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Core Network and Interoperability Testing (INT);
Communication Waiting (CW) 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
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Contents

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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 the Conformance Test Specification of Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem, 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 provides the Test Suite Structure (TSS) and Test Purposes (TP) for the test specifications for the Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem as specified in ETSI TS 124 615 [1] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4] and ETSI ETS 300 406 [5].

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 124 615: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol Specification (3GPP TS 24.615 Release 12)".

[2] ETSI TS 186 022-1: "Core Network and Interoperability Testing (INT); Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem; Conformance test specification (3GPP™ Release 12); Part 1: Protocol Implementation Conformance Statement (PICS)".

[3] ISO/IEC 9646-1: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General concepts".

[4] ISO/IEC 9646-7: "Information technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 7: Implementation Conformance Statements".

[5] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

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 124 615 [1] and the following apply:

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

PICS pro forma: Refer to ISO/IEC 9646-1 [3].

Point of Control and Observation: Refer to ISO/IEC 9646-1 [3].

Protocol Implementation Conformance Statement (PICS): Refer to ISO/IEC 9646-1 [3].

System Under Test (SUT): Refer to ISO/IEC 9646-1 [3].

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

NOTE: This may contain additional information.

3.2 Symbols

For the purposes of the present document, the symbols given in ETSI TS 124 615 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 124 615 [1] and the following apply:

AS	Application Server
CW	Communication Waiting
ISC	IP Multimedia Subsystem Service Control
IUT	Implementation Under Test
SUT	System Under Test
UE	User Equipment

4 Test Suite Structure (TSS) and configuration

4.1 Test Suite Structure

Table 4.1: Test suite structure

CW			
	destination_UE		CW_U01_xxx
	originating_UE		CW_U02_xxx
	AS		CW_N01_xxx
	interaction	CDIV	CW_N02_xxx
	configuration		CW_N03_xxx

4.2 Configuration

The scope of the present document is to test the signalling and procedural aspects of the stage 3 requirements as described in ETSI TS 124 615 [1]. The stage 3 description respects the requirements to several network entities and requirements regarding 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.

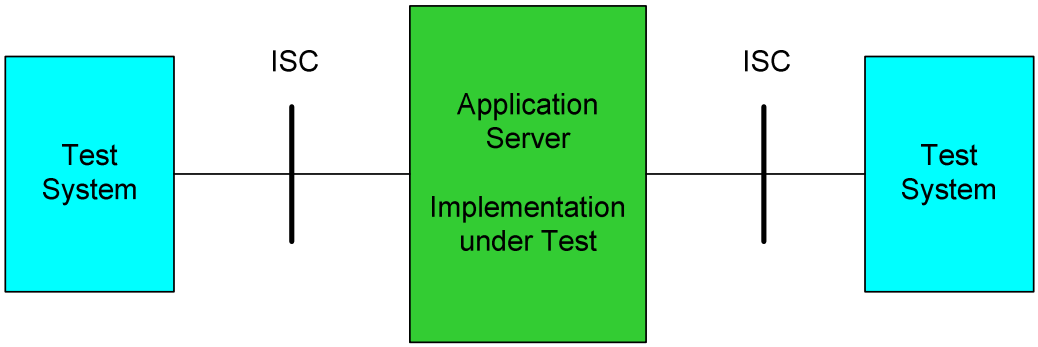

Figure 4.1: Applicable interface to test AS functionalities

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.

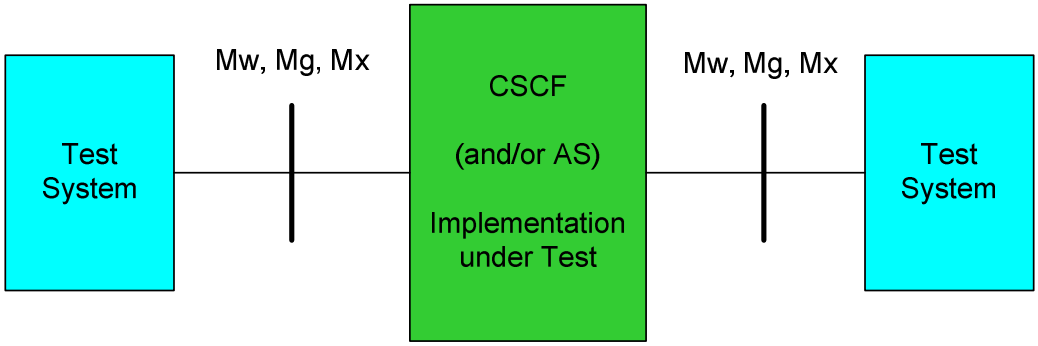

Figure 4.2: Applicable interfaces to test using the (generic) NNI interface

Figure 4.3 illustrates the usage of any NNI interface.

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

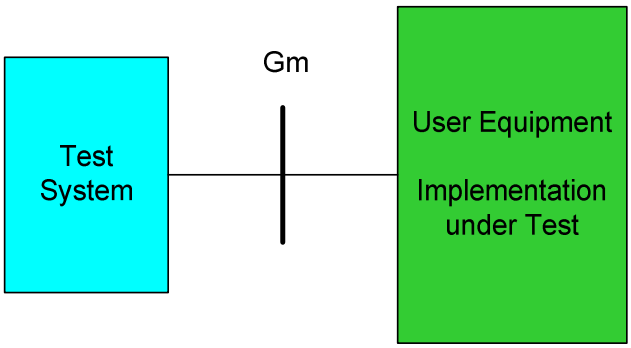

Figure 4.3: Applicable configuration to test the User Equipment

5 Test Purposes (TP)

5.1 Introduction

5.1.1 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. "CW"	
<iut>	=	type of IUT:	U	User - equipment
			N	Network
<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 ETSI TS 124 615 [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 186 022-1 [2]. The criteria applied include the following:

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

5.2 TPs for Communication Waiting (CW)

5.2.1 Test purposes at the destination (user B) UE

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_001	4.5.5.3.2/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose
The terminating User Equipment applies the Communication Waiting indication to the user.

Ensure that the user B User Equipment is able to notify the user that the communication establishment is waiting.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
communication-waiting-indication

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing	←	
	Indicate Communication Waiting to the user	
	Apply post test routine	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_002	4.5.5.3.2/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose
The terminating User Equipment sends a 180 Ringing if UDUB does not apply.

Ensure that the user B User Equipment is able to send a 180 Ringing if the terminal is not User determined User Busy.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing	←	
	Apply post test routine	

TSS	TP	Reference	Selection expression
CW/destination_UE	CW_U01_003	4.5.5.3.2/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/3 AND PICS 4.6.1/4

Test purpose
The terminating User Equipment sends a 180 Ringing if UDUB does not apply. A Communication Waiting indication is contained in the 180.

Ensure that the user B User Equipment is able to send a 180 Ringing if the terminal is not User determined User Busy. Ensure that Communication Waiting is contained in the Alert-Info header and the value is <urn:alert:service:call-waiting>.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing Alert-Info: <urn:alert:service:call-waiting>	←	
	Apply post test routine	

TSS	TP	Reference	Selection expression
CW/destination_UE	CW_U01_004	4.5.5.3.2/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/3

Test purpose
The terminating User Equipment is able to send a Communication Waiting indication in a 180 response.

Ensure that the user B User Equipment is able to accept a waiting communication and sends a Communication Waiting indication I the 180 Ringing response. An Alert-Info header is contained in the 180 and the value is <urn:alert:service:call-waiting>.

Preconditions:

SIP header values:
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing Alert-Info: <urn:alert:service:call-waiting>	←	
	Apply post test routine	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_005	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4 AND PICS 4.6.1/5

Test purpose

The terminating User Equipment starts timer T_{AS-CW} *and the timer is expired.*

Ensure that the user B User Equipment is able starts timer T_{AS-CW}.
If the timer is expired, the User Equipment stops the Communication Waiting to the user.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing	←	
	Start timer T_{UE-CW}	
	Timeout T_{UE-CW}	
480 Temporarily Unavailable	←	
ACK	→	
	Apply post test routine	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_006	4.5.5.3.2/[**1**]	PICS 4.5.1/1 AND NOT PICS 4.6.1/4

Test purpose

The terminating User Equipment sends a 415 Unsupported Media Type if the received INVITE contains a XML CW MIME attachment indicating CW.

Ensure that the user B User Equipment is able to send a 415 Unsupported Media Type if the User Equipment does not support the CW XML MIME attachment indicating Communication Waiting.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
415 Unsupported Media Type	←	
ACK	→	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_007	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose

The terminating User Equipment holds current communication and accepts the waiting call.

Ensure that the user B User Equipment is able set the current active communication on hold and accepts the waiting communication. After the communication with the previous waiting communication is active, the CW indication is stopped.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication (1)	
INVITE (2)	→	
100 Trying	←	
180 Ringing (2)	←	
INVITE (1, sendonly)	←	
200 OK INVITE (1, recvonly)	→	
ACK	←	
200 OK INVITE (2)	←	
ACK	→	
	Apply post test routine	

TSS	TP	Reference	Selection expression
CW/destination_UE	CW_U01_008	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose

The terminating User Equipment is able to release current communication and accepts the waiting call.

Ensure that the user B User Equipment is able to release the current active communication and accepts the waiting communication. After the communication with the previous waiting communication is active, the CW indication to the user is stopped.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication (1)	
INVITE (2)	→	
100 Trying	←	
180 Ringing (2)	←	
BYE (1)	←	
200 OK BYE (1)	→	
200 OK INVITE (2)	←	
ACK	→	
	Apply post test routine	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_009	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose

The terminating User Equipment is able to accept the waiting call after the current active communication is released by the User A.

Ensure that the user B User Equipment is able to accept the waiting communication after the remote active user (user A) released the active communication. After the communication with the previous waiting communication is active, the CW indication to the user is stopped.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication (1)	
INVITE (2)	→	
100 Trying	←	
180 Ringing (2)	←	
BYE (1)	→	
200 OK BYE (1)	←	
200 OK INVITE (2)	←	
ACK	→	
	Apply post test routine	

TSS	TP	Reference	Selection expression
CW/destination_UE	CW_U01_010	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4

Test purpose

The terminating User Equipment is able to accept the waiting call after the current active communication is released by the User C.

Ensure that the user B User Equipment is able to apply the terminating UE procedures upon receipt of BYE from user C. After the communication with the previous waiting communication is released, the CW indication to the user is stopped.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/ vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication (1)	
INVITE (2)	→	
100 Trying	←	
180 Ringing (2)	←	
CASE A		
BYE (2)	→	
200 OK BYE (2)	←	
487 Request Terminated	←	
ACK	→	
CASE B		
CANCEL (2)	→	
200 OK CANCEL (2)	←	
487 Request Terminated	←	
ACK	→	
	Apply post test routine	

TSS	**TP**	**Reference**	**Selection expression**
CW/destination_UE	CW_U01_005	4.5.5.3.3/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/4 AND PICS 4.6.1/5

Test purpose

The terminating User Equipment starts timer T_{AS-CW} *and the timer is expired the value us used from the Expires header in the received INVITE.*

Ensure that the user B User Equipment is able to start timer T_{AS-CW}. The value is used from the Expires header in the received INVITE indicating Communication Waiting.
If the timer is expired, the User Equipment stops the Communication Waiting to the user.

Preconditions:

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
Content_Disposition: 3gpp-alternative-service
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System		**User Equipment**
	Establish a confirmed communication	
INVITE	→	
100 Trying	←	
180 Ringing	←	
	Start timer T_{UE-CW}	
	Timeout T_{UE-CW}	
480 Temporarily Unavailable	←	
ACK	→	
	Apply post test routine	

5.2.2 Test purposes at the originating (user C) UE

TSS	**TP**	**CW reference**	**Selection expression**
CW/originating_UE	CW_U02_001	4.5.2.10/[**1**]	PICS 4.5.1/1 AND PICS 4.6.1/2

Test purpose

The originating user receives the Communication waiting indication.

Ensure that the originating user equipment can receive the "communication is waiting" indication in the Alert-Info header value <urn:alert:service:call-waiting>.
Ensure that this notification is reported to the user.

Preconditions:

SIP header values:
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

User Equipment		**Test System**
	←	INVITE
	→	100 Trying
	→	180 Ringing
	Apply post test routine	

5.2.3 Test purposes at the Application Server

TSS	**TP**	**Reference**	**Selection expression**
CW/AS	CW_N01_001	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/2

Test purpose
CW indication determined by approaching NDUB condition. The indication for CW is sent to the terminating user.

Ensure that on receipt of an INVITE request that fulfils the approaching NDUB condition for user B the AS determines that a Communication Waiting condition has occurred. The AS sends an INVITE request to the served user. Ensure that the INVITE contains:

- a MIME body with the "communication-waiting-indication" element contained in the "ims-cw" root element; **and**
- the Content-Type header field is set to "application/vnd.3gpp.cw+xml".

The 180 Ringing sent to the originating user may insert an Alert-Info header indicating Communication Waiting by value <urn:alert:service:call-waiting>

Preconditions: Terminating user subscribes to the CW simulation service

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0
<communication-waiting-indication/>
180 Ringing: possible Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System (ISC)		**AS**		**Test System (ISC)**
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing

Apply post test routine

TSS	**TP**	**Reference**	**Selection expression**
CW/AS	CW_N01_002	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/2 AND PICS 4.7.1/3

Test purpose
CW indication determined by approaching NDUB condition. The AS applies an announcement to the originating user.

Ensure that on receipt of an INVITE request that fulfils the approaching NDUB condition for user B the AS determines that a Communication Waiting condition has occurred. The AS sends an INVITE request to the served user. Ensure that the INVITE contains:

- a MIME body with the "communication-waiting-indication" element contained in the "ims-cw" root element; **and**
- the Content-Type header field is set to "application/vnd.3gpp.cw+xml".

Ensure that an announcement is applied to the originating user. The 180 Ringing sent to the originating user may insert an Alert-Info header indicating Communication Waiting by value <urn:alert:service:call-waiting>

Preconditions: Terminating user subscribes to the CW simulation service

SIP header values:
INVITE: MIME body
Content-Type: application/vnd.3gpp.cw+xml
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>
180 Ringing: possible Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System (ISC)		**AS**		**Test System (ISC)**
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing

Apply announcement to originating user

Apply post test routine

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_003	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/2

Test purpose

CW indication determined by approaching NDUB condition. Call establishment unsuccessful due to the terminating User Equipment do not support the CW indication in the received INVITE.

Ensure that on receipt of an INVITE request that fulfils the approaching NDUB condition for user B the AS determines that a Communication Waiting condition has occurred. The AS sends an INVITE request to the served user. Ensure that the INVITE contains:

- a MIME body with the "communication-waiting-indication" element contained in the "ims-cw" root element; **and**
- the Content-Type header field is set to "application/vnd.3gpp.cw+xml"; **and**

If a 415 Unsupported Media Type final response is received from the terminating user, a 486 Busy Here is sent to the originating user.

Preconditions: Terminating user subscribes to the CW simulation service

SIP header values:
INVITE: MIME body
Content-Type: application/ vnd.3gpp.cw+xml
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE
486 Busy Here	←		←	415 Unsupported Media Type
ACK	→		→	ACK

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_004	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/1

Test purpose

CW indication determined by receiving a 180 (Ringing) response with a Alert-Info header field set to "urn:alert:service:call-waiting".

Ensure that on receipt of a 180 (Ringing) response with an Alert-Info header field set to "urn:alert:service:call-waiting" Communication Waiting is determined. Ensure that the 180 Ringing is passed to the originating user.

Preconditions:

SIP header values:
180 Ringing: Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing

Apply post test routine

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_005	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/3

Test purpose

CW indication determined by receiving a 180 (Ringing) response with a Alert-Info header field set to "urn:alert:service:call-waiting". An announcement is applied to the originating user.

Ensure that on receipt of a 180 (Ringing) response with an Alert-Info header field set to "urn:alert:service:call-waiting" Communication Waiting is determined. Ensure that an announcement is applied to the originating user. Ensure that the 180 Ringing is passed to the originating user.

Preconditions:

SIP header values:

180 Ringing: Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing
		Apply announcement to originating user		
		Apply post test routine		

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_006	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/1 AND PICS 4.7.1/4

Test purpose

CW indication determined by receiving a 180 (Ringing) response with an Alert-Info header field set to "urn:alert:service:call-waiting". The T_{AS-CW} *timer expires.*

Ensure that on receipt of a 180 (Ringing) response with an Alert-Info header field set to "urn:alert:service:call-waiting" Communication Waiting is determined. Ensure that the 180 Ringing is passed to the originating user.

Preconditions:

SIP header values:

180 Ringing: Alert-Info: <urn:alert:service:call-waiting>

480 Temporarily unavailable: Reason: SIP;cause=408

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing
		Start timer T_{AS-CW}		
		T_{AS-CW} expired		
480 Temporarily unavailable	←		→	CANCEL
ACK	→		←	200 OK CANCEL
			←	487 Request Terminated
			→	ACK

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_007	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/2

Test purpose
CW indication determined by receiving a 486 (Busy here) response with a 370 Warning header field set to "insufficient bandwidth".

Ensure that on receipt of a 486 (Busy here) response with a Warning header field set to 370 indicating "insufficient bandwidth" Communication Waiting is determined. Ensure that the 180 Ringing containing an Alert-Info: header set to urn:alert:service:call-waiting is sent to the originating user.

Preconditions:

SIP header values:
INVITE 2: MIME body
Content-Type: application/ vnd.3gpp.cw+xml
MIME XML
ims-cw xmlns="urn:3gpp:ns:cw:1.0"
<communication-waiting-indication/>
486 Busy here: Warning: 370; "insufficient bandwidth"
180 Ringing 2: Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE 1
100 Trying	←		←	100 Trying
			←	486 (Busy here)
			→	ACK
			→	INVITE 2
			←	100 Trying
180 Ringing 2	←		←	180 Ringing 1

Apply post test routine

TSS	TP	Reference	Selection expression
CW/AS	CW_N01_001	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/4 AND PICS 4.7.1/7

Test purpose
CW indication determined by approaching NDUB condition. The network includes an Expires header in the INVITE.

Ensure that on receipt of an INVITE request that fulfils the approaching NDUB condition for user B the AS determines that a Communication Waiting condition has occurred. The AS sends an INVITE request to the served user. Ensure that the INVITE contains an Expires header set to the value of the T_{AS-CW} timer.

Preconditions: Terminating user subscribes to the CW simulation service

SIP header values:
INVITE:
Expires: <T_{AS-CW}>

Comments:

Test System (ISC)		AS		Test System (ISC)
INVITE	→		→	INVITE
100 Trying	←		←	100 Trying
180 Ringing	←		←	180 Ringing

Apply post test routine

TSS	**TP**	**Reference**	**Selection expression**
CW/AS	CW_N01_007	4.5.5.2/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/2 AND PICS 4.7.1/4 AND PICS 4.7.1/7

Test purpose
CW indication determined by receiving a 486 (Busy here) response the network includes an Expires header in the INVITE.

Ensure that on receipt of a 486 (Busy here) response with a Warning header field set to 370 indicating "insufficient bandwidth" Communication Waiting is determined. The AS sends an INVITE request to the served user. Ensure that the INVITE contains an Expires header set to the value of the T_{AS-CW} timer.

Preconditions:

SIP header values:
INVITE 2:
Expires: <T_{AS-CW}>

Comments:

Test System (ISC)		**AS**		**Test System (ISC)**
INVITE	→		→	INVITE 1
100 Trying	←		←	100 Trying
			←	486 (Busy here)
			→	ACK
			→	INVITE 2
			←	100 Trying
180 Ringing 2	←		←	180 Ringing 1

Apply post test routine

5.3 Interaction with other supplementary services

5.3.1 Communication diversion services (CDIV)

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_001	4.6.8.1/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/6

Test purpose
A Communication diversion activation is successful while a communication is waiting.

Ensure that communication forwarding unconditional supplementary service can be activated while a communication is waiting.

Preconditions: Configuration of simulation services via Ut interface is applicable

SIP header values:
HTTP PUT

```
<simservs
    <communication-waiting active="true"/>
</simservs>
```

Comments:

Test System (Ut)		**XCAP server**
	Establish a confirmed communication (SIP, Gm)	
	Establish a waiting dialogue (SIP, Gm)	
HTTP PUT	→	
HTTP 200 OK PUT	←	

Apply post test routine

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_002	4.6.8.1/[**1**]	PICS 4.5.1/2

Test purpose
A forwarded communication can invoke the CW service.

Ensure that a forwarded communication (CFU) can invoke the CW service.

Preconditions: Configuration of simulation services via Ut interface is applicable

SIP header values:
INVITE; History-Info header
<sip:URI any (PIXIT);index=1,
<sip:URI CW served user; cause=302>;index=1.1
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**AS CW**	**AS CDIV**		**Test System**
		Establish a confirmed communication (SIP, Gm)			
INVITE	→	→		→	INVITE
180 Ringing	←	←		←	180 Ringing (2)

Apply post test routine

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_003	4.6.8.3/[**1**]	PICS 4.5.1/2

Test purpose
A waiting communication can be forwarded no reply.

Ensure that if user B has activated the communication forwarding no reply service, then a waiting communication shall still be offered Ensure that waiting communication is able to be forwarded on no reply when the CFNR timer expires. The communication waiting ceases.

Preconditions: Communication forwarding no reply supplementary service is activated

SIP header values:
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**AS CW**	**AS CDIV**		**Test System**
		Establish a confirmed communication (1)			
INVITE	→	→		→	INVITE (2)
180 Ringing	←	←		←	180 Ringing (2)
			CANCEL (2) →	→	CANCEL (2)
			200 OK CANCEL (2) ←	←	200 OK CANCEL (2)
			487 (2) ←	←	487 (2)
			ACK (2) →	→	ACK (2)
			INVITE (3) →	→	INVITE (3)
180 Ringing	←		180 Ringing ←	←	180 Ringing

Apply post test routine

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_004	4.6.8.3/[**1**]	PICS 4.5.1/2

Test purpose
A forwarded no reply communication invokes the CW supplementary service.

Ensure that forwarded communication invokes the call waiting communication. The "communication is waiting" indication is sent in the 180 Ringing response. Ensure that an active communication is successful after the current communication is terminated.

Preconditions:

SIP header values:
INVITE: History-Info: <sip: URI any (PIXIT);index=1,
<sip: URI CW served user; cause=408;>;index=1.1
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**AS CW**	**AS CDIV**		**Test System**
		Establish a confirmed communication (SIP, Gm)			
INVITE	→	→			→ INVITE
180 Ringing	←	←			← 180 Ringing (2)

Apply post test routine

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_005	4.6.8.5/[**1**]	PICS 4.5.1/2

Test purpose
A waiting communication can be deflected.

Ensure that when receiving the communication waiting indication, user B can invoke the communication deflection service.

Preconditions: Communication forwarding no reply supplementary service is activated

SIP header values:
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**AS CW**	**AS CDIV**		**Test System**
		Establish a confirmed communication (1)			
INVITE	→	→			→ INVITE (2)
180 Ringing	←	←			← 180 Ringing (2)
			302 Moved Temporarily	←	← 302 Moved Temporarily
			ACK	→	→ ACK
			INVITE (3)	→	→ INVITE (3)
			180 Ringing	←	← 180 Ringing

Apply post test routine

TSS	**TP**	**CW reference**	**Selection expression**
CW/interaction/CDIV	CW_N02_006	4.6.8.5/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/5 AND PICS 4.7.1/4

Test purpose
A deflected communication invokes the CW supplementary service.

Ensure that forwarded communication invokes the call waiting communication. The "communication is waiting" indication is sent in the 180 Ringing response. Ensure that an active communication is successful after the current communication is terminated.

Preconditions:

SIP header values:
INVITE: History-Info: <sip: URI any (PIXIT);index=1,
<sip: URI CW served user; cause=480;>;index=1.1
180 Ringing Alert-Info: <urn:alert:service:call-waiting>

Comments:

Test System		**AS CW**	**AS CDIV**	**Test System**
		Establish a confirmed communication (SIP, Gm)		
INVITE	→	→		→ INVITE
180 Ringing	←	←		← 180 Ringing (2)
		Apply post test routine		

5.4 Test purposes for Service Configuration

TSS	**TP**	**CW reference**	**Selection expression**
CW/int	CW_N03_001	4.8/[**1**]	PICS 4.5.1/2 AND PICS 4.7.1/6

Test purpose
Communication Waiting can successful be activated using Ut interface.

Ensure that Communication Waiting can be activated by the user, a XML document is sent to the XCAP server.

Preconditions: Configuration of simulation services via Ut interface is applicable

SIP header values:
HTTP PUT

```
<?xml version="1.0" encoding="UTF-8"?>
<simservs     xmlns="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
              xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <communication-waiting active="true"/>
</simservs>
```

Comments:

Test System (Ut)		**XCAP server**
HTTP PUT	→	
HTTP 200 OK PUT	←	

TSS	**TP**	**CW reference**	**Selection expression**
CW/int	CW_N03_002	4.5.1/[**1**]	PICS 4.5.1/2 AND NOT PICS 4.7.1/6

Test purpose

Communication Waiting can successfully be SIP based activated.

Ensure that Communication Waiting can be activated by the user, the contents of the Request-URI in a SIP INVITE request is used to convey the configuration code to the Application Server that hosts the supplementary service.

Preconditions: Configuration of simulation services via CW Application Server is applicable

SIP header values:

INVITE: sip:<service code>;phone-context=home1.net;user=dialstring SIP/2.0

Comments:

Test System (Ut)		**CW AS**
INVITE	→	
200 OK INVITE	←	
ACK	→	
BYE	→	
200 OK BYE	←	

NOTE: Service code e.g. "***43***".

History

Document history		
V2.1.1	July 2009	Publication
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