



ABSTRACT TEST PLAN

# **ATP-069**

## **TR-069 Abstract Test Plan**

**Issue: 1**  
**Issue Date: February 2013**

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**Revision History**

<b>Issue Number</b>	<b>Approval Date</b>	<b>Publication Date</b>	<b>Issue Editor</b>	<b>Changes</b>
1	25 February 2013	18 March 2013	Tim Sheehan UNH-IOL	Original

Comments or questions about this Broadband Forum Abstract Test Plan should be directed to:

<b>Editor</b>	Timothy Sheehan	UNH-IOL	<a href="mailto:tsheehan@iol.unh.edu">tsheehan@iol.unh.edu</a>
<b>BroadbandHome</b>	Jason Walls	QACafe	<a href="mailto:jason@qacafe.com">jason@qacafe.com</a>
<b>WG Chair</b>	John Blackford	Pace	<a href="mailto:john.blackford@pace.com">john.blackford@pace.com</a>

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## **Executive Summary**

In order to ensure the continued growth of the TR-069 market and further the interoperability of the protocol, the Broadband Forum is creating a TR-069 Certification Program. Within this program, devices implementing a TR-069 management interface may be tested for their conformance to the TR-069 specification and various data-models. The TR-069 Certification Program will be released in differing phases, with the initial focus of verifying the conformance of a CPE device to the TR-069 base specification. To provide a consistent scope for this verification, the Broadband Forum developed test plans that are to be used by the testing agencies in the verification process.

ATP-069 provides a test plan that may be used to list the tests use to verify conformance of a CPE Device to the requirements defined in TR-069.

## **1 Purpose and Scope**

### **1.1 Purpose**

The purpose of ATP-069 is to provide a set of test cases, which will be used as a common testing language during CWMP CPE Conformance certification.

### **1.2 Scope**

The tests detailed in ATP-069 are only intended to facilitate TR-069 conformance testing. The tests in ATP-069 are limited to CWMP-enabled CPE devices.

All tests specified in ATP-069 are directly derived from the TR-069 specification.

## 2 References and Terminology

### 2.1 Conventions

In this Abstract Test Plan, several words are used to signify the requirements of the specification. These words are always capitalized. More information can be found in RFC 2119.

<b>MUST</b>	This word, or the term “REQUIRED”, means that the definition is an absolute requirement of the specification.
<b>MUST NOT</b>	This phrase means that the definition is an absolute prohibition of the specification.
<b>SHOULD</b>	This word, or the term “RECOMMENDED”, means that there could exist valid reasons in particular circumstances to ignore this item, but the full implications need to be understood and carefully weighed before choosing a different course.
<b>SHOULD NOT</b>	This phrase, or the phrase "NOT RECOMMENDED" means that there could exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications need to be understood and the case carefully weighed before implementing any behavior described with this label.
<b>MAY</b>	This word, or the term “OPTIONAL”, means that this item is one of an allowed set of alternatives. An implementation that does not include this option <b>MUST</b> be prepared to inter-operate with another implementation that does include the option.

## 2.2 References

The following references are of relevance to this Abstract Test Plan. At the time of publication, the editions indicated were valid.

A list of currently valid Broadband Forum Technical Reports is published at [www.broadband-forum.org](http://www.broadband-forum.org).

Document	Title	Source	Year
[1] TR-069 Amendment 4	<i>CPE WAN Management Protocol</i>	BBF	July 2011
[2] TR-098 Amendment 2	<i>Internet Gateway Device Data Model for TR-069</i>	BBF	Sept 2011
[3] TR-104	<i>Provisioning Parameters for VoIP CPE</i>	BBF	Sept 2005
[4] TR-106 Amendment 6	<i>Data Model Template for TR-069-Enabled Devices</i>	BBF	July 2011
[5] TR-135 Amendment 1	<i>Data Model for a TR-069 Enabled STB</i>	BBF	Nov 2010
[6] TR-140 Amendment 1	<i>TR-069 Data Model for Storage Service Enabled Devices</i>	BBF	April 2010
[7] TR-143 Corrigendum1	<i>Enabling Network Throughput Performance Test and Statistical Monitoring</i>	BBF	Dec 2008
[8] TR-157 Amendment 5	<i>Component Objects for CWMP</i>	BBF	Nov 2011
[9] TR-181 Issue 2 Amendment 2	<i>Device Data Model for TR-069</i>	BBF	Feb 2011
[10] TR-196 Issue2	<i>Femto Access Point Service Data Model</i>	BBF	Nov 2011
[11] <a href="#">RFC 2119</a>	<i>Key words for use in RFCs to Indicate Requirement Levels</i>	IETF	March 1997
[12] RFC 2131	<i>Dynamic Host Configuration Protocol</i>	IETF	March 1997
[13] RFC 2132	<i>DHCP Options and BOOTP Vendor Extensions</i>	IETF	March 1997
[14] RFC 3315	<i>Dynamic Host Configuration Protocol for IPv6 (DHCPv6)</i>	IETF	July 2003
[15] RFC 3489	<i>Session Traversal Utilities for NAT (STUN)</i>	IETF	March 2003
[16] RFC 5246	<i>The Transport Layer Security (TLS) Protocol</i>	IETF	Aug 2008

## 2.3 Definitions

<b>Auto-Configuration Server</b>	This is a component in the broadband network responsible for auto-configuration of the CPE for advanced services.
<b>Access Node</b>	DSL Access Multiplexer

## 2.4 Abbreviations

This Abstract Test Plan uses the following abbreviations:

<b>ACS</b>	Auto-Configuration Server
<b>CN</b>	Common Name
<b>CPE</b>	Customer Premise Equipment
<b>CWMP</b>	CPE WAN Management Protocol
<b>DHCP</b>	Dynamic Host Configuration Protocol
<b>DNS</b>	Domain Name System
<b>DUT</b>	Device Under Test
<b>FTP</b>	File transfer Protocol
<b>HTTP</b>	Hypertext Transfer Protocol
<b>HTTPS</b>	Hypertext Transfer Protocol over Secure Socket Layer
<b>ID</b>	Identifier
<b>IGD</b>	Internet Gateway Device
<b>IP</b>	Internet Protocol
<b>IPv6</b>	Internet Protocol version 6
<b>LAN</b>	Local Area Network
<b>NAT</b>	Network Address Translation
<b>NTP</b>	Network Time Protocol
<b>RFC</b>	Request for Proposal
<b>RG</b>	Residential Gateway
<b>RPC</b>	Remote Procedure Call
<b>SOAP</b>	Simple Object Access Protocol

<b>SSL</b>	Secure Socket Layer
<b>STB</b>	Set Top Box
<b>STUN</b>	Session Traversal Utilities for NAT
<b>TCP</b>	Transmission Control Protocol
<b>TFTP</b>	Tiny File transfer Protocol
<b>TLS</b>	Transport Layer Security
<b>TR</b>	Technical Report
<b>TTL</b>	Time to Live
<b>UDP</b>	User Datagram Protocol,
<b>URL</b>	Universal Resource Locator
<b>URN</b>	Uniform Resource Name
<b>UTC</b>	Coordinated Universal Time
<b>UTF</b>	Universal Multiple-Octet Coded Character Set Transformation Format
<b>UUID</b>	Universally Unique Identifier
<b>VoIP</b>	Voice over Internet Protocol
<b>WAN</b>	Wide Area Network
<b>XML</b>	Extensible Markup Language
<b>TR</b>	Technical Report
<b>WG</b>	Working Group

### **3 Abstract Test Plan Impact**

#### **3.1 Energy Efficiency**

ATP-069 has no impact on Energy Efficiency.

#### **3.2 IPv6**

ATP-069 is required to support the IPv6 protocol. DHCPv6 is used by the TR-069 protocol on the WAN to discover the CPE. DHCPv6 is also used on the LAN to determine Device Identity when testing gateways.

#### **3.3 Security**

ATP-069 requires the use of authentication when connecting CPE to an ACS. Use of an HTTPS URL indicates that the CPE can establish an SSL or TLS connection to the ACS.

Appendix B contains the steps that will be used to generate the Certificate of Authentication for this Certification Test Plan.

#### **3.4 Privacy**

ATP-069 has no direct impact on user data privacy.



## 4 Test Setup

### 4.1 Test Equipment

The necessary set of test equipment to deliver reliable and repeatable test results is specified in Table 1.

**Table 1: Required Test Equipment**

Test Equipment	Description and Functional Capabilities
CWMP Analyzer	For infrastructure needs, an CWMP Analyzer will be provided to emulate the connections from CPE under test to a WAN. This device will allow control of ACS protocol requests and responses.
Traffic Analyzer	To verify certain test metrics, Analyzers will be provided dependent upon the connection between the CPE and CWMP Analyzer.
Access Node	For infrastructure needs, a Access Node will be provided to bridge connections from the CPE under test to the CWMP Analyzer.
File Server	In order to facilitate testing the Download RPC and other RPCs, a file server will be provided on which firmware files are loaded that can then be accessed via HTTP and/or FTP.
CPE	Customer Premise Equipment are devices under test in this conformance test plan

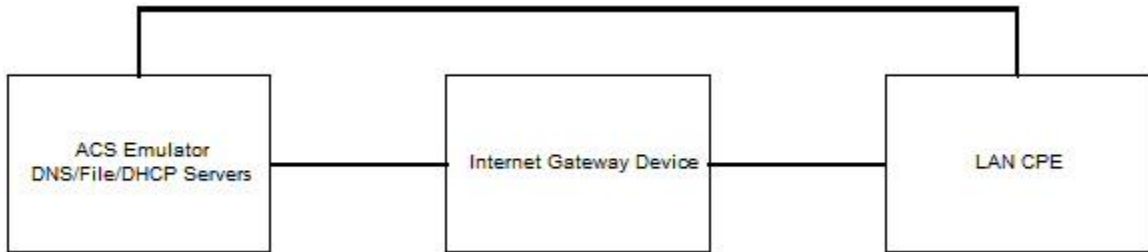
### 4.2 Test Setup and Execution

A typical basic test setup is shown below in Figure 1, this setup requires no media conversion. Figure 2 depicts a Basic IGD test setup that requires no media conversion. Figure 3 depicts a test setup that requires an access node and router to allow connection of ACS and CPE. Figure 4 shows the same access node test setup for IGD testing.

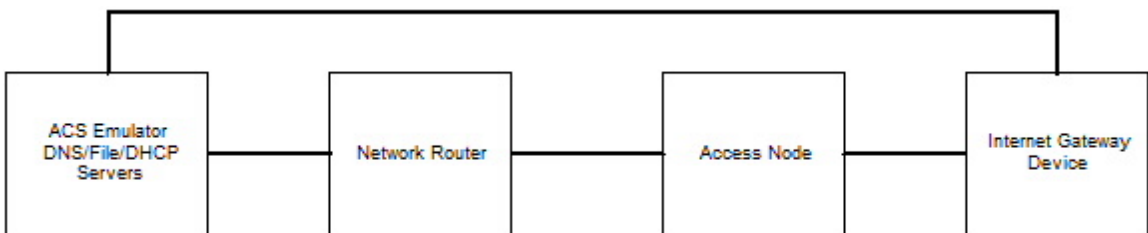
It is assumed that in the course of the testing, unless otherwise noted, that the network test setup remains in place for the duration of the entire test period. That is, though each test case specifies “connect the DUT and ACS to the test network” it is presumed that this setup remains connected in between test cases.



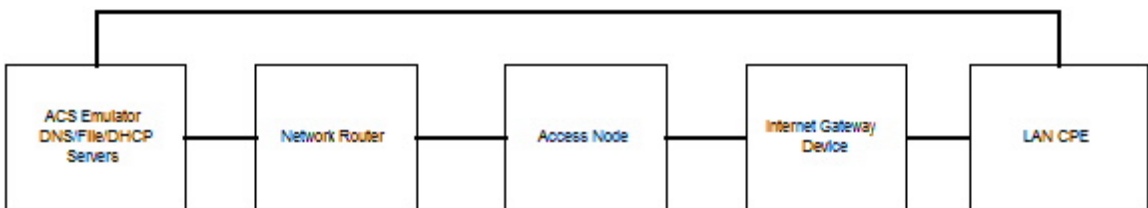
**Figure 1: RG Test setup via Ethernet**



**Figure 2: End Device Test Setup via Ethernet Through an RG**



**Figure 3: RG Test Setup via DSL/PON/Cable**



**Figure 4: End Device Test Setup via Ethernet through and RG that is connected via DSL/PON/CABLE**

### Test Execution

Each test is defined as either “automated” or “manual intervention required”. Automated tests are able to be performed sequentially by the test setup, through a test automation environment that is outside the scope of ATP-069. These tests, performed sequentially, may cause changes to the DUT’s state during the course of testing. It is recommended to perform all automated tests independently of those requiring manual intervention.

Those requiring manual intervention require some type of interaction between the performers of the test and the DUT’s interface in order to stimulate certain behavior as necessary in the test procedures. These interventions, and the tests themselves, may cause changes to the DUT’s state

during the course of testing. It is recommended to perform all manual tests independently of those that are able to be automated.

## Validation of Underlying Protocols and Universal Test Metrics

CWMP, as defined in TR-069, relies on several underlying protocols. While it is outside the scope of ATP-069 to exhaustively test the requirements of these underlying protocols, it is necessary to test the functionality that will be required in order to have a functional CWMP system.

For each test for which a CWMP transaction occurs, the following metrics apply:

1. Validate that the HTTP sent by the DUT conforms to RFC 2616, HTTP 1.1.
  - Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)
2. Verify that the DUT conforms to the requirements in TR-69 section 3.4.1 Encoding SOAP over HTTP and section 3.4.6 Additional HTTP requirements, specifically:
  - Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)
3. Validate the cookie handling requirements of TR-69 section 3.4.2. All tests in ATP-069 will use cookies marked for Discard.
4. Validate the SOAP body against the appropriate version of the TR-69 schema.
  - Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 4.3 CPE Test Requirements

In order to test the conformance of CPE devices, they MUST meet some requirements :

1. The CPE should be configurable, through non CWMP means, to allow modification of SSL, ACS usernames and passwords, ACS URL, and provide a means to change parameters for Active Notification tests.
2. The CPE MUST have two/three firmware images that are identical except for versioning to perform download testing.
3. The firmware images provided for certification MUST have “acs1.broadband-forum.org” as the default ACS URL. When a FactoryReset is performed this ACS URL value will persist.
4. The CPE should provide the means to monitor or configure the following:
  - a. Implemented RPCs
  - b. Implemented Optional RPCs

- c. At least one Parameter that supports Active Notification and value can be modified by non-CWMP methods
  - d. At least one Parameter that supports Passive Notification and value can be modified by non-CWMP methods
  - e. ACS Username and Password of “qacafe” and “qacafe123” respectively
  - f. ConnectionRequest Username and Password of “qacafe” and “qacafe123” respectively
  - g. Detailed steps to change ACS URL, ACS Username/Password, ConnectionRequest Username/Password, PeriodicInformInterval, PeriodicInformEnable, and CWMPEnable, via non-CWMP methods.
  - h. Parameters that can have Objects created and deleted
  - i. TR-069 container parameter (full path) that contains no leafs
  - j. Steps to perform FactoryReset and bring the device back to working order
  - k. Detailed steps to load a new Certificate of authentication
  - l. Detailed steps to download files
  - m. Detailed steps to upload files
  - n. Detailed steps to support CWMP DHCP options
  - o. Detailed steps to provision Primary WAN Connection
  - p. Detailed steps on activating any debug/logging feature
  - q. Detailed Recovery steps to bring the device back to working order
5. The CPE may either be a Residential Gateway or an End Device. The following four situations are possible
- a. The CPE is directly addressable RG.
  - b. The CPE is behind a bridged RG.
  - c. The CPE is behind a routed RG.
  - d. The CPE supports TR-069 Annex F/G STUN and UDP connection requests, the RG is a NAT enabled gateway.

#### 4.4 Test Validation

A test is considered successful (or passed) when the corresponding test procedure has been completed and the specified success metrics are attained. Tests can be validated by observing functional changes in the DUTs, through feedback interfaces on the devices under test, results attained from the CWMP Analyzer, and via an in-line protocol analyzer.

A test in ATP-069 can be designated as optional. The Optional Functionality Tag field in each test procedure define those test procedures that must be run against all DUTs because they represent Baseline Protocol functionality or will be run against a device that states it supports optional functionality in the TR-069 standard. If the Optional Functionality Tag field is set to Baseline Protocol, that test must be run against all DUTs seeking certification.

The Optional Functionality Tag labels a test as Mandatory or Conditionally Mandatory. Mandatory tests are tests that are required to be run against all DUTs being certified. Conditionally Mandatory tests are only run against DUTs that support stated functionality of the specific test.

Latency in the network or discrepancies in the clocks of the CPE and ACS can cause minor variations in the time values associated with each test case that contain metrics dealing with exact time values. Due to this variance, tests that have metrics dealing with exact times also have a latency time value associated that is either a plus(+) or minus(-) time value in the test metric.

## 5 Test Procedures

### 5.1 ACS Discovery using DHCPv4

**Purpose:**

This test is designed to verify that the DUT attempts to use DHCPv4 to discover the ACS URL when the DUT has no value for the ManagementServer.URL

**Optional Functionality Tag:**

Conditionally Mandatory - DHCPv4 ACS URL Discovery

**References:**

Section 3.1/TR-069a1 or later  
RFC 2132

**Test Execution Type:**

Manual

**Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must use DHCP to attempt to discover the ACS URL when the CPE has no value (empty or null) for the parameter ManagementServer.URL. A CPE identifies itself to the DHCP server as supporting this method by including the string “dslforum.org” (all lower case) anywhere in the Vendor Class Identifier ( DHCP option 60 ). The CPE may then use the values received from the DHCP server in the Vendor Specific Information ( DHCP option 43 ) to set the URL of the ACS and the Provisioning Code.

**Test Setup:**

1. Configure the DHCPv4 server or simulator to include the ACS URL in its DHCPv4 option 43.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv4 server or simulator, and CWMP Analyzer to the network infrastructure

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.2 ACS Discovery using DHCPv6

### **Purpose:**

This test is designed to verify that the DUT attempts to use DHCPv6 to discover the ACS URL when the DUT has no value for the ManagementServer.URL.

### **Optional Functionality Tag:**

Conditionally Mandatory - DHCPv6 ACS URL Discovery

### **References:**

Section 3.1/TR-069a3 or later  
RFC 3315

### **Test Execution Type:**

Manual

### **Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must use DHCP to attempt to discover the ACS URL when the CPE has no value (empty or null) for the parameter ManagementServer.URL . A CPE identifies itself to the DHCP server as supporting this method by including the string “dslforum.org” (all lower case) anywhere in the Vendor Class (DHCP option 16). The CPE may then use the values received from the DHCP server in the Vendor Specific Information (DHCPv6 option 17)to set the URL of the ACS and the Provisioning Code.

### **Test Setup:**

1. Configure the DHCPv6 server or simulator to include the ACS URL in its DHCPv6 options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv6 server or simulator, and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.3 ACS Rediscovery using DHCPv4

**Purpose:**

This test is designed to verify that the DUT consistently utilizes DHCPv4 to discover the ACS URL.

**Optional Functionality Tag:**

Conditionally Mandatory - DHCPv4 ACS URL Discovery

**References:**

Section 3.1/TR-069a1 or later  
RFC 2131

**Test Execution Type:**

Manual

**Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must utilize the same method for acquiring an ACS URL that it was originally configured to use, regardless of the mechanism used to change the ACS URL at a later point.

**Test Setup:**

1. Configure the DHCP server or simulator to include the ACS URL in its DHCPv4 options.
2. Configure the DUT to have a valid ACS URL.
3. Connect the DUT, DHCPv4 server or simulator, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.4 ACS Rediscovery using DHCPv6

### **Purpose:**

This test is designed to verify that the DUT consistently utilizes DHCPv6 to discover the ACS URL.

### **Optional Functionality Tag:**

Conditionally Mandatory - DHCPv6 ACS URL Discovery

### **References:**

Section 3.1/TR-069a3 or later  
RFC 3315

### **Test Execution Type:**

Manual

### **Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must utilize the same method for acquiring an ACS URL that it was originally configured to use, regardless of the mechanism used to change the ACS URL at a later point.

### **Test Setup:**

1. Configure the DHCPv6 server or simulator to include the ACS URL in its DHCPv6 options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv6 server or simulator, and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.5 DHCP Retry to the DHCPv4 server

### ***Purpose:***

This test is designed to verify that the DUT retries its DHCP message when it does not receive a reply from the DHCP server.

### ***Optional Functionality Tag:***

Conditionally Mandatory - DHCPv4 ACS URL Discovery

### ***References:***

Section 3.1/TR-069a1 or later  
RFC 2131

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must send a DHCP packet if it cannot communicate with the ACS indicated by the negotiated ACS URL value. Further, it must retry its DHCP packet if it does not receive a DHCPACK from the DHCP server within a reasonable time. This requirement is in accordance with RFC 2131.

### ***Test Setup:***

1. Configure the DHCP server or simulator to include the ACS URL in its DHCP options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.6 DHCP Retry to the DHCPv6 server

### **Purpose:**

This test is designed to verify that the DUT retries its DHCPv6 message when it does not receive a reply from the DHCP server.

### **Optional Functionality Tag:**

Conditionally Mandatory - DHCPv6 ACS URL Discovery

### **References:**

Section 3.1/TR-069a3 or later  
RFC 3315

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must send a DHCPv6 packet if it cannot communicate with the ACS indicated by the negotiated ACS URL value. Further, it must retry its DHCPv6 packet if it does not receive a DHCPACK from the DHCP server within a reasonable time. This requirement is in accordance with RFC 3315.

### **Test Setup:**

1. Configure the DHCP server or simulator to include the ACS URL in its DHCPv6 options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv6 server or simulator, and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.7 Session Initiation and Termination

### ***Purpose:***

This test is designed to verify that the CPE is able to initiate and terminate a session properly.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Sections 3.4.2, 3.7.1.1, 3.7.1.4/TR-069a1 or later

### ***Test Execution Type:***

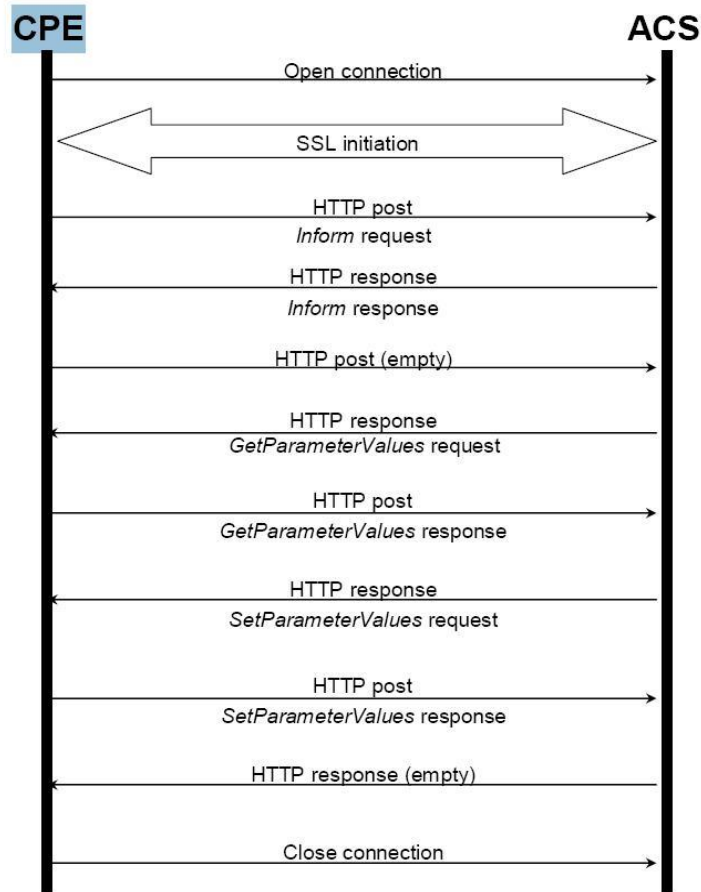
Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, once a connection between a CPE and an ACS is established, the CPE initiates a session by sending an initial Inform RPC on the ACS in an HTTP POST message. If and only if the CPE receives a successful Inform response to the Inform Request, the CPE considers the session to have been successfully initiated. Once initiated, the CPE must terminate the transaction session only when all of the following conditions are met:

- The ACS has no further requests to send the CPE. The CPE concludes this if and only if the most recent HTTP response from the ACS was empty.
- The CPE has no further requests to send to the ACS and the CPE has issued an empty HTTP POST to the ACS while HoldRequests is false (which indicates to the ACS that the CPE has no further requests for the remainder of the session). As defined in Table 6, if this condition has not been met but the CPE has no further requests or responses, it MUST send an empty HTTP POST, which will then fulfill this condition.
- The CPE has received all outstanding response messages from the ACS.
- The CPE has sent all outstanding response messages to the ACS resulting from prior requests.

Figure below is an example of a session.

**Test Setup:**

1. Configure the CPE to use the ACS URL set on the CWMP Analyzer.
2. Connect the CPE, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.8 Session Initiation and Termination With no RPC

### ***Purpose:***

This test is designed to verify that the CPE is able to initiate and terminate a session properly.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Sections 3.4.2, 3.7.1.1, 3.7.1.4/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, once a connection between a CPE and an ACS is established, the CPE initiates a session by sending an initial Inform RPC on the ACS in an HTTP POST message. If and only if the CPE receives a successful Inform response to the Inform Request, the CPE considers the session to have been successfully initiated. Once initiated, the CPE must terminate the transaction session only when all of the following conditions are met:

- The ACS has no further requests to send the CPE. The CPE concludes this if and only if the most recent HTTP response from the ACS was empty.
- The CPE has no further requests to send to the ACS and the CPE has issued an empty HTTP POST to the ACS while HoldRequests is false (which indicates to the ACS that the CPE has no further requests for the remainder of the session). As defined in Table 6, if this condition has not been met but the CPE has no further requests or responses, it MUST send an empty HTTP POST, which will then fulfill this condition.
- The CPE has received all outstanding response messages from the ACS.
- The CPE has sent all outstanding response messages to the ACS resulting from prior requests.

### ***Test Setup:***

1. Configure the CPE to use the ACS URL set on the CWMP Analyzer.
2. Connect the CPE, and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.9 Persistent TCP Connection Across a Single CWMP session

### ***Purpose:***

The purpose of this test is to verify that the ACS and CPE can maintain a persistent TCP connection across a single CWMP sessions.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.4.2/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, when a CPE receives an authentication challenge from ACS, the CPE must send the next HTTP request (including the “Authorization” HTTP header) in the same TCP connection unless the ACS specifically requested, via a “Connection: close” HTTP header, that the TCP connection be closed.

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.10 Multiple TCP Connections Across a Single CWMP session

### ***Purpose:***

This test is designed to verify that ACS and CPE can maintain multiple TCP connections over a single CWMP session.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.4.2/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, for a sequence of transactions forming a single session, a CPE should maintain a TCP connection that persists throughout the duration of the session. However, if the TCP connection is cleanly closed after an HTTP request/response round trip, and if the session has not otherwise terminated (either successfully or unsuccessfully) at the time of the last HTTP response, the CPE MUST continue the session by sending the next HTTP request in a new TCP connection.

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.11 Connection to ACS uses same mechanism after factory reset

**Purpose:**

This test is designed to verify that the DUT correctly connects to an ACS using the same connection mechanism as was used prior to the DUT being reset to factory defaults.

**Optional Functionality Tag:**

Conditionally Mandatory - DHCP ACS URL Discovery

**References:**

Section 3.1/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, the CPE MUST remember the mechanism it used to locate the ACS after each factory reset. If the CPE did not use DHCP to discover the ACS URL, then it SHOULD NOT fall back to using DHCP for ACS discovery. If the CPE originally used DHCP for ACS discovery, then when it fails to contact the ACS, it MUST perform re-discovery via DHCP.

**Test Setup:**

1. Configure the DUT to have an empty ACS URL.
2. Configure the DUT to use DHCP to discover the ACS
3. Connect the DUT, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.12 Handling Null Terminated ACS URL obtained from DHCPv4Server

### ***Purpose:***

This test is designed to verify that the DUT correctly interprets and acts upon the ACS URL used.

### ***Optional Functionality Tag:***

Conditionally Mandatory - DHCPv4 ACS URL Discovery

### ***References:***

Section 3.1/TR-069a1 or later  
RFC 2131

### ***Test Execution Type:***

Manual

### ***Normative Description:***

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must handle a null terminated ACS URL by accepting the URL as valid, without including the null terminating character in the URL.

### ***Test Setup:***

1. Configure the DHCPv4 server or simulator to include the ACS URL in its DHCPv4 options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv4 server or simulator, and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.13 Handling Null Terminated ACS URL obtained from DHCPv6 Server

**Purpose:**

This test is designed to verify that the DUT correctly interprets and acts upon the ACS URL used.

**Optional Functionality Tag:**

Conditionally Mandatory - DHCPv6 ACS URL Discovery

**References:**

Section 3.1/TR-069a3 or later  
RFC 3315

**Test Execution Type:**

Manual

**Normative Description:**

According to Broadband Forum TR-069 specification, a CWMP enabled CPE must handle a null terminated ACS URL by accepting the URL as valid, without including the null terminating character in the URL.

**Test Setup:**

1. Configure the DHCPv6 server or simulator to include the ACS URL in its DHCPv6 options.
2. Configure the DUT to have an empty or null value for the ManagementServer.URL parameter.
3. Connect the DUT, DHCPv6 server or simulator, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.14 Handling DNS server response

### ***Purpose:***

This test is designed to verify that the DUT does not cache the DNS server response beyond the duration of time to live (TTL) returned by DNS server.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.1/TR-069a1 or later  
DNS RFC 1034

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, the CPE must not cache the DNS server response beyond the duration of time to live (TTL) returned by DNS server unless it cannot contact the DNS server for an update. This behavior is required by DNS RFC 1034 and provides an opportunity for the DNS Server to update stale data.

### ***Test Setup:***

1. Configure the DUT to have a valid value for the ManagementServer.URL parameter. The URL requires DNS resolution
2. Connect the DUT, DNS server, DHCP server, and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.15 ACS Modifies URL

**Purpose:**

This test is designed to verify that the DUT accepts, interprets, and utilizes a new ACS URL set by the ACS via CWMP.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.1/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, once the CPE has established a connection to the ACS, the ACS may at any time modify the ACS address Parameter stored within the CPE. Once modified, the CPE must use the modified address for all subsequent connections to the ACS.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure an alternate instance or ACS URL on the CWMP Analyzer.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.16 ACS URL change on the DUT by third party means

### ***Purpose:***

This test is designed to verify that the DUT will send an Inform message when the ACS URL is modified by some third party means.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Optional CWMP Configuration

### ***References:***

Section 3.7.1.5/TR-069a1 or later

### ***Test Execution Type:***

Manual

### ***Normative Description:***

According to Broadband Forum TR-069 specification, if the ACS URL is modified by third party means then the DUT must send an Inform with an event code "0 BOOTSTRAP".

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **5.17 Parameters modified by ACS do not create a “4 VALUE CHANGE Inform event to the ACS**

***Purpose:***

This test is designed to verify that the DUT will not start a new session when a parameter is modified by the managing ACS.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.2.1/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, parameter changes made by the ACS itself via SetParameterValues MUST NOT cause a new session to be initiated.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure a parameter that is capable of being modified for “active notification” via SetParameterAttributes
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.18 Event Discard after BOOTSTRAP Inform

### ***Purpose:***

This test is designed to verify that the DUT correctly discards all undelivered events once a BOOTSTRAP has been sent.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.7.1.5/TR-069a1 or later

### ***Test Execution Type:***

Manual

### ***Normative Description:***

According to the Broadband Forum TR-069 specification, the CPE MUST NOT ever discard an undelivered BOOTSTRAP event. All other undelivered events MUST be discarded on BOOTSTRAP.

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.19 Connection after Connection Request

### **Purpose:**

This test is designed to verify that the DUT attempts to establish a connection with the ACS upon receiving a valid connection request from the ACS.

### **Optional Functionality Tag:**

Mandatory - Baseline Protocol

### **References:**

Sections 3.2.1, 3.2.2/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, the CPE MUST establish connection to the ACS after a valid connection request is received from an ACS. This is differentiated from a CPE that is connecting to an ACS in all previous tests.

A connection request is an HTTP 1.1 GET to a URL designated by the CPE. The URL value is available as read-only Parameter on the CPE. The path of this URL value SHOULD be randomly generated by the CPE so that it is unique per CPE.

The CPE must use HTTP digest authentication [7] to authenticate the ACS before proceeding—the CPE MUST NOT initiate a connection to the ACS due to an unsuccessfully authenticated request.

All CWMP sessions begin with the use of the Inform RPC. Each Inform RPC contains event codes in its arguments that indicate the event that caused the session to be initiated. In this case, the behavior is indicated by the event code “6 CONNECTION REQUEST”.

### **Test Setup:**

1. Configure the DUT with a connection request URL, connection request username, and connection request password.
2. Configure the CWMP Analyzer to use the pre-configured URL, username, and password for connection requests.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.20 Connection Request while session exists

### **Purpose:**

This test is designed to verify that the DUT that is already in an established session with an ACS, but then receives a Connection Request, does not terminate the existing session and either rejects the Connection Request or establishes a new session immediately following the existing session.

### **Optional Functionality Tag:**

Mandatory - Baseline Protocol

### **References:**

Sections 3.2.1, 3.2.2/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, if the CPE is already in a session with the ACS when it receives one or more Connection Requests, it MUST NOT terminate that session prematurely as a result.

The CPE MUST instead take one of the following alternative actions:

- Reject each Connection Request by responding with an HTTP 503 status code (Service Unavailable). In this case, the CPE SHOULD NOT include the HTTP Retry-After header in the response.
- Following the completion of the session, initiate exactly one new session (regardless of how many Connection Requests had been received during the previous session) in which it includes the “6 CONNECTION REQUEST” EventCode in the Inform. In this case, the CPE MUST initiate the session immediately after the existing session is complete and all changes from that session have been applied.

### **Test Setup:**

1. Configure the DUT with a connection request URL, connection request username, and connection request password.
2. Configure the CWMP Analyzer to use the pre-configured URL, username, and password for connection requests.
3. Configure the CWMP Analyzer to set the ManagementServer.PeriodicInformInterval to 10 and the ManagementServer.PeriodicInformEnabled to 1.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.21 Connection after PeriodicInformInterval

### **Purpose:**

This test is designed to verify that the CPE attempts to establish a connection with the ACS after a time period equal to ManagementServer.PeriodicInformInterval.

### **Optional Functionality Tag:**

Mandatory - Baseline Protocol

### **References:**

Section 3.2.1/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, the CPE MUST establish connection to the ACS after PeriodicInformInterval (example, after every 60 seconds). This is differentiated from a CPE connecting to an ACS for the first time, or a CPE connecting to the ACS after reboot.

All CWMP sessions begin with the use of the Inform RPC. Each Inform RPC contains event codes in its arguments that indicate the event that caused the session to be initiated. In this case, the behavior is indicated by the event code “2 PERIODIC”.

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a short value for the ManagementServer.PeriodicInformInterval, between 60 and 300 seconds. Configure the DUT to use this value for ManagementServer.PeriodicInformInterval.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.22 Connection Establishment using SSL 3.0

**Purpose:**

This test is designed to verify that the CPE is able to establish a connection with the ACS using SSL 3.0.

**Optional Functionality Tag:**

Conditionally Mandatory - Secure CWMP Session – SSL3.0

**References:**

Section 3.3/TR-069a1 and TR-069a2

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, The CPE MUST support SSL3.0, TLS 1.0 or both.

**Test Setup:**

1. Configure the CWMP Analyzer to use SSL 3.0.
2. Configure the DUT to use the HTTPS URL of the analyzer.
3. Configure the DUT with a pre-determined username and password for authentication.
4. Generate and install on the DUT a valid certificate for use in authentication with the CWMP Analyzer.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.23 Connection Establishment using TLS 1.0

**Purpose:**

This test is designed to verify that the CPE is able to establish a connection with the ACS using TLS 1.0.

**Optional Functionality Tag:**

Conditionally Mandatory - Secure CWMP Session – TLS 1.0

**References:**

Section 3.3/TR-069a1 and TR-069a2

**Test Execution Type:**

Automated

**Normative Description:**

The CPE MUST support SSL3.0, TLS 1.0 or both.

**Test Setup:**

1. Configure the CWMP Analyzer to use TLS 1.0.
2. Configure the DUT to use the HTTPS URL of the analyzer.
3. Configure the DUT with a pre-determined username and password for authentication.
4. Generate and install on the DUT a valid certificate for use in authentication with the CWMP Analyzer.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.24 Connection Establishment using TLS 1.2

### ***Purpose:***

This test is designed to verify that the CPE is able to establish a connection with the ACS using TLS 1.2.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Secure CWMP Session – TLS 1.2

### ***References:***

Section 3.3/TR-069a3 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

The CPE Should support TLS 1.2 (or a later version).

### ***Test Setup:***

1. Configure the CWMP Analyzer to use TLS 1.2.
2. Configure the DUT to use the HTTPS URL of the analyzer.
3. Configure the DUT with a pre-determined username and password for authentication.
4. Generate and install on the DUT a valid certificate for use in authentication with the CWMP Analyzer.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.25 Common Name certificate validation

### ***Purpose:***

This test is designed to verify that the CPE is able to verify that the Common Name component of the subject field of the ACS certificate is the same as that in the host portion of the ACS URL.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Secure CWMP Session

### ***References:***

Section 3.3/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, authentication of the ACS requires that the CPE MUST validate the certificate against a root certificate, and that the CPE MUST ensure that the value of the CN (Common Name) component of the Subject field in the certificate exactly matches the host portion of the ACS URL known to the CPE (even if the host portion of the ACS URL is an IP address).

### ***Test Setup:***

1. Configure the CWMP Analyzer to use SSL/TLS.
2. Configure the DUT and CWMP Analyzer with a pre-determined username and password for authentication.
3. Generate and install on the CWMP Analyzer a valid certificate for use in authentication with the CPE.
4. Configure the DUT to have a valid CA certificate.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.26 Rejection of Invalid Certificate

### ***Purpose:***

This test is designed to verify that the CPE does not authenticate a Communication from the ACS when the certificate is invalid.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Secure CWMP Session

### ***References:***

Section 3.3/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE MAY use certificate based authentication to validate Connection Requests from the ACS. If the DUT implements this functionality, it must not validate Connection Requests from the ACS when the certificate is invalid.

### ***Test Setup:***

1. Configure the CWMP Analyzer to use appropriate SSL/TLS.
2. Configure the DUT to use the HTTPS URL of the analyzer.
3. Configure the DUT with a pre-determined username and password for authentication.
4. Install mismatched certificates in the DUT and CWMP Analyzer.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.27 Use of Multiple Session Cookies Across Transactions in a Session

### *Purpose:*

This test is designed to verify that the CPE can successfully interact using cookies across multiple CWMP sessions.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 3.4.2/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, a CPE must support the use of cookies including the return of the cookie value in each subsequent HTTP POST, with the exception that a CPE need not support storage of cookies beyond the duration of a session. The CPE must support the compatibility requirements of section 9.1 of [7]. The CPE must support the use of multiple cookies by the ACS, and must make available at least 512 bytes for storage of cookies.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to use session cookies.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.28 Session Retry

### ***Purpose:***

This test is designed to verify that the DUT retries a failed session with the ACS.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.2.1.1/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE must retry failed sessions to attempt to redeliver events that it has previously failed to deliver and to allow the ACS to make additional requests in a timely fashion. The CPE **MUST** keep track of the number of times it has attempted to retry a failed session.

If the CPE fails to establish a session, this might be because the CPE supports CPE WAN Management Protocol v1.1 (or later) and the ACS supports only v1.0. If this situation is suspected, the CPE **MUST** revert to v1.0 when retrying the failed session.

A CPE **MUST** retry a failed session after waiting for an interval of time specified in the following Table or when a new event occurs, whichever comes first. The CPE **MUST** choose the wait interval by randomly selecting a number of seconds from a range given by the post-reboot session retry count. Beginning with the tenth post-reboot session retry attempt, the CPE **MUST** choose from a range between 2560 and 5120 seconds. The CPE **MUST** continue to retry a failed session until it is successfully terminated. Once a session terminates successfully, the CPE **MUST** reset the session retry count to zero and no longer applies the session retry policy to determine when to initiate the next session.

The CPE receives an HTTP layer fault from the ACS notifying it to revert back to CWMP v 1.0. It retries session with the ACS by reverting back to v1.0 when retrying the failed session.

Post reboot session retry count	Wait interval range (min-max seconds)
#1	5-10
#2	10-20
#3	20-40
#4	40-80
#5	80-160
#6	160-320
#7	320-640
#8	640-1280
#9	1280-2560
#10 and subsequent	2560-5120

***Test Setup:***

1. Configure the CPE to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.29 SOAP Response in an HTTP Request

### ***Purpose:***

This test is designed to verify that the SOAP Response is encoded properly in an HTTP Request Message.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.4.1/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, when there is a SOAP response in an HTTP Request, or when there is a SOAP Fault response in an HTTP Request, the SOAPAction header in the HTTP Request MUST have no value (with no quotes), indicating that this header provides no information as to the intent of the message. That is, it must appear as follows:

SOAPAction:

In addition to that, when an HTTP Request contains a SOAP Envelope, the HTTP Content-Type header must have a type/subtype of "text/xml"

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.30 HTTP Redirection Test – 302 Redirect

**Purpose:**

This test is designed to verify that the CPE supports the use of HTTP redirection by the ACS using the 302 (Found) status code.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, a CPE must support the use of HTTP redirection by the ACS. In doing so, the CPE must support the 302(Found) HTTP status code. In case of redirection, the CPE must attempt to continue the session using the URL provided in the HTTP redirect response. The CPE must resend the HTTP POST that resulted in the redirect response to the ACS at the redirected URL, and the CPE must then attempt to proceed with the session exactly as if no redirection had occurred. The redirected URL must not be saved by the CPE (i.e. as the value of the IGD.ManagementServer.URL) for use in any subsequent session or any subsequent retries of the session.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. If the CWMP Analyzer is capable of supporting multiple ACS URLs, configure an alternate ACS URL on the CWMP Analyzer.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### 5.31 HTTP Redirection Test – 307 Redirect

**Purpose:**

This test is designed to verify that the CPE supports the use of HTTP redirection by the ACS using the 307 (Temporary Redirect) status code.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, a CPE must support the use of HTTP redirection by the ACS. In doing so, the CPE must support the 307(Temporary) HTTP status code. In case of redirection, the CPE must attempt to continue the session using the URL provided in the HTTP redirect response. The CPE must resend the HTTP POST that resulted in the redirect response to the ACS at the redirected URL, and the CPE must then attempt to proceed with the session exactly as if no redirection had occurred. The redirected URL must not be saved by the CPE (i.e. as the value of the IGD.ManagementServer.URL) for use in any subsequent session or any subsequent retries of the session.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. If the CWMP Analyzer is capable of supporting multiple ACS URLs, configure an alternate ACS URL on the CWMP Analyzer.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.32 HTTP Redirection – Multiple Redirections

**Purpose:**

This test is designed to verify that the CPE allows up to 5 consecutive redirections.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, a CPE must allow up to 5 consecutive redirections. If the CPE is redirected more than 5 times consecutively, it may consider the session unsuccessfully terminated.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure Two ACS URLs on the CWMP Analyzer.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **5.33 HTTP Redirection – HTTPS with URL Matching Certificate**

***Purpose:***

This test is designed to verify that the CPE supports the use of HTTP redirection by the ACS to an HTTPS URL.

***Optional Functionality Tag:***

Conditionally Mandatory - Secure CWMP Session

***References:***

Section 3.4.2/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, if an HTTPS URL is provided in the HTTP redirection, by the ACS, the CPE must use SSL/TLS as transport mechanism, and establish connection with the HTTPS URL.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. If the CWMP Analyzer is capable of supporting multiple ACS URLs, configure an alternate https ACS URL on the CWMP Analyzer.
3. Generate the proper certificates for the alternate https URL.
4. Install the proper certificates on the DUT
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.34 HTTP Redirection – HTTPS with URL/Certificate Mismatch

***Purpose:***

This test is designed to verify that, when redirected, the CPE does not connect to an ACS with an HTTPS URL when the certificate is invalid for the URL.

***Optional Functionality Tag:***

Conditionally Mandatory - Secure CWMP Session

***References:***

Section 3.4.2/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, if as a result of an HTTP redirect, the CPE is attempting to access an ACS at a URL different from its pre-configured ACS URL, the CPE MUST validate the CN component of the ACS certificate against the host portion of the redirected ACS URL rather than the pre-configured ACS URL.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP analyzer.
2. If the CWMP analyzer is capable of supporting multiple ACS URLs, configure an alternate https ACS URL on the CWMP analyzer.
3. Generate the proper certificates for the original ACS URL.
4. Install the certificates on the DUT.
5. Connect the DUT and CWMP analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.35 Redirection at any Point in a Session

**Purpose:**

This test is designed to verify that the DUT correctly interprets and acts upon a Redirection request during an open session

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, the CPE MUST allow redirection to occur at any point during a session (including the Inform response), and the ACS MAY issue a redirect at any point during a session.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.36 HTTP Redirection – Use of session cookies

***Purpose:***

This test is designed to verify that the CPE can successfully communicate using cookies even after HTTP redirection.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.4.2/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE must include all cookies associated with the session in subsequent HTTP requests to the redirected ACS. The CPE must consider a redirect from an ACS to be a “verifiable transaction” and thus it must send cookies to the redirected ACS without performing domain validation of each cookie.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. If the CWMP Analyzer is capable of supporting multiple ACS URLs, configure an alternate ACS URL on the CWMP Analyzer.
3. Configure the CWMP Analyzer to use session cookies.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.37 Redirect HTTP Response Contains Data

**Purpose:**

This test is designed to verify that the DUT correctly interprets and acts upon a non-empty HTTP Response sent from the ACS.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, in an HTTP response sent by the ACS containing a redirect status code, the length of the HTTP message-body MUST be zero. If the CPE receives an HTTP re-direct response with a non-empty message-body, it MUST ignore the content of the message-body.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to send an HTTP Response that contains data.
3. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.38 HTTP Authentication - Basic Authentication

***Purpose:***

This test is designed to verify that the CPE can successfully establish a CWMP session with the ACS using basic authentication.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.4.4/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE must support Basic Authentication.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to use basic authentication.
3. The CWMP Analyzer is configured with proper credentials for the DUT.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### 5.39 Qop Authentication setting

**Purpose:**

This test is designed to verify that the DUT correctly sets the qop authentication field to “auth”

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.4.5/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, the CPE and the ACS MUST support the RFC 2617 “qop” option containing the value “auth”.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to use Digest authentication.
3. The CWMP Analyzer is configured with proper credentials for the DUT.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.40 HTTP Authentication - Digest Authentication

### *Purpose:*

This test is designed to verify that the CPE can successfully establish a CWMP session with the ACS using digest authentication.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 3.4.4/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, a CPE must support Digest Authentication.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to use Digest authentication.
3. The CWMP Analyzer is configured with proper credentials for the DUT.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.41 Maximum SOAP Message Size

***Purpose:***

This test is designed to verify that the DUT can accept a SOAP message of 32768 bytes.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.5/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, a CPE MUST be able to accept a SOAP request with a total envelope size of at least 32 kilobytes (32768 bytes) without resulting in a “Resources Exceeded” response.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to create and send a 32768 byte SOAP message.
3. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.42 SetParameterValues SOAP Fault Format

***Purpose:***

This test is designed to verify that the SetParameterValuesFault element in a SOAP Fault response is formed properly.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.5/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, along with the SOAP fault requirements outlined in the SOAP Fault Format test case, a SOAP Fault error during SetParameterValues must contain a SetParameterValuesFault element. This element is to be used only in an error response to the SetParameterValues method, that contains a list of one or more structures indicating the specific fault associated with each parameter in error. The structure contains the following elements:

- A ParameterName element that contains the full path name of the parameter in error.
- A FaultCode element that contains a single numeric fault code that indicates the fault associated with the particular parameter in error.
- A FaultString element that contains a human readable description of the fault for the particular parameter in error.

```

<soap:Envelope
  xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:cwmp="urn:dslforum-org:cwmp-1-0">
  <soap:Header>
    <cwmp:ID soap:mustUnderstand="1">1234</cwmp:ID>
  </soap:Header>
  <soap:Body>
    <soap:Fault>
      <faultcode>Client</faultcode>
      <faultstring>CWMP fault</faultstring>
      <detail>
        <cwmp:Fault>
          <FaultCode>9003</FaultCode>
          <FaultString>Invalid arguments</FaultString>
          <SetParameterValuesFault>
            <ParameterName>
              InternetGatewayDevice.Time.LocalTimeZone
            </ParameterName>
            <FaultCode>9012</FaultCode>
            <FaultString>Not a valid time zone value</FaultString>
          </SetParameterValuesFault>
        </cwmp:Fault>
      </detail>
    </soap:Fault>
  </soap:Body>
</soap:Envelope>

```

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid, writable parameter from the DUT's supported data model.
3. Construct an invalid parameter name within the context of the DUT's supported data model.
4. Select a non-writable parameter from the DUT's supported data model.
5. Choose a parameter with a restrictive data type in the DUT's supported data model.
6. Choose a parameter with restricted possible values in the DUT's supported data model.
7. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.43 GetRPCMethods and Required RPCs

***Purpose:***

This test is designed to verify that the CPE supports all the required RPCs.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.1.1/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE must support the following required RPCs, and may optionally support other RPCs: GetRPCMethods, SetParameterValues, GetParameterValues, GetParameterNames, SetParameterAttributes, GetParameterAttributes, AddObject, DeleteObject, Reboot, Download.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

#### 5.44 GetParameterNames – Complete Path

***Purpose:***

This test is designed to verify that the CPE is capable of responding to a simple complete path request made by the ACS to determine its accessibility.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.1.1/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, a CPE must support the following required RPCs, and may optionally support other RPCs: GetRPCMethods, SetParameterValues, SetParameterValues, GetParameterNames, SetParameterAttributes, GetParameterAttributes, AddObject, DeleteObject, Reboot, Download.

The GetParameterNames RPC is used to determine the availability of parameters in the CPEs data model and their access level. The RPC can a complete or partial path as its argument; this test exercises the ability to complete the GetParameterNames RPC using a complete parameter path.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

#### 5.45 GetParameterNames – Complete Path, NextLevel True

***Purpose:***

This test is designed to verify that the CPE is capable of appropriately responding to a simple complete path request with the NextLevel set to True made by the ACS.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.2.3/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

If NextLevel is true and ParameterPath is a Parameter name rather than a partial path, the CPE MUST return a fault response with the Invalid Arguments fault code (9003).

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



#### **5.46 GetParameterNames – Partial Path – Next Level True**

***Purpose:***

This test is designed to verify that the CPE is capable of responding to a partial path request made by the ACS when next level is set to true.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.2.3/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, when next level argument in GetParameterNames is set to true, the response from the DUT must contain all parameters and objects that are next-level children of the object given by the ParameterPath argument, if any. For example, if ParameterPath were “InternetGatewayDevice.LANDevice.1.Hosts.”, the response would include the following:

InternetGatewayDevice.LANDevice.1.Hosts.HostNumberOfEntries

InternetGatewayDevice.LANDevice.1.Hosts.Host

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

#### 5.47 GetParameterNames – Partial Path – Next Level False

**Purpose:**

This test is designed to verify that the CPE is capable of responding to a partial path request made by the ACS when next level is set to false.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section A.3.2.3/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, when next level argument in GetParameterNames is set to false, the response must contain the parameter or object whose name exactly matches the ParameterPath argument, if any (all levels below the specified object in the object hierarchy). For example, if ParameterPath were “InternetGatewayDevice.LANDevice.1.Hosts”, the response may include the following:

InternetGatewayDevice.LANDevice.1.Hosts.  
InternetGatewayDevice.LANDevice.1.Hosts.HostNumberOfEntries  
InternetGatewayDevice.LANDevice.1.Hosts.Host.  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.IPAddress  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.AddressSource  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.LeaseTimeRemaining  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.MACAddress  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.HostName  
InternetGatewayDevice.LANDevice.1.Hosts.Host.1.InterfaceType

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.48 GetParameterNames – Invalid Path

### *Purpose:*

This test is designed to verify that the CPE can identify an invalid path and respond with appropriate error message to a GetParameterNames request on an invalid parameter.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.3/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, when a GetParameterNames is attempted on an invalid parameter, the CPE must respond with a 9005 (Invalid Parameter Name) fault code.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose an incorrect parameter path name that has some contextual meaning to the DUT's supported data model. For example, "Device.DeviceInfo.Invalid."
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.49 GetParameterNames – Entire Object Model

### *Purpose:*

This test is designed to verify that the CPE can communicate its entire object model to the ACS.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.3/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, when ParameterPath argument in the GetParameterNames is set to the root object in the DUT's data model (i.e., "InternetGatewayDevice.", or "Device."), and next level argument in GetParameterNames is set to false, the response must contain the entire object model supported by the DUT.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.50 GetParameterValues – Simple Complete Path

### *Purpose:*

This test is designed to verify that the CPE can respond to a GetParameterValues request by the ACS on a simple complete path.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.2/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to BroadBand Forum TR-069 specification, a CPE must be able to respond to a GetParameterValues Request from an ACS when the argument is an array of strings, each representing the name of a requested parameter.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid parameter from the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.51 GetParameterValues – Multiple Complete Paths

**Purpose:**

This test is designed to verify that the CPE can respond to a GetParameterValues request by the ACS on a complete path.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.2.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to BroadBand Forum TR-069 specification, a CPE must be able to respond to a GetParameterValues Request from an ACS when the argument is an array of strings, each representing the name of a requested parameter.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose two valid parameters from the DUTs supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.52 GetParameterValues – Partial Path

### *Purpose:*

This test is designed to verify that the CPE can respond to a GetParameterValues request by the ACS on a partial path.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.2/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to BroadBand Forum TR-069 specification, a CPE must be able to respond to a GetParameterValues Request from an ACS when the argument is an array of strings, each representing the name of a requested parameter. If the parameter name argument is given as a partial path name, the request is to be interpreted as a RPC on return all of the Parameters in the branch of the naming hierarchy that shares the same prefix as the argument. A partial path name must end with a “.”(dot) after the last node name in the hierarchy. An empty string indicates the top of the name hierarchy.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid partial parameter path from the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### 5.53 GetParameterValues – Complete and Partial Paths

**Purpose:**

This test is designed to verify that the CPE can respond to a GetParameterValues request by the ACS on both complete and partial paths.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section A.3.2.2/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to BroadBand Forum TR-069 specification, a CPE must be able to respond to a GetParameterValues Request from an ACS when the argument is an array of strings, each representing the name of a requested parameter. If the parameter name argument is given as a partial path, the request is to be interpreted as a RPC to return all of the Parameters in the branch of the naming hierarchy that shares the same prefix as the argument. A partial path name must end with a “.”(dot) after the last node name in the hierarchy. An empty string indicates the top of the name hierarchy.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose two valid parameter paths from the DUT’s supported data model, one partial and one complete path.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.54 GetParameterValues – Entire Object Model

### *Purpose:*

This test is designed to verify that the CPE can respond to a GetParameterValues request by the ACS on a partial path representing the top level in the data model with the entire object model.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.2/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to BroadBand Forum TR-069 specification, a CPE must be able to respond to a GetParameterValues Request from an ACS when the argument is an array of strings, each representing the name of a requested parameter. If the parameter name argument is given as a partial path name, the request is to be interpreted as a RPC on return all of the Parameters in the branch of the naming hierarchy that shares the same prefix as the argument. A partial path name must end with a “.”(dot) after the last node name in the hierarchy. An empty string indicates the top of the name hierarchy.

Unlike the GetParameterNames RPC, a CPE may reject a GetParameterValues call on the entire object model. However, it may only do so due to a “9004 Resources Exceeded” error.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.55 GetParameterValues – Fault condition

### *Purpose:*

This test is designed to verify that the CPE can respond to a GetParameterValues appropriately if there is a fault condition with the ParameterNames element.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.2/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum Tr-069 specification, if the fault is caused by one or more invalid parameter names in the ParameterNames array, the Invalid Parameter Name fault code (9005) MUST be used instead of the more general Invalid Arguments fault code (9003). The value of a ParameterNames element MUST be considered invalid if it does not exactly match either the name of a parameter currently present in the CPE's data model (if the ParameterNames element does not end with a dot) or the name of an object currently present in the CPE's data model (if ParameterNames element ends with a dot).

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid parameter from the DUT's supported data model, but incorrectly modify the ParameterNames parameter.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.56 SetParameterValues – Single Parameter

### *Purpose:*

This test is designed to verify that the CPE supports the required SetParameterValues RPC and can change a single parameter.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.1/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, if an ACS calls SetParameterValues on a DUT, the DUT must support the request and respond appropriately. On successful receipt of a SetParameterValues RPC, the CPE must apply the changes to all of the specified Parameters atomically. That is, either all of the value changes are applied together, or none of the changes are applied at all. In the latter case, the CPE must return a fault response indicating the reason for the failure to apply the changes. The CPE must not apply any of the specified changes without applying all of them. This requirement must hold true even if the CPE experiences a crash during the process of applying the changes.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid, writable parameter from the DUT's supported data model.
3. Configure the CWMP Analyzer to set the ParameterKey argument in the GetParameterValues RPC to a unique value.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.57 SetParameterValues – Multiple Parameters

**Purpose:**

This test is designed to verify that the CPE supports the required SetParameterValues RPC and can change multiple parameters in a single procedure call.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section A.3.2.1/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, if an ACS calls SetParameterValues on a DUT, the DUT must support the request and respond appropriately. On successful receipt of a SetParameterValues RPC, the CPE must apply the changes to all of the specified Parameters atomically. That is, either all of the value changes are applied together, or none of the changes are applied at all. In the latter case, the CPE must return a fault response indicating the reason for the failure to apply the changes. The CPE must not apply any of the specified changes without applying all of them. This requirement must hold true even if the CPE experiences a crash during the process of applying the changes.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose at least two valid, writable parameters from the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.58 SetParameterValues – Same Parameter Multiple Times

### *Purpose:*

This test is designed to verify that the CPE supports the required SetParameterValues RPC and can respond back with the appropriate error code when a value for the same Parameter Name is set twice in the same SetParameterValues RPC.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.1/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, the ParameterList array, in the SetParameterValues RPC, MUST NOT contain more than one entry with the same Parameter name. If a given Parameter appears in this array more than once, the CPE MUST respond with fault 9003 (Invalid arguments).

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose at least one valid, writable parameters from the DUT's supported data model. Have the CWMP Analyzer set that parameter value twice in the same ParameterList of a SetParameterValues RPC.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.59 SetParameterValues – Atomic Test

### *Purpose:*

This test is designed to verify that the CPE supports the required SetParameterValues RPC. When the SetParameterValues RPC contains multiple entries and one is incorrect that it will respond with the correct Fault code.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.1/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum Tr-069 specification, on successful receipt of a SetParameterValues RPC, the CPE MUST apply the changes to all of the specified Parameters atomically. That is, either all of the value changes are applied together, or none of the changes are applied at all. In the latter case, the CPE MUST return a fault response indicating the reason for the failure to apply the changes. The CPE MUST NOT apply any of the specified changes without applying all of them.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose at least two valid, writable parameters from the DUT's supported data model. Allow one of the Parameter Names to be set incorrectly.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.60 GetParameterAttributes – Complete Path

### *Purpose:*

This test is designed to verify that the CPE can provide attribute information of a single complete path.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.5/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, if an ACS requests for attribute information of a parameter using GetParameterAttributes method, the CPE must reply to the request with attribute information of the parameter.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid parameter path in the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### 5.61 GetParameterAttributes – Multiple Complete Paths

***Purpose:***

This test is designed to verify that the CPE can provide attribute information of multiple complete paths.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.2.5/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, if an ACS requests for attribute information of an array of parameters using GetParameterAttributes method, the CPE must reply to the request with attribute information of all the parameters in the array.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose two valid parameter paths in the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.62 GetParameterAttributes – Partial Path

### *Purpose:*

This test is designed to verify that the CPE can return attribute information of all the parameters in the branch of the name hierarchy that shares the same prefix as the partial path argument.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.1/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, if an ACS requests for attribute information of an array of parameters using GetParameterAttributes method, the CPE must reply to the request with attribute information of all the parameters in the array. If a parameter name argument is given as a partial path name, the request is to be interpreted as a RPC on return all of the Parameters in the branch of the naming hierarchy that shares the same prefix as the argument.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid partial parameter path from the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.63 GetParameterAttributes – Complete and Partial Path

**Purpose:**

This test is designed to verify that the CPE can return attribute information of all the parameters in the branch of the name hierarchy that shares the same prefix as the partial path argument.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section A.3.2.5/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, if an ACS requests for attribute information of an array of parameters using GetParameterAttributes method, the CPE must reply to the request with attribute information of all the parameters in the array. If a parameter name argument is given as a partial path name, the request is to be interpreted as a RPC on return all of the Parameters in the branch of the naming hierarchy that shares the same prefix as the argument.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid complete parameter path and a valid partial parameter path in the DUT's supported data model.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.64 GetParameterAttributes – Invalid Parameter Name

### ***Purpose:***

This test is designed to verify that the CPE can return the appropriate Fault code when the Parameter Name is invalid in a GetParameterAttributes RPC.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section A.3.2.5/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, if an ACS requests for attribute information with an invalid Parameter Name using GetParameterAttributes method, the Invalid Parameter Name fault code (9005) MUST be used instead of the more general Invalid Arguments fault code (9003).

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer with a GetParameterAttributes RPC method that contains an invalid Parameter Name
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.65 GetParameterAttributes – Partial Path empty

### *Purpose:*

This test is designed to verify that the CPE can return the appropriate response when the Parameter Name of a partial path request does not have any sub objects in that partial path. Note that for other CPE devices, although CWMP requires the ability to get parameter attributes on a partial path that is empty may not be widespread in implementation. If this is the case, those CPE devices should skip this test

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.5/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum TR-069 specification, if the ParameterNames argument in the request was a partial path, and if there are no Parameters within the object represented by that partial path (at any level below), the ParameterList MUST be empty, and this MUST NOT cause an error response. For example, if the PortMapping table contained zero instances and you perform a partial path GetParameterAttributes RPC on this table it would return an empty ParameterList in the GetParameterAttributesResponse RPC.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer with a GetParameterAttributes RPC method that contains a partial path Parameter Name or an object that does not have any sub-objects populated
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.66 SetParameterAttributes – Active Notifications

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on a complete path with notification set to Active.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a complete path with notification set to Active, the CPE must initiate a session to the ACS, and include the new value in the ParameterList in the associated Inform message when the specified parameter value changes.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a parameter from the DUT's supported data model that can be altered locally from the DUT's interface and is capable of performing active notification.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.67 SetParameterAttributes – Active Notifications Persistence

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on a complete path with notification set to Active and that the setting persists across a device reboot.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a complete path with notification set to Active, the CPE must initiate a session to the ACS, and include the new value in the ParameterList in the associated Inform message when the specified parameter value changes.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a parameter from the DUT's supported data model that can be altered locally from the DUT's interface and is capable of performing active notification.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.68 SetParameterAttributes – Atomic

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS containing multiple attributes, one that is in error.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum TR-069 specification, on successful receipt of a SetParameterAttributes RPC, the CPE MUST apply the changes to all of the specified Parameters immediately and atomically. That is, either all of the attribute changes are applied together, or none of the changes are applied at all. In the latter case, the CPE MUST return a fault response indicating the reason for the failure to apply the changes. The CPE MUST NOT apply any of the specified changes without applying all of them. This requirement MUST hold even if the CPE experiences a crash during the process of applying the changes.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to send a SetParameterAttributes RPC containing two distinct attribute changes. One of the changes is in error (invalid ParameterName).
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.69 SetParameterAttributes – Passive Notification – Complete Path

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on a complete path with notification set to Passive.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a complete path with notification set to Passive, whenever the specified parameter value changes, the CPE must include the new value in the ParameterList in the Inform message that is sent the next time a session is established to the ACS. If the CPE has rebooted, or the URL of the ACS has changed since the last session, the CPE can choose to not include the changed parameter in the first session established with either the old ACS or the new ACS.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a parameter from the DUT's supported data model that can be altered locally from the DUT's interface.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.70 SetParameterAttributes – Passive Notification – Partial Path

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on a partial path with notification set to Passive.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a particular path with notification set to Passive, whenever the specified parameter value changes, the CPE must include the new value in the ParameterList in the Inform message that is sent the next time a session is established to the ACS. If the path is partial, the new attributes are to be applied to all Parameters below this point in the name hierarchy. If the CPE has rebooted, or the URL of the ACS has changed since the last session, the CPE can choose to not include the changed parameter in the first session established with either the old ACS or the new ACS.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a partial parameter path from the DUT's supported data model that contains parameters that can be altered locally from the DUT's interface.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.71 SetParameterAttributes – Passive Notification – Complete and Partial Path

### *Purpose:*

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on both complete and partial paths with notification set to Passive.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a particular path with notification set to Passive, whenever the specified parameter value changes, the CPE must include the new value in the ParameterList in the Inform message that is sent the next time a session is established to the ACS. If the path is partial, the new attributes are to be applied to all Parameters below this point in the name hierarchy. If the CPE has rebooted, or the URL of the ACS has changed since the last session, the CPE can choose to not include the changed parameter in the first session established with either the old ACS or the new ACS.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose two parameter paths, one complete and one partial, from the DUT's supported data model that contain parameters that can be altered locally from the DUT's interface.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.72 SetParameterAttributes – Disable Notification

### *Purpose:*

This test is designed to verify that the CPE is capable of disabling previously set notification attribute.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.4/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a particular path with notification set to 0 (disable notification), the CPE must cease informing the ACS of value change events on that parameter.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a parameter path (complete or partial) in the DUT's supported data model that is current set for either active or passive notification.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **5.73 SetParameterAttributes – Incorrect Parameter Name**

***Purpose:***

This test is designed to verify that the CPE can successfully process SetParameterAttributes request from the ACS on an incorrect Parameter Name.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.2.4/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, when the CPE receives a SetParameterAttributes request from the ACS on a an incorrect Parameter Name, If the fault is caused by an invalid parameter name, the Invalid Parameter Name fault code (9005) MUST be used instead of the more general Invalid Arguments fault code (9003).

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a parameter from the DUT's supported data that is capable of being set to Active Notification.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.74 AddObject

### *Purpose:*

This test is designed to verify that the CPE is capable of creating an instance of a multi-instance object. Note that for other CPE devices, although CWMP requires the ability to add objects, the creatable objects may not be widespread in implementation. If this is the case, those CPE devices should skip this test.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.6/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, if an ACS uses AddObject RPC to create a new instance of a multi-instance object in the DUT, the DUT should honor the request, perform necessary action, create a new instance, and report back to ACS with the instanceNumber of the newly created object. The AddObject method call from the ACS takes as an argument the path name of the collection of objects for which a new instance is to be created. For example:

Top.Group.Object.

This path name does not include an instance number for the object to be created. The instance number is assigned by the CPE and returned in the response.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a multi-instance, writable object within the DUT's supported data model.
3. Configure the CWMP Analyzer to set the ParameterKey to a unique value in the AddObject RPC.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.75 AddObject – Error Conditions

### *Purpose:*

This test is designed to verify that the CPE is capable handling incorrect AddObject methods.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.6/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, addition of an object MUST be done atomically. That is, either all of the Parameters and sub-objects are added together, or none are added. In the latter case the CPE MUST return a fault response indicating the reason for the failure to add the object. The CPE MUST NOT add any contained Parameters or sub-objects as a result of this method call without adding all of them (all Parameters and sub-objects supported by that CPE).

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a multi-instance, writable object within the DUT's supported data model.
3. Configure the CWMP Analyzer to produce the following invalid AddObject parameter:
  - a. AddObject Request without a "." at the end of the Name.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.76 DeleteObject

### *Purpose:*

This test is designed to verify that the CPE is capable of removing a particular instance of an object. Note that for other CPE devices, although CWMP requires the ability to delete objects, the creatable objects may not be widespread in implementation. If this is the case, those CPE devices should skip this test.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.7/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, if an ACS uses DeleteObject RPC to remove a particular instance of an object in the DUT, the DUT must honor the request, delete the particular instance of the object, and disregard the state previously associated with all Parameters (values and attributes) and sub-objects contained within this instance. The DeleteObject method call from the ACS takes as an argument the path name of the object instance including the instance number. For example:

Top.Group.Object.2.

When an object instance is deleted, the instance numbers associated with any other instances of the same collection of objects remain unchanged. Thus, the instance numbers of object instances in a collection might not be consecutive.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Add a known object to the DUT, if an object is not available.
3. Configure the CWMP Analyzer to set the ParameterKey in the DeleteObject RPC to a unique value.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.77 DeleteObject – Error Conditions

**Purpose:**

This test is designed to verify that the CPE is capable of handling error conditions in the DeleteObject RPC.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section A.3.2.7/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, if the fault is caused by an invalid ObjectName value, the Invalid Parameter Name fault code (9005) MUST be used instead of the more general Invalid Arguments fault code (9003). The ObjectName value MUST be considered invalid if it does not exactly match the name of a single instance of a multi-instance object currently present in the CPE's data model.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Add a known object to the DUT, if an object is not available.
3. Configure the CWMP Analyzer to send a DeleteObject RPC method without the "." at the end of the Object instance.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.78 Reboot

### *Purpose:*

This test is designed to verify that the CPE is capable of performing a reboot when instructed by the ACS.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.9/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, when an ACS instructs the CPE to perform a reboot by issuing the Reboot method call, the CPE must send a successful method response and complete the remainder of the session prior to rebooting.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.
3. Configure the CWMP Analyzer to set the CommandKey reboot argument in the Reboot RPC.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.79 Manual Reboot

### *Purpose:*

This test is designed to verify that the CPE is capable of sending the BOOT eventcode in the first INFORM RPC after a manual reboot of the CPE.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 3.7.1.5/TR-069a1 or later

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-069 specification, “1 BOOT” indicates that the session was established due to the CPE being powered up or reset.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.80 Download Test – Basic Version Upgrade

### *Purpose:*

This test is designed to verify that the CPE is capable of performing the Download RPC and apply the new software or firmware image.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.8/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum TR-069 specification, when Download method call is used by the ACS instructing the CPE to download a specified file from the designated location, the CPE must indicate successful or unsuccessful completion of the download using one of the following three means:

- A download Response with the status argument having a value of 0 (indicating success), or a fault response to the Download request (indicating failure).
- A TransferComplete RPC called later in the same session as the Download request (indicating either success or failure). In this case, the Status argument in the corresponding DownloadResponse must have a value of 1.
- A TransferComplete RPC made in a subsequent session (indicating either a success or failure). In this case, the Status argument in the corresponding DownloadResponse must have a value of 1.

Regardless of which mechanism is used, the CPE must only indicate successful completion of the download after the downloaded file has both been successfully transferred and applied. If the downloaded file is a software image, the CPE must consider the downloaded file to be successfully applied only after the new software image is actually installed and operational. If the software image replaces the overall software of the CPE (which would typically require a reboot to install and begin execution), the SoftwareVersion represented in the data model must already reflect the updated software image in the session in which the CPE makes a TransferComplete RPC on the ACS indicating successful download.

If the CPE requires a reboot to apply the downloaded file, then the only appropriate means of indicating successful completion is the third option listed above – a TransferComplete message sent in a subsequent session.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.

2. Obtain a firmware image for the DUT that, while structurally identical to the operating firmware under test, contains a different image version number.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Configure the CWMP Analyzer to set the CommandKey to a unique value in the Download RPC.
5. Copy the provided firmware image to the file server.
6. Connect all components of the test setup to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.81 Download Test – Queuing

***Purpose:***

This test is designed to verify that the CPE is capable of performing the Download RPC and Queuing up to a minimum of 3 separate download instances.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.2.8/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, if the CPE receives one or more Download or ScheduleDownload requests before performing a previously requested download, the CPE MUST queue all requested downloads and perform each of them as closely as possible to the requested time (based on the value of the DelaySeconds argument and the time of the request). Queued downloads MUST be retained across reboots of the CPE. The CPE MUST be able to queue a minimum of three file transfers (downloads and uploads). For each download performed, the CPE MUST send a distinct TransferComplete. If the CPE receives multiple Download requests with the same source URL, the CPE MUST perform each download as requested, and MUST NOT assume that the content of the file to be downloaded is the same each time.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Obtain a firmware image for the DUT that, while structurally identical to the operating firmware under test, contains a different image version number.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Copy the provided firmware image to the file server.
5. Connect all components of the test setup to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)





## 5.82 Download Test – Delay

### *Purpose:*

This test is designed to verify that the CPE is capable of performing the Download RPC with associated delay attribute.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section A.3.2.8/TR-069a1 or later

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum TR-069 specification, the CPE MUST perform and apply the download immediately after the time indicated by DelaySeconds, unless this is not possible for reasons outside the CPE's control, in which case the CPE MUST attempt to perform and apply the download within one hour after the time indicated by DelaySeconds. If the CPE cannot begin the download within this time window, the CPE MUST consider the download to have failed and report this failure to the ACS using the TransferComplete method. The ACS MAY set the FileSize value to zero. The CPE MUST interpret a zero value to mean that the ACS has provided no information about the file size. In this case, the CPE MUST attempt to proceed with the download under the presumption that sufficient space is available, though during the course of download, the CPE might determine otherwise.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Obtain a firmware image for the DUT that, while structurally identical to the operating firmware under test, contains a different image version number.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Copy the provided firmware image to the file server.
5. Configure CWMP Analyzer to set the download FileSize to be zero.
6. Configure the CWMP Analyzer to set the DelaySeconds to one minute.
7. Connect all components of the test setup to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.83 Download Test – Retry

***Purpose:***

This test is designed to verify that the CPE is capable of resending the TransferComplete request after a download has occurred and the ACS has not responded to the first TransferComplete request.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Sections 3.2.1.1, 3.7.1.5/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, the URL Download argument MUST NOT include the “userinfo” component, as defined in RFC 3986. If the CPE rejects the Download request because the FileSize argument exceeds the available space on the device, it MUST use the Download Failure (9010) fault code.

If the CPE detects the presence of the “userinfo” component in the file destination URL, it SHOULD reject the Upload request with the fault code 9003 (Invalid arguments).

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Obtain a firmware image for the DUT that, while structurally identical to the operating firmware under test, contains a different image version number.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Copy the provided firmware image to the file server.
5. Connect all components of the test setup to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.84 CancelTransfer

### **Purpose:**

This test is designed to verify that the DUT correctly performs Cancel Transfer via the CancelTransfer RPC method.

### **Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC - CancelTransfer

### **References:**

Section A.4.1.9/TR-069a3 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to the Broadband Forum TR-069 specification, this method MAY be used by the ACS to cause the CPE to cancel a file transfer initiated by an earlier Download, ScheduleDownload or Upload method call. The TransferComplete method is not called for a file transfer that has successfully been canceled.

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer
2. Configure the CWMP Analyzer to send a download request to start a Firmware image upgrade. Have the firmware image available on an accessible file server that is reachable by the DUT.
3. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.85 Upload

**Purpose:**

The purpose of this test is to verify DUT's upload functionality.

**Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC – Upload

**References:**

Section A.4.1.5/TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, if an ACS issues an Upload RPC on the DUT, the DUT may choose to upload the specified file to the designated location. If the file cannot be successfully uploaded, the DUT must not attempt to retry the file upload on its own initiative, but instead must report the failure of the upload to the ACS via either the Upload response.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Install or acquire a vendor configuration or log file that is installed on the DUT.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Configure the CWMP Analyzer to set the CommandKey to a unique value in the Upload RPC.
5. Connect all components of the test setup to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.86 Upload – Queuing

### ***Purpose:***

The purpose of this test is to verify DUT's upload functionality and its ability to queue a minimum of 3 Upload File Transfers.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Optional RPC - Upload

### ***References:***

Section A.4.1.5/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, if the CPE receives one or more Upload requests before performing a previously requested upload, the CPE MUST queue all requested uploads and perform each of them as closely as possible to the requested time (based on the value of the DelaySeconds argument and the time of the request). Queued uploads MUST be retained across reboots of the CPE. The CPE MUST be able to queue a minimum of three file transfers (downloads and uploads).

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Install or acquire a vendor configuration or log file that is installed on the DUT.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Connect all components of the test setup to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.87 Upload – Delay

### **Purpose:**

The purpose of this test is to verify DUT's upload functionality with respect to the DelaySeconds parameter being set.

### **Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC - Upload

### **References:**

Section A.4.1.5/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, the CPE MUST perform the upload immediately after the time indicated by DelaySeconds, unless this is not possible for reasons outside the CPE's control, in which case the CPE MUST attempt to perform the upload within one hour after the time indicated by DelaySeconds. If the CPE cannot begin the upload within this time window, the CPE MUST consider the upload to have failed and report this failure to the ACS using the TransferComplete method.

This URL MUST NOT include the “userinfo” component, as defined in RFC 3986. If the CPE detects the presence of the “userinfo” component in the file destination URL, it SHOULD reject the Upload request with the fault code 9003 (Invalid arguments).

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Install or acquire a vendor configuration or log file that is installed on the DUT.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Authentication may or may not be configured on the file server.
4. Configure the CWMP Analyzer to set the Upload URL with the Upload DelaySeconds parameter with a value of 60.
5. Connect all components of the test setup to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



## 5.88 ScheduleInform Test

### **Purpose:**

The purpose of this test is to verify that the CPE is able to schedule a one-time Inform method call when requested by the CWMP Analyzer using ScheduleInform Test.

### **Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC - ScheduleInform

### **References:**

Section A.4.1.2/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, if an ACS issues a ScheduleInform RPC, the CPE MUST schedule a one-time Inform method call sometime in the future. The time the CPE must wait before issuing an Inform message is specified as a parameter in the ScheduleInform request.

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a time interval between 60 and 300 seconds for the DUT to perform the scheduled inform.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.
4. Configure the CWMP Analyzer to set the CommandKey ScheduleInform RPC.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.89 FactoryReset

### ***Purpose:***

The purpose of this test is to verify that the DUT is capable of performing factory reset procedure upon receipt of FactoryReset RPC from the ACS.

### ***Optional Functionality Tag:***

Conditionally Mandatory - Optional RPC - FactoryReset

### ***References:***

Section A.4.1.6/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

According to Broadband Forum TR-069 specification, if an ACS issues a FactoryReset RPC to the DUT, the DUT can choose to perform factory reset. The DUT must initiate the FactoryReset procedure only after successful completion of the session.

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.90 CWMP Faults – Basic RPC Faults

### ***Purpose:***

The purpose of this test is to verify that the DUT is capable of rejecting RPCs that it does not support.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section A.5.1/TR-069a1 or later

### ***Test Execution Type:***

Automated

### ***Normative Description:***

Section A.5.1 of Broadband Forum TR-069 specification, specifies the CWMP Fault codes that can be returned by the CPE in a variety of circumstances. These faults, listed in Table 65 of [1], consist of a fault code which must be used as the value of the SOAP fault code element, as well as arguments that may be required as part of the fault's functionality. Different fault codes are allowed or required for each of the RPCs described in CWMP.

This test exercises the basic fault, "9000 – Method not supported".

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Choose a valid RPC that is not listed as supported by the DUT.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.91 CWMP Faults – Download Failure

### **Purpose:**

The purpose of this test is to verify that the DUT is capable of notifying the ACS of a failed Download RPC and TransferComplete RPC.

### **Optional Functionality Tag:**

Mandatory - Baseline Protocol

### **References:**

Section A.5.1/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

Section A.5.1 of Broadband Forum TR-069 specification, specifies the CWMP Fault codes that can be returned by the CPE in a variety of circumstances. These faults, listed in Table 65 of [1], consist of a fault code which must be used as the value of the SOAP fault code element, as well as arguments that may be required as part of the fault's functionality. Different fault codes are allowed or required for each of the RPCs described in CWMP.

This test exercises the faults that arise from a failed file transfer using the Upload and Download RPCs. The CPE attempts the transfer after the ACS makes an Upload or Download RPC on it, and makes the TransferComplete RPC on the ACS when the file transfer is completed or when an error occurs. The TransferComplete RPC contains a FaultStruct which includes any faults associated with the transfer. This test exercises faults 9010 through 9013, though the CPE may also include more detailed error codes for transfer errors (9014-9019).

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Install or acquire a vendor configuration or log file that is installed on the DUT.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Configure the file server both for unauthenticated and authenticated transfers.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.92 CWMP Faults – Upload Failure

### **Purpose:**

The purpose of this test is to verify that the DUT is capable of notifying the ACS of a failed Upload RPC, TransferComplete RPC.

### **Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC - Upload

### **References:**

Section A.5.1/TR-069a1 or later

### **Test Execution Type:**

Automated

### **Normative Description:**

Section A.5.1 of Broadband Forum TR-069 specification, specifies the CWMP Fault codes that can be returned by the CPE in a variety of circumstances. These faults, listed in Table 65 of [1], consist of a fault code which must be used as the value of the SOAP fault code element, as well as arguments that may be required as part of the fault's functionality. Different fault codes are allowed or required for each of the RPCs described in CWMP.

This test exercises the faults that arise from a failed file transfer using the Upload and Download RPCs. The CPE attempts the transfer after the ACS makes an Upload or Download RPC on it, and makes the TransferComplete RPC on the ACS when the file transfer is completed or when an error occurs. The TransferComplete RPC contains a FaultStruct which includes any faults associated with the transfer. This test exercises faults 9010 through 9013, though the CPE may also include more detailed error codes for transfer errors (9014-9019).

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Install or acquire a vendor configuration or log file that is installed on the DUT.
3. Configure and provide a file server (i.e., http or ftp) that can be accessed by DUT through the network infrastructure. Configure the file server both for unauthenticated and authenticated transfers.
4. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.93 Run Diagnostics

**Purpose:**

This test is designed to verify that the DUT correctly runs an IP Ping diagnostics Test (defined in BroadBand Forum TR-098) and sends back the correct “8 DIAGNOSTICS COMPLETE” Inform event code.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.7.1.5/TR-069a1 or later

Broadband Forum TR-098

IETF RFC 792

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-098 specification, defines an object and set of parameters for performing a simple diagnostics test utilizing the ICMP [4] based “ping” application. The test is initiated by the ACS using a SetParameterValues remote procedure call that changes the value of the DiagnosticsState parameter in the IPPingDiagnostics object to a value of “Requested”. The CPE then performs the diagnostic test; generally after the CWMP session terminates successfully.

This test uses the following values for the write-enabled parameters in the IPPingDiagnostics object:

- 1 Host: set to the IP address of the CWMP Analyzer
- 2 NumberofRepetitions: 10
- 3 Timeout: 1000
- 4 DataBlockSize: 64
- 5 DSCP: 0

Upon conclusion of the test, the CPE initiates a CWMP session with an event code of “8 DIAGNOSTICS COMPLETE” in the Inform arguments.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer
2. Configure the CWMP Analyzer to correct Ping parameters for test
3. Connect the DUT, DHCP server or simulator, and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.94 GetAllQueuedTranfers

**Purpose:**

The purpose of this test is to verify DUT's GetAllQueuedTransfers functionality.

**Optional Functionality Tag:**

Conditionally Mandatory - Optional RPC - GetAllQueuedTransfers

**References:**

Section A.4.1.7/TR-069a2 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-069 specification, this method MAY be used by an ACS to determine the status of all queued downloads and uploads, including any that were not specifically requested by the ACS, i.e. autonomous transfers.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the DUT to have 2 distinct Download and Upload function queued for activity. Use the DelaySeconds parameter to time the events.
3. Connect all components of the test setup to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)





## 5.95 XML Namespace Prefix Validation

### *Purpose:*

This test is designed to verify that the CPE doesn't require specific XML Namespace Prefixes.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 3.5/TR-069a1 or later

Namespaces in XML 1.0 [<http://www.w3.org/TR/REC-xml-names/>]

### *Test Execution Type:*

Automated

### *Normative Description:*

According to the Broadband Forum TR-069 specification, "Note – in the above examples, the XML namespace prefixes used are only examples. The actual namespace prefix values are arbitrary, and are used only to refer to a namespace declaration"

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP analyzer.
2. Configure the CWMP analyzer to use random (yet valid) namespace prefixes for SOAP and CWMP.
3. Connect the DUT and CWMP analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.96 DUT receives chunked transfer encoding

### **Purpose:**

This test is designed to verify that the DUT can properly receive TR-69 messages sent by an ACS using HTTP 1.1 chunked transfer-encoding.

### **Optional Functionality Tag:**

Mandatory - Baseline Protocol

### **References:**

Section 3.4/TR-069a1 or later

RFC 2616 section 3.6.1

### **Test Execution Type:**

Automated

### **Normative Description:**

According to Broadband Forum TR-069 specification, the DUT must use HTTP 1.1. HTTP 1.1 allows the use of chunked Transfer-Encoding in both requests and responses. The Transfer-Encoding used by the ACS and the DUT do not need to match.

This test sends the InformResponse as a single chunk, and a GetParameterValuesRequest in multiple chunks.

### **Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### **Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.97 DUT properly encodes and decodes XML entities

### *Purpose:*

This test is designed to verify that the DUT can properly send and receive data values that must be represented as XML entities such as '<', '&' and '>'.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 3.5/TR-069a1 or later

- [1] Simple Object Access Protocol (SOAP) 1.1
- [2] XML <http://www.w3.org/TR/REC-xml> section 2.4 and section 4.1

### *Test Execution Type:*

Automated

### *Normative Description:*

According to Broadband Forum TR-069 specification, SOAP 1.1 is required, which is based on the XML specification. Section 2.4 of [2] states that character data **MUST NOT** include a literal '<' or '&'. A CDATA section must not include ']]>' unless it is the end of the CDATA section. If the CDATA section needs to include ']]>' the '>' must be escaped. This test identifies parameters that could contain these problematic characters and tests the behavior of the device when they do contain these characters. If a value is set on the device containing the problematic characters with SetParameterValues and then read back with GetParameterValues, it is possible that the device stored the escaped data. The test should independently verify the data value on the device to ensure that the device decoded the XML entity.

For example: Setting the SSID via the ACS to "foo<&]]>bar" will result in the SOAP XML containing a data value encoded as "foo<&lt;&]]>&gt;bar". The DUT should be checked to ensure that that the SSID is "foo<&]]>bar", not "foo<&lt;&]]>&gt;bar". Reading the SSID should result in a data value encoded in the SOAP XML as "foo<&lt;&]]>&gt;bar". Other writeable strings in the data model that could be used include username, password and PersistentData.

Section 4.1 of [2] states the DUT **MUST** be able to decode numerically escaped data such as "&#x41;" as hexadecimal and "&#65;" as a decimal. Both represent the 'A' character.

If the DUT supports DeviceInfo.DeviceLog, the test should retrieve that parameter as it can be a source of problematic characters.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## 5.98 Inform on IP address change

### *Purpose:*

This test is designed to verify that the DUT sends an Inform when the IP address assigned to the DUT changes.

### *Optional Functionality Tag:*

Mandatory - Baseline Protocol

### *References:*

Section 2.3.3/TR-069a1 or later

Section 2.4.1/TR-098 or later

Section 3.5/TR-106a3 or earlier

Inform and Notification Requirements/TR-181 XML

### *Test Execution Type:*

Manual

### *Normative Description:*

According to Broadband Forum TR-098 specification, ConnectionRequestURL and ExternalIPAddress are required to be sent on every Inform. From TR-69 section 3.2.1, or section 2.3.3 in amendment 1 and newer, If the IP address changes, an Inform should be sent with Inform parameters reflecting the new IP address.

### *Test Setup:*

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### *Procedure:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### *Test Metrics:*

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## **5.99 No Inform on reconnect with no IP address change**

### ***Purpose:***

This test is designed to verify that the DUT does NOT send an Inform when the IP address assigned to the DUT remains the same on reconnect.

### ***Optional Functionality Tag:***

Mandatory - Baseline Protocol

### ***References:***

Section 3.4/TR-069a1 or later

Broadband Forum TR-098 section 2.4.1

### ***Test Execution Type:***

Manual

### ***Normative Description:***

According to Broadband Forum TR-098 section 2.4.1, ConnectionRequestURL and ExternalIPAddress are required to be sent on every Inform. From TR-69 section 3.2.1, or section 2.3.3 in amendment 1 and newer, If the IP address changes, an Inform should be sent with Inform parameters reflecting the new IP address. There is no need to send an Inform if there are no events to deliver upon reconnection.

### ***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

### ***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### ***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.100 EnableCWMP set to false

**Purpose:**

This test is designed to verify that the DUT no longer sends Informs after EnableCWMP is set to false.

**Optional Functionality Tag:**

Conditionally Mandatory - Optional Parameter - EnableCWMP

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Manual

**Normative Description:**

According to Broadband Forum TR-098 specification, setting EnableCWMP to false means that CWMP support in the CPE is disabled, in which case the device MUST NOT send any Inform messages to the ACS or accept any Connection Request Notifications from the ACS. From TR-69 section A.2.1 the values “0” and “false” are considered interchangeable, where both equivalently represent the logical value false.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### 5.101 Change ACS Username and password

**Purpose:**

This test is designed to verify that the ACS can change the username and password used to contact the ACS.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-098 specification, the ACS can change the username and password used to contact the ACS.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.102 PeriodInformEnable enables periodic Informs

**Purpose:**

This test is designed to verify that the CPE does not send periodic Informs if PeriodicInformEnable is false.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-098 specification, setting PeriodicInformEnable to 0 (false) will prevent the ACS from sending periodic Informs to the ACS. Setting PeriodicInformEnable to 1 (true) will allow the ACS to send periodic Informs to the ACS

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.103 PeriodicInformTime in The Past Controls Periodic Inform

**Purpose:**

This test is designed to verify that the CPE properly offsets periodic Informs based on PeriodicInformTime.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-098 specification, periodic Informs must occur at integer multiples of PeriodicInformInterval either before or after PeriodicInformTime. This test sets PeriodicInformInterval to 2 minutes and sets PeriodicInformTime in UTC to 6 minutes behind the current time of the CPE. The CPE should issue at least one Periodic Inform within three minutes.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.104 PeriodicInformTime in the future controls periodic Inform

**Purpose:**

This test is designed to verify that the CPE properly offsets periodic Informs based on PeriodicInformTime.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to Broadband Forum TR-098 specification, periodic Informs must occur at integer multiples of PeriodicInformInterval either before or after PeriodicInformTime. This test sets PeriodicInformInterval to 2 minutes and sets PeriodicInformTime in UTC to 6 minutes ahead of the current time of the CPE. The CPE should issue at least one Periodic Inform within three minutes.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.105 DefaultActiveNotificationThrottle Throttles Active Notifications

**Purpose:**

This test is designed to verify that the CPE delays sending an active notification within the defined time window after the previous Inform.

**Optional Functionality Tag:**

Conditionally Mandatory - Optional Parameter - NotificationThrottle

**References:**

TR-069a1 or later

TR-098a2 or later

**Test Execution Type:**

Manual

**Normative Description:**

According to Broadband Forum TR-098 specification, the CPE MUST wait at least a specified number of seconds before initiating a session for the purpose of delivering an active notification event.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **5.106 Inform Parameters Should Match DeviceInfo**

***Purpose:***

The parameter values included in the Inform should match the values returned by GetParameterValues, specifically the values in the DeviceInfo subtree.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section A.3.3.1/TR-069a1 or later

***Test Execution Type:***

Automated

***Normative Description:***

According to the Broadband Forum TR-069 specification, a CPE MUST call the Inform method to initiate a transaction sequence whenever a session with an ACS is established. The calling arguments for this method are defined in Table 34.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure.

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.107 Device Times Out If ACS Is Slow

**Purpose:**

The purpose of this test is to verify that the CPE considers the session with an ACS to be unsuccessfully terminated if it does not receive an HTTP response from the ACS within a 30 second time period.

**Optional Functionality Tag:**

Mandatory - Baseline Protocol

**References:**

Section 3.7.1.4 /TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, the CPE MUST also consider a session unsuccessfully terminated if it has received no HTTP response from an ACS for a locally determined time period of not less than 30 seconds. If the CPE fails to receive an HTTP response, the CPE MUST NOT attempt to retransmit the corresponding HTTP request as part of the same session.

According to the Broadband Forum TR-069 specification, if the CPE for any reason fails to establish a TCP connection, fails to send an HTTP message, or fails to receive an HTTP response, the CPE MUST consider the session unsuccessfully terminated. The CPE MUST wait a minimum of 30 seconds before declaring a failure to establish a TCP connection, or failure to receive an HTTP response.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Configure the CWMP Analyzer to not respond with an HTTP Response Inform Response.
3. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### 5.108 Use of Certificates in The Absence of NTP

**Purpose:**

This test is designed to verify that the CPE can still make use of Certificate Authentication when unable to resolve NTP.

**Optional Functionality Tag:**

Conditionally Mandatory - Secure CWMP Session

**References:**

Section 3.3 /TR-069a1 or later

**Test Execution Type:**

Automated

**Normative Description:**

According to the Broadband Forum TR-069 specification, a CPE SHOULD wait until it has accurate absolute time before contacting the ACS. If a CPE chooses to contact the ACS before it has accurate absolute time (or if it does not support absolute time), it MUST ignore those components of the ACS certificate that involve absolute time, e.g. not-valid-before and not-valid-after certificate restrictions.

**Test Setup:**

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. If the CWMP Analyzer is capable of supporting multiple ACS URLs, configure an alternate https ACS URL on the CWMP Analyzer.
3. Generate the proper certificates for the new ACS URL.
4. Install the certificates on the DUT.
5. Connect the DUT and CWMP Analyzer to the network infrastructure.

**Procedure:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

**Test Metrics:**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)



### **5.109 DUT receives content-length encoding**

***Purpose:***

This test is designed to verify that the DUT can properly receive TR-69 messages sent by an ACS using HTTP 1.1 using content-length.

***Optional Functionality Tag:***

Mandatory - Baseline Protocol

***References:***

Section 3.4 /TR-069a1 or later  
RFC 2616 section 14.13

***Test Execution Type:***

Automated

***Normative Description:***

According to Broadband Forum TR-069 specification, the DUT must use HTTP 1.1. HTTP 1.1 allows the use of content-length in both requests and responses. The Transfer-Encoding used by the ACS and the DUT do not need to match.

***Test Setup:***

1. Configure the DUT to use the ACS URL set on the CWMP Analyzer.
2. Connect the DUT and CWMP Analyzer to the network infrastructure

***Procedure:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

***Test Metrics:***

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## **Appendix I. Open Issues**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

## **Appendix II. Test Procedures Removed from this Test Plan**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

### **Appendix III. Test Certificate Generation**

Abstract Test Plan : See link for full test plan : [http://www.broadband-forum.org/technical/test\\_cert\\_programs.php](http://www.broadband-forum.org/technical/test_cert_programs.php)

End of Broadband Forum Abstract Test Plan ATP-069