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Core Network and Interoperability Testing (INT);
Diameter Conformance testing for Rf/Ro interface;
(3GPP™ Release 10);
Part 2: Test Suite Structure (TSS) and Test Purposes (TP)

Reference

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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 2 of a multi-part deliverable. Full details of the entire series can be found in part 1 [4].

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 provides the Test Suite Structure (TSS) and Test Purposes (TP) for the test specifications for the Diameter protocol on the Rf/Ro interfaces 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 [6] and ETSI ETS 300 406 [7].

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.

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[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] ETSI TS 102 790-2: "Technical Committee for IMS Network Testing (INT); Network Integration Testing; IMS specific use of Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Conformance Testing; Part 2: Test Suite Structure (TSS) and Test Purposes (TP)".

[4] ETSI TS 103 374-1: "Core Network and Interoperability Testing (INT); Diameter Conformance testing for Rf/Ro interface; (3GPP™ Release 10); Part 1: Protocol Implementation Conformance Statement (PICS)".

[5] ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

[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] IETF RFC 3588: "Diameter Base Protocol".

[9] IETF RFC 4005: "Diameter Network Access Server Application".

[10] 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 referenced document (including any amendments) applies.

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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.

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:

Abstract Test Method (ATM): Refer to ISO/IEC 9646-1 [5].

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [5].

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [5].

Test Purpose (TP): Refer to ISO/IEC 9646-1 [5].

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 the following apply:

CDF	Charging Data Function
CTF	Charging Trigger Function
TP	Test Purpose
TSS	Test Suite Structure

4 Test configurations

4.1 Introduction

Test purposes of the present document address the IMS functional entities that are accessible via the following standardized DIAMETER interfaces: Ro and Rf.

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 configurations using Rf interface

The Rf interface is located between a CTF equipment hosted by an x-CSCF or a SIP AS and the CDF.

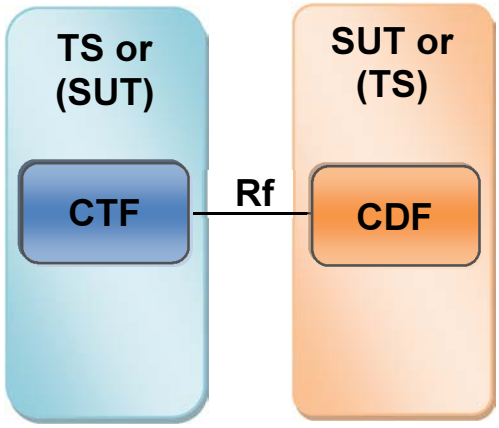

Figure 1: Test configuration CF_1Rf

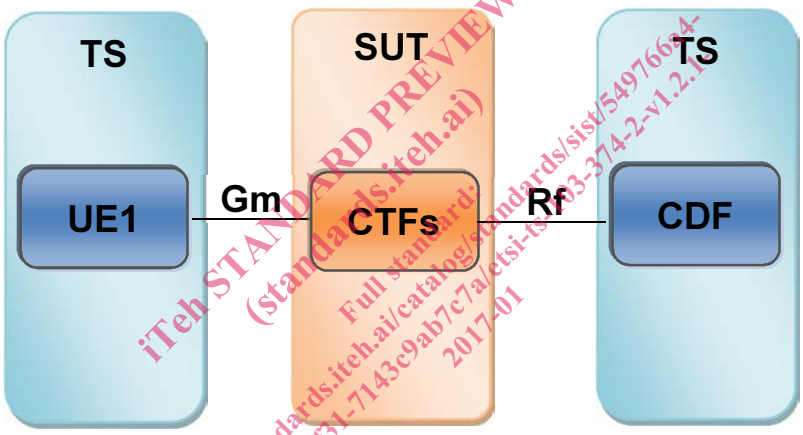

Figure 2: Test configuration CF_1Rf1Gm

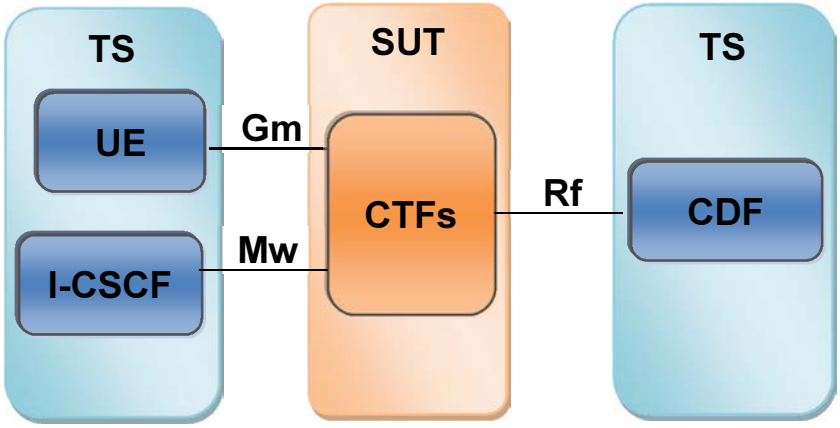

Figure 3: Test configuration CF_1Rf1Gm1Mw

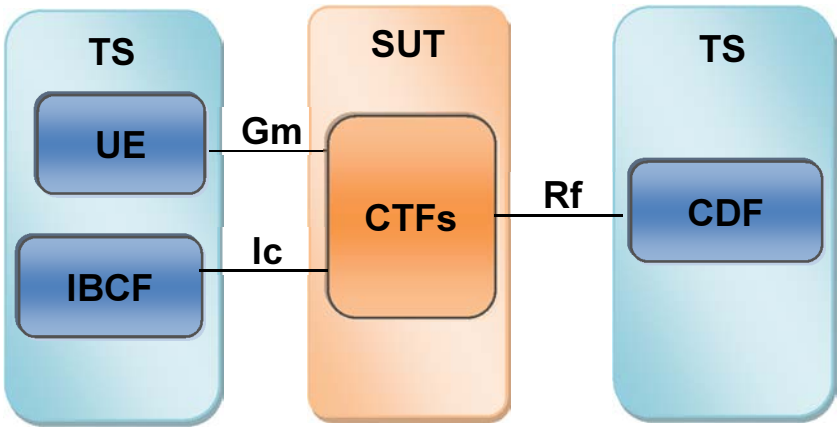

Figure 4: Test configuration CF_1Rf1Gm1Ic

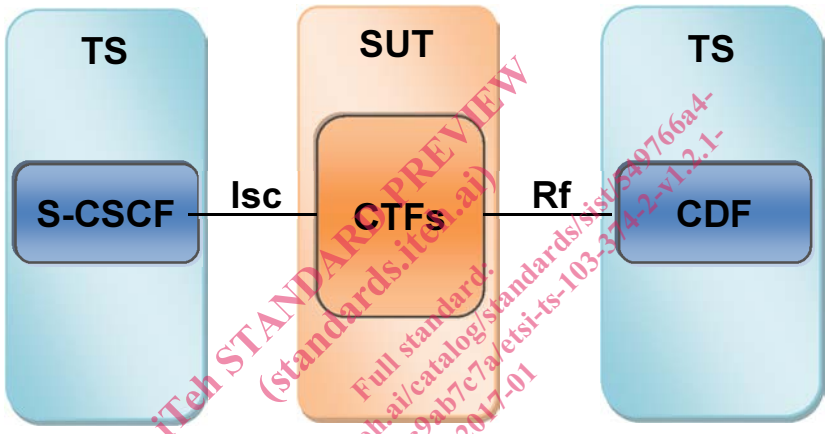

Figure 5: Test configuration CF_1Rf1Isc

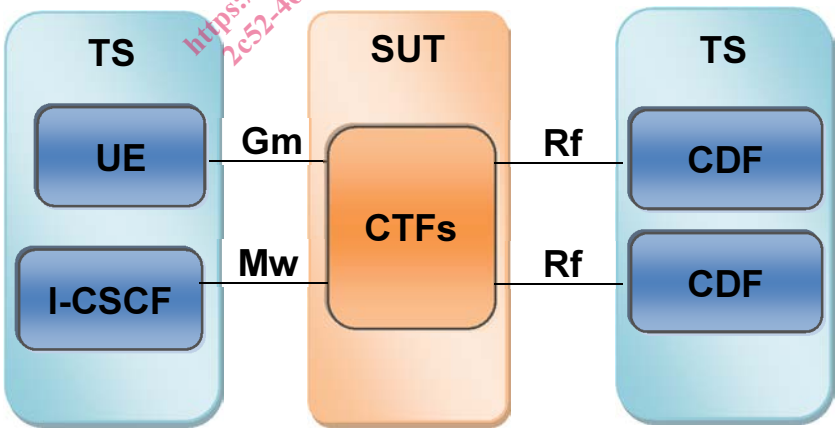

Figure 6: Test configuration CF_2Rf1Gm1Mw

4.3 Test configurations using Ro interface

The Ro interface is located between a CTF equipment hosted by an MRFC or a SIP AS or an IMS GW and the OCF.

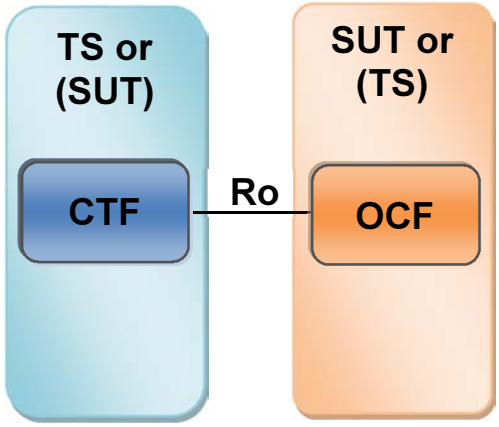

Figure 7: Test configuration CF_1Ro

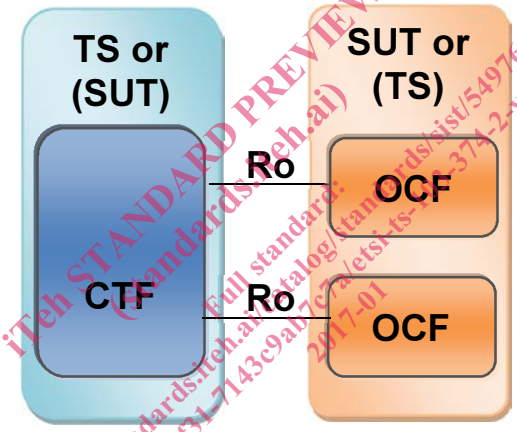

Figure 8: Test configuration CF_2Ro

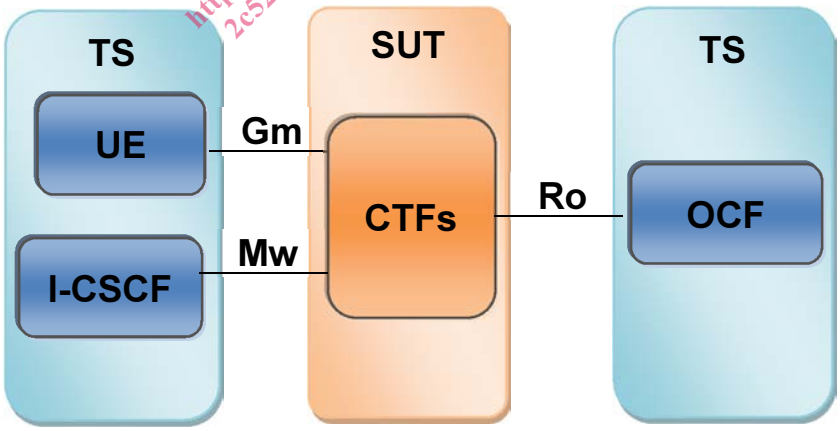

Figure 9: Test configuration CF_1Ro1Gm1Mw

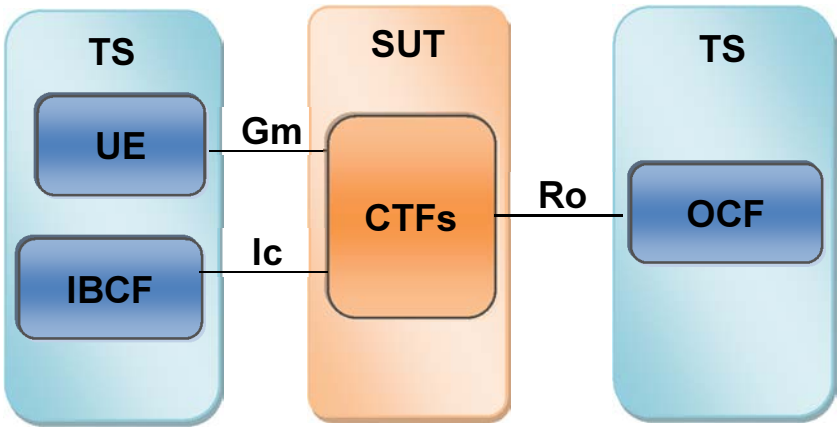

Figure 10: Test configuration CF_1Ro1Gm1Ic

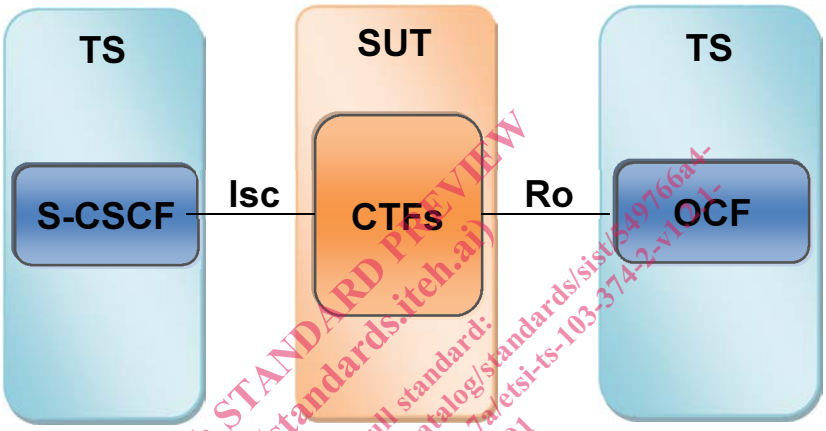

Figure 11: Test configuration CF_1Ro1Isc

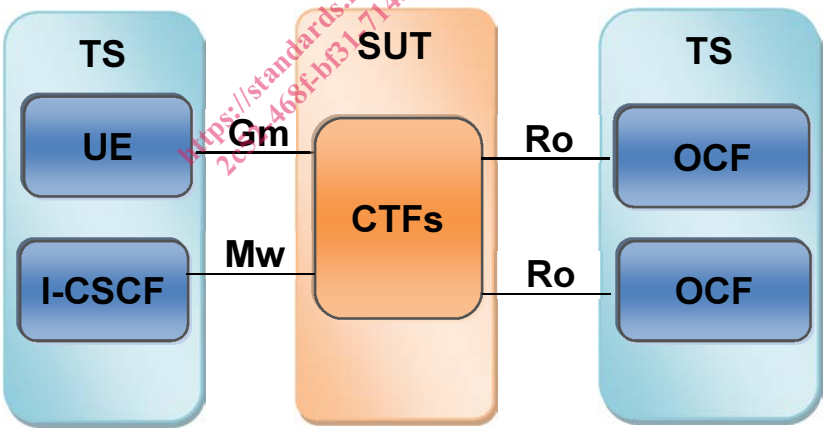

Figure 12: Test configuration CF_2Ro1Gm1Mw

5 Test Suite Structure (TSS) and Test Purposes (TP)

5.1 Test Suite Structure

5.1.1 TP naming convention

TPs are numbered, starting at 01, within each group. Groups are organized according to the TSS.

Table 1: TP identifier naming convention scheme

Identifier: **<TP>_<iut>_<scope>_<nn>**				
<tp>	=	Test Purpose:	fixed to "TP"	
<interface>		Interface:	RF or RO	
<iut>	=	type of IUT:	CDF, OCF or CTF	
<scope>	=	group	MS	Message syntax
			TC	Type of Charging
			EC	Error Cases
			CH	Tariff Changes
			RE	Re-authorization
			FH	Failure Handling
			FA	Failover
			CP	Credit Pooling
			OP	Other procedures ([2], clause 6.5)
<nn>	=	sequential number	(01 to 99)	

5.1.2 Test strategy

As the base standards in ETSI TS 132 260 [1] and ETSI TS 132 299 [2] contain no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification ETSI TS 103 374-1 [4].

5.1.3 TP structure

Each TP has been written in a manner which is consistent with all other TPs. The intention of this is to make the TPs more readable and checkable. A particular structure has been used which is illustrated in table 2. Table 2 should be read in conjunction with any TP, i.e. please use a TP as an example to facilitate the full comprehension of table 2.

Table 2: Structure of a single TP

TP part	Text	Example
Header	**<Identifier>** **<clause number in base ETSI TS 132 299 [2] >** **<PICS reference>**	see table 6.2.3 **clause 6.2.3** **A.2/3**
Summary	Short free text description of the test objective	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to IP-CAN session establishment
Configuration	One of the test configurations as described in clauses 4.2 and 4.3	CF_1Rf
Initial condition (optional)	Free text description of the condition that the IUT has reached before the test purpose applies	The IUT has received AF provisions information about the AF signalling flows between UE and AF
Start point	Ensure that the IUT in the <state> see IETF RFC 3588 [8] clause 5.6 and/or further actions before stimulus if the action is sending/receiving see below for message structure	 Open state having sent an AC-Request
Stimulus	<**trigger**>, see below for message structure or <goal>	on receipt of a Capabilities-Exchange-Request (see note 2) to require PCC supervision
Reaction	<**action**>. if the action is sending see below for message structure <next action>, etc.	sends, saves, does, etc.
Message structure	<message type> a) containing a(n) <avp name> AVP b) indicating <coding of the field> and back to a) or b) (see note 3)	Capabilities-Exchange-Answer, etc. (see note 2) Vendor-Id, etc.

NOTE 1: Text in italics will not appear in TPs and text between <> is filled in for each TP and may differ from one TP to the next.

NOTE 2: All messages are considered as "valid and compatible" unless otherwise specified in the test purpose. This includes the presence of all mandatory AVPs as specified in IETF RFC 3588 [8] and in ETSI TS 132 299 [2], clauses 6.2.2, 6.2.3, 6.4.2 and 6.4.3.

NOTE 3: An AVP can be embedded into another AVP. This is expressed by indentations, e.g. if Message1 contains AVP1 and AVP2 where AVP1 has AVP3 embedded this will be expressed like this:

```
sends/receives Message 1
    containing AVP1
        containing AVP3
            indicating ...
    containing AVP2
        indicating ...
```


5.2 Test Purposes

5.2.1 PICS references

All PICS items referred to in this clause are as specified in ETSI TS 103 374-1 [4] unless indicated otherwise by another numbered reference. PICS items are only meant for test selection, therefore only PICS items with status optional or conditional are explicitly mentioned.

5.2.2 Rf interface

5.2.2.1 CDF Role

5.2.2.1.1 Test selection

The IUT takes the role of the CDF; PICS A.2/1.