



**IMS Network Testing (INT);  
Diameter Conformance testing for Gx interface;  
Part 2: Test Suite Structure (TSS) and Test Purposes (TP)**

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Reference

DTS/INT-00068-2

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Keywords

diameter, TSS&TP

**ETSI**

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 IMS Network Testing (INT).

The present document is part 2 of a multi-part deliverable covering the test specifications for the Diameter protocol on the Gx interface, 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 Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

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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 Gx interface as specified in TS 129 212 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4] and ETS 300 406 [5].

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# 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>.

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## 2.1 Normative references

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

- [1] ETSI TS 129 212: "Universal Mobile Telecommunications System (UMTS); LTE; Policy and charging control over Gx/Sd reference point (3GPP TS 29.212 version 10.5.0 Release 10)".
- [2] ETSI TS 101 606-1: "IMS Network Testing (INT); Diameter Conformance testing for Gx interface; Part 1: Protocol Implementation Conformance Statement (PICS)".
- [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] IETF RFC 3588: "Diameter Base Protocol".
- [7] ETSI TS 129 213: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping (3GPP TS 29.213 version 10.3.0 Release 10)".
- [8] ETSI TS 129 214: "Universal Mobile Telecommunications System (UMTS); LTE; Policy and charging control over Rx reference point (3GPP TS 29.214 version 10.5.0 Release 10)".

## 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.

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 TS 129 212 [1] and the following apply:

**Abstract Test Method (ATM):** Refer to ISO/IEC 9646-1 [3].

**Abstract Test Suite (ATS):** Refer to ISO/IEC 9646-1 [3].

**Implementation Under Test (IUT):** Refer to ISO/IEC 9646-1 [3].

**Test Purpose (TP):** Refer to ISO/IEC 9646-1 [3].

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TS 129 212 [1] and the following apply:

TP	Test Purpose
TSS	Test Suite Structure

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## 4 Test configurations

## 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 001, 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"
<iut>	=	type of IUT:	PCRF or PCEF
<scope>	=	group	IPS Initial Provisioning Session
MSI		Modification of Session Information	
INV		Invalid Behaviour	
ST		Session Termination	
PCC		PCC rules	
EMS		Emergency services	
UMC		Usage monitoring control	
IRS		IMS Restoration Support	
MPS		Multimedia Priority Support	
SDC		Sponsored Data Connectivity	
RAU		Reporting Accumulated Usage	
<nn>	=	sequential number	(01 to 99)

### 5.1.2 Test strategy

As the base standard TS 129 212 [1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification TS 101 606-1 [2].

### 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. This table 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
<b>Header</b>	<Identifier> <clause number in base TS 129 212 [1] > <PICS reference>	see table 1 <b>clause 4.4.1</b> <b>A.2/3</b>
<b>Summary</b>	<i>Short free text description of the test objective</i>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to IP-CAN session establishment.
<b>Initial condition (optional)</b>	<i>Free text description of the condition that the IUT has reached before the test purpose applies.</i>	The IUT has received AF provisions information about the AF signalling flows between UE and AF.
<b>Start point</b>	Ensure that the IUT in the <state> see RFC 3588 [6] 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 AA-Request
<b>Stimulus</b>	<trigger>, see below for message structure  or <goal>	on receipt of a Capabilities-Exchange-Request (see note 2) to require PCC supervision ...
<b>Reaction</b>	<action>. if the action is sending see below for message structure <next action>, etc.	sends, saves, does, etc.
<b>Message structure</b>	<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 shall be considered as "valid and compatible" unless otherwise specified in the test purpose. This includes the presence of all mandatory AVPs as specified in RFC 3588 [6] and in TS 129 212 [1], clause 5.		
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

All PICS items referred to in this clause are as specified in TS 101 606-1 [2] 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. Call flow information for described test purposes is specified in TS 129 213 [7].

### 5.2.1 PCRF Role

Test Selection: IUT takes the role of the PCRF; PICS A.2.1



## 5.2.1.1 Session request

TP_PCRF_IPS_01	Standards Reference: 4.5.1 (item 1), 4.5.2 (1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to IP-CAN session establishment.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Subscription-Id AVP containing the user identification containing an IP-CAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP indicating the full IP address of the UE, <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP.	

TP_PCRF_IPS_02	Standards Reference: 4.5.1 ¶1, 4.3a.4.1 ¶3, 4.5.2 (1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory and optional AVPs in a CC-Request received due to IP-CAN session establishment.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Subscription-Id AVP containing the user identification containing an IPCAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP containing the Framed-IP-Address containing a Called-Station-ID AVP containing the PDN information containing a PDN Connection-ID AVP containing the PDN connection identifier containing a 3GPP-MS-TimeZone AVP containing the UE time zone information containing an Access-Network-Charging-Identifier-Gx AVPs containing the Access-Network-Charging-Address containing a Network-Request-Support AVP containing an indicator for support of network-initiated bearer request procedures containing a QoS-Information AVP containing an APN-Aggregate-Max-Bitrate-DL/UL AVPs containing the APN-AMBR containing a Bearer-Usage AVP containing an indicator for default bearer request containing a Routing-Rule-Install AVP containing one or more Routing-Rule-Definition AVPs containing Routing-Filter AVP, <b>sends a CC-Answer</b> containing PCC rules.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP. The Routing-Rule-Install AVP is configured as for installation of IP flow mobility routing rule.	

TP_PCRF_IPS_03	Standards Reference: 4.5.10 ¶2 and 3	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process a CC-Request received due to an IP-CAN session establishment with bearer control mode selection.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Request</b> containing all mandatory AVPs and containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Network-Request-Support AVP, <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS containing a Bearer-Control-Mode AVP.	
<b>Comments:</b>		

TP_PCRF_IPS_04	Standards Reference: 4.5.1 (item 1, 2 <sup>nd</sup> paragraph)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process a CC-Request received due to an IP-CAN session establishment that supports multiple IP-CAN bearers.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Default_EPS_Bearer_QoS AVP containing the QoS_Class_Identifier AVP containing the Allocation_Retention_Priority AVP <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS.	
<b>Comments:</b>	Usage of Default_EPS_Bearer_QoS_AVP is optional.	

TP_PCRF_IPS_05	Standards Reference: 4.5.1 (item 1, 3 <sup>rd</sup> paragraph)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process a CC-Request received due to 3GPP-EPS and 3GPP2 accesses.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a AN-GW-Address AVP containing the IPv4 or IPv6 addresses of SGW/AGW <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS.	
<b>Comments:</b>		

TP_PCRF_IPS_06	Standards Reference: 4.5.1 (item 1, 4 <sup>th</sup> paragraph)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process a CC-Request received due to xDSL IP-CAN Type.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Subscription-Id AVP containing a Logical-Access-ID AVP containing a Physical-Access-ID AVP <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS.	
<b>Comments:</b>		

## 5.2.1.2 Session modification

TP_PCRF_MSI_01	Standards Reference: 4.5.1 ¶2, 4.5.2 (1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to IP-CAN session modification.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing previously provisioned PCC rule(s) and their status containing an Event-Trigger AVP containing the reason for the IP-CAN session modification, <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS.	
<b>Comments:</b>		

TP_PCRF_MSI_02	Standards Reference: 4.5.1 ¶2, 4.3a.4.1 ¶3, 4.5.2(1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory and optional AVPs in a CC-Request received due to IP-CAN session modification.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing an Access-Network-Charging-Address AVP containing an Access-Network-Charging-Identifier-Gx AVP containing a Charging-Rule-Report AVP containing previously provisioned PCC rule(s) and their status containing an Event-Trigger AVP containing the reason for the IP-CAN session modification containing a Routing-Rule-Install AVP containing one or more Routing-Rule-Definition AVPs containing a Routing-Filter AVP, <b>sends a CC-Answer</b> containing PCC rules.	
<b>Comments:</b>	The Routing-Rule-Install AVP is configured as for installation of IP flow mobility routing rule.	

TP_PCRF_MSI_03	Standards Reference: 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 1 <sup>st</sup> dash), 4.5.2 1 <sup>st</sup> dashed list (1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due a UE request for allocation of new resources.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing an Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating ADDITION containing a Packet-Filter-Information AVPs containing a Precedence AVP containing a Packet-Filter-Content AVP containing a QoS-Information AVP, <b>sends a CC-Answer</b> containing PCC rules.	
<b>Comments:</b>		

TP_PCRF_MSI_04	<b>Standards Reference:</b> 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 2 <sup>nd</sup> dash), 4.5.2 (1 <sup>st</sup> dash)	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due a UE request for modification of existing resources.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing an Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating MODIFICATION containing a Packet-Filter-Information AVPs containing a Packet-Filter-Identifier AVP containing a packet filter identifier, <b>sends a CC-Answer</b> containing PCC rules.	
<b>Comments:</b>		

TP_PCRF_MSI_05	<b>Standards Reference:</b> 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 3 <sup>rd</sup> dash), 4.5.2 (1 <sup>st</sup> dash)	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due a UE request for deletion of resources.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing an Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating DELETION containing a Packet-Filter-Information AVPs containing a Packet-Filter-Identifier AVP, <b>sends a CC-Answer</b> containing PCC rules.	
<b>Comments:</b>		

TP_PCRF_MSI_06	<b>Standards Reference:</b> 4.5.10 ¶2 and 3	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process a CC-Request received due to IP-CAN session modification with bearer control mode selection.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is already established, <b>on receipt of a CC-Request</b> containing all mandatory AVPs and containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Network-Request-Support AVP, <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS containing a Bearer-Control-Mode AVP.	
<b>Comments:</b>		

## 5.2.1.3 Invalid behaviour

TP_PCRF_INV_01	Standards Reference: 4.5.1 (last paragraph in clause), 4.5.12 ¶1	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to the failure of installation/activation of PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing ( <ul style="list-style-type: none"> <li>a Charging-Rule-Name AVP   indicating failed PCC rule</li> <li>or a Charging-Rule-Base-Name AVP   indicating failed PCC rule</li> </ul> ) containing a PCC-Rule-Status AVP containing a Rule-Failure-Code AVP, <b>sends a CC-Answer</b> containing an Experimental-Result AVP indicating DIAMETER_ERROR_TRAFFIC_MAPPING_INFO_REJECTED.	
<b>Comments:</b>		

TP_PCRF_INV_02	Standards Reference: 4.5.1, 4.5.15.2.1 ¶2 and 3	PICS item:
<b>Summary:</b>	Verify that the IUT can reject a request for PCC rules for an emergency service.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing an IP-CAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP indicating the full IP address of the UE containing a Called-Station-Id AVP indicating the Emergency APN containing a Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Subscription-Id AVP indicating IMSI, <b>sends a CC-Answer</b> containing an Experimental-Result AVP indicating DIAMETER_ERROR_TRAFFIC_MAPPING_INFO_REJECTED.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP.	

## 5.2.1.4 Session Termination

TP_PCRF_ST_01	Standards Reference: 4.5.6 ¶3	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to the termination of an IP-CAN bearer.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing a Rule-Status AVP indicating INACTIVE containing a Rule-Failure-Code AVP indicating RESOURCE_ALLOCATION_FAILURE, <b>sends a CC-Answer</b>	
<b>Comments:</b>		

TP_PCRF_ST_02	Standards Reference: 4.5.7 ¶4	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process all mandatory AVPs in a CC-Request received due to the termination of an IP-CAN session.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating TERMINATION_REQUEST, <b>sends a CC-Answer</b>	
<b>Comments:</b>		

TP_PCRF_ST_03	Standards Reference: 4.5.9, [7] 4.2.3.1	PICS item: A.3.9
<b>Summary:</b>	Verify that the IUT can terminate an IP-CAN session with an RA-Request and process the subsequent RA-Answer and CC-Request messages.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to terminate</b> an IP CAN session due to an internal or SPR trigger, <b>sends an RA-Request</b> containing a Session-Release-Cause AVP <b>on receipt of a RA-Answer and</b> <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating TERMINATION_REQUEST, <b>sends a CC-Answer</b>	
<b>Comments:</b>		

## 5.2.1.5 PCC rules

TP_PCRF_PCC_01	Standards Reference: 4.5.2 (2 <sup>nd</sup> dashed list 1 <sup>st</sup> dash)	PICS item: A.3.3.2
<b>Summary:</b>	Verify that the IUT can activate PCC rules with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, to activate a PCC rule, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Name AVP providing a reference to a PCC rule.	
<b>Comments:</b>		

TP_PCRF_PCC_02	<b>Standards Reference:</b> 4.5.2 (2 <sup>nd</sup> dashed list 1 <sup>st</sup> dash)	<b>PICS item:</b> A.3.3.2
<b>Summary:</b>	Verify that the IUT can deactivate PCC rules with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, to deactivate a PCC rule, <b>sends a RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Name AVP providing a reference to a PCC rule.	
<b>Comments:</b>		

TP_PCRF_PCC_03	<b>Standards Reference:</b> 4.5.2 ¶6	<b>PICS item:</b> A.3.3.2
<b>Summary:</b>	Verify that the IUT can activate a group of PCC rules with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, <b>to activate</b> a group of PCC rules, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Base-Name AVP providing a reference to a PCC rules.	
<b>Comments:</b>		

TP_PCRF_PCC_04	<b>Standards Reference:</b> 4.5.2 (after note 1)	<b>PICS item:</b> A.3.3.2, A.3.3.3
<b>Summary:</b>	Verify that the IUT can request confirmation of successful resource allocation for a PCC rule with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, <b>to request</b> confirmation that the resources associated to a PCC rule are successfully allocated, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Name AVP providing a reference to a PCC rule containing a Resource-Allocation-Notification AVP indicating ENABLE_NOTIFICATION containing a Event-Trigger AVP indicating SUCCESSFUL_RESOURCE_ALLOCATION.	
<b>Comments:</b>		

TP_PCRF_PCC_05	<b>Standards Reference:</b> 4.5.2 (2 <sup>nd</sup> dashed list 2 <sup>nd</sup> dash)	<b>PICS item:</b> A.3.3.2
<b>Summary:</b>	Verify that the IUT can modify a PCC rule with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, to modify a PCC rule, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP.	
<b>Comments:</b>		

TP_PCRF_PCC_06	<b>Standards Reference:</b> 4.5.2 (2 <sup>nd</sup> dashed list 3 <sup>rd</sup> dash)	<b>PICS item:</b> A.3.3.2
<b>Summary:</b>	Verify that the IUT can remove a PCC rule with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, to remove a PCC rule, <b>sends a RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Name AVP.	
<b>Comments:</b>		

<b>TP_PCRF_PCC_07</b>	<b>Standards Reference:</b> <b>4.5.2 ¶14</b>	<b>PICS item:</b> <b>A.3.3.2</b>
<b>Summary:</b>	Verify that the IUT can remove a group of PCC rules with an RA-Request using the PUSH procedure.	
<b>Test purpose:</b>	Ensure that the IUT, to remove a group of PCC rules, <b>sends a RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Base-Name AVP.	
<b>Comments:</b>		

<b>TP_PCRF_PCC_08</b>	<b>Standards Reference:</b> <b>4.5.4.2 ¶2 and 3</b>	<b>PICS item:</b> <b>A.3.5.2</b>
<b>Summary:</b>	Verify that the IUT does not reject CC-Request and IUT can provide a default charging method with a CC-Answer.	
<b>Test purpose:</b>	Ensure that the IUT, to provide a default charging method, <b>on receipt of a CC-Request</b> containing an Online AVP containing an Offline AVP <b>sends a CC-Answer</b> ( containing an Online AVP or containing an Offline AVP. )	
<b>Comments:</b>		

<b>TP_PCRF_PCC_09</b>	<b>Standards Reference:</b> <b>4.5.5.0 (2<sup>nd</sup> dash), 4.5.5.2</b>	<b>PICS item:</b> <b>A.3.3.2. A3.5</b>
<b>Summary:</b>	Verify that the IUT can provide authorized QoS to a PCC rule with an RA-Request.	
<b>Test purpose:</b>	Ensure that the IUT, to provide authorized QoS to a PCC rule, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a QoS-Information AVP not containing a Bearer-Identifier AVP.	
<b>Comments:</b>		

## 5.2.1.6 Special services and features

### 5.2.1.6.1 Emergency services

<b>TP_PCRF_EMS_01</b>	<b>Standards Reference:</b> <b>4.5.15.2.2.2 ¶1 and 2</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can provide PCC rules for emergency services with an RA-Request.	
<b>Test purpose:</b>	Ensure that the IUT <b>on receipt of IMS service information</b> from the AF for an emergency service via the Rx interface, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a QoS-Information AVP containing an Allocation-Retention-Priority AVP containing a Priority-Level AVP.	
<b>Comments:</b>		



TP_PCRF_EMS_02	Standards Reference: 4.5.15.2.2 ¶2, 5.3.23	PICS item:
<b>Summary:</b>	Verify that the IUT can detect that a Gx session is restricted to IMS Emergency services when a CCR command is received with a CC-Request-Type AVP set to value "INITIAL_REQUEST" and the Called-Station-Id AVP includes a PDN identifier that matches one of the Emergency APNs from the configurable list.	
<b>Initial Condition:</b>	The IUT is configured with Emergency_APN_A included in the PDN identifier configurable list.	
<b>Test purpose:</b>	Ensure that the IUT to detect a Gx session restricted to IMS Emergency services, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Called-Station-Id AVP indicating an Emergency APN_A <b>sends a CC-Answer</b> containing a Result-Code AVP indicating DIAMETER_SUCCESS containing a Bearer-Control-Mode AVP. indicating NW_mode.	
<b>Comments:</b>		

## 5.2.1.6.2 Usage monitoring control

TP_PCRF_UMC_01	Standards Reference: 4.5.16¶2,6	PICS item: A.3.15
<b>Summary:</b>	Verify that the IUT can request usage monitoring control.	
<b>Test purpose:</b>	Ensure that the IUT, to request usage monitoring control, <b>on receipt of a CC-Request,</b> <b>sends a CC-Answer</b> containing an Event-Trigger AVP indicating USAGE_REPORT containing a Usage-Monitoring-Information AVP containing a Granted-Service-Unit AVP containing ( a CC-Total-Octets AVP or a CC-Input-Octets AVP or a CC-Output-Octets AVP ) containing a Monitoring-Key AVP containing a monitoring key.	
<b>Comments:</b>		

## 5.2.1.6.3 IMS restoration procedures

TP_PCRF_IRS_01	Standards Reference: 4.5.18 ¶1	PICS item: A.3.17
<b>Summary:</b>	Verify that the IUT can install dynamic PCC rules with an RA-Request.	
<b>Initial Condition:</b>	The IUT has received AF provisions information about the AF signalling flows between UE and AF.	
<b>Test purpose:</b>	Ensure that the IUT, <b>to install</b> dynamic PCC rules, <b>sends a RA-Request</b> containing Charging-Rule-Install AVP containing the Charging-Rule-Definition AVP containing Flow-Information AVP indicating the signalling flows between UE and AF containing AF-Signalling-Protocol AVP indicating the signalling protocol between UE and AF.	
<b>Comments:</b>		

<b>TP_PCRF_IRS_02</b>	<b>Standards Reference:</b> <b>4.5.18 ¶3</b>	<b>PICS item:</b> <b>A.3.17</b>
<b>Summary:</b>	Verify that the IUT can remove dynamic PCC rules with an RA-Request.	
<b>Initial Condition:</b>	The IUT has received AF de-provisions information about the AF signalling flows between UE and AF.	
<b>Test purpose:</b>	Ensure that the IUT, <b>to remove</b> dynamic PCC rules, <b>sends a RA-Request</b> containing Charging-Rule-Remove AVP containing the Charging-Rule-Name AVP.	
<b>Comments:</b>		

## 5.2.1.6.4 Multimedia Priority support

<b>TP_PCRF_MPS_01</b>	<b>Standards Reference:</b> <b>4.5.19.1.1 ¶4</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can provide PCC rules for multimedia priority services.	
<b>Initial Condition:</b>	The IUT has received AF provisioning information about the AF signalling flows between UE and AF including priority parameters to be stored in SPR (TS 129 214 [8], clause A.9).	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST <b>sends a CC-Answer</b> containing a QoS-Information AVP containing a QoS-Class-Identifier AVP containing an Allocation-Retention-Priority AVP.	
<b>Comments:</b>	Priority parameters that are considered are MPS EPS Priority, MPS Priority Level and IMS Signalling Priority.	

<b>TP_PCRF_MPS_02</b>	<b>Standards Reference:</b> <b>4.5.19.1.1 ¶5</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can provide modified PCC rules for multimedia priority services in with an RA-Request.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt</b> of a notification of a change of priority from the SPR, <b>sends a RA-Request</b> containing a QoS-Information AVP containing a QoS-Class-Identifier AVP containing an Allocation-Retention-Priority AVP.	
<b>Comments:</b>		

## 5.2.1.6.5 Sponsored Data Connectivity

<b>TP_PCRF_SDC_01</b>	<b>Standards Reference:</b> <b>4.5.20 ¶2</b>	<b>PICS item:</b> <b>A.3.1</b>
<b>Summary:</b>	Verify that the IUT can provide sponsored data connectivity for PCC rules using the PUSH method.	
<b>Initial Condition:</b>	The IUT has received information about the sponsor of the sponsored data connectivity from the AF.	
<b>Test purpose:</b>	Ensure that the IUT, <b>to provide</b> sponsored data connectivity to PCC rules, <b>sends a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Sponsor-Identity AVP containing a Application-Service-Provider-Identity AVP containing a Reporting_Level AVP indicating SPONSORED_CONNECTIVITY_LEVEL.	
<b>Comments:</b>		

TP_PCRF_SDC_02	Standards Reference: 4.5.20 ¶2	PICS item: A.3.1
<b>Summary:</b>	Verify that the IUT can provide sponsored data connectivity for PCC rules using the PULL method.	
<b>Initial Condition:</b>	The IUT has received information about the sponsor of the sponsored data connectivity from the AF.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Request, sends a CC-Answer</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Sponsor-Identity AVP containing a Application-Service-Provider-Identity AVP containing a Reporting_Level AVP indicating SPONSORED_CONNECTIVITY_LEVEL.	
<b>Comments:</b>		

## 5.2.2 PCEF Role

Test Selection: IUT takes the role of the PCEF; PICS A.2.2

### 5.2.2.1 Session request

TP_PCEF_IPS_01	Standards Reference: 4.5.1 (item 1)	PICS item:
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session establishment with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT <b>to indicate</b> a request for PCC rules at IP-CAN session establishment, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Subscription-Id AVP containing the user identification containing an IP-CAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP indicating the full IP address of the UE.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP.	

TP_PCEF_IPS_02	Standards Reference: 4.5.1 (item 1), 4.3a.4.1 ¶3	PICS item: A4.3
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules and install IP flow mobility routing rules at IP-CAN session establishment with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT <b>to indicate</b> a request for PCC rules at IP-CAN session establishment and <b>to install</b> IP flow mobility routing rules, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing a Subscription-Id AVP containing the user identification containing an IP-CAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP indicating the full IP address of the UE containing a Routing-Rule-Install AVP containing one or more Routing-Rule-Definition AVPs containing Routing-Filter AVP.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP.	

TP_PCEF_IPS_03	Standards Reference: 4.5.1	PICS item:
<b>Summary:</b>	Verify that the IUT can reject an IP-CAN session when receiving error from PCRF.	
<b>Initial Condition:</b>	IP-CAN session establishment is outstanding. The IUT has send a CC-Request to the PCRF. The PCRF is not able to provision a policy decision.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Answer</b> containing an Experimental-Result AVP containing an Experimental-Result_Code AVP indicating DIAMETER_ERROR_INITIAL_PARAMETERS, <b>rejects</b> the IP-CAN session establishment or modification.	
<b>Comments:</b>		

TP_PCEF_IPS_04	Standards Reference: 4.5.1	PICS item:
<b>Summary:</b>	Verify that the IUT can reject an IP-CAN session when receiving error from PCRF.	
<b>Initial Condition:</b>	IP-CAN session establishment is outstanding. The IUT has send a CC-Request to the PCRF. The new PCC rule is covered by the packet filters of outstanding PCC rules that the PCRF is provisioning.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Answer</b> containing an Experimental-Result AVP containing an Experimental-Result_Code AVP indicating DIAMETER_ERROR_CONFLICTING_REQUEST, <b>rejects</b> the IP-CAN session establishment or modification.	
<b>Comments:</b>		

<b>TP_PCEF_IPS_05</b>	<b>Standards Reference:</b> <b>4.5.1</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can reject an IP-CAN session when receiving error from PCRF.	
<b>Initial Condition:</b>	IP-CAN session establishment is outstanding. The IUT has send a CC-Request to the PCRF. The PCRF does not accept one or more of the traffic mapping filters.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Answer</b> containing an Experimental-Result AVP containing an Experimental-Result_Code AVP indicating DIAMETER_ERROR_TRAFFIC_MAPPING_INFO_REJECTED, <b>rejects</b> the IP-CAN session establishment or modification.	
<b>Comments:</b>		

<b>TP_PCEF_IPS_06</b>	<b>Standards Reference:</b> <b>4.5.4.2, 3<sup>rd</sup> paragraph</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process all Online_AVP and Offline_AVP in a CC-Answer from PCRF.	
<b>Initial Condition:</b>	IP-CAN session establishment is outstanding. The IUT has send a CC-Request to the PCRF. IUT has pre-configured Default charging method.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a CC-Answer</b> containing an Online_AVP containing an Offline_AVP, <b>accepts</b> the message and <b>overwrites</b> use of any pre-configured Default charging method.	
<b>Comments:</b>	NOTE: Verification of the result needs further study.	

### 5.2.2.2 Session modification

<b>TP_PCEF_MSI_01</b>	<b>Standards Reference:</b> <b>4.5.1 (item 2)</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session modification with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to indicate</b> a request for PCC rules at IP-CAN session modification, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing PCC rule(s) and their status containing a Event-Trigger AVP containing IP-CAN session modification.	
<b>Comments:</b>		

TP_PCEF_MSI_02	<b>Standards Reference:</b> 4.5.1 (item 2), 4.3a.4.1 ¶3	<b>PICS item:</b> A.4.3
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session modification and install IP flow mobility routing rules with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to indicate</b> a request for PCC rules at IP-CAN session modification and <b>to install</b> IP flow mobility routing rules, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing PCC rule(s) and their status containing a Event-Trigger AVP containing IP-CAN session modification containing a Routing-Rule-Install AVP containing one or more Routing-Rule-Definition AVPs containing Routing-Filter AVP.	
<b>Comments:</b>		

TP_PCEF_MSI_03	<b>Standards Reference:</b> 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 1 <sup>st</sup> dash)	<b>PICS item:</b> A.4.4.1
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session modification (UE requested allocation of new resources) with a CC-Request.	
<b>Initial Condition</b>	UE has requested allocation of new resources for PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to indicate</b> a request for PCC rules at IP-CAN session modification, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing PCC rule(s) and their status containing a Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating ADDITION containing one or more Packet-Filter-Information AVP containing a Precedence AVP containing a Packet-Filter-Content AVP containing QoS-Information AVP.	
<b>Comments:</b>		

TP_PCEF_MSI_04	<b>Standards Reference:</b> 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 2 <sup>nd</sup> dash)	<b>PICS item:</b> A.4.4.2
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session modification (UE requested modification of existing resources) with a CC-Request.	
<b>Initial Condition</b>	UE has requested modification of existing resources for PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to indicate</b> a request for PCC rules at IP-CAN session modification, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing PCC rule(s) and their status containing a Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating MODIFICATION containing one or more Packet-Filter-Information AVP.	
<b>Comments:</b>		

TP_PCEF_MSI_05	<b>Standards Reference:</b> 4.5.1 (item 2, 2 <sup>nd</sup> dashed list, 3 <sup>rd</sup> dash)	<b>PICS item:</b> A.4.4.3
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session modification (UE requested deletion of existing resources) with a CC-Request.	
<b>Initial Condition</b>	UE has requested deletion of existing resources for PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session is established, <b>to indicate</b> a request for PCC rules at IP-CAN session modification), <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating UPDATE_REQUEST containing a Charging-Rule-Report AVP containing PCC rule(s) and their status containing a Event-Trigger AVP indicating RESOURCE_MODIFICATION_REQUEST containing a Packet-Filter-Operation AVP indicating DELETION containing one or more Packet-Filter-Information AVP containing a Packet-Filter-Identifier AVP.	
<b>Comments:</b>		

### 5.2.2.3 Invalid Behaviour

Void

### 5.2.2.4 Session Termination

TP_PCEF_ST_01	<b>Standards Reference:</b> 4.5.7 ¶4, [7] 4.2.2.1	<b>PICS item:</b> A.4.7
<b>Summary:</b>	Verify that the IUT can terminate an IP-CAN session with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT, <b>when</b> an IP-CAN session is established, <b>to initiate</b> the IP-CAN session termination, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating <b>TERMINATION_REQUEST</b> .	
<b>Comments:</b>		

TP_PCEF_ST_02	<b>Standards Reference:</b> 4.5.9 ¶1, [7] 4.2.3.1	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can process a request for termination of an IP-CAN session.	
<b>Test purpose:</b>	Ensure that the IUT, <b>when</b> an IP-CAN session is established, <b>on receipt of a RA-Request</b> containing a Session-Release-Cause AVP, <b>sends a RA-Answer and</b> <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating <b>TERMINATION_REQUEST</b> .	
<b>Comments:</b>		

## 5.2.2.5 PCC rules

TP_PCEF_PCC_01	Standards Reference: 4.5.2 (2 <sup>nd</sup> dashed list 1 <sup>st</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating one PCC rule.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing one Charging-Rule-Install AVP containing a Charging-Rule-Name AVP providing a reference to one PCC rule, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>	NOTE: IP-CAN session identification is realized by DIAMETER session ID.	

TP_PCEF_PCC_02	Standards Reference: 4.5.2 ¶6	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating multiple PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing <b>multiple</b> Charging-Rule-Install AVPs containing a Charging-Rule-Base-Name AVP providing a reference to one PCC rule, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		

TP_PCEF_PCC_03	Standards Reference: 4.5.2 (after note 1)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) requesting confirmation of the successful allocation of resource to a PCC rule.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Name AVP providing a reference to a PCC rule containing a Resource-Allocation-Notification AVP indicating ENABLE_NOTIFICATION containing a Event-Trigger AVP indicating SUCCESSFUL_RESOURCE_ALLOCATION, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		

TP_PCEF_PCC_04	Standards Reference: 4.5.2 (2 <sup>nd</sup> dashed list 2 <sup>nd</sup> dash)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) installing or modifying a PCC rule.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		



<b>TP_PCEF_PCC_05</b>	<b>Standards Reference:</b> <b>4.5.2 (2<sup>nd</sup> dashed list 3<sup>rd</sup> dash)</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) deactivating or removing a PCC rule.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Name AVP, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		

<b>TP_PCEF_PCC_06</b>	<b>Standards Reference:</b> <b>4.5.2 ¶12</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) deactivating a group of PCC rules.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Base-Name AVP, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		

<b>TP_PCEF_PCC_07</b>	<b>Standards Reference:</b> <b>4.5.2.3 ¶1, 5.3.53</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating a PCC rule for a gate function.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Flow-Information AVP containing a Flow-Direction AVP indicating UPLINK or DOWNLINK containing a Packet-Filter-Identifier AVP, <b>sends an RA-Answer</b> containing a Media-Component-Description AVP containing a Flow Status AVP indicating if possible uplink or downlink gate is opened or closed.	
<b>Comments:</b>	NOTE: Check if answer is sent by SUT in case of optional AVP.	

<b>TP_PCEF_PCC_08</b>	<b>Standards Reference:</b> <b>4.5.2.5 ¶1</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating a PCC rule with usage monitoring control.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Monitoring-Key AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

<b>TP_PCEF_PCC_09</b>	<b>Standards Reference:</b> <b>4.5.3 ¶1 and 3</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) removing event triggers.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing an Event-Trigger AVP indicating NO_EVENT_TRIGGERS, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

<b>TP_PCEF_PCC_10</b>	<b>Standards Reference:</b> <b>4.5.4.4 ¶1 and 2</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) requesting provision of the access network charging identifier.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing an Event-Trigger AVP indicating CHARGING_CORELATION_EXCHANGE containing a Charging-Rule-Install AVP containing a Charging-Correlation-Indicator AVP indicating CHARGING_IDENTIFIER_REQUIRED, <b>sends an RA-Answer and</b> <b>sends a CC-Request</b> containing an Access-Network-Charging-Identifier-Gx AVP.	
<b>Comments:</b>		

<b>TP_PCEF_PCC_11</b>	<b>Standards Reference:</b> <b>4.5.5.2 ¶1 and 2</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) provisioning of authorized QoS.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a QoS-Information AVP not containing a Bearer-Identifier AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

<b>TP_PCEF_PCC_12</b>	<b>Standards Reference:</b> <b>4.5.12 ¶1</b>	<b>PICS item:</b>
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) trying to activate an unknown PCC rule.	
<b>Test purpose:</b>	Ensure that the IUT is in PUSH procedure, <b>on receipt of a RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Name AVP providing a reference to a non existing PCC rule, <b>sends a RA-Answer</b> containing a Charging-Rule-Report AVP containing a Charging-Rule-Name AVP containing a Rule-Failure-Code AVP indicating UNKNOWN_RULE_NAME containing a PCC-Rule-Status AVP indicating INACTIVE.	
<b>Comments:</b>		

TP_PCEF_PCC_13	Standards Reference: 4.5.12 ¶7	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) trying to activate a PCC rule with unknown values.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA- Request-</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Rating-Group AVP indicating unknown value, <b>sends an RA-Answer</b> containing a Charging-Rule-Report AVP containing a Charging Rule-Name AVP containing a Rule-Failure-Code AVP indicating RATING_GROUP_ERROR containing a PCC-Rule-Status AVP indicating INACTIVE.	
<b>Comments:</b>		

TP_PCEF_PCC_14	Standards Reference: 4.5.13	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating the revalidation timer.	
<b>Test purpose:</b>	Ensure that the IUT trigger a PCRF interaction to request PCC rules from the PCRF for an established IP CAN session <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Revalidation-Time AVP indicating a new value, <b>sends an RA-Answer,</b> and after revalidation timeout <b>sends a CC-Request.</b>	
<b>Comments:</b>		

TP_PCEF_PCC_15	Standards Reference: 4.5.13	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) stopping the revalidation timer.	
<b>Test purpose:</b>	Ensure that the IUT trigger a PCRF interaction to request PCC rules from the PCRF for an established IP CAN session <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Revalidation-Time AVP indicating a new value, <b>sends an RA-Answer,</b> and before revalidation timeout <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Event-Trigger AVP indicating REVALIDATION_TIMEOUT, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

TP_PCEF_PCC_16	Standards Reference: 4.5.13	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) activating a PCC rule with time of the day procedure.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Rule-Activation-Time AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

TP_PCEF_PCC_17	Standards Reference: 4.5.13	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) deactivating a PCC rule with time of the day procedure.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP containing a Rule-Deactivation-Time AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

TP_PCEF_PCC_18	Standards Reference: 4.5.2 (10 <sup>th</sup> paragraph)	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) combining multiple PCC rule operations.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Name AVP containing two Charging-Rule-Install AVPs containing a Charging-Rule-Definition AVP containing a Charging-Rule-Name AVP, <b>sends an RA-Answer</b> indicating the same IP-CAN session.	
<b>Comments:</b>		

TP_PCEF_PCC_19	Standards Reference: 4.5.3 ¶1	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) containing multiple event triggers.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing two Event-Trigger AVPs, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

TP_PCEF_PCC_20	Standards Reference: 4.5.5.0 ¶1 <sup>st</sup> dash	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) provisioning of authorized QoS for IP-CAN bearer.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of an RA-Request</b> containing a QoS-Information AVP containing a Bearer-Identifier AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

## 5.2.2.6 Special services and features

## 5.2.2.6.1 Emergency services

TP_PCEF_EMS_01	Standards Reference: 4.5.15.2.1 ¶2	PICS item:
<b>Summary:</b>	Verify that the IUT can indicate requests for PCC rules at IP-CAN session establishment to an emergency service with a CC-Request.	
<b>Test purpose:</b>	Ensure that the IUT <b>to indicate</b> a request for PCC rules for Emergency services at IP-CAN session establishment, <b>sends a CC-Request</b> containing a CC-Request-Type AVP indicating INITIAL_REQUEST containing an IP-CAN-Type AVP containing the type of IP-CAN containing a RAT-Type AVP containing the radio access technology containing a Framed-IP-Address AVP indicating the full IP address of the UE containing a Called-Station-Id AVP indicating the Emergency APN containing a Subscription-Id AVP indicating IMSI or containing a User-Equipment-Info AVP indicating IMEI.	
<b>Comments:</b>	In the case of IPv6 the Framed-IP-Address AVP is replaced by the Framed-IPv6-Address-Prefix AVP.	

## 5.2.2.6.2 Usage monitoring control

TP_PCEF_UMC_01	Standards Reference: 4.5.16 ¶2 and 5	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) requesting usage monitoring control.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a RA-Request</b> containing an Event-Trigger AVP containing an USAGE_REPORT containing a Usage-Monitoring-Information AVP containing a Granted-Service-Unit AVP containing a CC-Total-Octets AVP containing a CC-Input-Octets AVP containing a CC-Output-Octets AVP containing a Monitoring-Key AVP containing a monitoring key, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

## 5.2.2.6.3 Reporting Accumulated Usage

TP_PCEF_RAU_01	Standards Reference: 4.5.17.1	PICS item:
<b>Summary:</b>	Verify that the IUT can report that the usage threshold for a monitoring key has been reached with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A	
<b>Test purpose:</b>	Ensure that the IUT, <b>when</b> the usage threshold for Key_A is reached, <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating UPDATE_REQUEST. containing Event-Trigger AVP indicating USAGE_REPORT containing Usage-Monitoring-Information AVP containing Monitoring-Key AVP indicating Key_A containing Used-Service-Unit AVP containing CC-Total-Octets AVP indicating the total volume containing ( CC-Input-Octets AVP (Note 1) indicating the uplink volume or CC-Output-Octets AVP (Note 2) indicating the downlink volume ). ).	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	

TP_PCEF_RAU_02	Standards Reference: 4.5.17.2	PICS item:
<b>Summary:</b>	Verify that the IUT can report that the accumulated usage for a rule that has been removed or deactivated with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A	
<b>Test purpose:</b>	Ensure that the IUT: <b>on receipt of a RA-Request</b> removing or deactivating the PCC rule associated with Key_A, <b>sends a RA-Answer</b> <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating UPDATE_REQUEST containing Event-Trigger AVP indicating USAGE_REPORT containing Usage-Monitoring-Information AVP containing Monitoring-Key AVP indicating Key_A containing Used-Service-Unit AVP containing CC-Total-Octets AVP indicating the total volume containing ( CC-Input-Octets AVP (Note 1) indicating the uplink volume or CC-Output-Octets AVP (Note 2) indicating the downlink volume ). ).	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	

TP_PCEF_RAU_03	Standards Reference: 4.5.17.2	PICS item:
<b>Summary:</b>	Verify that the IUT can report that the accumulated usage for a rule that has been removed or deactivated with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A The IUT has sent a CC-Request not related to reporting usage for Key_A.	
<b>Test purpose:</b>	Ensure that the IUT having sent a CC-Request, <b>on receipt of a CC-Answer</b> removing or deactivating the PCC rule associated with Key_A, <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating UPDATE_REQUEST containing Event-Trigger AVP indicating USAGE_REPORT containing Usage-Monitoring-Information AVP containing Monitoring-Key AVP indicating Key_A containing Used-Service-Unit AVP containing CC-Total-Octets AVP indicating the total volume containing ( CC-Input-Octets AVP (Note 1) indicating the uplink volume or CC-Output-Octets AVP (Note 2) indicating the downlink volume ). ).	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	

TP_PCEF_RAU_04	Standards Reference: 4.5.17.4	PICS item:
<b>Summary:</b>	Verify that the IUT can report the accumulated usage at IP-CAN session termination with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A	
<b>Test purpose:</b>	Ensure that the IUT, when an IP-CAN session has terminated, <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating TERMINATION_REQUEST containing Usage-Monitoring-Information AVP containing Used-Service-Unit AVP containing CC-Total-Octets AVP indicating the total volume containing ( CC-Input-Octets AVP (Note 1) indicating the uplink volume or CC-Output-Octets AVP (Note 2) indicating the downlink volume ). ).	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	

TP_PCEF_RAU_05	Standards Reference: 4.5.17.5	PICS item:
<b>Summary:</b>	Verify that the IUT can report the accumulated usage requested by the PCRF for all monitored keys with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for multiple monitoring keys.	
<b>Test purpose:</b>	<p>Ensure that the IUT,</p> <p><b>on receipt of a RA-Request</b></p> <p>containing Usage-Monitoring-Information AVP  containing Usage-Monitoring-Report AVP  indicating USAGE_MONITORING_REPORT_REQUIRED  not containing Monitoring-Key AVP,</p> <p><b>sends a RA-Answer</b></p> <p><b>sends a CC-Request</b></p> <p>containing CC-Request-Type AVP  indicating UPDATE_REQUEST  containing Event-Trigger AVP  indicating USAGE_REPORT  containing one Usage-Monitoring-Information AVP per monitored key  containing Monitoring-Key AVP  containing Used-Service-Unit AVP  containing CC-Total-Octets AVP  indicating the total volume  containing  (</p> <p>CC-Input-Octets AVP (Note 1)  indicating the uplink volume</p> <p>or</p> <p>CC-Output-Octets AVP (Note 2)  indicating the downlink volume</p> <p>).</p>	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	



TP_PCEF_RAU_06	Standards Reference: 4.5.17.5	PICS item:
<b>Summary:</b>	Verify that the IUT can report the accumulated usage requested by the PCRF for one monitored keys with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a RA-Request</b> containing Usage-Monitoring-Information AVP containing Usage-Monitoring-Report AVP indicating USAGE_MONITORING_REPORT_REQUIRED containing Monitoring-Key AVP indicating Key_A, <b>sends a RA-Answer</b> <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating UPDATE_REQUEST containing Event-Trigger AVP indicating USAGE_REPORT containing Usage-Monitoring-Information AVP containing Monitoring-Key AVP indicating Key_A containing Used-Service-Unit AVP containing CC-Total-Octets AVP indicating the total volume containing ( CC-Input-Octets AVP (Note 1) indicating the uplink volume or CC-Output-Octets AVP (Note 2) indicating the downlink volume ).	
<b>Comments:</b>	NOTE 1: Only for uplink. NOTE 2: Only for downlink.	

TP_PCEF_RAU_07	Standards Reference: 4.5.17.3	PICS item:
<b>Summary:</b>	Verify that the IUT can report when a monitored key has been disabled with a CC-Request.	
<b>Initial Condition:</b>	Usage monitoring is enabled for monitoring key: Key_A.	
<b>Test purpose:</b>	Ensure that the IUT, <b>on receipt of a RA-Request</b> containing Usage-Monitoring-Information AVP containing Usage-Monitoring-Support AVP indicating USAGE_MONITORING_DISABLED, containing Monitoring-Key AVP indicating Key_A, <b>sends a RA-Answer</b> <b>sends a CC-Request</b> containing CC-Request-Type AVP indicating UPDATE_REQUEST containing Event-Trigger AV indicating USAGE_REPORT.	
<b>Comments:</b>		

## 5.2.2.6.4 IMS Restoration Support

TP_PCEF_IRS_01	Standards Reference: 4.5.18 ¶2	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) requesting IMS restoration support.	
<b>Test purpose:</b>	Ensure that the IUT: <b>on receipt of a RA- Request</b> containing a Charging-Rule-Install AVP containing a Charging-Rule-Definition AVP containing a Flow-Information AVP containing a AF-Signaling-Protocol AVP <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

TP_PCEF_IRS_02	Standards Reference: 4.5.18	PICS item:
<b>Summary:</b>	Verify that the IUT can successfully process an RA-Request (PUSH procedure) stopping the IMS restoration support.	
<b>Initial Condition:</b>	IMS restoration support is switched on.	
<b>Test purpose:</b>	Ensure that the IUT: <b>on receipt of a RA- Request</b> containing a Charging-Rule-Remove AVP containing a Charging-Rule-Name AVP, <b>sends an RA-Answer.</b>	
<b>Comments:</b>		

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## History

<b>Document history</b>		
V1.1.1	September 2012	Publication