ETSI TS 101 588-2 V6.1.1 (2018-07)

**Core Network and Interoperability Testing (INT);
Completion of Communications to Busy Subscriber (CCBS)
and Completion of Communications by No Reply (CCNR)
using IP Multimedia (IM) Core Network (CN) subsystem;
Conformance Test Specification (3GPP™ Release 12);
Part 2: Test Suite Structure and Test Purposes (TSS&TP)**

Reference
RTS/INT-00149-2

Keywords
CCBS, CCNR, conformance, IMS, testing, TSS&TP

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

Contents

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Core Network and Interoperability Testing (INT).

The present document is part 2 of a multi-part deliverable covering Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem; Conformance Test Specification, as identified below:

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

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

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document specifies the test suite structure and test purposes of the Completion of Communications to Busy Subscriber (CCBS) service and the Completion of Communication on no Reply (CCNR) service, based on stage three of the IMS 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) as defined in ETSI TS 124 642 [1] in compliance with the relevant requirements.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

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

[1] ETSI TS 124 642: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification (3GPP TS 24.642 Release 12)".

[2] ETSI TS 101 588-1: "Core Network and Interoperability Testing (INT); Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem; Conformance Test Specification (3GPP™ Release 12); Part 1: Protocol Implementation Conformance Statement (PICS)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TS 124 642 [1] apply.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI TS 124 642 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 124 642 [1] apply.

4 Test Suite Structure (TSS)

4.0 Table of Test Suite Structure

Table 4-1: Test Suite Structure

CC			
	originating_AS	Invocation	CC_N01_xxx
		Revocation	CC_N02_xxx
		Operation	CC_N03_xxx
	terminating_AS	possibleIndication	CC_N04_xxx
		Invocation	CC_N05_xxx
		Revocation	CC_N06_xxx
		CCOperation	CC_N07_xxx
	Interaction	TIR	CC_N08_xxx
		CDIV	CC_N09_xxx

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 [1]. The stage 3 description respects the requirements to several network entities and to requirements regarding to end 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:

Testing of the Application Server: This entity is responsible to perform the service. Hence the ISC interface is the appropriate access point. Figure 4-1 points to this.

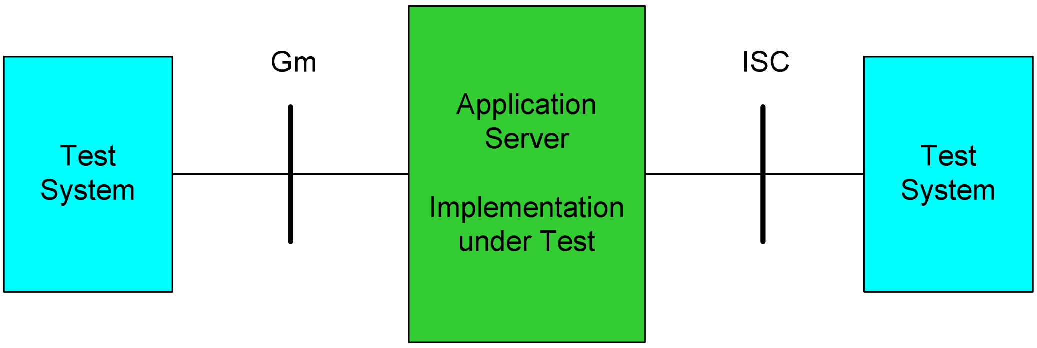

Figure 4-1: Applicable interface to test AS functionalities

If the ISC interface is not accessible it is also applicable to perform the test of the AS using any NNI (Mw, Mg, Mx) interface (consider figure 4-2). In case only the Gm interface is accessible this shall be used instead. In this case, be aware that the verification of several requirements is impeded.

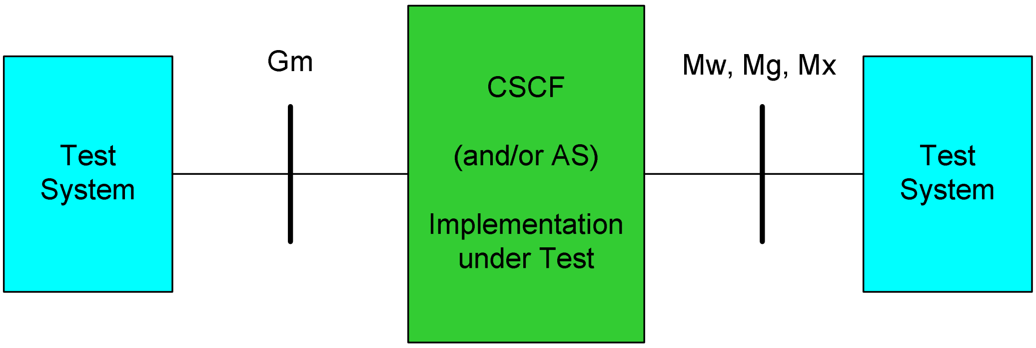

Figure 4-2: Applicable interfaces to test using the (generic) NNI interface

Testing of User Equipment: There are several requirements regarding to the end devices. Therefore, a special configuration appears.

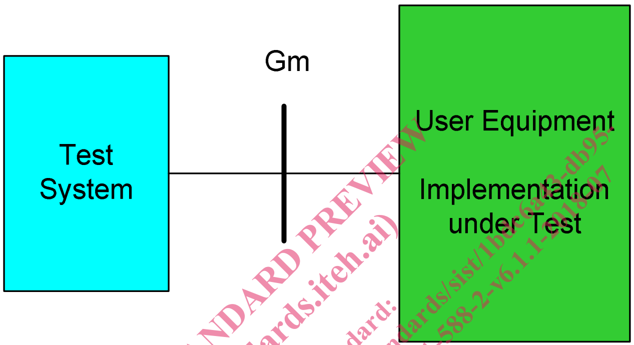

Figure 4-3: Applicable configuration to test the User Equipment

5 Test Purposes (TP)

5.1 Introduction

5.1.0 General treatment

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 5-1).

Table 5-1: TP identifier naming convention scheme

Identifier: **<ss>_<iut><group>_<nnn>**				
<ss>	=	supplementary service:	e.g. "CC"	
<iut>	=	type of IUT:	U N	User - equipment Network
<group>	=	group	2 digit field representing group reference according to TSS	
<nnn>	=	sequential number	(001 to 999)	

5.1.2 Test strategy

As the base standard ETSI TS 124 642 [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 ETSI TS 101 588-1 [2]. The criteria applied include the following:

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

5.2 Actions at the originating AS

5.2.1 CC Invocation

TSS	**TP**	**Reference**	**Selection expression**
CC/originating_AS/Invocation	CC_N01_001	4.5.4.2.1.1.1, 4.5.4.2.1.1.3	PICS 4.7.1/9

Test purpose
Detecting CCNL is possible.

Ensure that when an originating user establishes a session to a terminating user not logged in, a 183 (Session Progress) response is forwarded to the originating user if a 480 (Temporarily Unavailable) response has been received. The Application Server provides an announcement.

Preconditions:

SIP header values:
480 Temporarily Unavailable
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=NL

Comments:

SIP 1 (Gm)		**SUT**		**SIP 2 (ISC)**
INVITE	→		→	INVITE
			←	480 (Temporarily Unavailable)
183 Session Progress	←		→	ACK
Announcement that CC is possible				
		Apply post test routine		

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_002	4.5.4.2.1.1.1, 4.5.4.2.1.1.3	

Test purpose
Detecting CCBS is possible.

Ensure that when an originating user establishes a session to a terminating user is busy, a 183 (Session Progress) response is forwarded to the originating user if a 486 (Busy Here) response has been received. The Application Server provides an announcement.

Preconditions:

SIP header values:
486 Busy Here:
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=BS

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	486 (Busy Here)
183 Session Progress	←		→	ACK

Announcement that CC is possible

Apply post test routine

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_003	4.5.4.2.1.1.1, 4.5.4.2.1.1.3	

Test purpose
Detecting CCNR is possible.

Ensure that when an originating user establishes a session to a terminating user is busy, a 183 (Session Progress) response is forwarded to the originating user if a 180 (Ringing) response has been received. The Application Server provides an announcement. The Call-Info header is removed from the 180 (Ringing) sent to the originating user.

Preconditions:

SIP header values:
180 Ringing 1
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=NR

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	180 (Ringing) 1
180 (Ringing)	←	**Start CCNR-T5**		

Timeout CCNR-T5

Announcement that CC is possible

Apply post test routine

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_004	4.5.4.2.1.1.3	PICS 4.7.1/9

Test purpose
CCNL is possible hence not confirmed.

Ensure that when the originating user does not confirm the CCNL indication to invoke the service a 486 (Busy Here) is forwarded to the originating user when Retention timer CC-T1 is expired.

Preconditions:

SIP header values:
480 Temporarily Unavailable 1
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=NL

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	480 (Temporarily Unavailable) 1
183 Session Progress	←	**Start CC-T1**	→	ACK
		Announcement that CC is possible		
480 (Temporarily Unavailable)	←	**Timeout CC-T1**		
ACK	→			
		Apply post test routine		

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_005	4.5.4.2.1.1.3	

Test purpose
CCBS is possible hence not confirmed.

Ensure that when the originating user does not confirm the CCBS indication to invoke the service a 486 (Busy Here) is forwarded to the originating user when Retention timer CC-T1 is expired.

Preconditions:

SIP header values:
486 Busy Here:
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=BS

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	486 (Busy Here)
183 Session Progress	←	**Start CC-T1**	→	ACK
		Announcement that CC is possible		
486 (Busy Here)	←	**Timeout CC-T1**		
ACK	→			
		Apply post test routine		

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_006	4.5.4.2.1.1.3	

Test purpose
CCNR is possible hence not confirmed.

Ensure that when the originating user does not confirm the CCBS indication to invoke the service a 199 (Early Dialog Terminated) is forwarded to the originating user when Retention timer CC-T1 is expired.

Preconditions:

SIP header values:
180 Ringing 1
Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=NR

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	180 (Ringing) 1
180 (Ringing)	←	**Start CCNR-T5, CC-T1**		
		Timeout CCNR-T5		
		Announcement that CC is possible		
		Timeout CC-T1		
199 (Early Dialog Terminated)	←			
		Apply post test routine		

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_007	4.5.4.2.1.1.5, 4.5.4.2.1.1.6	NOT PICS 4.7.1/10 AND NOT PICS 4.7.1/11

Test purpose

Successful CCBS request.

A 486 (Busy Here) is received from the terminating AS containing a Call-Info header field a purpose parameter set to call-completion and the m parameter is set to BS. Ensure that the AS withholds the 486 and sends a 183 Session Progress and starts to play an announcement to inform the originating user that Call Completion is possible. The originating user activates via inband interaction the CCBS call completion service. Ensure that the AS sends a SUBSCRIBE to the terminating AS. The NOTIFY received from the terminating AS confirms the successful invocation of the CC service. The Application Server confirms the successful invocation to the originating user by sending of a 486 (Busy Here) final response.

Preconditions:

SIP header values:

486 Busy Here 1:

Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=BS

SUBSCRIBE sip: T-AS;m=BS

From:<UE-A>

To:<UE-B>

Contact:<O-AS>

Call.Info: <UE-A>; purpose=call-completion;m=BS

P-Assertd-Identity: UE-A

Expires: CC-T3

Event:call-completion

NOTIFY

Event:call-completion

Content-Type: application/call-completion

cc-state: queued

Comments:

SIP 1 (Gm)		**SUT**		**SIP 2 (ISC)**
INVITE	→		→	INVITE
			←	486 (Busy Here) 1
183 Session Progress	←		→	ACK
		Announcement that CCBS is possible		
		Inband-interaction procedures for the CC activation		
			→	SUBSCRIBE
			←	200 OK SUBCSRIBE
			←	NOTIFY
			→	200 OK NOTIFY
		Confirm to the caller that the invocation was successful		
486 (Busy Here) 2	←			
ACK	→			
		Apply post test routine		

TSS	TP	Reference	Selection expression
CC/originating_AS/Invocation	CC_N01_008	4.5.4.2.1.1.5, 4.5.4.2.1.1.6	PICS 4.7.1/10 AND PICS 4.7.1/11

Test purpose

Successful CCBS request.

A 486 (Busy Here) is received from the terminating AS containing a Call-Info header field a purpose parameter set to call-completion and the m parameter is set to BS. Ensure that the AS withholds the 486 and sends a 183 Session Progress and starts to play an announcement to inform the originating user that Call Completion is possible. The originating user activates via inband interaction the CCBS call completion service. Ensure that the AS sends a SUBSCRIBE to the terminating AS. The NOTIFY received from the terminating AS confirms the successful invocation of the CC service. The Application Server confirms the successful invocation to the originating user by sending of a 486 (Busy Here) final response. Ensure that a Date header and a Content-Type header containing a message/external-body value are present in the 486 sent to the originating user.

Preconditions:

SIP header values:

486 Busy Here 1:

Call-Info: <sip:UE-B or T-AS>;purpose=call-completion;m=BS

SUBSCRIBE sip: T-AS;m=BS

From:<UE-A>
To:<UE-B>
Contact:<O-AS>
Call.Info: <UE-A>; purpose=call-completion;m=BS
P-Assertd-Identity: UE-A
Expires: CC-T3
Event:call-completion

NOTIFY

Event:call-completion
Content-Type: application/call-completion
cc-state: queued

486 Busy Here 2:

Date: <current date and time>
Content-Type: message/external-body; access-type="URL"; URL= < any url >

Comments:

SIP 1 (Gm)		SUT		SIP 2 (ISC)
INVITE	→		→	INVITE
			←	486 (Busy Here) 1
183 Session Progress	←		→	ACK
Announcement that CCBS is possible				
Inband-interaction procedures for the CC activation				
			→	SUBSCRIBE
			←	200 OK SUBCSRIBE
			←	NOTIFY
			→	200 OK NOTIFY
Confirm to the caller that the invocation was successful				
486 (Busy Here) 2	←			
ACK	→			
Apply post test routine				