



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.3946.2

(04/2013)

SERIES Q: SWITCHING AND SIGNALLING

Signalling requirements and protocols for the NGN –
Testing for next generation networks

IETF SIP RFC3261 Conformance Tests Specification; Part 2: Test Suite Structure and Test Purposes (TSS&TP)

CAUTION !

PREPUBLISHED RECOMMENDATION

This prepublication is an unedited version of a recently approved Recommendation. It will be replaced by the published version after editing. Therefore, there will be differences between this prepublication and the published version.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU [had/had not] received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at <http://www.itu.int/ITU-T/ipr/>.

© ITU 2013

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Recommendation ITU-T Q.3946.2

IETF SIP RFC3261 Conformance Tests Specification; Part 2: Test Suite Structure and Test Purposes (TSS&TP)

Summary

The present Recommendations proposes a Test Suite Structure and Test Purposes (TSS&TP) for the SIP protocol as described in RFC 3261, "Session Initiation Protocol". This Recommendation has been produced by ETSI [6] and is endorsed by ITU-T without modifications.

.....

Recommendation ITU-T Q.3946.2

IETF SIP RFC3261 Conformance Tests Specification; Part 2: Test Suite Structure and Test Purposes (TSS&TP)

1 Scope

The present Recommendation provides a Test Suite Structure and Test Purposes (TSS&TP) for the Session Initiation Protocol (SIP) implementation in compliance with the relevant requirements specified in RFC 3261 [1].

The present document is part 2 of a multi-part deliverable covering Conformance Test Specification for SIP (IETF RFC 3261), as identified below:

Part 1: "Protocol Implementation Conformance Statement (PICS) proforma";

Part 2: "Test Suite Structure and Test Purposes (TSS&TP)";

Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma".

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [1] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [2] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [3] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [4] ISO/IEC 9646-3: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation".
- [5] ISO/IEC 9646: (all parts): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework".
- [6] ETSI TS 102 027-2 V4.1.1 (2006-07) Methods for Testing and Specification (MTS); Conformance Test Specification for SIP (IETF RFC 3261); Part 2: Test Suite Structure and Test Purposes (TSS&TP)

3 Definitions

For the purposes of the present document, the following terms and definitions apply:

For the purposes of the present document, the terms and definitions given in RFC 3261 [1], ISO/IEC 9646-1 [2], ISO/IEC 9646-2 [3], ISO/IEC 9646-3 [4] and the following apply:

callee: SIP entity that is requested to participate to a session by receiving an INVITE message

caller: SIP entity that initiates a session by sending an INVITE message

dialog: identifier defined as the combination of the remote address, local address, and Call-ID

inopportune: test group that handles invalid signalling exchanges of messages, which are properly structured and correctly encoded

Invalid (I): test group that handles valid signalling exchanges of messages, which are either not properly structured or incorrectly encoded

Test Purpose (TP): non-formal high-level description of a test, mainly using text

NOTE: This test description can be used as the basis for a formal test specification (e.g. Abstract Test Suite in TTCN). See ISO/IEC 9646 [5].

Valid (V): test group that handles valid signalling exchanges of messages, which are properly structured and correctly encoded

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

For the purposes of the present document, the following abbreviations apply:

For the purposes of the present document, the following abbreviations apply:

ATS	Abstract Test Suite
CE	Call Establishment
CR	Call Release
I	Invalid
IUT	Implementation Under Test
MG	MessaGing
O	inOpportune
OE	Originating Endpoint
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PR	PRoxy
RD	ReDirect server
RG	ReGistration
RR	RegistraR
RT	RegistranT
SIP	Session Initiation Protocol
SM	Session Modification
TE	Terminating Endpoint
TP	Test Purpose

TR	TRansport
TSS	Test Suite Structure
UA	User Agent
V	Valid

5 Test Suite Structure (TSS)

5.1 Introduction

5.1.1 SIP Entities

Test Purposes have been written for SIP entities according to the RFC 3261 [1].

Four kinds of entities are considered successively as IUT (see Figure 1):

- User Agent behaving as client or Server.
- Registrar.
- Proxy (outbound and simple proxy).
- Redirect server.

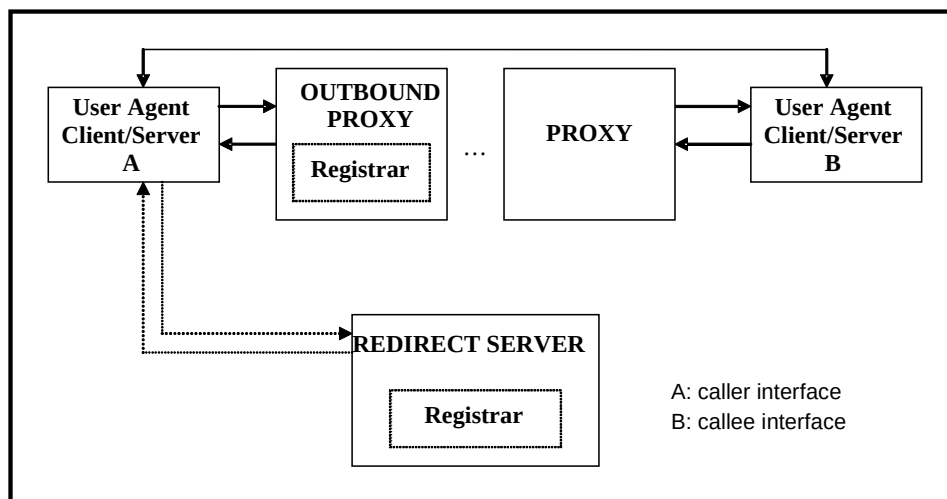


Figure 1: SIP protocol entities

5.1.2 General assumptions

Test purposes have been written for behaviours requested with "MUST" or that appear as obvious in present form.

Several proxy servers may forward the requests, but the test purposes are written from the point of view of one SIP entity only. The client can be either a user agent client or the client portion of a proxy server.

SDP has been considered as the method used to describe the session, but no test purposes have been written to check the SDP content itself as it is out of scope.

Proxy, redirect server, registrar and UA shall support both UDP and TCP as transport layer.

SIP entities are considered in the present document to be addressed with SIP-URLs, except for test purposes that validate the IUT's behaviour upon reception of non SIP-URLs.

The verb "ignore" in test purpose means that the IUT does not react with an error message and does not take into account the element to be ignored. When this element is an undefined Header field, according to RFC 3261, section 10 [1], proxy shall not remove or modify it.

The adjective "unknown" means in the test purpose not defined in the standard RFC 3261 [1] while "non-understood" means unknown from the point of view of the IUT.

The mandatory header fields like CALL-ID, Cseq, From, To and Via are supposed to be present in all messages as Max-Forwards in Request message without stressing this requirement in each test purpose (see sections 8.1.1 and 8.2.6 of RFC 3261 [1]).

5.1.3 System under test

In SIP, a client can either sends its request directly to the Request-URI or to its outbound proxy. It can also ask for SIP URL to a redirect server before sending its request. Test purpose will apply depending of the current tested configuration.

Three kinds of session have been considered in the present document:

- Call using a proxy.
- Direct call with no proxy.
- Call using a redirect server.

5.2 Overview of the Test Suite Structure (TSS)

The Test Suite Structures is based on SIP entities and assumptions as described in clause 4.1.2.

Figure 2 shows the Test Suite Structure (TSS).

Last Sub groups may be subdivided in three subgroups: Valid behaviour (V), Invalid behaviour (I), Inopportune behaviour (O).

Test Suite	Main Functionalities	Role	Functionalities subgroups	Test group
SIP	Registration	Registrant		V
		Registrar		V-I-O
	Call Control	Originating Endpoint	Call establishment	V-Timers
			Call release	V-I-Timers
			Session Modification	V
		Terminating Endpoint	Call establishment	V-I-Timers
			Call release	V-I-Timers
			Session Modification	V-I
		Proxy	Message processing	Request
				Response
			Transaction	Client
				Server
		Redirect server	Call establishment	V
			Call release	V
	Querying for capabilities	Originating Endpoint	Asking for capabilities	
		Terminating Endpoint	Responding for capabilities	
		Proxy	Responding for capabilities	
	Messaging	Registrant		V-I
		Registrar		V-I
		Originating Endpoint		V-I
		Terminating Endpoint		V-I
		Proxy		V-I
		Redirect Server		V-I

Figure 2: TSS for SIP

6 TP naming convention

Table 1: TP identifier naming convention scheme

Identifier:	<protocol>_<main functionality>_<role>_<functionality>_<type>_<nn>		
<protocol>	SIP		
<main functionality>	Registration (RG), Call Control (CC), Querying for capabilities (QC), Messaging (MG)		
<role> =	Registrant (RT), Registrar (RR) Originating Endpoint (OE), Terminating Endpoint (TE), Proxy (PR), Redirect (RD)		
<functionality> (optional)	Call Establishment (CE), Call Release (CR), Session modification (SM), Message Processing (MP) Transaction (TR), Asking for capabilities (AC), Responding for capabilities (RC).		
<sub-functionality> (optional)	Request (RQ), Response (RS), Client (CL), Server (SE)		
<type>	Valid Behaviour (V), Invalid Behaviour (I), Inopportune Behaviour (O)		
<nnn> =	sequential number	(001-999)	

6.1.2 State Definitions during a call

For more clarity and consistency, states defined in figures 5 to 8 in RFC 3261 [1], have been reused in the wording of test purposes.

6.1.3 TP structure

Each test purpose is decomposed in seven keywords.

- The TPId gives a unique identifier to each test purpose.
- "Status" specifies, when a test purpose is optional, the selection condition according to RFC 3261 [1] PICS document. It specifies also when is set to "Recommended" that the requirement appears in RFC 3261 [1] with a "SHOULD" statement. The group status applies to all test purposes belonging to this group. When no status is specified, mandatory shall be assumed.
- "Ref." outlines the references in RFC 3261 [1] used to create the test purpose.
- "Purpose" describes the objective of the test.

6.2 Test Purposes for Registration

6.2.1 Registrant

Group selection: Registration being listed as an option, the test purpose is applicable if the SUT is declared as supporting periodic registration and can behave as User Agent.

Status: PICS: A.1/1 and A.2/1

6.2.1.1 Valid Behaviour

TPId: SIP_RG_RT_V_001

Status: Mandatory

Ref: RFC 3261 [1] section 10.2.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to its registrar, without user name in the Request-URI and with a SIP-URI as request-URI.

TPId: SIP_RG_RT_V_002

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT having sent a REGISTER request is able to receive a Success (200 OK) response containing its current registration list in the Contact header and an expires parameter in the header.

TPId: SIP_RG_RT_V_003

Status: PICS: A.3/1.1

Ref: RFC 3261 [1] section 10.2.6.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to its pre-configured registrar address and without username.

TPId: SIP_RG_RT_V_004

Status: PICS: A.3/1.2

Ref: RFC 3261 [1] section 10.2.6.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to host part of address of record as the Request-URI and without username.

TPId: SIP_RG_RT_V_005

Status: PICS: A.3/1.3

Ref: RFC 3261 [1] section 10.2.6.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to the well-known "all SIP servers" multicast address "sip.mcast.net" (224.0.1.75) and without username.

TPId: SIP_RG_RT_V_006

Status: Void

TPId: SIP_RG_RT_V_007

Status: PICS: A.8/1

Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.

Purpose: Ensure that the IUT having sent a REGISTER request, on receipt of an Unauthorized (401 Unauthorized) response including a WWW-Authenticate header, repeats its REGISTER request with an Authorization header and with an incremented Cseq value.

TPId: SIP_RG_RT_V_008

Status: Mandatory

Ref: RFC 3261 [1] section 10.2.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to its registrar, with a address-of record in the To header of type SIP URI.

TPId: SIP_RG_RT_V_009

Status: Mandatory

Ref: RFC 3261 [1] section 10.2.

Purpose: Ensure that the IUT, in order to be registered, sends a REGISTER request to its registrar, with the same URI in the From and the To header.

TPId: SIP_RG_RT_V_010

Status: Mandatory

Ref: RFC 3261 [1] section 10.2.

Purpose: Ensure that the IUT, having sent a REGISTER request to which no final response was received, does not send a new registration before expiration of the initial request.

TPId: SIP_RG_RT_V_011

Status: Mandatory AND PICS: A.3/4

Ref: RFC 3261 [1] section 10.2.

Purpose: Ensure that the IUT having sent a REGISTER request, will increment the CSeq value by one in the next new REGISTER request with the same Call-ID.

TPId: SIP_RG_RT_V_012

Status: Recommended AND PICS: A.3/4

Ref: RFC 3261 [1] section 10.2.4.

Purpose: Ensure that the IUT, already registered, sends at least one REGISTER request, during the shortest lifetime indicated in the Expires parameter of Contact addresses of the Success (200 OK) response it has received, using the same Call-ID as in the previous REGISTER request.

TPId:	SIP_RG_RT_V_013
Status:	Recommended AND PICS: A.3/3
Ref:	RFC 3261 [1] section 10.2.2.
Purpose:	Ensure that the IUT, in order to remove an existing binding sends a REGISTER request, with Expires parameter set to zero in the Contact headers or an Expires header set to 0 when Contact field is set to "*".
TPId:	SIP_RG_RT_V_014
Status:	PICS: A.3/5
Ref:	RFC 3261 [1] section 10.2.1.
Purpose:	Ensure that the IUT, in order to get its registered contacts, sends a REGISTER request to its registrar without Contact header.
TPId:	SIP_RG_RT_V_015
Status:	PICS: A.3/6
Ref:	RFC 3261 [1] section 10.2.1.1.
Purpose:	Ensure that the IUT, in order to suggest an expiration interval for its binding, sends a REGISTER request to its registrar with either an Expires header field or "expires" Contact header parameter.
TPId:	SIP_RG_RT_V_016
Status:	PICS: A.3/7
Ref:	RFC 3261 [1] section 10.2.1.2.
Purpose:	Ensure that the IUT, in order to order its bindings, to indicate a relative preference for the list in the Contact header field value, sends a REGISTER request to its registrar with "q" Contact header parameter.
TPId:	SIP_RG_RT_V_017
Status:	PICS: A.3/8
Ref:	RFC 3261 [1] section 10.2.5.
Purpose:	Ensure that the IUT having sent a REGISTER request is able to receive a Success (200 OK) response containing a Date header field.
TPId:	SIP_RG_RT_V_018
Status:	PICS: A.8/1
Ref:	RFC 3261 [1] sections 8.1.3.5 and 22.2.
Purpose:	Ensure that the IUT having sent a REGISTER request, on receipt of an Unauthorized (401 Unauthorized) response including a WWW-Authenticate header, repeats its REGISTER request with an Authorization header including proper values for username, realm nonce, digest-uri and response HTTP parameters.

TPId: SIP_RG_RT_V_019
Status: PICS: A.8/1
Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.
Purpose: Ensure that the IUT having sent a REGISTER message, on receipt of a Proxy Authentication Required (407 Proxy Authentication Required) response including a Proxy-Authenticate header, repeats its REGISTER request with a Proxy-Authorization header and with an incremented Cseq value.

TPId: SIP_RG_RT_V_020
Status: PICS: A.8/1
Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.
Purpose: Ensure that the IUT having sent a REGISTER message, on receipt of a Proxy Authentication Required (407 Proxy Authentication Required) response including a Proxy-Authenticate header, repeats its REGISTER request with a Proxy-Authorization header including proper values for username, realm nonce, digest-uri and response HTTP parameters.

6.2.1.2 Timers

TPId: SIP_RG_RT_TI_001
Status: Mandatory
Ref: RFC 3261 [1] annex A and section 17.1.2.2.
Purpose: If an unreliable transport is used, ensure that the IUT, having sent a REGISTER request, repeats its request after timer E set to T1 value expires.

TPId: SIP_RG_RT_TI_002
Status: Mandatory
Ref: RFC 3261 [1] annex A and section 17.1.3.
Purpose: If an unreliable transport is used, ensure that the IUT, having sent twice times a REGISTER request, repeats its request after timer E set to the $\text{MIN}(2 \cdot T1, T2)$ value expires.

TPId: SIP_RG_RT_TI_003
Status: Mandatory
Ref: RFC 3261 [1] annex A and section 17.1.3.
Purpose: If an unreliable transport is used, ensure that the IUT, having sent three times a REGISTER request, repeats its request after timer E set to the $\text{MIN}(4 \cdot T1, T2)$ value expires.

TPId: SIP_RG_RT_TI_004
Status: PICS: A.15/5
Ref: RFC 3261 [1] annex A and section 17.1.3.
Purpose: If an unreliable transport is used, ensure that the IUT does not repeat a REGISTER request, after timer F set to $64 \cdot T1$ expires.

TPId:	SIP_RG_RT_TI_005
Status:	Mandatory
Ref:	RFC 3261 [1] annex A and section 17.1.3.
Purpose:	Ensure that the IUT, when a REGISTER client transaction is in the Proceeding state, repeats its REGISTER request after timer E set to T1 value expires.
TPId:	SIP_RG_RT_TI_006
Status:	Mandatory
Ref:	RFC 3261 [1] annex A and section 17.1.3.
Purpose:	Ensure that the IUT, when a REGISTER client transaction is in the Proceeding state and REGISTER request have been already repeated in this state, repeats its REGISTER request after timer E set to T2 value expires.
TPId:	SIP_RG_RT_TI_007
Status:	PICS: A.15/5
Ref:	RFC 3261 [1] annex A and section 17.1.3.
Purpose:	Ensure that the IUT, when a REGISTER client transaction is in the Proceeding state, does not repeat its REGISTER request, after timer F set to 64*T1 expires.

6.2.2 Registrar

Group selection:IUT is a Registrar

Status: PICS: A.1/2

REGISTER message can be received either on unicast or multicast address, depending of IUT ability (PICS: A.63/4 or A.63/5)

6.2.2.1 Valid Behaviour

TPId:	SIP_RG_RR_V_001
Status:	Mandatory
Ref:	RFC 3261 [1] section 10.3.
Purpose:	Ensure that the IUT on receipt of a REGISTER and without user name in the Request-URI, sends a Success (200 OK) response, containing all current bindings listed in the Contact header, with the expires parameter for each Contact value.
TPId:	SIP_RG_RR_V_002
Status:	Mandatory
Ref:	RFC 3261 [1] section 10.3.
Purpose:	Ensure that the IUT on receipt of a REGISTER request including multiple Contact header sends a Success (200 OK) response, and adds these addresses to the current bindings list.

TPId:	SIP_RG_RR_V_003
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT on receipt of a successive REGISTER with the same Call-ID but with different Contact header answers successively each of them with a Success (200 OK) response, and adds these addresses to the current bindings list.
TPId:	SIP_RG_RR_V_004
Status:	PICS: A.63/6
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT on receipt of a REGISTER request including a From header addressing a different entity than that addressed by the To header (third party registration), sends a Success (200 OK) response.
TPId:	SIP_RG_RR_V_005
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT on receipt of periodic REGISTER request with the same Call-ID and Contact header, and with an increasing CSeq number answers each of them with a Success (200 OK) response.
TPId:	SIP_RG_RR_V_006
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT when the UA is already registered, on receipt of REGISTER request without Contact header, sends a Success (200 OK) response including the expiration time of the registration in an expires parameter in the Contact header.
TPId:	SIP_RG_RR_V_007
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT on receipt of a REGISTER request including an Expires header, sends a Success (200 OK) response.
TPId:	SIP_RG_RR_V_008
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 10.3.
Purpose:	Ensure that the IUT on receipt of a REGISTER request including an Expires parameter in the Contact header, sends a Success (200 OK) response.
TPId:	SIP_RG_RR_V_009
Status:	Mandatory
Ref:	RFC 3261 [1] sections 10.2 and 20.10.
Purpose:	Ensure that the IUT on receipt of a REGISTER request including a Contact header without display name, sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_010

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to * and an Expires header set to zero, and Call-ID is the same as the stored Call-ID value and CSeq is greater than the stored CSeq value of that binding, removes that binding and sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_011

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to * and an Expires header set to zero, and Call-ID is different from the stored Call-ID value of that binding, removes that binding and sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_012

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is not in the bindings list, and the received expiration time other than zero, and Call-ID is different from the stored Call-ID value of that binding, adds that binding to the list and sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_013

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with a Call-ID different from the value stored for that binding, and an expiration time other than zero, sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_014

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with a Call-ID different from the value stored for that binding, and an expiration time set to zero, deletes that binding and sends a Success (200 OK) response.

- TPId:** SIP_RG_RR_V_015
- Status:** Mandatory
- Ref:** RFC 3261 [1] section 10.3.
- Purpose:** Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with the same Call-ID as the value stored for that binding, CSeq is greater than the stored CSeq value of that binding, and an expiration time other than zero, sends a Success (200 OK) response.
- TPId:** SIP_RG_RR_V_016
- Status:** Mandatory
- Ref:** RFC 3261 [1] section 10.3.
- Purpose:** Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with the same Call-ID as the value stored for that binding, CSeq is greater than the stored CSeq value of that binding, and an expiration time equal to zero, deletes that binding and sends a Success (200 OK) response.
- TPId:** SIP_RG_RR_V_017
- Status:** Mandatory
- Ref:** RFC 3261 [1] section 10.3.
- Purpose:** Ensure that the IUT when a call is currently established, on receipt of a REGISTER request, sends a Success (200 OK) response.
- TPId:** SIP_RG_RR_V_018
- Status:** PICS: A.68/1
- Ref:** RFC 3261 [1] sections 10.3, item 3 and 22.2.
- Purpose:** Ensure that the IUT on receipt of a REGISTER request not including an Authorization or Proxy-Authorization header fields, sends an Unauthorized (401 Unauthorized) or Proxy Authentication Required (407 Proxy Authentication Required) response, containing a WWW-Authenticate or a Proxy-Authenticate header.
- TPId:** SIP_RG_RR_V_019
- Status:** PICS: A.68/1
- Ref:** RFC 3261 [1] section 10.3, item 4.
- Purpose:** Ensure that the IUT on receipt of a REGISTER request, but the authenticated user not authorized to modify this address-of record, sends a Forbidden (403 Forbidden) response.
- TPId:** SIP_RG_RR_V_020
- Status:** PICS: A.63/2
- Ref:** RFC 3261 [1] section 10.2.1.2.
- Purpose:** Ensure that the IUT on receipt of a REGISTER and including "q" Contact header parameter, sends a Success (200 OK) response.

TPId: SIP_RG_RR_V_021

Status: PICS: A.68/1

Ref: RFC 3261 [1] sections 10.3, item 3 and 22.2.

Purpose: Ensure that the IUT on receipt of a REGISTER request not including an Authorization or a Proxy-Authorization header fields, sends an Unauthorized (401 Unauthorized) or Proxy Authentication Required (407 Proxy Authentication Required) response, containing a WWW-Authenticate or a Proxy-Authenticate header including proper value for realm and nonce HTTP parameters.

TPId: SIP_RG_RR_V_022

Status: PICS: A.68/1

Ref: RFC 3261 [1] sections 10.3, item 3 and 22.2.

Purpose: Ensure that the IUT having sent an Unauthorized (401 Unauthorized) or a Proxy Authentication Required (407 Proxy Authentication Required) response to a REGISTER request, on receipt of a REGISTER request including a valid Authorization or Proxy-Authorization header field, sends a Success (200 OK) response.

6.2.2.2 Invalid Behaviour

TPId: SIP_RG_RR_I_001

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT on receipt of a REGISTER request including a To header from which the extracted address-of-record is not valid for the domain in the Request-URI, sends a Request Failure (404 Not Found) response.

TPId: SIP_RG_RR_I_002

Status: Mandatory

Ref: RFC 3261 [1] sections 10.3 and 19.1.1.

Purpose: Ensure that the IUT on receipt of a REGISTER request including a user name in the SIP URI as the Request-URI, sends a Success (200 OK) response.

TPId: SIP_RG_RR_I_003

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT on receipt of a REGISTER request including a Contact header set to "*" together with an additional Contact header, sends a Client error (400 Bad Request) response.

TPId: SIP_RG_RR_I_004

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT on receipt of a REGISTER request including a Contact header set to "*", and an Expires header with an expiration time set to other than zero, sends a Client error (400 Bad Request) response.

6.2.2.3 Inopportune Behaviour

TPId: SIP_RG_RR_O_001

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to * and an Expires header set to zero, and Call-ID is the same as the stored Call-ID value and CSeq is equal to the stored CSeq value of that binding, does not remove that binding and sends a Success (200 OK) response.

TPId: SIP_RG_RR_O_002

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with the same Call-ID as the value stored for that binding, CSeq is equal to the stored CSeq value of that binding, and an expiration time other than zero, sends a Server Failure (500 Server Error) response.

TPId: SIP_RG_RR_O_003

Status: Mandatory

Ref: RFC 3261 [1] section 10.3.

Purpose: Ensure that the IUT when a binding already registered, on receipt of a REGISTER request including a Contact header set to an address which is in the bindings list with the same Call-ID as the value stored for that binding, CSeq is equal to the stored CSeq value of that binding, and an expiration time equal to zero, does not remove that binding and sends a Server Failure (500 Server Error) response.

6.3 Test Purposes for Call Control

Ref: RFC 3261 [1] section 1.4.4.

6.3.1 Originating Endpoint

Group selection: IUT is an User Agent.

Status: PICS: A.1/1

6.3.1.1 Call establishment

Group selection: IUT can behave as a User Agent client to establish a call.

Status: PICS: A.16/1.1

6.3.1.1.1 Valid Behaviour

TPId: SIP_CC_OE_CE_V_001

Status: Mandatory

Ref: RFC 3261 [1] section 8.1.1.

Purpose: Ensure that the IUT, to establish a call sends an INVITE request including at least To, From, CSeq, Call-ID, Max-Forwards, Contact and Via headers.

TPId:	SIP_CC_OE_CE_V_002
Status:	Recommended
Ref:	RFC 3261 [1] section 8.1.1.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request with a Request-URI set to the same URI value of the To header.
TPId:	SIP_CC_OE_CE_V_003
Status:	Mandatory
Ref:	RFC 3261 [1] section 8.1.1.2.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including a To header set to an address of the callee and without TAG parameter.
TPId:	SIP_CC_OE_CE_V_004
Status:	Mandatory
Ref:	RFC 3261 [1] section 8.1.1.3.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including a From header with a TAG parameter.
TPId:	SIP_CC_OE_CE_V_005
Status:	Mandatory
Ref:	RFC 3261 [1] section 8.1.1.5.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including a CSeq header with a method that matches "INVITE".
TPId:	SIP_CC_OE_CE_V_006
Status:	Recommended
Ref:	RFC 3261 [1] section 8.1.1.6.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including a Max-Forward header set to 70.
TPId:	SIP_CC_OE_CE_V_007
Status:	Mandatory
Ref:	RFC 3261 [1] section 8.1.1.7.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including a Via header with a protocol name set to SIP, a protocol version set to 2.0 and a branch parameter set to a value beginning with "z9hG4bK".
TPId:	SIP_CC_OE_CE_V_008
Status:	PICS: A.22/2.5
Ref:	RFC 3261 [1] section 13.2.1.
Purpose:	Ensure that the IUT, to establish a call sends an INVITE request including Allow and Supported headers.

TPId: SIP_CC_OE_CE_V_009

Status: Mandatory

Ref: RFC 3261 [1] sections 8, 8.1.3.2 and 13.2.2.1, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Trying (100 Trying) response enters in the Proceeding state.

TPId: SIP_CC_OE_CE_V_010

Status: Mandatory

Ref: RFC 3261 [1] sections 8.1.3.2 and 13.2.2.1, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Session Progress (183 Session Progress) response enters in the Proceeding state.

TPId: SIP_CC_OE_CE_V_011

Status: Mandatory

Ref: RFC 3261 [1] sections 8.1.3.2 and 13.2.2.1, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Unknown (199 Unknown) response enters in the Proceeding state.

TPId: SIP_CC_OE_CE_V_012

Status: Mandatory

Ref: RFC 3261 [1] sections 8.1.3.2 and 13.2.2.1, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of a Trying (100 Trying) response stays in the Proceeding state.

TPId: SIP_CC_OE_CE_V_013

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response sends an ACK request.

TPId: SIP_CC_OE_CE_V_014

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of a Success (200 OK) response sends an ACK request.

TPId: SIP_CC_OE_CE_V_015

Status: Recommended

Ref: RFC 3261 [1] section 8.1.3.3, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of a Success (200 OK) response with more than one Via header value does not send an ACK request, discards the response.

- TPId:** SIP_CC_OE_CE_V_016
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response sends an ACK request with the same CSeq sequence number as in the original INVITE request and the CSeq method field value set to "ACK".
- TPId:** SIP_CC_OE_CE_V_017
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response sends an ACK request with the To header set to the same value as in the received final response.
- TPId:** SIP_CC_OE_CE_V_018
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response including a To header without TAG sends an ACK request with a To header without TAG.
- TPId:** SIP_CC_OE_CE_V_019
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, 13.2.2.4, figure 5 and 17.1.1.2.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of Success (200 OK) responses differing only on the tag in the To header, sends an ACK request with a To header identical to the received one for each received Success (200 OK) responses.
- TPId:** SIP_CC_OE_CE_V_020
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, figure 5 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response sends an ACK request with the same Call-ID and From headers as in the original INVITE request.
- TPId:** SIP_CC_OE_CE_V_021
- Status:** Mandatory
- Ref:** RFC 3261 [1] section 12.2.1.1 and 13.2.2.4, figure 5.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response with no Record-Route header set sends an ACK request with the Request-URI set to the Contact URI included in the received final response and with no Route header set.

TPId: SIP_CC_OE_CE_V_022

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1, and 13.2.2.4, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response with a Record-Route header set to a list in which the last element contains *lr* parameter, sends an ACK request with the Request-URI set to the Contact URI and a Route header set to the list in a reverse order of the Record-Route included in the received final response.

TPId: SIP_CC_OE_CE_V_023

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1, and 13.2.2.4, figure 5.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Success (200 OK) response with a Record-Route header set to a list in which the last element does not contain *lr* parameter, sends an ACK request with the Request-URI set to this element and a Route header set to the remainder list in a reverse order of the received Record-Route appended with the received Contact URI.

TPId: SIP_CC_OE_CE_V_024

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.2, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Multiple Choices (300 Multiple Choices) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in the Multiple Choices (300 Multiple Choices) response.

TPId: SIP_CC_OE_CE_V_025

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.2, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of a Multiple Choices (300 Multiple Choices) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in the Multiple Choices (300 Multiple Choices) response.

TPId: SIP_CC_OE_CE_V_026

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.2, figure 5 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Multiple Choices (300 Multiple Choices) response sends an ACK request with a single Via header equal to the top Via header sent in the original INVITE request.

TPId: SIP_CC_OE_CE_V_027

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.2, figure 5, 17.1.1.2 and 17.1.1.3.

- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Moved Permanently (301 Moved Permanently) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in the Moved Permanently (301 Moved Permanently) response.
- TPId:** SIP_CC_OE_CE_V_028
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 12.2.1.1, 13.2.2.2, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Moved Temporarily (302 Moved Temporarily) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in the Moved Temporarily (302 Moved Temporarily) response.
- TPId:** SIP_CC_OE_CE_V_029
- Status:** PICS: A.16/1.3
- Ref:** RFC 3261 [1] sections 8.1.3.4, 21.3.4, 13.2.2.2, figure 5, 17.1.1.2 [1], and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Use Proxy (305 Use Proxy) response sends an INVITE request to the proxy given by the Contact header.
- TPId:** SIP_CC_OE_CE_V_030
- Status:** PICS: A.16/1.3
- Ref:** RFC 3261 [1] section 8.1.3.4, figure 5.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Moved Permanently (301 Moved Permanently) response sends a new INVITE request with a Request-URI set with one of URI given in the Contact header of the redirection response.
- TPId:** SIP_CC_OE_CE_V_031
- Status:** PICS: A.16/1.3
- Ref:** RFC 3261 [1] section 8.1.3.4, figure 5.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Moved Permanently (301 Moved Permanently) response sends a new INVITE request with a new branch ID in the top Via header.
- TPId:** SIP_CC_OE_CE_V_032
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Not Found (404 Not Found) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.
- TPId:** SIP_CC_OE_CE_V_033
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of a Not Found (404 Not Found) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

TPId: SIP_CC_OE_CE_V_034

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Gone (410 Gone) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

TPId: SIP_CC_OE_CE_V_035

Status: Mandatory

Ref: RFC 3261 [1] section 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Temporarily Unavailable (480 Temporarily Unavailable) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

TPId: SIP_CC_OE_CE_V_036

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.3 figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Busy Here (486 Busy Here) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

TPId: SIP_CC_OE_CE_V_037

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Server Internal Error (500 Server Internal Error) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.

TPId: SIP_CC_OE_CE_V_038

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Busy Everywhere (600 Busy Everywhere) and a Server Internal Error (500 Server Internal Error) responses with different branch parameter value on the top Via header sends only one ACK request.

TPId: SIP_CC_OE_CE_V_039

Status: Mandatory

Ref: RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.

- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Decline (603 Decline) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.
- TPId:** SIP_CC_OE_CE_V_040
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT having already received a non 2XX final response to its INVITE request, on receipt of a Decline (603 Decline) response, with the same Via branch parameter and CSeq header method as in the INVITE request, sends an ACK message.
- TPId:** SIP_CC_OE_CE_V_041
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 17, 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT having already received a 2XX final response to its INVITE request, on receipt of a Success (200 OK) response, with a different Record-Route as in previous response, but with the same Via branch parameter and CSeq header method as in the INVITE request, sends an ACK request with a Route header set according to this new Record-Route.
- TPId:** SIP_CC_OE_CE_V_042
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 8.1.3.2, 13.2.2.3, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT when an INVITE client transaction is in the Calling state, on receipt of a Unknown (699 Unknown) response sends an ACK request with the same Call-ID, From headers and Request-URI as in the original INVITE request and the same Tag in the To header as in this response.
- TPId:** SIP_CC_OE_CE_V_043
- Status:** PICS: A.16/1.3
- Ref:** RFC 3261 [1] sections 21.3.3, 12.2.1, 13.2.2.2, figure 5, 17.1.1.2 and 17.1.1.3.
- Purpose:** Ensure that the IUT having sent an INVITE to the location get from the redirect server, on receipt of a Success (200 OK) response sends an ACK request.
- TPId:** SIP_CC_OE_CE_V_044
- Status:** Mandatory
- Ref:** RFC 3261 [1] section 13.2.1.
- Purpose:** Ensure that the IUT while is establishing a call, sends a unique session description either in the INVITE request or in the ACK request to answer the initial offers given then in the final 2XX response.
- TPId:** SIP_CC_OE_CE_V_045
- Status:** PICS: A.22/2.13
- Ref:** RFC 3261 [1] sections 20.14 and 13.2.1.
- Purpose:** Ensure that the IUT while is establishing a call, sends a Content-Length header set to the size of the body in the message that contains the session description.

TPId: SIP_CC_OE_CE_V_046

Status: Mandatory

Ref: RFC 3261 [1] sections 20.15 and 13.2.1.

Purpose: Ensure that the IUT while is establishing a call, sends a Content-Type header in the message that contains the session description.

TPId: SIP_CC_OE_CE_V_047

Status: Mandatory

Ref: RFC 3261 [1] sections 7.4 and 13.2.1.

Purpose: Ensure that the IUT while is establishing a call, sends a Content-Encoding header only in the message that contains the session description.

TPId: SIP_CC_OE_CE_V_048

Status: Mandatory

Ref: RFC 3261 [1] section 13.2.1.

Purpose: Ensure that the IUT while is establishing a call on receipt of in 2XX a not acceptable session description, sends an ACK request immediately followed by a BYE request.

TPId: SIP_CC_OE_CE_V_049

Status: Mandatory

Ref: RFC 3261 [1] sections 20.14 and 13.2.1.

Purpose: If a reliable transport (TCP) is used, ensure that the IUT while is establishing a call, sends a Content-Length header set to the size of the body in the message that contains the session description.

TPId: SIP_CC_OE_CE_V_050

Status: PICS: A.31/1

Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.

Purpose: Ensure that the IUT having sent an INVITE request, on receipt of an Unauthorized (401 Unauthorized) response including a WWW-Authenticate header, repeats its INVITE request with an Authorization header and with an incremented Cseq value.

TPId: SIP_CC_OE_CE_V_051

Status: PICS: A.31/1

Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.

Purpose: Ensure that the IUT having sent an INVITE request, on receipt of an Unauthorized (401 Unauthorized) response including a WWW-Authenticate header, repeats its INVITE request with an Authorization header including proper values for username, realm nonce, digest-uri and response HTTP parameters.

TPId: SIP_CC_OE_CE_V_052

Status: PICS: A.31/1

Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.

Purpose: Ensure that the IUT having sent an INVITE request, on receipt of a Proxy Authentication Required (407 Proxy Authentication Required) response including a Proxy-Authenticate header, repeats its INVITE request with a Proxy-Authorization header and with an incremented Cseq value.

TPId: SIP_CC_OE_CE_V_053

Status: PICS: A.31/1

Ref: RFC 3261 [1] sections 8.1.3.5 and 22.2.

Purpose: Ensure that the IUT having sent an INVITE request, on receipt of a Proxy Authentication Required (407 Proxy Authentication Required) response including a Proxy-Authenticate header, repeats its INVITE request with a Proxy-Authorization header including proper values for username, realm nonce, digest-uri and response HTTP parameters.

6.3.1.1.2 Timers

TPId: SIP_CC_OE_CE_TI_001

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.1.1.

Purpose: If an unreliable transport (UDP) is used, ensure that the IUT, when an INVITE client transaction is in the Calling state repeats its INVITE request on the timeout condition of timer A set with a value of T1.

TPId: SIP_CC_OE_CE_TI_002

Status: Recommended

Ref: RFC 3261 [1] annex A and section 17.1.1.1.

Purpose: If a reliable transport (TCP) is used, ensure that the IUT, when an INVITE client transaction is in the Calling state does not repeat its INVITE request on the timeout condition of timer A set with a value of T1.

TPId: SIP_CC_OE_CE_TI_003

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.1.1.

Purpose: If an unreliable transport (UDP) is used, ensure that the IUT, when an INVITE client transaction is in the Calling state having already repeated its INVITE wait for a timer A set with a value of 2*T1 before sending it again.

TPId: SIP_CC_OE_CE_TI_004

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.1.1.

Purpose: If an unreliable transport (UDP) is used, ensure that the IUT, when an INVITE client transaction is in the Calling state retransmits its INVITE request with intervals that double after each transmission.

TPId: SIP_CC_OE_CE_TI_005

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.1.1.

Purpose: Ensure that the IUT, when an INVITE client transaction is in the Calling state, when timer B set to a value of 64*T1 expires, does not send an ACK.

TPId:	SIP_CC_OE_CE_TI_006
Status:	Recommended
Ref:	RFC 3261 [1] annex A and section 17.1.1.1.
Purpose:	Ensure that the IUT, when an INVITE client transaction is in the Calling state, when timer B set to a value of $64 \cdot T1$ expires, considers the transaction terminated.
TPId:	SIP_CC_OE_CE_TI_007
Status:	Recommended
Ref:	RFC 3261 [1] annex A and section 17.1.1.1.
Purpose:	Ensure that the IUT, when an INVITE client transaction is in the Proceeding state, does not repeat its INVITE request.
TPId:	SIP_CC_OE_CE_TI_008
Status:	PICS: A.38/6
Ref:	RFC 3261 [1] annex A and section 17.1.1.1.
Purpose:	If an unreliable transport is used, ensure that the IUT, when an INVITE client transaction is in the Completed state, on receipt of final responses that matches the transaction, still answer with an ACK request until timer D set to at least 32 second expires.
TPId:	SIP_CC_OE_CE_TI_009
Status:	PICS: A.38/6
Ref:	RFC 3261 [1] annex A and section 17.1.1.1.
Purpose:	If a reliable transport is used, ensure that the IUT, when an INVITE client transaction is in the Completed state, on receipt of a final response that matches the transaction, does not repeats its ACK request.
TPId:	SIP_CC_OE_CE_TI_010
Status:	PICS: A.38/6
Ref:	RFC 3261 [1] annex A and section 17.1.1.1.
Purpose:	If an unreliable transport is used, ensure that the IUT, when an INVITE client transaction is in the Completed state, on receipt of new final responses with different Via branch parameter value, does not repeat its ACK request until timer D set to at least 32 second expires.
TPId:	SIP_CC_OE_CE_TI_011
Status:	Mandatory
Ref:	RFC 3261 [1] annex A and section 13.2.2.4.
Purpose:	Ensure that the IUT, when an INVITE client transaction has been in the Terminated state, on receipt of a retransmitted Success (200 OK) responses sends an ACK request until $64 \cdot T1$ duration expires.

TPId: SIP_CC_OE_CE_TI_012

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 13.2.2.4.

Purpose: Ensure that the IUT, when an INVITE client transaction has been in the Terminated state, after 64*T1 duration expires, on receipt of a retransmitted Success (200 OK) responses does not send an ACK request.

6.3.1.2 Call release

6.3.1.2.1 Valid Behaviour

TPId: SIP_CC_OE_CR_V_001

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1 and 15.

Purpose: Ensure that the IUT, once a dialog has been established, to release it sends a BYE request with a To header set to the same value as in the last received final response.

TPId: SIP_CC_OE_CR_V_002

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1 and 15.

Purpose: Ensure that the IUT, once a dialog has been established with a final response in which the TAG in the To header was omitted, to release it sends a BYE request with an identical To header without TAG value.

TPId: SIP_CC_OE_CR_V_003

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1 and 15.

Purpose: Ensure that the IUT, once a dialog has been established, to release it sends a BYE request with the same Call-ID, From headers as in the original INVITE message.

TPId: SIP_CC_OE_CR_V_004

Status: Mandatory

Ref: RFC 3261 [1] section 12.2.1.1.

Purpose: Ensure that the IUT, once a dialog has been established, to release it sends a BYE request with an incremented of one CSeq value, a method field in the CSeq header set to "BYE".

TPId: SIP_CC_OE_CR_V_005

Status: Mandatory

Ref: RFC 3261 [1] sections 12.2.1.1 and 15.

Purpose: Ensure that the IUT, once a dialog has been established with a Success (200 OK) response including no Record-Route header set, to release it sends a BYE request with the Request-URI set to the Contact URI included in the received final response and with no Route header set.

TPId:	SIP_CC_OE_CR_V_006
Status:	Mandatory
Ref:	RFC 3261 [1] sections 12.2.1.1 and 15.
Purpose:	Ensure that the IUT, once a dialog has been established with a Success (200 OK) response including a Record-Route header set to a list in which the last element contains lr parameter, to release the call, sends a BYE request with the Request-URI set to the Contact URI and a Route header set to the list in a reverse order of the Record-Route included in the received final response.
TPId:	SIP_CC_OE_CR_V_007
Status:	Mandatory
Ref:	RFC 3261 [1] sections 12.2.1.1 and 15.
Purpose:	Ensure that the IUT, once a dialog has been established with a Success (200 OK) response including a Record-Route header set to a list in which the last element does not contain lr parameter, to release the call, sends an BYE request with the Request-URI set to this element and a Route header set to the remainder list in a reverse order of the received Record-Route appended with the received Contact URI.
TPId:	SIP_CC_OE_CR_V_008
Status:	Mandatory
Ref:	RFC 3261 [1] sections 12.2.1.1 and 15.
Purpose:	Ensure that the IUT, once a dialog has been established, having sent a BYE request, on receipt of a Success (200 OK) response considers the session and the dialog terminated.
TPId:	SIP_CC_OE_CR_V_009
Status:	Mandatory
Ref:	RFC 3261 [1] sections 12.2.1.1 and 15.1.1.
Purpose:	Ensure that the IUT, once a dialog has been established, having sent a BYE request, on receipt of a Call Leg/Transaction Does Not Exist (481 Call Leg/Transaction Does Not Exist) considers the session and the dialog terminated.
TPId:	SIP_CC_OE_CR_V_010
Status:	Mandatory
Ref:	RFC 3261 [1] sections 15 and 9.1, figure 5.
Purpose:	Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, to give up the call, sends a CANCEL request.
TPId:	SIP_CC_OE_CR_V_011
Status:	Mandatory
Ref:	RFC 3261 [1] sections 15 and 9.1, figure 5.
Purpose:	Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, to give up the call, sends a CANCEL request with the same Request-URI, Call-ID, From, To headers as in the original INVITE message.

- TPId:** SIP_CC_OE_CR_V_012
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 15 and 9.1, figure 5.
- Purpose:** Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, sends a CANCEL request with the same numeric part of CSeq as in the original INVITE message and with a method field in the CSeq header set to "CANCEL".
- TPId:** SIP_CC_OE_CR_V_013
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 15 and 9.1, figure 5.
- Purpose:** Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, sends a CANCEL request with a single Via header value matching the top Via value of the Via header of the original INVITE message.
- TPId:** SIP_CC_OE_CR_V_014
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 15 and 9.1, figure 5.
- Purpose:** Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, to give up the call, sends a CANCEL request without Require or Proxy-Require header.
- TPId:** SIP_CC_OE_CR_V_015
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 15 and 9.1, figure 5.
- Purpose:** Ensure that the IUT having received a Trying (100 Trying) response to its INVITE request, to give up the call having sent a CANCEL request, on receipt of a 2XX response to the original INVITE sends an ACK request.

6.3.1.2.2 Invalid Behaviour

- TPId:** SIP_CC_OE_CR_I_001
- Status:** Mandatory
- Ref:** RFC 3261 [1] sections 9 and 16.10.
- Purpose:** Ensure that the IUT, once a dialog has been established, on receipt of a CANCEL request followed by a BYE request, sends a Success (200 OK) response to the BYE request.

6.3.1.2.3 Timers

- TPId:** SIP_CC_OE_CR_TI_001
- Status:** Mandatory
- Ref:** RFC 3261 [1] annex A and section 17.1.2.2.
- Purpose:** If an unreliable transport is used, ensure that the IUT, having sent a BYE request on an established dialog, repeats its request after timer E set to T1 value expires.

TPId: SIP_CC_OE_CR_TI_002

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: If an unreliable transport is used, ensure that the IUT, having sent twice times a BYE request on an established dialog, repeats its request after timer E set to the MIN(2*T1,T2) value expires.

TPId: SIP_CC_OE_CR_TI_003

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: If an unreliable transport is used, ensure that the IUT, having sent three times a BYE request on an established dialog, repeats its request after timer E set to the MIN(4*T1,T2) value expires.

TPId: SIP_CC_OE_CR_TI_004

Status: PICS: A.38/8

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: If an unreliable transport is used, ensure that the IUT does not repeat a BYE request on an established dialog, after timer F set to 64*T1 expires.

TPId: SIP_CC_OE_CR_TI_005

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: Ensure that the IUT, when a BYE client transaction is in the Proceeding state, repeats its BYE request after timer E set to T1 value expires.

TPId: SIP_CC_OE_CR_TI_006

Status: Mandatory

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: Ensure that the IUT, when a BYE client transaction is in the Proceeding state and BYE request have been already repeated in this state, repeats its BYE request after timer E set to T2 value expires.

TPId: SIP_CC_OE_CR_TI_007

Status: PICS: A.38/8

Ref: RFC 3261 [1] annex A and section 17.1.3.

Purpose: Ensure that the IUT, when a BYE client transaction is in the Proceeding state, does not repeat a BYE request on an established dialog, after timer F set to 64*T1 expires.

TPId: SIP_CC_OE_CR_TI_008

Status: PICS: A.38/8

Ref: RFC 3261 [1] annex A and sections 17.1.3.and 9.1.

Purpose: Ensure that the IUT, when a BYE client transaction is in the Trying state, considers the transaction terminated after timer F set to 64*T1 duration expires without receiving any final response.

6.3.1.3 Session modification

6.3.1.3.1 Valid Behaviour

TPId: SIP_CC_OE_SM_V_001

Status: Mandatory

Ref: RFC 3261 [1] section 14.2.

Purpose: Ensure that the IUT, having sent an INVITE, on receipt of a re-INVITE on this dialog, sends a Request Pending (491 Request Pending) response.

TPId: SIP_CC_OE_SM_V_002

Status: Mandatory

Ref: RFC 3261 [1] section 14.2.

Purpose: Ensure that the IUT when an INVITE client transaction is in the Proceeding state, on receipt of an re-INVITE on this dialog, sends a Request Pending (491 Request Pending) response.

6.3.2 Terminating Endpoint

Group selection: IUT is an User Agent.

Status: PICS: A.1/1

6.3.2.1 Call establishment

Group selection: IUT can behave as a User Agent server to establish a call.

Status: PICS: A.16/1.2

6.3.2.1.1 Valid Behaviour

TPId: SIP_CC_TE_CE_V_001

Status: Mandatory

Ref: RFC 3261 [1] sections 8, 8.2, and 13.3.1.1.

Purpose: Ensure that the IUT on receipt of an INVITE request, sends a Success (200 OK) or a provisional (101-199) response.

TPId: SIP_CC_TE_CE_V_002

Status: PICS: A.18/4.14 Status/Sending

Ref: RFC 3261 [1] section 8.2.2.1.

Purpose: Ensure that the IUT on receipt of an INVITE request with a Request-URI set with a scheme that it does not support, sends a Unsupported URI scheme (416 Unsupported URI scheme) response.

TPId: SIP_CC_TE_CE_V_003

Status: PICS: A.18/4.5 Status/Sending

Ref: RFC 3261 [1] section 8.2.2.1.

Purpose: Ensure that the IUT on receipt of an INVITE request with a Request-URI set with an address that it does not accept sends a Not Found (404 Not Found) response.

TPId: SIP_CC_TE_CE_V_004

Status: Mandatory