



**Intelligent Transport Systems (ITS);  
Communications Access for Land Mobiles (CALM);  
Test specifications for non-IP networking (ISO 29281);  
Part 1: Protocol Implementation Conformance  
Statement (PICS) proforma**

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**Reference**

DTS/ITS-0020028-1

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650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - 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

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## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport System (ITS).

The present document is part 1 of a multi-part deliverable covering Communications Access for Land Mobiles (CALM); Test specifications for non-IP networking (ISO 29281), as identified below:

- Part 1: "Protocol Implementation Conformance Statement (PICS) proforma";**
- Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";
- Part 3: "Abstract Test Suite (ATS) and partial PIXIT proforma".

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# 1 Scope

The present document provides the "Protocol Implementation Conformance Statement" (PICS) proforma for the ISO protocols specified in ISO 29281-1 [1] in compliance with the relevant requirements, and in accordance with the relevant guidance given in ISO/IEC 9646-7 [3], ETS 300 406 [2] and EG 202 798 [i.3].

---

# 2 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 reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://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.

## 2.1 Normative references

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

- [1] ISO/DIS 29281-1: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 1: Fast networking & transport layer protocol (FNTP)".
- [2] ETSI ETS 300 406 (1995): "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [3] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

## 2.2 Informative references

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] ARIB STD-T88:2004: "DSRC application sub-layer".
- [i.2] ISO/DIS 29281-2: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 2: Legacy system support".
- [i.3] ETSI EG 202 798: "Intelligent Transport Systems (ITS); Testing; Framework for conformance and interoperability testing".
- [i.4] ISO 15628: "Road transport and traffic telematics -- Dedicated short range communication (DSRC) -- DSRC application layer".

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1], [2], [3], [i.3] and the following apply:

**PICS proforma:** document, in the form of a questionnaire, which when completed for a protocol implementation or system becomes a PICS

**Protocol Implementation Conformance Statement (PICS):** statement made by the supplier of a protocol implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

NOTE: The PICS can take several forms: protocol PICS, profile PICS, profile specific PICS, information object PICS, etc.

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in [1], [2], [3], [i.3] and the following apply:

|      |   |
|------|---|
| FNTP | Fast Networking & Transport Protocol          |
| IUT  | Implementation Under Test                     |
| PICS | Protocol Implementation Conformance Statement |
| SCS  | System Conformance Statement                  |
| SUT  | System Under Test                             |

---

## 4 Conformance to this PICS proforma specification

If it claims to conform to the present document, the actual PICS proforma to be filled in by a supplier shall be technically equivalent to the text of the PICS proforma given in annex A and shall preserve the numbering/naming and ordering of the proforma items.

A PICS which conforms to the "Fast Networking & Transport Protocol (FNTP)" [1] shall be a conforming PICS proforma completed in accordance with the guidance for completion given in clause A.1.

A PICS which conforms to the set of "Legacy system support protocols" [i.2] shall be a conforming PICS proforma completed in accordance with the guidance for completion given in clause B.1.

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## Annex A (normative): PICS proforma for "Fast Networking & Transport Protocol"

Notwithstanding the provisions of the copyright clause related to the text of the present document, ETSI grants that users of the present document may freely reproduce the PICS proforma in this annex so that it can be used for its intended purposes and may further publish the completed PICS.

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### A.1 Guidance for completing the PICS proforma

#### A.1.1 Purposes and structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in ISO 29281-1 [1] may provide information about the implementation in a standardized manner.

The PICS proforma is subdivided into clauses for the following categories of information:

- guidance for completing the PICS proforma;
- identification of the implementation;
- identification of the protocol;
- global statement of conformance;
- PICS proforma tables.

#### A.1.2 Abbreviations and conventions

The PICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [3].

##### Item column

The item column contains a number which identifies the item in the table.

##### Item description column

The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

##### Status column

The following notations, defined in ISO/IEC 9646-7 [3], are used for the status column:

- m mandatory - the capability is required to be supported.
- o optional - the capability may be supported or not.
- n/a not applicable - in the given context, it is impossible to use the capability.
- x prohibited (excluded) - there is a requirement not to use this capability in the given context.
- o.i qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.

- ci conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.

#### Reference column

The reference column makes reference to ISO 29281-1 [1], except where explicitly stated otherwise.

#### Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [3], are used for the support column:

- Y or y supported by the implementation.  
 N or n not supported by the implementation.  
 N/A, n/a or - no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

NOTE: As stated in ISO/IEC 9646-7 [3], support for a received PDU requires the ability to parse all valid parameters of that PDU. Supporting a PDU while having no ability to parse a valid parameter is non-conformant. Support for a parameter on a PDU means that the semantics of that parameter are supported.

#### Values allowed column

The values allowed column contains the type, the list, the range, or the length of values allowed. The following notations are used:

- range of values: <min value> .. <max value>  
 example: 5 .. 20
- list of values: <value1>, <value2>, ..., <valueN>  
 example: 2 ,4 ,6, 8, 9  
 example: '1101'B, '1011'B, '1111'B  
 example: '0A'H, '34'H, '2F'H
- list of named values: <name1>(<val1>), <name2>(<val2>), ..., <nameN>(<valN>)  
 example: reject(1), accept(2)
- length: size (<min size> .. <max size>)  
 example: size (1 .. 8)

#### Values supported column

The values supported column shall be filled in by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

#### References to items

For each possible item answer (answer in the support column) within the PICS proforma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table. If there is more than one support column in a table, the columns are discriminated by letters (a, b, etc.), respectively.

EXAMPLE 1: B.5/4 is the reference to the answer of item 4 in table 5 of annex B.

EXAMPLE 2: B.6/3b is the reference to the second answer (i.e. in the second support column) of item 3 in table 6 of annex B.

Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>.

A prerequisite line indicates that the whole table is not required to be completed if the predicate is FALSE.

### A.1.3 Instructions for completing the PICS proforma

The supplier of the implementation shall complete the PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided, using the notation described in clause A.1.2.

If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately.

More detailed instructions may be given at the beginning of the different clauses of the PICS proforma.

## A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and client information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the PICS should be named as the contact person.

### A.2.1 Date of the statement

.....

### A.2.2 Implementation Under Test (IUT) identification

IUT name:

.....

.....

IUT version:

.....

### A.2.3 System Under Test (SUT) identification

SUT name:

.....

.....

Hardware configuration:

.....

.....

.....

Operating system:

.....

## A.2.4 Product supplier

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

## A.2.5 Client (if different from product supplier)

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....  
 .....

## A.2.6 PICS contact person

(A person to contact if there are any queries concerning the content of the PICS)

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....  
 .....  
 .....

---

## A.3 Identification of the protocol

This PICS proforma applies to the following protocol specified in ISO 29281-1: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 1: Fast networking & transport layer protocol (FNTF)" [1]

---

## A.4 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No)

NOTE: Answering "No" to this question indicates non-conformance to the ISO 29281-1 - FNTF specification [1]. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming, on pages attached to the PICS proforma.

## A.5 Basic functionality

**Table A.1: Implementation architectures**

| Item  | Supported architecture   | Reference | Status | Support |
|-------|--|-----------|--------|---------|
| 1     | Support of ITS station-internal network  | 5.4       | c101   |         |
| c101: | IF (A.2/1 OR A.2/2) THEN m ELSE o -- ITS-S host and ITS-S router in separate ITS-SCUs. |           |        |         |

**Table A.2: ITS-SCU roles**

| Item   | ITS-SCU role  | Reference | Status | Support |
|--------|---|-----------|--------|---------|
| 1      | Stand-alone ITS-S host                                  | 5.1, 5.4  | o.201  |         |
| 2      | Stand-alone ITS-S router                                | 5.1, 5.4  | o.201  |         |
| 3      | Combined ITS-S host/router                              | 5.1, 5.4  | o.201  |         |
| o.201: | It is mandatory to support at least one of these items. |           |        |         |

**Table A.3: Communication protocol functionality**

| Item | Supported architecture                              | Reference | Status | Support |
|------|---|-----------|--------|---------|
| 1    | Basic functionality, i.e. single-hop communications | 5.1       | m      |         |
| 2    | Extended functionality                              | 5.1       | o      |         |

**Table A.4: Extended communication protocol functionality**

| Prerequisite: A.3/2 -- Support of FNTTP extended functionality |   |            |        |         |
|--|---|------------|--------|---------|
| Item   | Additional protocol functionality                                     | Reference  | Status | Support |
| 1  | ITS station-internal forwarding                                       | 5.1.3      | c401   |         |
| 2  | Secure communications   | 5.1.3      | o      |         |
| 3  | N-hop broadcast   | 5.1.3      | o      |         |
| 4  | Local port protocol; ARIB [i.1]                                       | 5.1.3      | o      |         |
| 5  | CIP management  | 5.1.3, 7.9 | o      |         |
| c401:  | IF A.1/1 THEN m ELSE o -- Support of ITS station-internal forwarding. |            |        |         |

**Table A.5: Support of other protocols**

| Item | Support of other protocols | Reference    | Status | Support |
|------|----------------------------|--------------|--------|---------|
| 1    | ISO 15628 [i.4] support    | 5.1, 6.2.2.2 | o      |         |

## A.6 Protocol elements

### A.6.1 Service access points

**Table A.6: Service access points**

| Item | Supported SAP functionality | Reference       | Status | Support |
|------|-----------------------------|-----------------|--------|---------|
| 1    | IN-SAP                      | 6.1.1, 7.1.2    | m      |         |
| 2    | NF-SAP                      | 6.1.2, 7.1.3, 8 | m      |         |
| 3    | MN-SAP                      | 6.1.3, 7.1.4    | m      |         |
| 4    | SN-SAP                      | 6.1.4, 7.1.5    | o      |         |

## A.6.2 FNET PDU

Table A.7: FNET NPDUs

| Item | PDU for  | Sending   |        |         | Receiving |        |         |
|------|----------|-----------|--------|---------|-----------|--------|---------|
|      |          | Reference | Status | Support | Reference | Status | Support |
| 1    | FNET PDU | 6.2       | m      |         | 6.2       | m      |         |

## A.6.3 PDU elements

### A.6.3.1 Elements of FNET NPDUs

Table A.8: Elements of FNET NPDUs

| Item | Elements of FNET NPDUs | Reference | Status | Support |
|------|------------------------|-----------|--------|---------|
| 1    | FNET header            | 6.2.2     | m      |         |
| 2    | FNET body              | 6.2.3     | m      |         |

Table A.9: Elements of FNET NPDUs header

| Item | Element of FNET NPDUs header | Reference | Status | Support |
|------|------------------------------|-----------|--------|---------|
| 1    | sourcePort                   | 6.2.2     | m      |         |
| 2    | destinationPort              | 6.2.2     | m      |         |
| 3    | FNET Control                 | 6.2.2     | m      |         |

Table A.10: Elements of FNET NPDUs header Options for station-internal forwarding mode of operation

| Prerequisite: A.4/1 -- Support of ITS station-internal forwarding |                             |           |        |         |
|---|-----------------------------|-----------|--------|---------|
| Item  | Element of forwarding NPDUs | Reference | Status | Support |
| 1   | ITS-SCU-ID ITS-S host       | 6.2.2.3.2 | m      |         |
| 2   | Link-ID VCI in ITS-S router | 6.2.2.3.2 | m      |         |
| 3   | Counter                     | 6.2.2.3.2 | m      |         |
| 4   | sourcePort                  | 6.2.2.3.2 | m      |         |
| 5   | destinationPort             | 6.2.2.3.2 | m      |         |

Table A.11: Elements of FNET NPDUs header Options for secure communications

| Prerequisite: A.4/2 -- Support of secure communications |                             |           |        |         |
|---|-----------------------------|-----------|--------|---------|
| Item  | Element of forwarding NPDUs | Reference | Status | Support |
| 1   | Length                      | 6.2.2.3.3 | m      |         |
| 2   | Security elements           | 6.2.2.3.3 | m      |         |

Table A.12: Elements of FNET NPDUs header Options for N-hop broadcast

| Prerequisite: A.4/3 -- Support of N-hop broadcast |                             |           |        |         |
|---|-----------------------------|-----------|--------|---------|
| Item  | Element of forwarding NPDUs | Reference | Status | Support |
| 1   | FNET hop count              | 6.2.2.3.4 | m      |         |
| 2   | Security elements           | 6.2.2.3.4 | m      |         |

**Table A.13: Elements of FNTF NPDU header Options for CIP management**

| Prerequisite: A.4/5 -- Support of CIP management |                            |           |        |         |
|--|----------------------------|-----------|--------|---------|
| Item   | Element of forwarding NPDU | Reference | Status | Support |
| 1  | RX Length                  | 6.2.2.3.6 | m      |         |
| 2  | RX CIPs                    | 6.2.2.3.6 | m      |         |
| 3  | TX Length                  | 6.2.2.3.6 | m      |         |
| 4  | TX CIPs                    | 6.2.2.3.6 | m      |         |

### A.6.3.2 Parameters of FNTF NPDUs

**Table A.14: Special port numbers**

| Item | Special port  | Reference | Status | Support | Values   |           |
|------|---|-----------|--------|---------|----------|-----------|
|      |   |           |        |         | Allowed  | Supported |
| 1    | Station-internal forwarding: Identification of ITS-S router | 6.2.2.2   | c1401  |         | PORT_RTR |           |
| 2    | Station-internal forwarding: Identification of ITS-S host   | 6.2.2.2   | c1401  |         | PORT_HST |           |
| 3    | Indication of unknown port / do not care value in tables    | 6.2.2.2   | m      |         | PORT_UNK |           |
| 4    | Reserved for special purposes                               | 6.2.2.2   | x      |         | PORT_RES |           |

c1401: IF A.4/1 THEN m ELSE n/a -- Support of ITS station-internal forwarding.

**Table A.15: Other port numbers**

| Item | Port number | Reference | Status | Support |
|------|-------------|-----------|--------|---------|
| 1    | PORT_DYN    | 6.2.2.2   | m      |         |
| 2    | PORT_REG    | 6.2.2.2   | o      |         |

### A.6.4 Protocol management elements

**Table A.16: Protocol management elements**

| Item | Support of functionality of | Reference | Status | Support |
|------|-----------------------------|-----------|--------|---------|
| 1    | Service look-up table       | 6.3.1     | m      |         |
| 2    | Forwarding table            | 6.3.2     | m      |         |

## A.7 Protocol procedures

**Table A.17: General protocol procedures**

| Item | General protocol procedure  | Reference | Status | Support |
|------|---|-----------|--------|---------|
| 1    | Port manager  | 7.2       | m      |         |
| 2    | Maintenance of entries in forwarding tables                         | 7.3       | m      |         |
| 3    | ITS-S host: Allocation and deletion of a port                       | 7.4.1     | c1702  |         |
| 4    | ITS-S host: Assignment of communication interfaces                  | 7.4.2     | c1701  |         |
| 5    | ITS-S router: Assignment of communication interfaces                | 7.5.1     | c1703  |         |
| 6    | Setting of forwarding tables by ITS-S management                    | 7.8.1     | m      |         |
| 7    | Notification of changes in forwarding table to the ITS-S management | 7.8.2     | m      |         |

c1701: IF (A.2/1 AND A.1/1) OR A.2/3 THEN m ELSE n/a -- ITS-S host role and support of ITS station-internal network, or ITS-S host/router role.  
c1702: IF A.2/1 OR A.2/3 THEN m ELSE n/a -- ITS-S host role.  
c1703: IF (A.2/2 AND A.1.1) OR A.2/3 THEN m ELSE n/a -- ITS-S router role and support of ITS station-internal network, or ITS-S host/router role.

**Table A.18: Transmit protocol procedures**

| Item  | Transmit protocol procedure                                | Reference    | Status | Support |
|---|--|--------------|--------|---------|
| 1   | Transmitting packets - NF-SAP transmission request         | 7.6.1        | m      |         |
| 2   | Transmitting packets - Basic procedure                     | 7.6.1, 7.6.2 | m      |         |
| 3   | Transmitting packets - Extended procedure                  | 7.6.1, 7.6.3 | c1801  |         |
| 4   | Transmitting packets - Forwarding host to router procedure | 7.6.1, 7.6.4 | c1802  |         |
| c1801: IF A.3/2 THEN m ELSE n/a -- Support of FNTTP extended functionality.   |  |              |        |         |
| c1802: IF (A.2/1 OR A.2/3) AND A.4/1 THEN m ELSE n/a -- ITS-S host role and support of ITS station-internal forwarding. |  |              |        |         |

**Table A.19: Receive protocol procedures**

| Item   | Receive protocol procedure                                  | Reference | Status | Support |
|--|---|-----------|--------|---------|
| 1  | Receiving packets - Checking of FNTTP header                | 7.7.1     | m      |         |
|  | Receiving packets - ITS-SPcheck and forwarding table update | 7.7.2     | m      |         |
| 2  | Receiving packets - Basic delivery procedure                | 7.7.3     | m      |         |
| 3  | Receiving packets - Extended delivery procedure             | 7.7.4     | c1903  |         |
| 4  | Receiving packets - N-hop broadcast procedure               | 7.7.5     | c1901  |         |
| 5  | Receiving packets - Forwarded delivery procedure            | 7.7.6     | c1902  |         |
| 6  | Receiving packets - Send procedure                          | 7.7.7     | c1904  |         |
| 7  | Receiving packets - Forwarding router to host procedure     | 7.7.8     | c1904  |         |
| c1901: IF (A.2/2 OR A.2/3) AND A.4/3 THEN m ELSE n/a -- ITS-S router role and N-hop broadcast. |   |           |        |         |
| c1902: IF A.2/1 OR A.2/3 THEN m ELSE n/a -- ITS-S host role.                                   |   |           |        |         |
| c1903: IF A.3/2 THEN m ELSE n/a -- Support of FNTTP extended functionality.                    |   |           |        |         |
| c1904: IF (A.2/2 OR A.2/3) THEN m ELSE n/a -- ITS-S router role.                               |   |           |        |         |

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## A.8 Procedures related to CIP management

**Table A.20: Procedures related to CIP management**

| Prerequisite: A.4/5 -- CIP management supported                                |  |           |        |         |
|--|--|-----------|--------|---------|
| Item   | Procedure related to CIP management                | Reference | Status | Support |
| 1  | CIP management                                     | 7.9.1     | m      |         |
| 2  | Forwarding of CIPs from ITS-S host to ITS-S router | 7.9.2     | c2001  |         |
| 3  | Forwarding of CIPs from ITS-S router to ITS-S host | 7.9.3     | c2001  |         |
| c2001: IF A.4/1 THEN m ELSE n/a -- Support of ITS station-internal forwarding. |  |           |        |         |

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## A.9 NF-SAP service primitives

**Table A.21: NF-SAP service primitives**

| Prerequisite: A.2/1 OR A.2/3 -- ITS-S host role supported |   |           |        |         |
|---|---|-----------|--------|---------|
| Item  | Support of NF-SAP service primitive functionality | Reference | Status | Support |
| 1   | NF-FNTP-PORT.request                              | 8.2.1     | m      |         |
| 2   | NF-FNTP-PORT.confirm                              | 8.2.2     | m      |         |
| 3   | NF-FNTP-COMM.request                              | 8.3.1     | m      |         |
| 4   | NF-FNTP-COMM.confirm                              | 8.3.2     | m      |         |
| 5   | NF-FNTP-COMM.indication                           | 8.3.3     | m      |         |

## A.10 MN-SAP service primitives

Table A.22: MN-SAP service primitives

| Item | Support of MN-SAP service primitive functionality | Reference    | Status | Support |
|------|---|--------------|--------|---------|
| 1    | MN-COMMAND.request                                | 7.1.4, 7.8.1 | m      |         |
| 2    | MN-COMMAND.confirm                                | 7.1.4, 7.8.1 | m      |         |
| 3    | MN-REQUEST.request                                | 7.1.4, 7.8.2 | m      |         |
| 4    | MN-REQUEST.confirm                                | 7.1.4, 7.8.2 | m      |         |

Table A.23: MN-Commands supported

| Item | MN-Command functionality | Reference | Status | Support |
|------|--------------------------|-----------|--------|---------|
| 1    | FWTset                   | 7.8.1     | m      |         |
| 2    | FWTupdate                | 7.8.1     | m      |         |
| 3    | FWTdelete                | 7.8.1     | m      |         |

Table A.24: MN-Requests supported

| Item | MN-Request functionality | Reference | Status | Support |
|------|--------------------------|-----------|--------|---------|
| 1    | FWTsetNot                | 7.8.2     | m      |         |
| 2    | FWTupdateNot             | 7.8.2     | m      |         |
| 3    | FWTdeleteNot             | 7.8.2     | m      |         |

## A.11 IN-SAP service primitives

Table A.25: IN-SAP service primitives supported

| Item | IN-SAP service primitive functionality | Reference | Status | Support |
|------|--|-----------|--------|---------|
| 1    | IN-UNITDATA.request                    | 7.1.2     | m      |         |
| 2    | IN-UNITDATA.indication                 | 7.1.2     | m      |         |
| 3    | IN-UNITDATA-STATUS.indication          | 7.1.2     | o      |         |

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## Annex B (normative): PICS proforma for the set of "Legacy system support"

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### B.1 Guidance for completing the PICS proforma

NOTE: This annex is to be provided in a future version of the present document.

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## History

| <b>Document history</b> |           |             |
|-------------------------|-----------|-------------|
| V1.1.1                  | July 2012 | Publication |
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