



**Core Network and Interoperability Testing (INT);  
Diameter Conformance testing for Rf/Ro interface;  
(3GPP™ Release 10);  
Part 1: Protocol Implementation  
Conformance Statement (PICS)**

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Reference

DTS/INT-00121-1

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Keywords

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## Foreword

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

The present document is part 1 of a multi-part deliverable covering the test specifications for the Diameter protocol on the Rf/Ro interface, as identified below:

- Part 1: "**Protocol Implementation Conformance Statement (PICS)**";
- Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";
- Part 3: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT) pro forma specification".

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## Modal verbs terminology

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

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

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## Introduction

To evaluate protocol conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. Such a statement is called a Protocol Implementation Conformance Statement (PICS).

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# 1 Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) pro forma for the test specifications for the Diameter protocol on the Rf/Ro interface as specified in ETSI TS 132 260 [1] and ETSI TS 132 299 [2] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4] and ETSI ETS 300 406 [5].

The supplier of a protocol implementation which is claimed to conform to ETSI TS 132 260 [1] and ETSI TS 132 299 [2] is required to complete a copy of the PICS pro forma provided in annex A of the present document and is required to provide the information necessary to identify both the supplier and the implementation.

---

## 2 References

### 2.1 Normative references

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

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

- [1] ETSI TS 132 260 (V10.14.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging (3GPP TS 32.260 version 10.14.0 Release 10)".
- [2] ETSI TS 132 299 (V10.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Charging management; Diameter charging applications (3GPP TS 32.299 version 10.15.0 Release 10)".
- [3] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [4] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [5] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [6] ETSI TR 121 905 (V10.3.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 version 10.3.0 Release 10)".
- [7] IETF RFC 4006: "Diameter Credit-Control Application".

## 2.2 Informative references

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

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

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

Not applicable.

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TS 132 260 [1], ETSI TS 132 299 [2] and the following apply:

**PICS pro forma:** document, in the form of a questionnaire, designed by the protocol specifier or conformance test suite specifier, which, when completed for an OSI implementation or system, becomes the PICS

NOTE: See ISO/IEC 9646-1 [3].

**Protocol Implementation Conformance Statement (PICS):** statement made by the supplier of an Open Systems Interconnection (OSI) implementation or system, stating which capabilities have been implemented for a given OSI protocol

NOTE: See ISO/IEC 9646-1 [3].

**static conformance review:** review of the extent to which the static conformance requirements are met by the IUT, accomplished by comparing the PICS with the static conformance requirements expressed in the relevant standard(s)

NOTE: See ISO/IEC 9646-1 [3].

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 132 260 [1], ETSI TS 132 299 [2] and ETSI TR 121 905 [6] apply.

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## 4 Conformance

A PICS pro forma which conforms to this PICS pro forma specification shall be technically equivalent to annex A, and shall preserve the numbering and ordering of the items in annex A.

A PICS which conforms to this PICS pro forma specification shall:

- a) describe an implementation which claims to conform to ETSI TS 132 260 [1] and ETSI 132 299 [2];
- b) be a conforming ICS pro forma which has been completed in accordance with the instructions for completion given in clause A.1;
- c) include the information necessary to uniquely identify both the supplier and the implementation.

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## Annex A (normative): PICS pro forma

### A.1 The right to copy

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 pro forma in this annex so that it can be used for its intended purposes and may further publish the completed PICS pro forma.

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### A.2 Guidance for completing the ICS pro forma

#### A.2.1 Purposes and structure

The purpose of this PICS pro forma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in relevant specifications may provide information about the implementation in a standardized manner.

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

- instructions for completing the PICS pro forma;
- identification of the implementation;
- identification of the protocol;
- PICS pro forma tables (for example: Major capabilities, etc.).

#### A.2.2 Abbreviations and conventions

This annex does not reflect dynamic conformance requirements but static ones. In particular, a condition for support of a PDU parameter does not reflect requirements about the syntax of the PDU (i.e. the presence of a parameter) but the capability of the implementation to support the parameter.

In the sending direction, the support of a parameter means that the implementation is able to send this parameter (but it does not mean that the implementation always sends it).

In the receiving direction, it means that the implementation supports the whole semantic of the parameter that is described in the related protocol specification.

As a consequence, PDU parameter tables in this annex are not the same as the tables describing the syntax of a PDU in the reference specification.

The PICS pro forma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [4].

##### 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?".

##### Reference column

The reference column gives reference to the relevant sections in core specifications.

##### Status column

The various status used in this annex are in accordance with the rules in table A.1.

**Table A.1: Key to status codes**

Status code	Status name	Meaning
m	mandatory	The capability shall be supported. It is a static view of the fact that the conformance requirements related to the capability in the reference specification are mandatory requirements. This does not mean that a given behaviour shall always be observed (this would be a dynamic view), but that it shall be observed when the implementation is placed in conditions where the conformance requirements from the reference specification compel it to do so. For instance, if the support for a parameter in a sent PDU is mandatory, it does not mean that it shall always be present, but that it shall be present according to the description of the behaviour in the reference specification (dynamic conformance requirement).
o	optional	The capability may or may not be supported. It is an implementation choice.
n/a	not applicable	It is impossible to use the capability. No answer in the support column is required.
c.<integer>	conditional	The requirement on the capability ("m", "o", "n/a") depends on the support of other optional or conditional items. <integer> is the identifier of the conditional expression.
o.<integer>	qualified optional	For mutually exclusive or selectable options from a set. <integer> is the identifier of the group of options, and the logic of selection of the options.

### Mnemonic column

The Mnemonic column contains mnemonic identifiers for each item.

### 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 [4], 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)

### References to items

For each possible item answer (answer in the support column) within the PICS pro forma there exists a unique reference, 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.

EXAMPLE:    A.5/4 is the reference to the answer of item 4 in table A.5.

## A.2.3 Instructions for completing the PICS pro forma

The supplier of the implementation may complete the PICS pro forma in each of the spaces provided. More detailed instructions are given at the beginning of the different clauses of the PICS pro forma.

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## A.3 Identification of the Network Equipment

### A.3.1 Introduction

Identification of the Network Equipment 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.3.2 Date of the statement

.....

### A.3.3 Network Equipment Under Test identification

Name:

.....  
.....

Hardware configuration:

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

Software configuration:

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

### A.3.4 Product supplier

Name:

.....

Address:

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

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

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

### A.3.5 Client

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

### A.3.6 PICS contact person

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

## A.4 Identification of the protocol

This PICS pro forma applies to the following specifications:

ETSI TS 132 260 [1] and ETSI TS 132 299 [2].

## A.5 Global statement of conformance

The implementation described in this PICS meets all the mandatory requirements of the referenced standard?

**Yes**

**No**

**NOTE:** Answering "No" to this question indicates non-conformance to the protocol specification. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming. Explanations may be entered in the comments field at the bottom of each table or on attached pages.

In the tabulations which follow, all references are to ETSI TS 132 299 [2] unless another numbered reference is explicitly indicated.

## A.6 PICS pro forma tables for the Rf interface

### A.6.1 Roles

**Table A.2: Roles for the Rf interface**

Item	Roles	Reference	Status	Support
1	CDF		o.1	
2	CTF		o.1	
2.1	BGCF		c.1	
2.2	MGCF		c.1	
2.3	MRFC		c.1	
2.4	SIP-AS		c.1	
2.5	P-CSCF		c.1	
2.6	I-CSCF		c.1	
2.7	S-CSCF		c.1	
2.8	IBCF		c.1	
2.9	E-CSCF		c.1	
o.1: At least one of these roles shall be supported.				
c.1: At least one of these roles shall be supported, if A.2/1 is supported, else n/a.				

### A.6.2 PICS Items for CDF

#### A.6.2.1 System Capabilities for CDF

The table provided in this clause need only to be completed for CDF implementations, where item A.2/1 above is supported.

**Table A.3: System Capabilities for CDF**

Item	Does the IUT support ...	Reference	Status	Support
1	charging?	5.1.1	m	
1.1	event based charging?	5.1.1.1	o.2	
1.2	session based charging?	5.1.1.2	o.2	
2	CDF backup available?	4.1.1	o	
3	request for envelope reporting in the Envelope-Report AVP AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.6	o	
o.2: At least one of these charging options shall be supported.				

## A.6.3 PICS Items for CTF

### A.6.3.1 System Capabilities for CTF

The table provided in this clause need only to be completed for CTF implementations, where item A.2/2 above is supported.

**Table A.4: System Capabilities for CTF**

Item	Does the IUT support ...	Reference	Status	Support
1	charging?	5.1.1	m	
1.1	event based charging?	5.1.1.1	o.3	
1.2	session based charging?	5.1.1.2	o.3	
2	handling of offline charging error cases?	6.1.3	m	
2.1	buffering of generated accounting data when the connection to the CDF breaks?	6.1.3.1	o	
2.2	retransmission of ACR messages when no ACA is received?	6.1.3.2	o	
3	handling of envelope reporting request?	6.5.6, 7.2.61	o	
5	connection to a backup CDF?	4.1.1	o	
o.3: At least one of these charging options shall be supported.				

## A.7 PICS pro forma tables for the R0 interface

### A.7.1 Roles

**Table A.5: Roles for the Ro interface**

Item	Roles	Reference	Status	Support
1	OCF		o.4	
2	CTF		o.4	
2.1	SIP-AS		c.2	
2.2	MRFC		c.2	
o.4: At least one of these roles shall be supported.				
c.2: At least one of these roles shall be supported, if A.5/1 is supported, else n/a.				

### A.7.2 PICS Items for OCF

#### A.7.2.1 System Capabilities for OCF

The table provided in this clause need only to be completed for OCF implementations, where item A.5/1 above is supported.

Table A.6: System Capabilities for OCF

Item	Does the IUT support ...	Reference	Status	Support
1	unit determination?	5.2.1	m	
1.1	centralized unit determination?	5.2.1	o.5	
1.2	decentralized unit determination?	5.2.1	o.5	
2	rating?	5.2.1	m	
2.1	centralized rating?	5.2.1	o.6	
2.2	decentralized rating?	5.2.1	o.6	
3	charging?	6.3.2.1	m	
3.1	immediate event charging?	6.3.3	o.7	
3.2	event charging with unit reservation?	6.3.4	o.7	
3.3	session charging with unit reservation?	6.3.5	o.7	
4	handling of online charging error cases and scenarios?	6.3.6.1	m	
5	tariff changes during an active user session?	6.3.7	o	
6	re-authorization?	6.3.8	o	
7	failover?	6.3.10	o	
8	credit pooling?	6.3.11	c.3	
9	re-authorization?	6.5.1	o	
9.1	specification of an idle timeout in the Quota Holding-Time AVP of the CCA message.	6.5.1.1	o	
9.2	instructions to trigger re-authorization in the Trigger AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.1.2	o	
10	inclusion of threshold based re-authorization triggers?	6.5.2	o	
10.1	inclusion of the Time-Quota-Threshold AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.2	c.4	
10.2	inclusion of the Volume-Quota-Threshold AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.2	c.4	
10.3	inclusion of the Unit-Quota-Threshold AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.2	c.4	
11	indication of the quota consumption time in the Quota-Consumption-Time AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.4	o	
12	procedures for service termination?	6.5.5	o	
12.1	service termination with a CCA message, if a CCR request is pending?	6.5.5	c.5	
12.2	service termination with an ASR message, if no CCR request is pending?	6.5.5	c.5	
12.3	service termination with a RAR message, if no CCR request is pending?	6.5.5	c.5	
13	request for envelope reporting in the Envelope-Report AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.6	o	
14	indication of combinational quota in the Time-Quota-Mechanism AVP in the Multiple-Services-Credit-Control AVP of the CCA message?	6.5.7	o	
15	indication of online control of offline charging information in the Offline-Charging AVP of the CCA message?	6.5.8	o	
16.1	CCFH configured for TERMINATE?	IETF RFC 4006 [7] Clause 6.5	o.8	
16.2	CCFH configured for RETRY_AND_TERMINATE?	IETF RFC 4006 [7] Clause 6.5	o.8	
16.3	CCFH configured for CONTINUE?	IETF RFC 4006 [7] Clause 6.5	o.8	
17.1	DDFH configured for TERMINATE_OR_BUFFER?	IETF RFC 4006 [7] Clause 6.5	o.8	
17.2	DDFH configured for CONTINUE?	IETF RFC 4006 [7] Clause 6.5	o.8	
o.5:	At least one of these unit determination options shall be supported.			
o.6:	At least one of these rating options shall be supported.			
o.7:	At least one of these charging options shall be supported.			
o.8:	At least one of these items shall be supported.			
c.3:	m, if A.6/3.2 or A.6/3.3 is supported, else n/a.			
c.4:	o, if A.6/9 is supported, else n/a.			
c.5:	At least one of these items shall be supported, if A.6/12 is supported, else n/a.			

## A.7.3 PICS Items for CTF

### A.7.3.1 System Capabilities for CTF

The table provided in this clause need only to be completed for CTF implementations, where item A.5/2 above is supported.

**Table A.7: System Capabilities for CTF**

Item	Does the IUT support ...	Reference	Status	Support
1	unit determination?	5.2.1	m	
1.1	centralized unit determination?	5.2.1	m	
1.2	decentralized unit determination?	5.2.1	m	
2	rating?	5.2.1	m	
2.1	centralized rating?	5.2.1	m	
2.2	decentralized rating?	5.2.1	m	
3	charging?	6.3.2.1	m	
3.1	immediate event charging?	6.3.3	o.9	
3.2	event charging with unit reservation?	6.3.4	o.9	
3.3	session charging with unit reservation?	6.3.5	o.9	
4	handling of online charging error cases and scenarios?	6.3.6	m	
5	tariff changes during an active user session?	6.3.7	o	
6	re-authorization?	6.3.8	o	
7	failure handling?	6.3.9	m	
8	failover?	6.3.10	o	
9	re-authorization?	6.5.1	o	
10	handling of threshold based re-authorization triggers?	6.5.2	m	
11	sending of termination actions?	6.5.3	m	
12	handling of quota consumption time indications?	6.5.4	m	
13	receipt of service termination indications?	6.5.5	m	
14	handling of envelope reporting request?	6.5.6	m	
15	handling of combinational quota indications?	6.5.7	m	
16	handling of online control of offline charging information indications?	6.5.8	m	
17.1	CCFH configured for TERMINATE?	IETF RFC 4006 [7] Clause 6.5	o.10	
17.2	CCFH configured for RETRY_AND_TERMINATE?	IETF RFC 4006 [7] Clause 6.5	o.10	
17.3	CCFH configured for CONTINUE?	IETF RFC 4006 [7] Clause 6.5	o.10	
18.1	DDFH configured for TERMINATE_OR_BUFFER?	IETF RFC 4006 [7] Clause 6.5	o.10	
18.2	DDFH configured for CONTINUE?	IETF RFC 4006 [7] Clause 6.5	o.10	
19	independent credit-control of multiple services within a (sub-)session.	IETF RFC 4006 [7] Clause 5.1.2 ¶ 5	o	
o.9: At least one of these charging options shall be supported.				
o.10: At least one of these items shall be supported.				

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## History

<b>Document history</b>		
V1.1.2	October 2015	Publication