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Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Closed User Group (CUG); Part 2: Test Suite Structure and Test Purposes (TSS&TP)

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

The present document is part 2 of a multi-part deliverable covering PSTN/ISDN simulation services; Closed User Group (CUG), as identified below:

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

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 specification".

1 Scope

The present document specifies the test suite structure and test purposes of the Closed User Group (CUG) service, based on stage three of the IMS closed user group (CUG) simulation services. Within the Next Generation Network (NGN) the stage 3 description is specified using the IP-Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP).

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:

  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;

  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] ETSI TS 183 054: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Protocol specification Closed User Group (CUG)".

[2] ETSI TS 186 016-1: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services; Closed User Group (CUG); Part 1: Protocol Implementation Conformance Statement (PICS)".

[3] ETSI TS 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".

[4] IETF RFC 3261: "SIP: Session Initiation Protocol".

[5] ETSI ES 283 027: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Endorsement of the SIP-ISUP Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

Not applicable.

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in TS 181 002 [3] and the following apply:

escaped character: See RFC 3261 [4].

NOTE: This may contain additional information.

3.2   Abbreviations

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

AS	Application Server
CUG	Closed User Group
ICB	Incoming Communication Barring within a CUG
IMS	IP Multimedia Subsystem
IP	Internet Protocol
NGN	Next Generation Network
OAE	Outgoing Access, explicit request required
OAI	Outgoing Access, implicit outgoing access for all communications
OCB	Outgoing Communication Barring within a CUG
PIXIT	Protocol Implementation eXtra Information for Testing
PSTN	Public Switched Telephone Network
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SS	Supplementary Services
SUT	System Under Test
TP	Test Purposes
TSS	Test Suite Structure
UA	User Agent
UE	User Equipment
XML	eXtensible Markup Language

4   Test Suite Structure (TSS)

CUG			
	originating_UE		CUG_U01_xxx
	originating_AS		
		CUG without preference	CUG_N01_xxx
		CUG without preference + OAE	CUG_N02_xxx
		CUG without preference + OAI	CUG_N03_xxx
		CUG with preference	CUG_N04_xxx
		CUG with preference + OAE	CUG_N05_xxx
		CUG with preference + OAI	CUG_N06_xxx
		No CUG	CUG_N07_xxx
	terminating_AS		
		CUG with OA not allowed	CUG_N08_xxx
		CUG with OA allowed	CUG_N09_xxx
		No CUG	CUG_N10_xxx

Figure 1: Test suite structure

4.1 Configuration

The scope of the present document is to test the signalling and procedural aspects of the stage 3 requirements as described in TS 183 054 [1]. The stage 3 description describes the requirements for several network entities and also the requirements regarding terminal devices. Therefore several interfaces (reference points) are addressed to satisfy the test of the different entities.

Therefore to test the appropriate entities the configurations below are applicable:

4.1.1 Testing of the AS

The AS entity is responsible for performing and managing services. The ISC interface is the appropriate access point for testing.
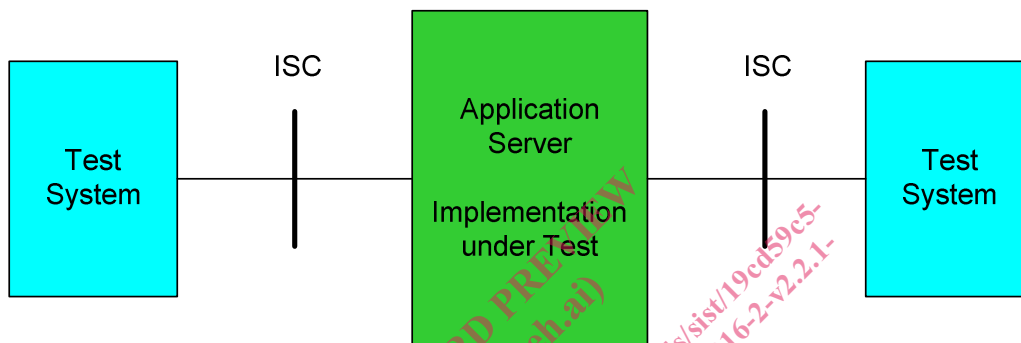
Figure 2: Applicable interface to test AS functionalities

If the ISC interface is not accessible it is also possible to perform the test of the AS using any NNI (Mw, Mg, Mx) interface (see figure 3). In case only the Gm interface is accessible this interface can be used instead for testing, but the verification of all requirements may not be possible.
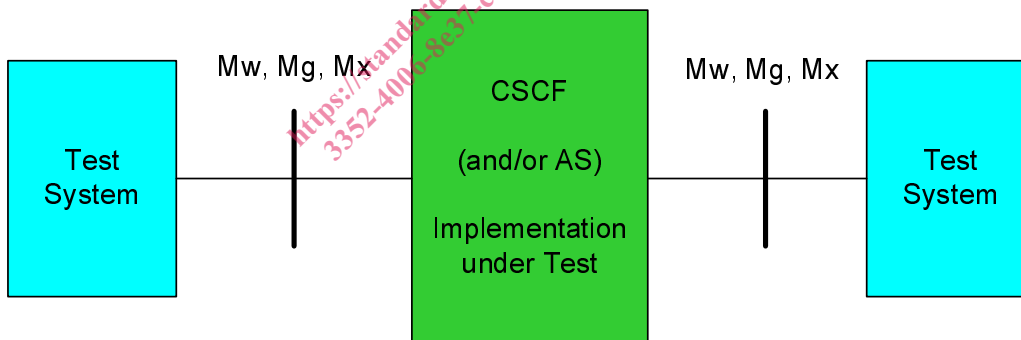
Figure 3: Applicable interfaces for tests using a (generic) NNI interface

4.1.2 Testing of the UE

There are special clauses in the protocol standard describing the procedures that apply at the originating and terminating user equipment. Therefore the test configuration in figure 4 has been chosen.
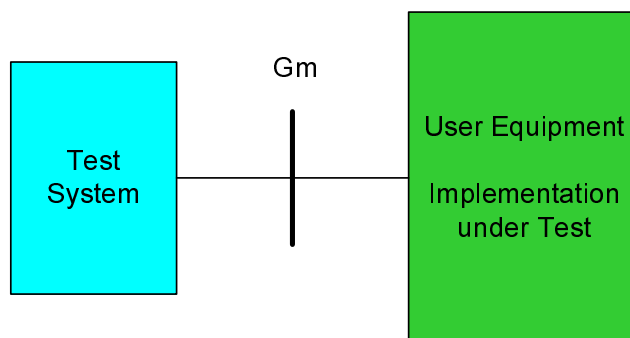
Figure 4: Applicable configuration to test UE functionalities

5 Test Purposes (TP)

5.1 Introduction

For each test requirement a TP is defined.

5.1.1 TP naming convention

TPs are numbered, starting at 001, within each group. Groups are organized according to the TSS. Additional references are added to identify the actual test suite and whether it applies to the network or the user (see table 1).

Table 1: TP identifier naming convention scheme

Identifier: **<ss>_<iut><group>_<nnn>**

  <ss>   =   supplementary service: e.g. "CUG"

  <iut>   =   type of IUT: U   User equipment
                                           N   Network entity

  <group>   =   group   2 digit field representing group reference according to TSS

  <nnn>   =   sequential number   (001-999)

5.1.2 Test strategy

As the base standard TS 183 054 [1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification TS 186 016-1 [2]. The criteria applied include the following:

- Whether or not a test case can be built from the TP is not considered.

5.2 Test Purposes for Closed User Group (CUG)

5.2.1 TPs at the originating UA

TSS	TP	CUG reference	Selection expression
CUG/originating_UE	CUG_U01_001	clause 4.5.2.1	
Test purpose			
Explicit request of CUG service.			
The originating user requests explicitly the CUG service by including in the initial INVITE an xml CUGrequestType containing the preferred CUG and an outgoing access request set to "true".			
Preconditions:			
SIP header values:			
INVITE:			
<cug>			
<cugCallOperation>			
<outgoingAccessRequest>TRUE</outgoingAccessRequest>			
<cugIndex>[PIXIT]</cugIndex>			
</cugCallOperation>			
</cug>			
Comments:			
User equipment		**Test equipment**	
	➔	INVITE requesting CUG explicitly	

5.2.2 Test Purposes at the Application Server of the originating User

In clauses 5.2.2.1 through to 5.2.2.6 the originating user is member of one closed user group which is not assigned as preferential. In the following test purposes the CUG index of this closed user group is referred to as "registered CUGIndex".

In clause 5.2.2.4 through to 5.2.2.6 the originating user is also member of a second closed user group which is assigned as preferential. In the relevant test purposes the CUG index of this second closed user group is referred to as "preferred CUGIndex".

In clause 5.2.2.7 the originating user has not subscribed to the CUG service.

5.2.2.1 CUG without preference

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_001	clause 4.5.2.4	PICS 1/1

Test purpose

CUG without preference: INVITE with CUG index, successful.

Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
     registered CUGIndex,
returns an INVITE request containing an xml element cug with
   cugInterlockBinaryCode related to registered CUG index,
   networkIndicator (PIXIT) and
   cugCommunicationIndicator set to "11" (CUG without outgoing access).

Preconditions: Originating user has subscribed to CUG
     Options for registered CUG index:
     Intra CUG restrictions: None designated
     Options for public identity in use:
     Preferential CUG: None designated
     Outgoing access: not allowed

SIP header values:

INVITE1:
```
<cug>
   <cugCallOperation>
      <cugIndex>[registered CUG index]</cugIndex>
   </cugCallOperation>
</cug>
```

INVITE2:
```
<cug>
   <networkIndicator >[PIXIT]</ networkIndicator>
   <cugInterlockBinaryCode>[related to registered CUG index]</cugInterlockBinaryCode>
   <cugCommunicationIndicator>11</cugCommunicationIndicator>
</cug>
```

Comments:

Test equipment (ISC)		AS		Test equipment (ISC)
INVITE1	→		→	INVITE2

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_002	clause 4.5.2.4	PICS 1/1

Test purpose

CUG without preference: INVITE with CUG index, unsuccessful.

Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
     registered CUGIndex,
rejects the INVITE request by sending a 603 Decline.

Preconditions: Originating user has subscribed to CUG
     Options for registered CUG index:
     Intra CUG restrictions: OCB
     Options for public identity in use:
     Preferential CUG: None designated
     Outgoing access: not allowed

SIP header values:

INVITE:
```
<cug>
   <cugCallOperation>
      <cugIndex>[registered CUG index]</cugIndex>
   </cugCallOperation>
</cug>
```

Comments:

Test equipment (ISC)		AS
INVITE	→	
603 Decline	←	
ACK	→	

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_003	clause 4.5.2.4	PICS 1/1

Test purpose
CUG without preference: INVITE with CUG index, unsuccessful.
Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
     unregistered CUGIndex,
rejects the INVITE request by sending a 403 Forbidden.

Preconditions:	Originating user has subscribed to CUG
	Options for registered CUG index:
	Intra CUG restrictions: None designated
	Options for public identity in use:
	Preferential CUG: None designated
	Outgoing access: not allowed

SIP header values:
INVITE:
```
<cug>
   <cugCallOperation>
      <cugIndex>[unregistered CUG]</cugIndex>
   </cugCallOperation>
</cug>
```

Comments:

Test equipment (ISC)		AS
INVITE	→	
403 Forbidden	←	
ACK	→	

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_004	clause 4.5.2.4	PICS 1/1

Test purpose
CUG without preference: INVITE with CUG index and outgoingAccessRequest = true, successful.
Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
     outgoingAccessRequest = true and
     registered CUGIndex,
returns an INVITE request containing an xml element cug with
   cugInterlockBinaryCode related to registered CUG index,
   networkIndicator (PIXIT) and
   cugCommunicationIndicator set to "11" (CUG without outgoing access).

Preconditions:	Originating user has subscribed to CUG
	Options for registered CUG index:
	Intra CUG restrictions: None designated
	Options for public identity in use:
	Preferential CUG: None designated
	Outgoing access: not allowed

SIP header values:
INVITE1:
```
<cug>
   <cugCallOperation>
      <outgoingAccessRequest>TRUE</outgoingAccessRequest>
      <cugIndex>[registered CUG index]</cugIndex>
   </cugCallOperation>
</cug>

INVITE2:
<cug>
   <networkIndicator >[registered CUG index]</ networkIndicator>
   <cugInterlockBinaryCode>[related to registered CUG index]</cugInterlockBinaryCode>
   <cugCommunicationIndicator>11</cugCommunicationIndicator>
</cug>
```

Comments:

Test equipment (ISC)		AS		Test equipment (ISC)
INVITE1	→		→	INVITE2

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_005	clause 4.5.2.4	PICS 1/1

Test purpose
CUG without preference: INVITE with CUG index and outgoingAccessRequest = true, unsuccessful.
Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
      outgoingAccessRequest = true and
      registered CUGIndex,
rejects the INVITE request by sending a 603 Decline.

Preconditions: Originating user has subscribed to CUG
      Options for registered CUG index:
      Intra CUG restrictions: OCB
      Options for public identity in use:
      Preferential CUG: None designated
      Outgoing access: not allowed

SIP header values:
INVITE:
```
<cug>
   <cugCallOperation>
      <outgoingAccessRequest>TRUE</outgoingAccessRequest>
      <cugIndex>[registered CUG index]</cugIndex>
   </cugCallOperation>
</cug>
```
Comments:
Test equipment (ISC)   **AS**
INVITE →
603 Decline ←
ACK →

TSS		TP	CUG reference	Selection expression
CUG/originating_AS/CUG without preference		CUG_N01_006	clause 4.5.2.4	PICS 1/1

Test purpose
CUG without preference: INVITE with CUG index and outgoingAccessRequest = true, unsuccessful.
Ensure that the SUT on receipt of an INVITE request containing an xml element cug with
   cugCallOperation containing
      outgoingAccessRequest = true and
      unregistered CUGIndex,
rejects the INVITE request by sending a 403 Forbidden.

Preconditions: Originating user has subscribed to CUG
      Options for registered CUG index:
      Intra CUG restrictions: None designated
      Options for public identity in use:
      Preferential CUG: None designated
      Outgoing access: not allowed

SIP header values:
INVITE:
```
<cug>
   <cugCallOperation>
      <outgoingAccessRequest>TRUE</outgoingAccessRequest>
      <cugIndex>[unregistered CUG]</cugIndex>
   </cugCallOperation>
</cug>
```
Comments:
Test equipment (ISC)   **AS**
INVITE →
403 Forbidden ←
ACK →