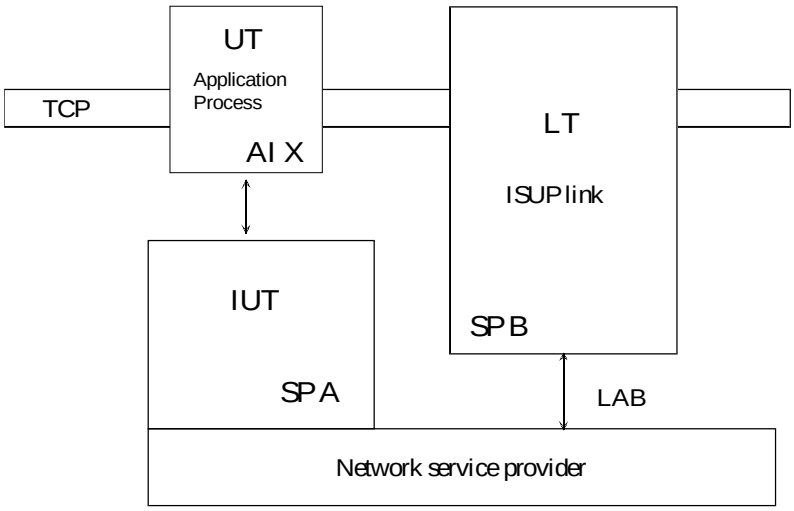


**Figure 2: APM Test configuration for local exchanges**

## 4.4 Transit exchanges – PIN / PAN

For this configuration the same rules and definitions are applicable as used in subclause 5.3.

## 4.5 Transit exchanges - ISUP

The configuration proposed for testing transit exchanges is shown in figure 3. In order to test the protocol and functionality of transit exchanges, one needs to consider the incoming and outgoing side of the SUT.

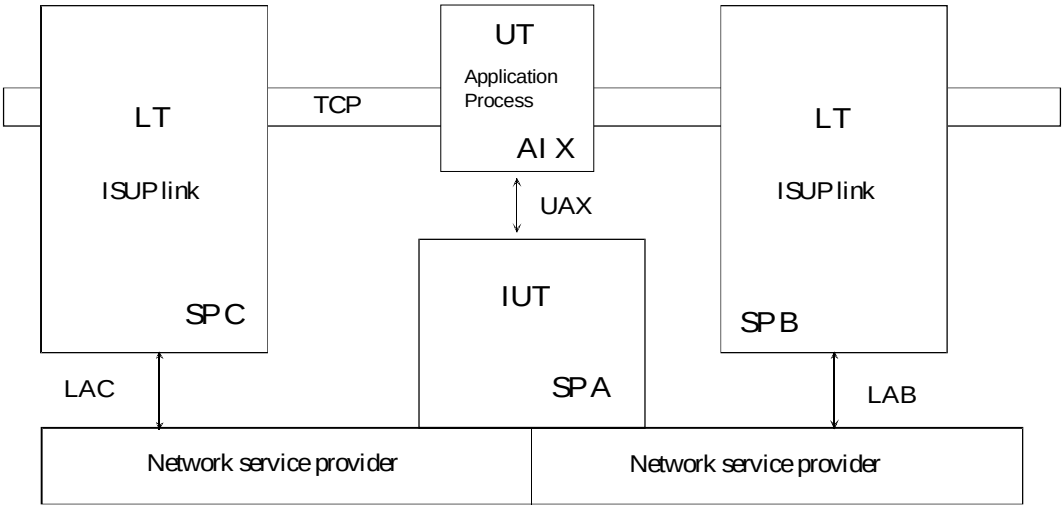


**Figure 3: APM Test configuration for transit exchanges**

The IUT is observed and controlled from two ISUP links with associated circuits. The points of Control and Observation (PCO) are labelled LAB on the one side and LAC on the other.

The LAB and LAC PCOs are used by the Lower Testers (LT) for controlling the ISUP signalling links.

The underlying network service provider is the Message Transfer Part (MTP) protocol as specified in ITU-T Recommendations Q.701 [7] to Q.707 [8].

The Test Co-ordination Procedures (TCP) allow for communication between the testers. The test components are mostly implicitly co-ordinated (asynchronously); the TCPs are only used when it is necessary to obtain the verdict from the parallel test component.

The Upper Tester (UT) and its UAX PCO is not used in this configuration.

# 5 Test Suite Structure (TSS)

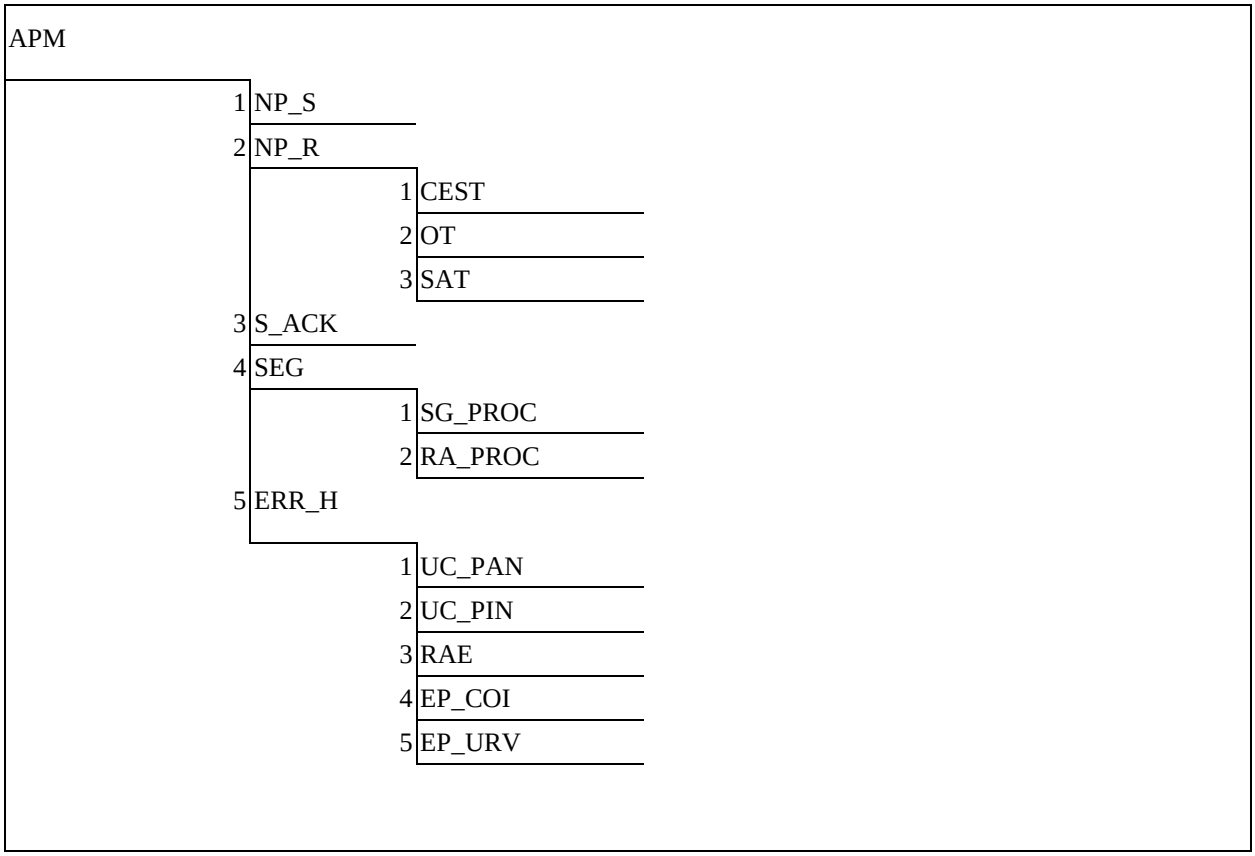


**Figure 4: Test suite structure**

Test suite structure (TSS) naming conventions are:

| | |
|---|---|
| NP_S | **N**ormal **P**rocedures **S**ending |
| NP_R | **N**ormal **P**rocedures **R**eceiving |
| CEST | **C**all **E**stablishment |
| OT | Procedures at **O**ther **T**imes |
| SAT | **S**end_**APM**_**T**ransit |
| S_ACK | **S**ending of **ACK**nowledgement |
| SEG | **SEG**mentation |
| SG_PROC | **PROC**edures for **S**e**G**mentation |
| RA_PROC | **PROC**edures for **R**e-**A**ssembly |
| ERR_H | **ERR**or **H**andling with UCEH |
| UC_PAN | **U**nidentified **C**ontext Handling (**PAN**) |
| UC_PIN | **U**nidentified **C**ontext Handling (**PIN**) |
| RAE | **R**e**A**ssembly **E**rror Handling |
| EP_COI | Exceptional Procedures – Context identifier error |
| EP_URV | Exceptional Procedures – Unrecognized Reason value |
| V | Valid behaviour stimulus |

# 6 Test purposes (TP)

## 6.1 Introduction

For each test requirement a Test Purpose (TP) is defined.

## 6.2 Test purpose (TP) naming convention

Test Purposes are numbered ascending within each group. Groups are organized according to the TSS down to the last but one level. The classification in the V/I groups is done by the inclusion of V or I in the test case name. Additional qualifiers, in form of lower case letters, are added to identify variants within one generic test case, see table 1.

**Table 1: TP Identifier naming convention scheme**

| | | |
|---|---|---|
| Identifier: | **APM_<group>_<N>_<n>_{<n>}_{<a>}** | |
| **APM** | **=** | **Application Transport Mechanism** |
| <group> | = | One character representing the test group:<br>V: Valid stimulus<br>I: Inopportune stimulus |
| <N> | = | Sequence number in the test suite structure |
| <n> | = | Sequence number used within the group |
| {<n>} | = | Optional additional number used |
| {<a>} | = | Optional lower-case character distinguishing tests with same reference number |

### 6.2.1 Source of test purpose definition

The test purposes cover validation testing aspects and were developed within ETSI.

### 6.2.2 Test purpose structure

The test purpose structure overlaps with the Test Suite Structure (TSS).

Test purposes that test normal behaviour have been grouped in the **V** / (valid) behaviour group.

Test purposes that test the IUT behaviour in situations that are not normal operation have been grouped in the **I** / (inopportune stimulus group.

## 6.3 Test purposes for the SS7, Application TransPort Mechnism (APM)

All of the following test purposes belong to the main group ISUP_APM. Each test purpose is presented in a separate table. The first row of the table contains the following items:

| | |
|---|---|
| TSS | Identifier in the test suite structure (test group/subgroup identifier) |
| TP | Identifier of the test purpose |
| EN 301 069-1 [1] reference | The reference to the requirement in the Signalling system number 7, application transport mechanism EN 301 069-1 [1], which led to the test purpose |
| Selection expression | Selection criterion for the test purpose taking into account the exchange's role and the answers to the specified PICS questions. If there is no selection expression specified, the TP is valid for all roles of exchanges |
| Configuration | This is a reference to the test configuration used |

The next row defines the test purpose itself, each having a *title* in *italics* and a text body.

The ISUP **messages**, **parameters**, the APM **primitives** are highlighted **bold** to ease the readability.

In order to check the specified behaviour for some test purposes, a special prerequisite test condition has to be fulfilled. If such a condition is needed, it is presented after the test purpose under the heading 'Pre-test conditions'.

### 6.3.1 Application Transport Mechanism (APM ASE)

#### 6.3.1.1 Normal Procedures - Sending

| TSS<br>/NP_S/ | TP<br>APM_V_1_1 | EN 301 069-1 [1] reference<br>10.2.1 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|
| Test purpose<br>*Mapping of Application Transport Parameter*<br>To verify that the IUT can successfully construct the **Application Transport Parameter** (APP) in case on reception of an **APM_Data request** primitive from the APM-user and maps this in an **Initial Address message** (IAM).<br>Pre-test conditions: Do nothing, keep quiet!! | | | | |

| TSS<br>/NP_S/ | TP<br>APM_V_1_2 | EN 301 069-1 [1] reference<br>10.2.1 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|
| Test purpose<br>*Pass on of an APM Transit primitive*<br>To verify that the IUT can successfully pass on the **APM_Transit request** from the APM user and does not change the contents which is mapped into an **Application Transport message** (APM).<br>Pre-test conditions: None | | | | |

### 6.3.1.2 Normal Procedures - Receiving

| TSS<br>/NP_R/CEST | TP<br>APM_V_2_1_3 | EN 301 069-1 [1]<br>reference<br>10.2.2.1 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose
*Mapping of the application transport parameter - context supported / no re-assembly*
To verify that the IUT can successfully map the **Application Transport Parameter** (APP) in the received **Initial Address Message** (IAM) into an **APM_Data indication** primitive which is sent to the APM-user.

NOTE: That the **Application Transport Parameter** (APP) contains the following data:
Application Context Identifier: specified by the person who executes the test e.g. 1 (PSS1);
APM segmentation indicator: 0 (final segment);
Sequence indicator field: 0 (Subsequent segment to first segment).

Pre-test conditions: None

| TSS<br>/NP_R/CEST | TP<br>APM_V_2_1_4 | EN 301 069-1 [1]<br>reference<br>10.2.2.1 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose
*Mapping of the application transport parameter - context not supported / no re-assembly*
To verify that the IUT can successfully map the **Application Transport Parameter** (APP) with the Application Context Identifier set to '63' (spare value) in the received **Initial Address Message** (IAM) into an **APM_UCEH_Error indication** primitive which is sent to the APM-user. The Application Context and **Application Transport Instruction Indicators** (ATII) are set as received in the **APM_Transfer** primitive and the **Reason** is set to 'Unidentified Context'.

NOTE: That the **Application Transport Parameter** (APP) contains the following data:
Application Context Identifier: 63 (spare) / the context should not be supported
APM segmentation indicator: 0 (final segment)
Sequence indicator field: 0 (Subsequent segment to first segment)

Pre-test conditions: None

#### 6.3.1.2.1 Procedures at other times

| TSS<br>/NP_R/OT | TP<br>APM_V_2_2_5 | EN 301 069-1 [1]<br>reference<br>10.2.2.2 / EN 301 069-1 [1] | Selection expression | Configuration<br>Transit |
|---|---|---|---|---|

Test purpose

*Pass on of the application transport parameter*

To verify that the IUT can successfully pass on the received **Application Transport Parameter** (APP) in an **Initial Address Message** (IAM) if the context does not belong to this node. The IUT shall not verify and change the contents of the **Transit_Data** parameter of the **APM_Tansfer indication** primitive.

Pre-test conditions: None

| TSS /NP_R/OT | TP APM_V_2_2_6 | EN 301 069-1 [1] reference / EN 301 069-1 [1] / EN 301 069-1 [1] 7.2.3.3.1 / EN 301 069-1 [1] | Selection expression PICS A1/3 | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*context supported - segmentation applies / PIN is not sending any APM messages before acknowledgement received*<br><br>To verify that the IUT (PIN) shall not send subsequent segments to an **Initial Address message** (IAM) until a **Address Complete message** (ACM) is received containing an **Application Transport Parameter** (APP), which implicitly indicates that a path has been successfully routed to the PAN. To trigger that behaviour an **APM_Data** primitive with the parameter set to:<br>Application Context Identifier: specified by a person who executes the test, e.g. 1 (PSS1)<br>Application Transport Instruction Indicator: 0 (do not release call)<br>Application Information: some garbage data with more than 2 048 bytes is sent from the tester to the IUT.<br><br>Pre-test conditions: None | | | | |

| TSS /NP_R/OT | TP APM_V_2_2_7 | EN 301 069-1 [1] reference / EN 301 069-1 [1] 7.2.3.3.1 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*context supported - segmentation reassembly applies / PAN*<br><br>To verify that the IUT can successfully map the **Initial Address Message** (IAM) with an **Application Transport Parameter** (APP) set to:<br>Application Context Identifier (ACI): specified by a person who execute the test, e.g. 1 (PSS1 ASE )<br>Application Transport Instruction Indicators (ATII): 0 (do not release)<br>APM segmentation indicator: 2 (indicates 2 following segments)<br>Sequence indicator (SI): 1 (New sequence)<br>into a **More_APP_Info** primitive and send it to the APM-user.<br><br>Pre-test conditions: None | | | | |

| TSS /NP_R/OT | TP APM_V_2_2_8 | EN 301 069-1 [1] reference 10.2.2.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*context supported - segmentation applies*<br><br>To verify that the IUT sends the completely reassembled Application Information in an **APM_Data indication** primitive to the APM-user, after reception of an **Application Transport Message** (APM) which contains an **Application Transport Parameter** (APP) indicating the APM segmentation indicator set to 'final segment'.<br><br>Pre-test conditions: None | | | | |

| TSS /NP_R/OT | TP APM_V_2_2_9 | EN 301 069-1 [1] reference 10.2.2.2 / EN 301 069-1 [1] | Selection expression | Configuration Transit |
|---|---|---|---|---|
| Test purpose<br><br>*context not supported - pass-on node*<br><br>To verify that the IUT can successfully map the **Initial Address Message** (IAM) with the **Application Transport Parameter** (APP) indicating an unsupported context into an **APM_Transit indication** primitive including the same **Application Transport Parameter** (APP) and send it to the PAN.<br><br>Pre-test conditions: None | | | | |

| TSS /NP_R/OT | TP APM_V_2_2_10 | EN 301 069-1 [1] reference 10.2.2.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*context not supported - 1st segment of sequence*<br><br>To verify that the IUT sends an **APM_UCEH_Error indication** primitive with the Application Context and **Application Transport Instruction Indicators** (ATII) set as received in the **APM_Transfer** primitive and the **Reason** indicates 'Unidentified Context' to the APM-user in case of receiving an **Initial Address Message** (IAM) with the **Application Transport Parameter** (APP) indicating a context which is not supported by the IUT.<br><br>Pre-test conditions: None | | | | |

| TSS /NP_R/OT | TP APM_V_2_2_11 | EN 301 069-1 [1] reference 10.2.2.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*context not supported - 2nd segment of sequence*<br><br>To verify that the IUT discards an **APM_Transfer** primitive which is a subsequent segment to an **Initial Address Message** (IAM) containing an **Application Transport Parameter** (APP) with a context which was not supported by the IUT.<br><br>NOTE: That the tester sends the **Application Transport Message** (APM) for the second segment.<br><br>Pre-test conditions: None | | | | |

#### 6.3.1.2.2 Reception of the Send_APM_Transit primitive

| TSS<br>/NP_R/SAT | TP<br>APM_V_2_3_12 | EN 301 069-1 [1] reference<br>10.2.2.3 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose

*Send_APM_Transit - Pass on transparently*

To verify that the IUT can successfully pass on unchanged the contents of the **Send_APM_Transit** primitive send by the APM-user to an **APM_Transit** primitive which is mapped into an **Application Transport Message** (APM) on the ISUP side.

Pre-test conditions: None

### 6.3.1.3 Send of acknowledgement

| TSS<br>/S_ACK | TP<br>APM_V_3_1 | EN 301 069-1 [1] reference<br>10.2.3 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose

*APM_Acknowledgement request – construction of related APP*

To verify that the IUT is able to construct the appropriate **Application Transport Parameter** (APP) to a given context (e.g. VPN) received in an **APM_Acknowledgement request** primitive and send it in an **APM_Transfer request** primitive or **Application Transport Message** (APM), respectively to the PAN. The **Application Transport Parameter** (APP) shall be coded as follows:

**Application Transport Instruction Indicator** (ATII): Bit A=1(release call) Bit B=0 (do not send notification)

The Application Information field shall be empty.

Pre-test conditions: None

### 6.3.1.4 Segmentation

#### 6.3.1.4.1 Procedures for segmentation

| TSS<br>/SEG/SG_PROC | TP<br>APM_V_4_1_1 | EN 301 069-1 [1] reference<br>10.2.4.1a) / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose

*Segmentation – splitting into 3 segments*

To verify that the IUT can successfully apply the segmentation procedure, an **APM_Data request** primitive is received by the APM-user with an **application data** parameter containing 3 segments (about 4200 bytes). The IUT should map this primitive into an **Initial Address Message** (IAM) which is followed by the **Application Transport messages** (APM).

Pre-test conditions: None

| TSS /SEG/SG_PROC | TP APM_V_4_1_2 | EN 301 069-1 [1] reference 10.2.4.1a) / EN 301 069-1 [1] | Selection expression NOT PICS A1/4 | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Segmentation – discarding of IAM*<br><br>To verify that the IUT discards an **APM_Data request** primitive containing an **Application Data** parameter which is greater than 10 segments, e.g. >2 MBytes.<br><br>Pre-test conditions: None | | | | |

| TSS /SEG/SG_PROC | TP APM_V_4_1_3 | EN 301 069-1 [1] reference 10.2.4.1a) / EN 301 069-1 [1] | Selection expression PICS A1/4 | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Segmentation – discarding of IAM*<br><br>To verify that the IUT discards an **APM_Data request** primitive containing an **Application Data** parameter which is greater than 9 segments, e.g. >1.8MBytes.<br><br>Pre-test conditions: None | | | | |

| TSS /SEG/SG_PROC | TP APM_V_4_1_4 | EN 301 069-1 [1] reference 10.2.4.1b) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Segmentation – generation of IAM with appropriate application transport parameter*<br><br>To verify that the IUT can successfully map the **application data** parameter of the **APM_Data request** primitive into an **Initial Address Message** (IAM) followed by associated **Application Transport Message** (APM) messages. The **IAM** should include the **Application Transport Parameter** (APP) containing the Segmentation indicator field with 'new sequence' and the Number of Segments Remaining field indicating the number of segments that remains to be sent to the PAN with the appropriated **Application Transport messages** (APM).<br><br>Pre-test conditions: None | | | | |

| TSS /SEG/SG_PROC | TP APM_V_4_1_5 | EN 301 069-1 [1] reference 10.2.4.1 c) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Segmentation – segmentation indicator field set to ' subsequent segment to first segment '*<br><br>To verify that the IUT can successfully segment the received **APM_Data request** primitive into an **Initial Address Message** (IAM) and the associated **Application Transport messages** (APM) with the following coding rules:<br><br>The encapsulated information field in each **Application Transport Message** (APM) shall begin with the first octet following the last octet transmitted in the previous segment. The **APM segmentation indicator** field shall indicate 'subsequent segment to first segment' and the Number of Segments Remaining field shall be decremented to indicate the number of segments that remain to be sent. The Segmentation Local Reference (SLR) shall have the same value as sent in the **Initial Address Message** (IAM) or first **Application Transport Message** (APM).<br><br>Pre-test conditions: None | | | | |

| TSS /SEG/SG_PROC | TP APM_V_4_1_6 | EN 301 069-1 [1] reference 10.2.4.1 f) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Segmentation – continuity of the ATII parameter*

To verify that the IUT is able to provide the **Application Transport Instruction Indicators** (ATII) parameter as received in the **APM-Data request** primitive from the APM-user. This is applicable for the first and all subsequent segments, i.e. the **Initial Address Message** (IAM) and the following **Application Transport messages** (APM) send by the IUT to the PAN.

Pre-test conditions: None

### 6.3.1.4.2 Procedures for re-assembly

| TSS /SEG/RA_PROC | TP APM_V_4_2_1 | EN 301 069-1 [1] reference 10.2.4.2 a) b) d) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly – basic rules*

To verify that the IUT can successfully apply the re-assembly function, on receiving of an **Initial Address Message** (IAM) which is followed by an sequence of two associated **Application Transport message** (APM) where the first **Application Transport message** (APM) is received with the Sequence Indicator field indicating 'subsequent segment to first segment' and the Number of Segments Remaining field set to a value one less than the value in the previously received segment and the same Segmentation Local Reference (SLR) value as received in the **Initial Address Message** (IAM). The second **Application Transport message** (APM) includes the **Application Transport Parameter** (APP) with the Number of Segments Remaining field has a value equal to zero and 'final segment', than the IUT shall deliver the accumulated segments, including the last segment, as the complete Application Information to the APM-user with the **APM_Data indication** primitive.

NOTE: The Initial Address Message (IAM) and Application Transport Messages (APM) are sent by the tester.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_2 | EN 301 069-1 [1] reference 10.2.4.2 e) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly – no reassembly active / send APM_UCEH_Error Indication (Subsequent segment to first segment)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' in case if there is no reassembly process active and an **Application Transport Message** (APM) is received with a Sequence Indicator coded 'Subsequent segment to first segment'.

NOTE: That the previous message, e.g. an **Initial Address Message** (IAM), to this **Application Transport Message** (APM) indicates 'final segment' in the APM segmentation indicator.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_3 | EN 301 069-1 [1] reference 10.2.4.2 e) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - no reassembly active / send APM_UCEH_Error Indication (number of segments >9)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' in case if there is no reassembly process active and an **Application Transport Message** (APM) is received with a Number of Segments Remaining field value exceeding 9.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_4 | EN 301 069-1 [1] reference 10.2.4.2 f) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - reassembly active / send APM_UCEH_Error Indication (decrementation error)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discard the received and any saved segments on receipt of an **Application Transport Message** (APM) including an **Application Transport Parameter** (APP) with a Number of Segments Remaining field value that is not decremented from the value of the previous messages. There shall be no **APM_Data indication** primitive sent to the APM-user.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_5 | EN 301 069-1 [1] reference 10.2.4.2 f) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - reassembly active / send APM_UCEH_Error Indication (different Segmentation Local Reference)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discard the received and any saved segments on receipt of an **Application Transport Message** (APM) including an **Application Transport Parameter** (APP) with a Segmentation Local Reference (SLR) which differs from the received Segmentation Local Reference (SLR) in the first messages (e.g. an **Initial Address message** (IAM)). There shall be no **APM_Data indication** primitive sent to the APM-user.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_6 | EN 301 069-1 [1] reference 10.2.4.2 g) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - reassembly active / send APM_UCEH_Error Indication (Segments with a Sequence Indicator indicating 'New sequence')*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discards the received and any saved segments on receipt of an **Application Transport Message** (APM) including an **Application Transport Parameter** (APP) with a Sequence Indicator coded 'New Sequence'. There shall be no **APM_Data indication** primitive sent to the APM-user.

NOTE: The first message of the sequence, e.g. an **Initial Address Message** (IAM) shall include the Sequence Indicator indicating 'New Sequence', the following **Application Transport Messages** (APM) shall indicate 'Subsequent segment to first segment' in that parameter.

Pre-test conditions: None

| TSS /SEG/RA_PROC | TP APM_V_4_2_7 | EN 301 069-1 [1] reference 10.2.4.2 h) / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - no reassembly active / send APM_UCEH_Error Indication*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discard all received segments for the current sequence on expiry of timer **T-reass**. There shall be no **APM_Data indication** primitive sent to the APM-user.

Pre-test conditions: None

## 6.3.2 Unidentified Context and Error Handling (UCEH ASE)

### 6.3.2.1 Unidentified Context handling (PAN)

| TSS /ERR_H/UC_PAN | TP APM_V_5_1_1 | EN 301 069-1 [1] reference 13.1.1 / EN 301 069-1 [1] 7.2.3.3.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Unidentified Context handling – unidentified context identifier, release call / send APM_UCEH_Error Indication*

To verify that the IUT (PAN) sends an **APM_UCEH_Error indication** primitive to the APM-user in case of receiving an **Initial Address Message** (IAM) which includes an unknown context identifier and an **Application Transport Instruction Indicator** (ATII) set to 'release call' in the **Application Transport Parameter** (APP). The IUT shall release the call with a **Release** (REL) message. The value of the **Reason** in the **UCEH_Release indication** primitive is be mapped into the **Cause parameter** of the **Release** (REL) message, indicating the cause value #79 - 'Unidentified Context'. Also an **UCEH_Release indication** primitive shall be sent to the APM –user (application).

NOTE: Before the **Release** (REL) is sent an **Pre_Release** (PRI) message is sent which carries the **Application Transport Parameter** (APP) with the appropriate data.

Pre-test conditions: None

| TSS<br>/ERR_H/UC_PAN | TP<br>APM_V_5_1_2 | EN 301 069-1 [1] reference<br>13.1.1 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose

*Unidentified Context handling – unidentified context identifier, allowed to proceed / send APM_UCEH_Error Indication*

To verify that the IUT (PAN) sends an **APM_UCEH_Error indication** primitive to the APM-user in case of receiving an **Initial Address Message** (IAM) which includes an unknown context identifier and an **Application Transport Instruction Indicator** (ATII) set to 'do not release call' in the **Application Transport Parameter** (APP). The IUT shall not release the call.

Pre-test conditions: None

| TSS<br>/ERR_H/UC_PAN | TP<br>APM_V_5_1_3 | EN 301 069-1 [1] reference<br>13.1.1 / EN 301 069-1 [1]<br>7.2.3.3.2 /<br>EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|

Test purpose

*Unidentified Context handling – unidentified context identifier, do not send notification / send APM_UCEH_Error Indication*

To verify that the IUT (PAN) sends an **APM_UCEH_Error indication** primitive to the APM-user in case of receiving an **Initial Address Message** (IAM) which includes an unknown context identifier and an **Application Transport Instruction Indicator** (ATII) set to 'release call' and 'do not send notification' in the **Application Transport Parameter** (APP). The IUT shall release the call with a **Release** (REL) message. The value of the **Reason** in the **UCEH_Release indication** primitive is be mapped into the **Cause parameter** of the **Release** (REL) message, indicating the cause value #79 - 'Unidentified Context'. The IUT shall **not** send an **Application Transport Message** (APM) including an Application Context Identifier indicating 'Unidentified Context and Error Handling (UCEH) ASE' in the **Application Transport Parameter** (APP).

NOTE: Before the **Release** (REL) is sent an **Pre_Release** (PRI) message is sent which carries the **Application Transport Parameter** (APP) with the appropriate data.

Pre-test conditions: None

| TSS<br>/ERR_H/UC_PAN | TP<br>APM_V_5_1_4 | EN 301 069-1 [1] reference<br>13.1.1 / EN 301 069-1 [1]<br>7.2.3.3.2 /<br>EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Unidentified Context handling – unidentified context identifier, send notification / send APM_UCEH_Error Indication*<br><br>To verify that the IUT (PAN) sends an **APM_UCEH_Error indication** primitive to the APM-user in case of receiving an **Initial Address Message** (IAM) which includes an unknown context identifier and an **Application Transport Instruction Indicator** (ATII) set to 'release call' and 'send notification' in the **Application Transport Parameter** (APP). The IUT shall release the call with a **Release** (REL) message. The value of the **Reason** in the **UCEH_Release indication** primitive is be mapped into the **Cause parameter** of the **Release** (REL) message, indicating the cause value #79 - 'Unidentified Context'. The IUT shall send the **Application Transport Parameter** (APP) set as below, in an backward message (**Application Transport Message** (APM)) to the PIN.<br><br>**Application Transport Parameter** (APP) settings:<br>Application Context Identifier: 0 (Unidentified Context and Error Handling (UCEH) ASE<br>Application Transport Instruction Indicator: Bit A=1(release call) Bit B=0 (do not send notification)<br>The Encapsulated Application Information includes the 'Application Transport Notification Information' with the abused 'Application Context Identifier' and the reason set to 'Unidentified Context'.<br>There shall be an **APM_Data indication** primitive send to the APM-user (application).<br><br>NOTE: Before the **Release** (REL) is sent an **Pre_Release** (PRI) message is sent which carries the **Application Transport Parameter** (APP) with the appropriate data.<br><br>Pre-test conditions: None | | | | |

### 6.3.2.2 Unidentified Context handling (PIN)

| **TSS<br>/ERR_H/UC_PIN** | **TP<br>APM_V_5_2_1** | **EN 301 069-1 [1] reference<br>13.1.2 / EN 301 069-1 [1]** | **Selection expression** | **Configuration<br>Transit** |
|---|---|---|---|---|
| Test purpose<br><br>*Unidentified Context handling – APP 'pass on' to the APM-user*<br><br>To verify that the IUT (PIN) is able to pass on unchanged the **Application Transport Parameter** (APP) of the received **Application Transport Message** (APM), if the IUT is a 'pass on' node for the Context Identifier.<br><br>Pre-test conditions: None | | | | |

| TSS<br>/ERR_H/UC_PIN | TP<br>APM_V_5_2_2 | EN 301 069-1 [1] reference<br>13.1.2 / EN 301 069-1 [1] | Selection expression | Configuration<br>Local / TE_P |
|---|---|---|---|---|
| Test purpose<br><br>*Unidentified Context handling – APP not 'pass on' to the APM-user*<br><br>To verify that the IUT (PIN) is able to send an **APM_Error indication** primitive to the APM-user identified by the Context Identifier in the **Application Transport Parameter** (APP) of the received **Application Transport Message** (APM). The **APM_Error indication** primitive is indicating that the reason for the error was that the peer APM-user was not present at the PAN.<br><br>Pre-test conditions: None | | | | |

### 6.3.2.3 Reassembly Error Handling

| TSS /ERR_H/RA | TP APM_V_5_3_1 | EN 301 069-1 [1] reference 13.2 / EN 301 069-1 [1] 7.2.3.3.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - reassembly active / send APM_UCEH_Error Indication (different Segmentation Local Reference)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discards the received and any saved segments on receipt of an **Application Transport Message** (APM) including an **Application Transport Parameter** (APP) with an **Application Transport Instruction Indicator** (ATII) set to 'release call' and a Segmentation Local Reference (SLR) which differs from the received Segmentation Local Reference (SLR) in the first messages (e.g. an **Initial Address message** (IAM)). There shall be no **APM_Data indication** primitive send to the APM-user.

The IUT shall release the call with a **Release** (REL) message. The value of the **Reason** parameter in the **UCEH_Release indication** primitive is be mapped into the **Cause parameter** of the **Release** (REL) message indicating the cause value #111(reassembly error). Also an **UCEH_Release indication** primitive shall be sent to the APM –user (application).

NOTE: Before the **Release** (REL) is sent an **Pre_Release** (PRI) message is sent which carries the **Application Transport Parameter** (APP) with the appropriate data.

Pre-test conditions: None

| TSS /ERR_H/RA | TP APM_V_5_3_2 | EN 301 069-1 [1] reference 13.2 / EN 301 069-1 [1] 13.4.2 / EN 301 069-1 [1] 7.2.3.3.2 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Re-assembly - reassembly active / send APM_UCEH_Error Indication (different Segmentation Local Reference)*

To verify that the IUT sends an **APM_UCEH_Error Indication** primitive indicating 'reassembly error' and discards the received and any saved segments on receipt of an **Application Transport Message** (APM) including an **Application Transport Parameter** (APP) with an **Application Transport Instruction Indicator** (ATII) set to 'release call', 'send notification' and a Segmentation Local Reference (SLR) which differs from the received Segmentation Local Reference (SLR) in the first messages (e.g. an **Initial Address message** (IAM)). There shall be no **APM_Data indication** primitive send to the APM-user.
The IUT shall release the call with a **Release** (REL) message. The value of the **Reason** in the **UCEH_Release indication** primitive is be mapped into the **Cause parameter** of the **Release** (REL) message indicating the cause value #111.
The IUT shall send the **Application Transport Parameter** (APP) set as below, in an backward message (**PRE-Release** (PRI)) to the PIN.
**Application Transport Parameter** (APP) settings:
Application Context Identifier: 0 (Unidentified Context and Error Handling (UCEH) ASE
Application Transport Instruction Indicator: Bit A=1(release call) Bit B=0 (do not send notification)
The Encapsulated Application Information includes the '**Application Transport Notification Information**' with the abused 'Application Context Identifier' and the reason set to 'Reassembly Error'.
There shall be an **APM_Data indication** primitive send to the APM-user (application).

NOTE: Before the **Release** (REL) is sent an **Pre_Release** (PRI) message is sent which carries the **Application Transport Parameter** (APP) with the appropriate data.

Pre-test conditions: None

### 6.3.2.4 Exceptional Procedures – Context identifier error

| TSS /ERR_H/EP_COI | TP APM_V_5_4_1 | EN 301 069-1 [1] reference 13.4.3 / EN 301 069-1 [1] | Selection expression | Configuration Loca / TE_P |
|---|---|---|---|---|

Test purpose

*Context identifier error – context identifier set to 'no information'*

To verify that the IUT (PIN) discards the '**Application Transport Notification Information**' if it indicates an context identifier with 'no information' in the Encapsulated Application Information of an **Application Transport Parameter** (APP). The **Application Transport Parameter** (APP) is received from the PAN in an **Application Transport Message** (APM).

NOTE: The tester sends the **Application Transport Message** (APM) to the IUT.

Pre-test conditions: None

### 6.3.2.5 Exceptional Procedures – Unrecognized Reason value

| TSS /ERR_H/EP_URV | TP APM_V_5_5_1 | EN 301 069-1 [1] reference 13.4.4 / EN 301 069-1 [1] | Selection expression | Configuration Local / TE_P |
|---|---|---|---|---|

Test purpose

*Context identifier error – context identifier with unrecognized Reason*

To verify that the IUT (PIN) discards the '**Application Transport Notification Information**' if it indicates a **Reason** with 'spare' in the Encapsulated Application Information of an **Application Transport Parameter** (APP). The **Application Transport Parameter** (APP) is received from the PAN in an **Application Transport Message** (APM).

NOTE: The tester sends the **Application Transport Message** (APM) to the IUT.

Pre-test conditions: None

# 7 Test Coverage

The test purposes defined in this test specification cover most main capabilities of the Application Transport Mechanism (APM). For this purpose the essential components of the specification EN 301 069-1 [1], i.e. the Application Transport Mechanism protocol control (APM ASE), the ISUP Basic Call (ISUP ASE), the Unidentified Context and Error Handling control (UCEH ASE) and the associated procedures are tested.

A list containing the number of test purposes for the related requirements of the standard is provided in table 2.

Whenever it was possible, the test purposes have been described such that they bundle related requirements of the standard. Due to this fact a test purpose may lead to implementing several test cases for the ATS.

The test purposes concentrate on valid behaviour. This means that there are no invalid behaviour test purposes specified. An expansion of the invalid behaviour test purposes is further study.

**Table 2: /Q.apm_test - Number of tests for the Application Transport Mechanism (APM)**

| Item | APM procedures | Group | Number of test purposes |
|---|---|---|---|
| | **APM ASE** | | |
| 1 | Normal Procedures | NP | 12 |
| 2 | Send of acknowledgement | S_ACK | 1 |
| 3 | Procedures for Segmentation | SG_PROC | 6 |
| 4 | Procedures for Reassembly | RA_PROC | 7 |
| | **Error Handling with UCEH ASE** | | |
| 5 | Unidentified Context handling (PAN) | UC_PAN | 4 |
| 6 | Unidentified Context handling (PIN) | UC_PIN | 2 |
| 7 | Reassembly Error Handling | RA | 2 |
| 8 | Exceptional Procedures | EP | 2 |
| | **Total** | | 36 |

# Bibliography

The following material, though not specifically referenced in the body of the present document (or not publicly available), gives supporting information.

ITU-T Recommendation Q.763 (1997): "Formats and codes of the ISDN User Part of Signalling System No. 7".

ITU-T Recommendation Q.764 (1997): "Signalling procedures of the ISDN User Part of Signalling System No. 7".

ISO/IEC 9646-2 (1997): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite Specification".

ISO/IEC 9646-5 (1997): "Information technology - Open Systems Interconnection -Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

ITU-T Recommendation Q.784.1 (1997): "ISUP basic call test specification".

ITU-T Recommendation Q.702 (1988): "Signalling data link".

ITU-T Recommendation Q.703 (1996): "Signalling link".

ITU-T Recommendation Q.704 (1996): "Signalling network functions and messages".

ITU-T Recommendation Q.705 (1993): "Signalling network structure".

ITU-T Recommendation Q.706 (1993): "Message transfer part signalling performance".

# History

| Document history | | | |
|---|---|---|---|
| V1.1.2 | November 1999 | Public Enquiry | PE 200009: 1999-11-03 to 2000-03-03 |
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