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dfc[ fUa ]f`^j Y[ U\_`ca i b]\_UM`g\_Y[ Uj a Ygb]\_UfD7`Ł`g]ghYa U9i fc!`G8 B`Ě`" `XY.  
GdYVWZ\_UM`U`n[ fUXVY`dfYg\_i ýUbY[ U`b]nU]b`bUa Yb]`dfYg\_i ýUb`U`fHGG/ HDŁ`nU  
ca fYyb]`XcglŁdcj b]`df]dca c Y\_`fB5 : Ł

Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN  
Programming Communication Interface (PCI); Part 3: Test Suite Structure and Test  
Purposes (TSS&TP) specification for the Network Access Facility (NAF)

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**ICS:**

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)
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Conformance testing for the Euro-ISDN Programming  
Communication Interface (PCI);  
Part 3: Test Suite Structure and Test Purposes (TSS&TP)  
specification for the Network Access Facility (NAF)**

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## Foreword

The third part of this Interim European Telecommunication Standard (I-ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

An ETSI standard may be given I-ETS status either because it is regarded as a provisional solution ahead of a more advanced standard, or because it is immature and requires a "trial period". The life of an I-ETS is limited to three years after which it can be converted into an ETS, have its life extended for a further two years, be replaced by a new version, or be withdrawn.

This is the third part of a I-ETS which comprises four Parts:

"Integrated Services Digital Network (ISDN); Conformance testing for the Euro-ISDN Programming Communication Interface (PCI);

Part 1: "Test Suite Structure and Test Purposes (TSS&TP) for the PCI User Facility (PUF)";

Part 2: "Abstract Test Suite (ATS) for the PCI User Facility (PUF)";

**Part 3: "Test Suite Structure and Test Purposes (TSS&TP) for the Network Access Facility (NAF)";**

Part 4: "Abstract Test Suite (ATS) for the Network Access Facility (NAF)".

Announcement date	
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## Introduction <https://standards.iteh.ai/catalog/standards/sist/3f66f3c1-5817-4e6e-9647-a5a02f06f497/sist-i-ets-300-697-3-e1-2003>

I-ETS 300 697, Parts 1 to 4 comprises the Test Suite Structure and Test Purposes (TSS&TP) and the Abstract Test Suites (ATS) for ETS 300 325 [1]. The Euro-ISDN PCI is a Programming Communication Interface (PCI) which provides access to the Euro-ISDN. The basic model of the Euro-ISDN PCI consists of two entities, a service user called the PCI User Facility (PUF) and a service provider called the Network Access Facility (NAF). For the purposes of conformance testing, the PUF and the NAF are treated separately. This is because the PUF manufacturer and the NAF manufacturer may be completely different and their testing needs should be treated separately. Each part is tested to ensure that they each meet the conformance requirements of the I-ETS and to increase their probability of inter-operating. This is the reason why a separate TSS&TP and a separate ATS has been produced for each of the PCI User Facility (PUF) and the Network Access Facility (NAF).

All parts have been produced according to ISO/IEC 9646, Parts 1 to 3 [2], [3], [4] and ETS 300 406 [8].

As stated above, this I-ETS is structured in four Parts:

- part 1 contains the TSS&TP for the PUF;
- part 2 contains the ATS for the PUF;
- **part 3 contains the TSS&TP for the NAF;**
- part 4 contains the ATS for the NAF.

**Part 1** (TSS&TP for the PUF) contains all Test Purposes (TPs) for PUF (PCI messages). It describes what is covered by the TPs for the PUF and what areas of the I-ETS are not covered. The Test Suite Structure (TSS) is described and the convention followed in naming the TPs is described. A list of basic interconnection tests is given.

**Part 2** (ATS for the PUF) contains the Abstract Test Suite (ATS) for the PUF (PCI messages). The test method used is described in detail and diagrams explaining the test method are presented. The reasons for choosing the test method are also given. The ATS is written in the Tree and Tabular Combined Notation (TTCN) and the TTCN is contained in annex A. Annex B contains the Protocol Conformance Test Report (PCTR), annex C contains the Implementation eXtra Information for Testing (IXIT) and annex D contains an Implementation Conformance Statement (ICS).

**Part 3** (TSS&TP for the NAF) contains all the TPs for the NAF (PCI messages and Exchange Mechanism). It describes what is covered by the TPs for the NAF and what areas of the I-ETS are not covered. The TSS is described and the TPs are given. A list of basic interconnection tests is given.

**Part 4** (ATS for the NAF) contains the ATS for the NAF (PCI messages and Exchange Mechanism). The test method used is described in detail and a diagram explaining the test method is given. The reasons for choosing the test method is also given. The ATS is written in concurrent TTCN and the TTCN is contained in annex A. Annex B contains the PCTR, annex C contains the IXIT and annex D contains an ICS.

NOTE: The ICS in annexes D of Parts 2 and 4 of this I-ETS are informative because ETS 300 325 [1] already contains an ICS. However the ICS in ETS 300 325 [1] is not adequate for these ATSS and should, eventually, be replaced by annex D of Parts 2 and 4 of this I-ETS.

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## 1 Scope

Part 3 of this I-ETS contains the Test Suite Structure and Test Purposes (TSS&TP) for the Network Access Facility (NAF) part of Euro-ISDN PCI. The NAF is situated between the PCI User Facility (PUF) and the ISDN network. In order to test the NAF, the NAF is stimulated from both sides, i.e. PUF and network, and the response of the NAF can be observed on either side and a result for the test assigned.

## 2 Normative references

Part 3 of this I-ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this part of the I-ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETS 300 325 (1994): "Integrated Services Digital Network (ISDN); Programming Communication Interface (PCI) for Euro-ISDN".
- [2] ISO/IEC 9646-1 (1994): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [3] ISO/IEC 9646-2 (1994): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [4] ISO/IEC 9646-3 (1994): "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation".
- [5] ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3: Specifications for basic call control".
- [6] ETS 300 080 (1992): "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".
- [7] ISO/IEC 8208 (1990): "Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".
- [8] ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specification Standardisation Methodology".

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of this part of the I-ETS, all the definitions in ISO/IEC 9646, Parts 1, 2 and 3 ([2], [3], [4]) and ETS 300 102-1 ([5]) apply.

### 3.2 Abbreviations

For the purposes of this I-ETS, the following abbreviations apply:

ATS	Abstract Test Suite
Bcug	Bilateral closed user group
CTS	Conformance Testing Services
GFI	General Format Identifier
ICS	Implementation Conformance Statement
IE	Information Element
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
LT	Lower Tester

NAF	Network Access Facility
NCO	Network Connection Object
NCOID	NCO IDentifier
NMA	Network layer Message Access
PCI	Programming Communication Interface
PCO	Point of Control and Observation
PIXIT	PCI Implementation eXtra Information for Testing
PUF	PCI User Facility
TMA	Transparent Message Access
TP	Test Purpose
TSS	Test Suite Structure
TSS&TP	Test Suite Structure & Test Purposes
TTCN	Tree and Tabular Combined Notation
UT	Upper Tester

## 4 Coverage

The tests in this third part of the I-ETS which have been produced for the NAF were selected under the constraint that the duration of the final test campaign would be one to two days only. Thus the number of test cases has been limited. This has been achieved in some areas by combining several TPs into one TP and in other areas by selective coverage of a feature, e.g. the treatment by the NAF of a missing parameter is checked in some messages only. The combined TP occurs in the main body of the I-ETS and the individual TPs are presented in annex A. In the case of a combined TP, the reference shall always be to more than one individual TP in annex A.

### 4.1 What is covered?

Nearly all mandatory and optional requirements of ETS 300 325 [1] are covered, i.e. all messages of all planes and all the mandatory and optional parameters within the messages. The functionality described in ETS 300 325 [1] is also covered. The User Plane protocols (ETS 300 080 [6], CCITT Recommendation T.70, Null are not covered.

### 4.2 Invalid behaviour coverage

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The reaction of the NAF to invalid behaviour by the PUF or network is tested through the NAF's use of the Administration Plane return codes and by testing its reaction to messages which contain errors, as defined in ETS 300 325 [1], e.g. missing parameters, invalid parameter contents, etc.

## 5 Testability of the NAF

The nature of both the upper and the lower interfaces of the NAF are clearly stated in ETS 300 325 [1], and the behaviour of the NAF at these two interfaces can be both controlled and observed. The upper interface is the ISDN-PCI Exchange Mechanism and the lower interface is the ISDN network. The operation of the NAF at the two interfaces shall be tested and the mapping by the NAF of messages from each interface to the other shall also be tested. Because the test suite can be automated, verdict assignment can also be automated at these two interfaces.

In the description of the PCI messages, some parameters are noted as mandatory and some as optional. Normally, test cases which are derived by combining other test cases cannot test a mixture of mandatory and optional parameters because the optional parameter might not be supported by the IUT and this might lead to a problem when executing the test case. However, it is important to note here that the term "optional" has a specific and different meaning in ETS 300 325 [1] for each of the PUF and the NAF, see ETS 300 325 [1], subclause 6.1.2. In the case of the NAF, the network may provide any parameter and "...the NAF shall only supply the item if it is available". This is interpreted to mean that the network may supply a parameter to the NAF and if supplied, the NAF shall pass it to the PUF. In the context of testing, where the tester has control of the network, the tester may supply several parameters to the NAF which are noted as optional in ETS 300 325 [1], and the NAF shall supply these parameters to the PUF. It is the same case for messages sent by the PUF. Therefore, optional parameters can be combined because the test tool shall have control over whether or not the feature is optional.

## 6 NAF basic interconnection tests

There is no basic interconnection test group in the TSS. However, a list of basic interconnection tests is provided here. These tests may be executed on the Implementation Under Test (IUT) prior to execution of the test suite in order to give the IUT implementor confidence that the IUT can perform certain basic tasks. The tests have been chosen to check that the IUT can perform simple tasks on each of the three planes, i.e. create a Network Connection Object (NCO), set up a D-channel and transfer data on the B-channel. Some operations from the Exchange Mechanism are specifically included and other operations from the Exchange Mechanism shall be exercised in the other test cases.

PCI message/Exchange Mechanism	Test case identifier
DOS declaration	1.1.1.a
DOS PCIRegister	1.1.4
Unix declaration	1.2.1.a
Unix PCIRegister	1.2.3
Windows declaration	1.3.1
Windows PCIRegister	1.3.5
ACreateNCOcnf	2.1.1.4
CConnectRsp	3.1.1.6
CConnectCnf	3.1.1.7
CDisconnectReq	3.1.1.14
CDisconnectInd	3.1.1.36
U3ConnectRsp	4.1.38
U3ConnectCnf	4.1.51
U3DisconnectReq	4.1.65
U3DataReq	4.1.81
U3DataInd	4.1.86

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## 7 Test Suite Structure (TSS)

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This clause describes the Test Suite Structure (TSS) used in this part of the I-ETS.

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The TSS is strictly hierarchical and contains separate test groups for the:

- Exchange Mechanism;
- Administration Plane;
- Control Plane;
- User Plane.

The DOS, UNIX and Windows Exchange Mechanisms are covered by different test groups within the more general test group named "Exchange Mechanism".

The Administration Plane (see clause 9), apart from covering the three message classes corresponding to that functional plane and including two test groups concerning error handling, has an additional test group related to the "Selection Criteria", as this feature can be seen as resource management and this is clearly related to this functional plane.

The Control Plane (see clause 10) is divided into two major test groups. The first contains separate test groups covering the support and implementation of each message class in this plane and, where it applies, the mapping between the ISDN events and the exchanges at the PCI interface. The second major test group is related to error handling.

Within the subclause 10.2 ("Invalid state for message errors"), the TPs only cover those states that are considered as testable. Note that in this precise context, testable states are those which correspond to waiting situations from the NAF point of view, i.e. when the NAF is waiting for some message from the PUF, as opposed to those states when the NAF sends something to the PUF.

The User Plane (see clause 11) covers both PUF co-ordination and NAF co-ordination. It also covers the Transparent Message Access (TMA) messages and includes a subclause on error handling in the User Plane.

There is no explicit separate part to test the way the NAF reacts to the use of the PUF co-ordination function as this is seen as the default situation. In this way it is being tested over all three planes.

There are no specific TPs addressing each of the supplementary services, because the PUF is the only entity which plays an active role in this matter. The NAF only provides a passive mapping of the ISDN messages to PCI messages and Information Element (IE) contents to PCI parameters field values, and this mapping is covered in other Parts of the I-ETS.

## 8 Exchange Mechanism

Test group objective: This test group tests the Exchange Mechanism for each of the three operating systems: DOS, Unix and Windows. All of the operating systems are tested for all of the Exchange Mechanism functions and for the declaration and extraction mechanism.

### 8.1 DOS Mechanism

TP111a (reference ETS 300 325 [1] / annex F, subclause F.4.1.1).

keywords: DOS declaration.

Verify that the IUT, in order to declare itself to the list of available NAFs, adds its handle to the PCIDD\$ device driver of available PCI\_Handles, i.e. is now available to PCIGetHandles.

TP111b (reference ETS 300 325 [1] / annex F, subclause F.4.1.2).

keywords: DOS extraction

Verify that the IUT, in order to extract itself from the list of available NAFs, removes its own PCI\_HANDLE from PCIDD\$ device driver, i.e. is no longer available to PCIGetHandles.

TP112 (reference ETS 300 325 [1] / subclause 7.1.3, annex F, subclause F.1.3.2, subclause 6.8.6, table 28).

keywords: PciGetProperty function;

Verify that if the PUF calls to the far function address PCIHandle, obtained by prior execution of the PciGetHandles function or by use of other means (e.g. local knowledge), with:

- PciGetProperty function code;
- value of MaximumSize of property allowed on return;
- pointer to Property buffer;
- pointer to ActualSize variable.

On successful execution the NAF returns the value #0 - Success and:

- has set the value of ActualSize according to the number of bytes actually filled on the Property buffer;
- has filled the Property buffer in a TLV coding form, with the NAF properties.

TP113 (reference ETS 300 325 [1] / subclause 7.1.3, annex F, subclause F.1.3.2, subclause 6.8.6, table 28).

keywords: PciGetProperty function, PropertyBufferTooSmall.

Verify that if the PUF calls to the far function address PCIHandle, obtained by prior execution of the PciGetHandles function or by use of other means (e.g. local knowledge), with:

- PciGetProperty function code;
- MaximumSize of property allowed on return, with a value which is less than that required to get the all list of Properties;
- pointer to Property buffer;
- pointer to ActualSize variable.

The NAF provides the PUF with the function return code #144 - PropertyBufferTooSmall, indicating that the size of the buffer for Properties is too small to contain the complete list of Properties.

TP114 (reference ETS 300 325 [1] / subclause 7.1.4, annex F, subclause F.1.3.3, subclause 6.8.6, table 28).

keywords: PciRegister function.

Verify that if the PUF calls to the far function address PCIHandle, obtained by prior execution of the PciGetHandles function, with:

- PciRegister function code;
- pointer to PCIRegisterInfo structure;
- pointer to PCIOPSysInfo structure;
- pointer to ExchangeID variable.

On successful execution the NAF makes available the value of the exchange identifier ExchangeID which identifies the exchange link between PUF and NAF and returns the value #0 - Success.

TP115 (reference ETS 300 325 [1] / subclause 7.1.4, annex F, subclause F.1.3.3, subclause 6.8.6, table 28).

keywords: PciRegister function, InvalidPUFType.

Verify that if the PUF calls to the far function address PCIHandle, obtained by prior execution of the PciGetHandles function, with:

- PciRegister function code;
- pointer to PCIRegisterInfo structure, with field PUFVersion=1 and PUFType field value other than 0;
- pointer to PCIOPSysInfo structure;
- pointer to ExchangeID variable.

The NAF provides the PUF with the function return code #134 - InvalidPUFType, indicating that the type of the PUF is invalid or unsupported.

TP116 (reference ETS 300 325 [1] / subclause 7.1.4, annex F, subclause F.1.3.3, subclause 6.8.6, table 28).

keywords: PciRegister function, InvalidPUFVersion.

Verify that if the PUF calls to the far function address PCIHandle, obtained by prior execution of the PciGetHandles function, with:

- PciRegister function code;
- pointer to PCIRegisterInfo structure, with PUFVersion field value greater than 1 and field PUFType =0;
- pointer to PCIOPSysInfo structure;
- pointer to ExchangeID variable.

The NAF provides the PUF with the function return code #135 - InvalidPUFVersion, indicating that the PCI version that the PUF implements is invalid or unsupported.

TP117 (reference ETS 300 325 [1] / subclause 7.3.6, annex F, subclause F.1.3.5, subclause 6.8.6, table 28).

keywords: PciPutMessage function.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciPutMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- pointer to appropriately filled PCIMPB structure;
- pointer to appropriately filled message buffer.

On successful execution the NAF returns the value #0 - Success.

TP118 (reference ETS 300 325 [1] / subclause 7.3.6, annex F, subclause F.1.3.5, subclause 6.8.6, table 28).

keywords: PciPutMessage function, InvalidExID.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciPutMessage function code;
- an invalid ExchangeID interaction identifier;
- pointer to appropriately filled PCIMPB structure;
- pointer to appropriately filled message buffer.

After execution the NAF returns the value #136 - InvalidExID.

TP119 (reference ETS 300 325 [1] / subclause 7.3.6, annex F, subclause F.1.3.5, subclause 6.8.6, table 28).

keywords: PciPutMessage function, InvalidPCIMPB.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciPutMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- invalid pointer to PCIMPB structure;
- pointer to appropriately filled message buffer;
- pointer to appropriately filled data buffer.

After execution the NAF returns the value #137 - InvalidPCIMPB.

TP1110 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function.

Verify that when in the conversation phase and if the NAF has some message available, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- pointer to appropriately partially filled PCIMPB structure;
- pointer to message buffer;
- pointer to data buffer.

After successful execution the NAF has filled the message and data buffers in accordance with the MessageID MessageActualUsedSize and DataActualUsedSize values updated by the NAF in the PCIMPB structure, and returns the value #0 - Success.

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TP1111 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function, NOMESSAGE.

Verify that when in the conversation phase and if there is no message available, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- pointer to appropriately partially filled PCIMPB structure;
- pointer to message buffer;
- pointer to data buffer.

After successful execution the NAF has filled the MessageType field of the PCIMPB structure with the value NOMESSAGE(0), and returns the value #0 - Success.

TP1112 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function, InvalidExID.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- an invalid ExchangeID interaction identifier;
- pointer to appropriately filled PCIMPB structure;
- pointer to message buffer;
- pointer to data buffer.

After execution the NAF returns the value #136 - InvalidExID.

TP1113 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function, InvalidPCIMPB.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- invalid pointer to PCIMPB structure;
- pointer to message buffer;
- pointer to data buffer.

After execution the NAF returns the value #137 - InvalidPCIMPB.

TP1114 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function, InvalidMessageBuffer.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- pointer to appropriately filled PCIMPB structure;
- invalid pointer to message buffer;
- pointer to data buffer.

After execution the NAF returns the value #138 - InvalidMessageBuffer.

TP1115 (reference ETS 300 325 [1] / subclause 7.3.7, annex F, subclause F.1.3.6, subclause 6.8.6, table 28).

keywords: PciGetMessage function, MessageBufferTooSmall.

Verify that when in the conversation phase, if the PUF calls to the far function address provided by the NAF during registration phase, with:

- PciGetMessage function code;
- ExchangeID related to the current association, obtained by prior execution of PciRegister;
- pointer to appropriately filled PCIMPB structure, but with the MaximumMessageSize field with a value inferior to that needed to get the message;
- pointer to message buffer;
- pointer to data buffer.

After execution the NAF returns the value #141 - MessageBufferTooSmall.

TP1116 (reference ETS 300 325 [1] / annex F, subclause F.3.6.7).

key words: NAF notification mechanism.

Verify that on conversation phase, and after PUF's successful execution of the PciSetSignal function setting the notification mechanism, if there is a PCI message to be delivered to the PUF, then the NAF shall notify the PUF by calling back the routine located at the address passed during the previous call to the PciSetSignal.

TP1117 (reference ETS 300 325 [1] / annex F, subclause F.3.6.7).

keywords: NAF notification mechanism removal.

Verify that on conversation phase, and after PUF's successful execution of the PciSetSignal function removing the notification mechanism previously established, if there is a PCI message to be delivered to the PUF, then the NAF shall not notify the PUF.

TP1118 (reference ETS 300 325 [1] / subclauses 7.2 & 7.2.10).

keyword: De-registration.

Verify that if the PUF disassociates using the PciDeregister function, then the NAF shall free any resources allocated for this PUF, e.g. clearing already existing connections.