



**Core Network and Interoperability Testing (INT);  
Diameter Conformance testing for Cx and Dx interfaces;  
(3GPP™ Release 10);  
Part 3: Abstract Test Suite (ATS) and partial Protocol  
Implementation eXtra Information for Testing (PIXIT)  
pro forma specification**

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## Reference

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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 3 of a multi-part deliverable covering the test specifications for the Diameter protocol on the Cx and Dx interfaces, as identified below:

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

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# 1 Scope

The present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the test specifications for Diameter protocol on the Cx and Dx interfaces as specified in ETSI TS 129 228 [1] and ETSI TS 129 229 [2] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [6] and ETSI ETS 300 406 [7].

The test notation used in the ATS is TTCN-3 (see ETSI ES 201 873-1 [8]).

The following test specification and design considerations can be found in the body of the present document:

- the overall test suite structure;
- the testing architecture;
- the test methods and port definitions;
- the test configurations;
- TTCN styles and conventions;
- the partial PIXIT proforma;
- the modules containing the TTCN-3 ATS.

Annex A provides the Partial Implementation Extra Information for Testing (PIXIT) Proforma.

Annex B provides the Abstract Test Suite (ATS) part of the ATS.

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## 2 References

### 2.1 Normative references

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

Referenced documents which are not found to be publicly available in the expected location might be found at <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 129 228 (V10.8.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents (3GPP TS 29.228 version 10.8.0 Release 10)".
- [2] ETSI TS 129 229 (V10.5.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Cx and Dx interfaces based on the Diameter protocol; Protocol details (3GPP TS 29.229 version 10.5.0 Release 10)".
- [3] ETSI TS 103 289-2: "Core Network and Interoperability Testing (INT); Diameter Conformance testing for Cx and Dx interfaces; (3GPP Release 10); Part 2: Test Suite Structure (TSS) and Test Purposes (TP)".
- [4] ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

- [5] ISO/IEC 9646-6: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 6: Protocol profile test specification".
- [6] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".
- [7] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [8] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

## 2.2 Informative references

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

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

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

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 ISO/IEC 9646-7 [6] and ETSI TS 129 228 [1] apply.

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ISO/IEC 9646-1 [4], ISO/IEC 9646-6 [5], ISO/IEC 9646-7 [6] and ETSI TS 129 228 [1] apply.

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## 4 Abstract Test Method (ATM)

### 4.1 Introduction

This clause describes the ATM used to test ETSI TS 129 229 [2].

NOTE: In a real operating network the different Diameter nodes would not connect directly to each other. The connection is usually proxied through one or more Diameter Agents. In the following test architecture figures the Diameter Agent is not explicitly depicted as it is seen as a transparent message handler for conformance testing purposes.

## 4.2 Test architecture

### 4.2.1 Test method

The test method chosen is the remote test method. Remote test method means that the test tool (the test machine + the executable test suite) shall behave as a CSCF when the IUT is an HSS or an SLF and shall behave as an HSS or SLF when the IUT is a CSCF. As the exchange between the test system and the IUT is at the diameter message level, the lower layers of the test machine shall be totally conformant with the corresponding lower layers specifications to use the remote test method.

### 4.2.2 Test machine configuration

#### 4.2.2.1 Test configurations using Cx interface

The Cx interface is located between a CSCF and the HSS.

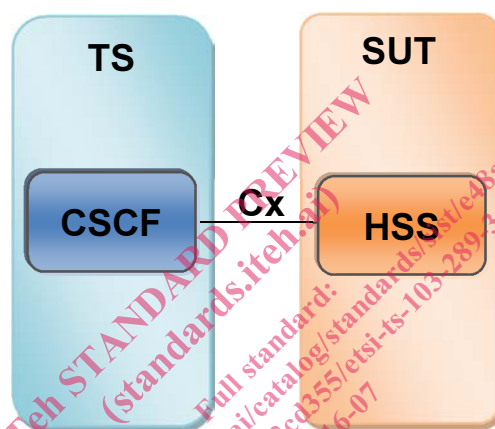


Figure 1: Test configuration CF\_1Cx

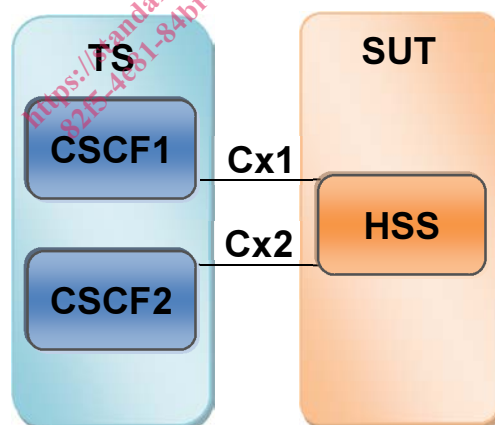


Figure 2: Test configuration CF\_2Cx



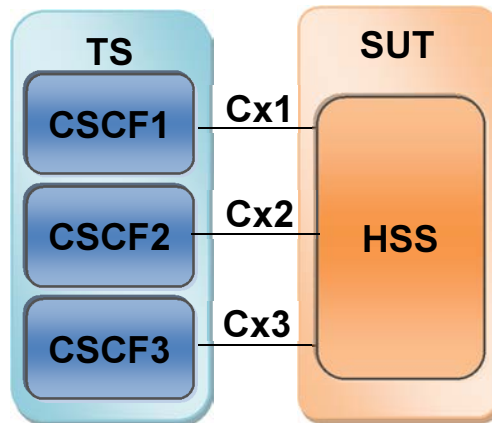


Figure 3: Test configuration CF\_3Cx

NOTE 1: Within figure 3 CSCF represents one I-CSCF and two S-CSCF components. Cx interface (DIAMETER protocol) is located between an HSS and I-CSCF or between an HSS and S-CSCF.

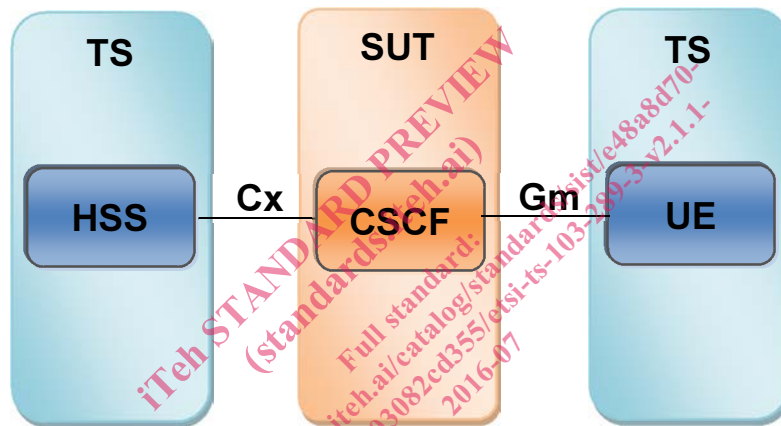


Figure 4: Test configuration CF\_1Cx1Gm

NOTE 2: Within figure 4 CSCF represents P-CSCF, I-CSCF and S-CSCF components. Gm interface (SIP protocol) is located between a UE and P-CSCF. Cx interface (DIAMETER protocol) is located between an HSS and I-CSCF or between an HSS and S-CSCF.

#### 4.2.2.2 Test configurations using the Dx interface

The Dx interface is located between a CSCF and the SLF.

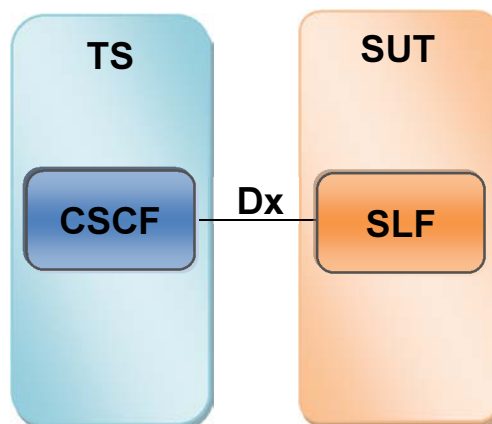


Figure 5: Test configuration CF\_1Dx

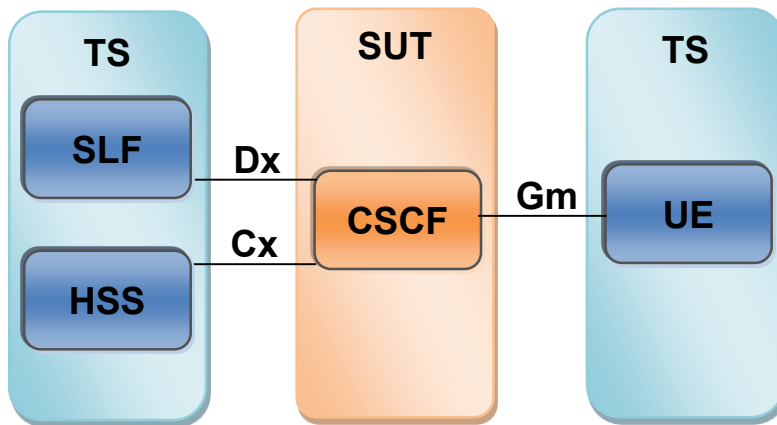


Figure 6: Test configuration CF\_1Dx1Cx1Gm

NOTE: Within figure 5 CSCF represents P-CSCF, I-CSCF and S-CSCF components. Gm interface (SIP protocol) is located between a UE and P-CSCF. Cx interface (DIAMETER protocol) is located between an HSS and I-CSCF or between an HSS and S-CSCF. Dx interface (DIAMETER protocol) is located between an SLF and I-CSCF or between an SLF and S-CSCF.

## 4.2.3 Interconnection of TS and SUT

### 4.2.3.1 HSS Role

Figure 7 shows the interconnection of TS and SUT in terms of Diameter message flows. Diameter messages are transferred over the DIAM port. However in case of several Cx interfaces (CF\_2Cx and CF\_3Cx) there will be only one

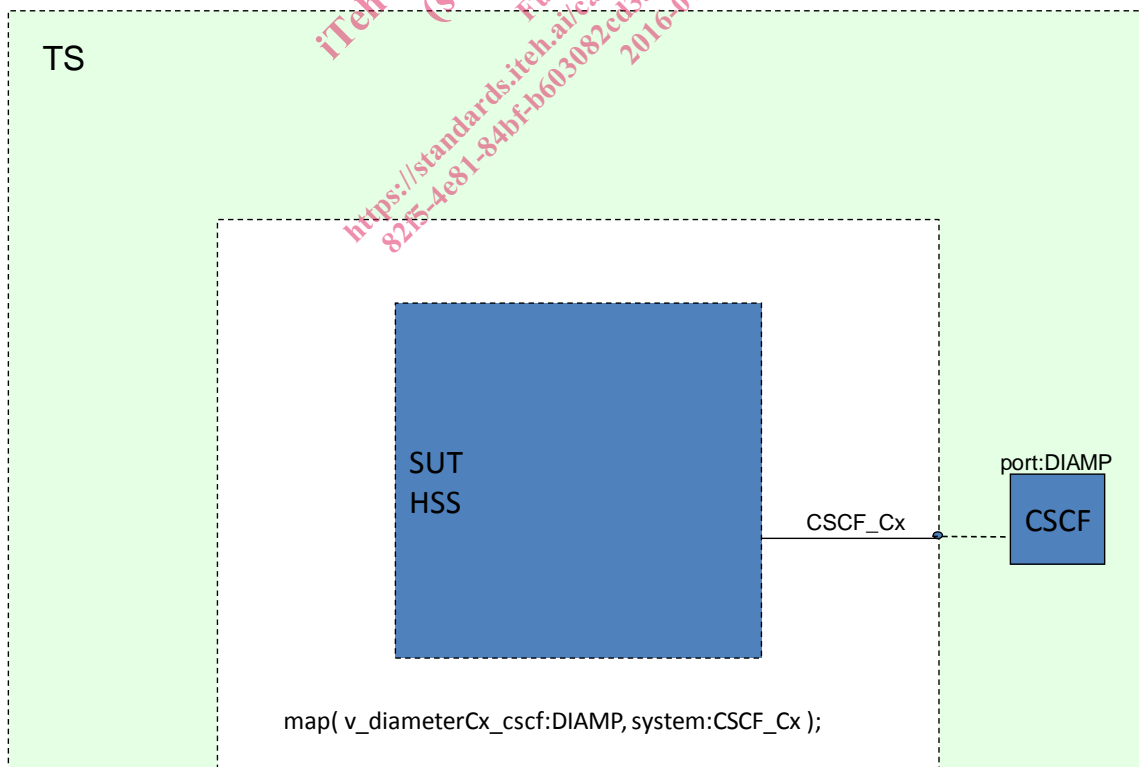


Figure 7: Interconnection for HSS role