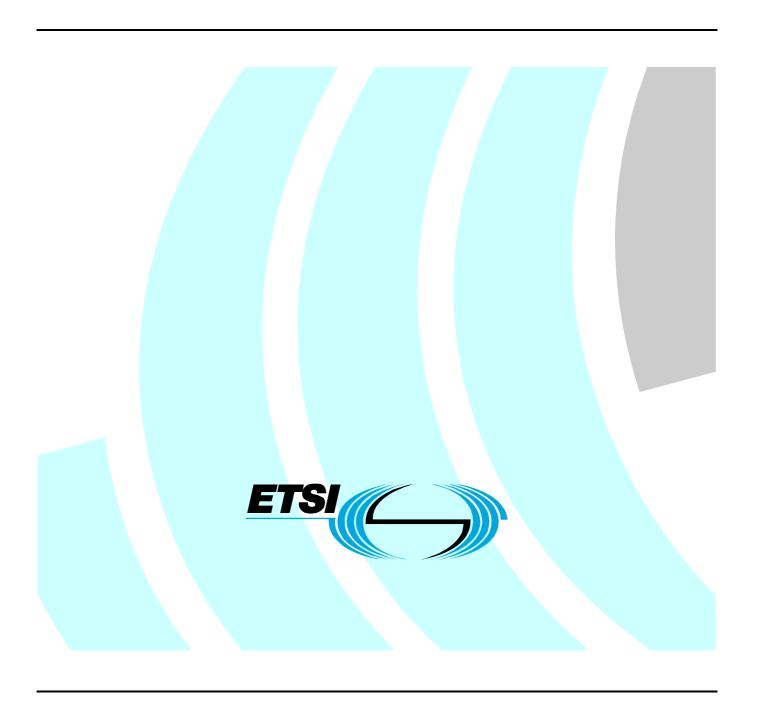
# ETSITS 186 011-2 V3.1.1 (2011-06)

Technical Specification

IMS Network Testing (INT);
IMS NNI Interoperability Test Specifications;
Part 2: Test Descriptions for IMS NNI Interoperability



#### Reference

#### RTS/INT-00032-2

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#### **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

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# **Foreword**

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

The present document is part 2 of a multi-part deliverable covering the IMS NNI Interoperability Test Specifications, as identified below:

Part 1: "Test Purposes for IMS NNI Interoperability";

Part 2: "Test Descriptions for IMS NNI Interoperability";

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

# 1 Scope

The present document specifies interoperability Test Descriptions (TDs) for Inter-IMS Network to Network Interface (II-NNI) interoperability testing for the IP Multimedia Call Control Protocol based on Stage 3 Session Initiation Protocol (SIP) and Session Description Protocol (SDP) standard, TS 124 229 [1]. Interconnection aspects between two different IM CN subsystems for end to end service interoperability are based on standard TS 129 165 [16]. TDs have been specified on the basis of the Test Purposes (TPs) and Test Suite Structure (TSS) presented in TS 186 011-1 [2]. TP fragments presented in the present document as part of TDs are defined using the TPLan notation of ES 202 553 [5]. TDs have been written based on the test specification framework described in TS 102 351 [3] and the interoperability testing methodology defined in TS 102 237-1 [4], i.e. interoperability testing with a conformance relation.

For the assessment of IMS core network requirements related to the ISC interface parts of the supplementary services HOLD (see TS 124 410 [10]), CDIV (see TS 124 404 [11]), ACR-CB (see TS 124 411 [12]), and OIP/OIR (see TS 124 407 [13]) have been used.

The scope of these test descriptions is not to cover all requirements specified in TS 124 229 [1]. TDs have been only specified for requirements that are observable at the interface between two IMS core network implementations, i.e. IMS NNI.

NOTE: Requirements pertaining to a UE or an AS implementation or IMS core network requirements that can only be observed at the interface between UE and IMS CN are explicitly not within the scope of the present document. The latter requirements have been dealt with from a UE and conformance perspective in TS 134 229-1 [6].

# 2 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 reference document (including any amendments) applies.

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

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

# 2.1 Normative references

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

[1]	ETSI TS 124 229 (V8.10.0): "Digital cellular telecommunications system (Phase 2+); Universal
	Mobile Telecommunications System (UMTS); LTE; Internet Protocol (IP) multimedia call control
	protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP);
	Stage 3 (3GPP TS 24.229 version 8.10.0 Release 8)".".
[2]	ETCLTC 106 011 1 (V2 1 1), "IMC Natural Testing (INT), IMC NNI Intercongrability Test

- [2] ETSI TS 186 011-1 (V3.1.1): "IMS Network Testing (INT); IMS NNI InteroperabilityTest Specifications; Part 1: Test Purposes for IMS NNI Interoperability".
- [3] ETSI TS 102 351: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".
- [4] ETSI TS 102 237-1: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Interoperability test methods and approaches; Part 1: Generic approach to interoperability testing".
- [5] ETSI ES 202 553: "Methods for Testing and Specification (MTS); TPLan: A notation for expressing Test Purposes".

- [6] ETSI TS 134 229-1: "Universal Mobile Telecommunications System (UMTS); LTE; Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Part 1: Protocol conformance specification (3GPP TS 34.229-1 Release 8)".
- [7] ETSI TS 133 203: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; 3G security; Access security for IP-based services (3GPP TS 33.203 Release 8)".
- [8] IETF RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".
- [9] IETF RFC 3966: "The tel URI for Telephone Numbers".
- [10] ETSI TS 124 410: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); TISPAN; NGN Signalling Control Protocol; Communication HOLD (HOLD) PSTN/ISDN simulation services; Protocol specification (3GPP TS 24.410 Release 8)".
- [11] ETSI TS 124 404: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); TISPAN; PSTN/ISDN simulation services: Communication Diversion (CDIV); Protocol specification (3GPP TS 24.404 Release 7)".
- [12] ETSI TS 124 411: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); TISPAN; PSTN/ISDN simulation services: Anonymous Communication Rejection (ACR) and Communication Barring (CB); Protocol specification (3GPP TS 24.411 Release 7)".
- [13] ETSI TS 124 407: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); TISPAN; PSTN/ISDN simulation services; Originating Identification Presentation (OIP) and Originating Identification Restriction (OIR); Protocol specification (3GPP TS 24.407 Release 7)".
- [14] ETSI TS 183 063: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based IPTV stage 3 specification".
- [15] ETSI TS 124 247: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Messaging service using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3 (3GPP TS 24.247 Release 8)".
- [16] ETSI TS 129 165: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Inter-IMS Network to Network Interface (NNI) (3GPP TS 29.165 version 8.4.0 Release 8)".
- [17] ETSI TS 102 901: "IMS Network Testing (INT); IMS NNI Interoperability Test Specifications; IMS NNI & ISC interoperability test descriptions for RCS".
- [18] ETSI TS 129 163 (V8.10.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (3GPP TS 29.163 version 8.10.0 Release 8)".

# 2.2 Informative references

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.

- [i.1] ETSI TR 133 978: "Universal Mobile Telecommunications System (UMTS); Security aspects of early IP Multimedia Subsystem (IMS) (3GPP TR 33.978 version 7.0.0 Release 8)".
- [i.2] ETSI TR 123 981: "Universal Mobile Telecommunications System (UMTS); LTE; Interworking aspects and migration scenarios for IPv4-based IP Multimedia Subsystem (IMS) implementations (3GPP TR 23.981 Release 8)".

# 3 Abbreviations

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

3GPP 3rd Generation Partnership Project
ACR Anonymous Communication Rejection
AKA Authentication and Key Agreement

AS (IMS) Application Server

BC Broadcast
CB Call Barring
CDIV Call DIVersion
CF (Test) ConFiguration
CFU Call Forward Unconditional

CFW Call FloW
CN Core Network
CoD Content on Demand
CS Circuit Switched

CSCF Call Session Control Function

DHCP Dynamic Host Configuration Protocol

DNS Domain Name System
ENUM E.164 Number Mapping
HOLD Communication HOLD
HSS Home Subscriber Server

IBCF Interconnection Border Control Gateway

I-CSCF Interrogating CSCF
IMS IP Multimedia Subsystem
IOI Inter Operator Identifier

IP Internet Protocol

IPsec Internet Protocol security

IPTV IP Television
ISC IMS Service Control

ISDN Integrated Service Digital Network

ISUP ISDN User Part

MGCF Media Gateway Control Function

MGF Media Gateway Function

MRFC Multimedia Resource Function Controller MRFP Multimedia Resource Function Processor

MTP <u>Message Transfer Part</u>

NNI Network-to-Network Interface

N-PVR Network based Personal Video Recording
OCB Outgoing Communication Barring
OIP Originating Identification Presentation
OIR Originating Identification Restriction
PCO Point of Control and Observation

P-CSCF Proxy CSCF
PO Point of Observation

PSTN Public Switched Telephone Network

SA Security Association S-CSCF Serving CSCF

SCTP <u>Stream Control Transmission Protocol</u>

SDPSession Description ProtocolSIPSession Initiation ProtocolSGFSignalling Gateway Function

SUT System Under Test

TCP Transmission Control Protocol

TD Test Description

TISPAN Telecommunications and Internet converged Services and Protocols for Advanced Networking

TP Test Purpose

TPLan Test Purpose Notation
TSS Test Suite Structure

UC Use Case

UE User Equipment

URI Uniform Record Identifier
VoIP Voice over Internet Protocol
XML eXxtensible Markup Language

# 4 IMS NNI Interoperability Test Specification

# 4.1 Introduction

The IMS NNI Interoperability Test Descriptions (TDs) defined in the following clauses are derived from the Test Purposes (TPs) specified in TS 186 011-1 [2]. *The TDs cover both basic call procedures such as call establishment and call release and a selection of the most common supplementary services.* 

# 4.2 Test Prerequisites

# 4.2.1 IP Version

These test specifications are based on the use of IPv4 for SIP message transport throughout all IMS nodes as specified in TR 123 981 [i.2].

# 4.2.2 Authentication and Security

The current test specification supports as default full IMS TS 133 203 [7] 3GPP security. Non-compliance with full IMS security features defined in TS 133 203 [7] is expected to be a problem mainly at the UE side, because of the potential lack of support of the USIM/ISIM interface (especially in 2G-only devices) and of the potential inability to support IPsec on some UE platforms. For those reasons, fallback to early IMS TR 133 978 [i.1] and SIP Digest authentication without key agreement and null authentication may be used to achieve satisfactory test results. Tests should however be executed with full IMS security if all required IMS nodes support it.

# 4.2.3 Registration and Subscription

#### 4.2.3.1 SIP Call Flow

This clause describes the registration call flow under the authentication and security scope described in clause 4.2.2.

#### 4.2.3.1.1 Early IMS Registration and Subscription Call Flow

Early IMS security does not allow SIP requests to be protected using an IPsec Security Association (SA) because it does not perform a key agreement procedure. IPsec security associations are not set up between UE and P-CSCF, as they are in the full IMS security solution. For early IMS security, the expected registration and subscription sequence is:

Cton	Dire	ction	Magazara	Commont			
Step	UE	IMS	- Message	Comment			
1				The UE establishes an IP bearer as required by its			
				specific access network (optional).			
2	<b>←</b>	$\rightarrow$		P-CSCF address discovery using DHCP			
				procedures for IPv4 (optional).			
3	$\rightarrow$		$\rightarrow$		REGISTER	The UE sends initial registration for IMS services.	
4	•	<del>(</del>	200 OK	The IMS responds with 200 OK.			
5	-	<del>&gt;</del>	SUBSCRIBE	The UE subscribes to its registration event	_		
				package.	ě		
6	•	<del>(</del>	200 OK or 202 Accepted	The IMS responds with 200 OK or 202 Accepted.	Unprotected		
7	•	<del>(</del>	NOTIFY	The IMS sends initial NOTIFY for registration event	] 은		
				package, containing full registration state	ПŢ		
				information for the registered public user identity in	_ ا		
				the XML body.			
8	_	<del>)</del>	200 OK	The UE responds with 200 OK.			

# 4.2.3.1.2 Full IMS Registration and Subscription Call Flow

For full IMS security, the expected registration and subscription sequence is:

Step	Direction	Message	Comment	
-	UE IMS	Wessage		
1			The UE establishes an IP bearer as required by its	
	( )		specific access network (optional).	
2	$\leftarrow \rightarrow$		P-CSCF address discovery using DHCP	
		DECLOTED	procedures for IPv4 (optional).	<u> </u>
3	<b>→</b>	REGISTER	The UE sends initial registration for IMS services.	g
4	<b>←</b>	401 Unauthorized	The IMS responds with a valid Digest AKA	Unprotected
			authentication challenge and a list of integrity and encryption algorithms supported by the network as	ote
			defined in the IMS AKA procedure of	jpr
			TS 133 203 [7].	Ž
5			Upon receipt of 401 Unauthorized, the UE selects the first integrity and encryption algorithm	
			combination on the list received from the P-CSCF in	
			401 Unauthorized which is also supported by the	
			UE. If the P-CSCF did not include any	
			confidentiality algorithm in 401 Unauthorized then	
			the UE shall select the NULL encryption algorithm.	
			The UE then proceeds to establish two new pairs of	
			IPSEC Security Associations (SA1 and SA2).	
6	$\rightarrow$	REGISTER	The UE sends another REGISTER with	1
			authentication credentials over IPSEC security	SA
			association SA1.	<u>&gt;</u>
		222 214	TI 1040	Protected by SA1
7	<b>←</b>	200 OK	The IMS responds with 200 OK over the same	cte
			IPSEC security association SA1.	ote
				Pro
8	$\rightarrow$	SUBSCRIBE	The UE subscribes to its registration event package	
		SOBSCRIBE	over the IPSEC security association SA2.	
9	<b>←</b>	200 OK or 202 Accepted	The IMS responds with 200 OK or 202 Accepted	2
		over the IPSEC security association SA2.		Protected by SA2
10	+	NOTIFY	The IMS sends initial NOTIFY for registration event	by
			package, containing full registration state	p
			information for the registered public user identity in	cte
			the XML body, over the IPSEC security association	ote
			SA2.	<u>~</u>
11	$\rightarrow$	200 OK	The UE responds with 200 OK over the IPSEC	
			security association SA2.	

# 4.2.3.1.3 SIP Digest Registration and Subscription Call Flow

For SIP Digest authentication without key agreement and null authentication, the expected registration and subscription sequence is:

Step	Direction UE IMS	Message	Comment				
1			The UE establishes an IP bearer as required by its specific access network (optional).				
2	←→		P-CSCF address discovery using DHCP procedures for IPv4 (optional).	res			
3	$\rightarrow$	REGISTER	The UE sends initial registration for IMS services.				
4	+	401 Unauthorized	The IMS responds with a valid HTTP Digest authentication challenge as defined in RFC 2617 [8].				
5	$\rightarrow$	REGISTER	The UE sends another REGISTER with authentication credentials.	Jnprotected			
6	+	200 OK	The IMS responds with 200 OK.	je l			
7	$\rightarrow$	SUBSCRIBE	The UE subscribes to its registration event package.	20			
8	+	200 OK or 202 Accepted	The IMS responds with 200 OK or 202 Accepted.	Jr I			
9	+	NOTIFY	The IMS sends initial NOTIFY for registration event package, containing full registration state information for the registered public user identity in the XML body.				
10	$\rightarrow$	200 OK	The UE responds with 200 OK.				

# 4.2.4 Supported Options

### 4.2.4.1 Security

Support for security agreement is optional in case of Full IMS Reg. It shall only be used in case all IMS nodes support it.

# 4.2.4.2 Signalling Compression

"No SigComp" is the default signalling configuration in all test descriptions. Tests may be executed with signalling compression if the required nodes support it.

# 4.3 Test Infrastructure

In these clauses we define the involvement of the various IMS nodes specifically as they pertain to NNI testing. The configuration of the nodes is described. Points of control and observation are identified and static test configurations are described. The Mw interface or the Ic interface if topology hiding is required is the interface under observation for NNI interoperability testing.

# 4.3.1 Core IMS Nodes

The current testing scope includes IMS roaming and border control functionality. For IMS roaming, Mw reference point between IMS core in visited network (P-CSCF) and IMS core in home network will be monitored for testing purposes. For border control functionality, Mx reference point between IMS Core and IBCF, Ici reference point between an IBCF and another IBCF or I-CSCF belonging to a different IM CN subsystem network and Izi reference point between a TrGW and another TrGW or media handling node belonging to a different IM CN subsystem network will be monitored for testing purposes. For all test cases not requiring IMS roaming or border control functionality, P-CSCF, S-CSCF, I-CSCF, IBCF, and HSS are considered to be within a "black box" for testing purposes, i.e. the System Under Test (SUT). Interfaces within the IMS (excluding Mx reference point between IMS Core and IBCF when border control functionality is required) are considered internal and not observable for testing purposes.

#### 4.3.1.1 P-CSCF

#### 4.3.1.1.1 Relevant Interfaces

The P-CSCF constitutes the point of entry for UE signalling into the IMS core. The Gm interface between the P-CSCF and the UE is used as a point of control and observation (PCO) for NNI interoperability testing purposes. In the case of IMS roaming configurations the Mw reference point of the P-CSCF is exposed at the NNI and used there as a point of observation (PO).

#### 4.3.1.1.2 Node Configuration

The P-CSCF should be configured to support the pre-requisites outlined in clause 4.2.

#### 4.3.1.2 S-CSCF

#### 4.3.1.2.1 Relevant Interfaces

The S-CSCF is the core IMS node delivering IMS services to subscribers. When no border control functionalities are applied, the Mw reference point between the S-CSCF and either I- or S-CSCF in another network domain is used as a PO against which NNI interoperability tests are validated. The Mw interfaces between I- and S-CSCFs within the same network are considered to be internal IMS interfaces. Although considered as internal and not explicitly involved in all NNI test configurations, it is recommended that these interface are exposed for troubleshooting purposes. When border control functionalities are applied, the Mx reference point between S-CSCF and IBCF within the same network domain, is used as a PO for NNI interoperability checks.

#### 4.3.1.2.2 Node Configuration

The S-CSCF should be configured to support the pre-requisites outlined in clause 4.2. When applicable based on the specific configuration, the S-CSCF must be provisioned to support required Application Servers (AS) as trusted nodes.

### 4.3.1.3 I-CSCF

#### 4.3.1.3.1 Relevant Interfaces

The I-CSCF is the contact point within an operator's network for all connections destined to a user of that network operator, or a roaming user currently located within that network operator's service area. When no border control functionalities are applied, the Mw reference point between the I-CSCF and an S-CSCF in another network domain is used as a PO against which NNI interoperability tests are validated. The Mw interfaces between I- and S-CSCFs within the same network are considered to be internal IMS interfaces. Although considered as internal and not explicitly involved in all NNI test configurations, it is recommended that these interface are exposed for troubleshooting purposes. When border control functionalities are applied, the Mx reference point between I-CSCF and IBCF within the same network domain, is used as a PO for NNI interoperability checks.

#### 4.3.1.3.2 Node Configuration

The I-CSCF should be configured to support the pre-requisites outlined in clause 4.2.

#### 4.3.1.4 IBCF

#### 4.3.1.4.1 Relevant Interfaces

The IBCF is the core IMS node providing border control functionalities such as topology hiding, transport plane control, screening of SIP signalling or application level gateway (for instance enabling communication between IPv6 and IPv4 SIP applications). However, the IBCF can act also as a pass-through entity between adjacent IMS networks. The IcI reference point between the IBCF and either IBCF or I- or S-CSCF in another network domain is used as a PO against which NNI interoperability tests are validated.

# 4.3.1.4.2 Node Configuration

The IBCF should be configured to support the pre-requisites outlined in clause 4.2. The IBCF node will be present in all tests to be executed. In case the requirement to support topology hiding is not explicitly stated in the pre-conditions of a test description it shall be assumed that the IBCF does not apply this functionality. In case the requirement to support application level gateway (ALG) is not explicitly stated in the pre-conditions of a test description it shall be assumed that the IBCF does not apply this functionality.

#### 4.3.1.5 HSS

#### 4.3.1.5.1 Relevant Interfaces

The HSS constitutes the repository for IMS subscriber information. The Cx interface between the HSS and the S-CSCF and/or I-CSCF is considered an internal IMS interface.

#### 4.3.1.5.2 Node Configuration

The HSS should be configured within each IMS participating in an interoperability test, i.e. IMS\_A as well as IMS\_B, to interact with CSCFs as required using DIAMETER Cx interfaces. Users should be provisioned to match the sample profiles listed in table 1. In addition, each IMS shall have its own unique domain. Also the phone numbers configured in the two IMSes participating in an interoperability test shall be unique, i.e. IMS\_A and IMS\_B shall have no phone numbers in common. All public identities belong to the same implicitly registered set.

Public Identity 2 **Private Identity Public Identity 1** Default Filter criteria (SIP URI) **Public** (Tel URI) Identity userGEN\_priv userGEN na na e.g. tel:+330123402 userSIP\_priv userSIP 1 na userTEL\_priv userTEL e.g. tel:+330123403 2 na userNOAS priv userNOAS contact AS on terminating INVITE SESSION\_TERMINATED userHOLD contact HOLD AS userHOLD\_priv 1 na userOIP\_priv userOIP contact OIP AS 1 na userOIR\_priv userOIR contact OIR AS 1 na userACR\_priv userACR contact ACR AS 1 na userCFU\_priv userCFU contact CFU AS na

Contact IPTV AS

Table 1: HSS sample user profiles

Public user identity may take the form of SIP or TEL URIs (RFC 3966 [9]).

userIPTV

EXAMPLE 1: sip: userGEN@ims\_a.net.

EXAMPLE 2: tel: +330123402.

A private user identity may also take the form of-<imsi>@ims.<xxx>mnc.<yyy>.mcc.3gppnetwork.org.

EXAMPLE 3: <u>293410100367663@ims.041mnc.293.mcc.3gppnetwork.org.</u>

#### 4.3.1.6 MRFC

userIPTV\_priv

#### 4.3.1.6.1 Relevant Interfaces

The Media Resource Function Controller (MRFC) is a signalling plane node that acts as a SIP User Agent to the S-CSCF, and which controls the MRFP across an <u>H.248</u> interface. The Mr interface between the MRFC and the S-CSCF, the Cr/Sr interfaces to the AS and the Mp interface to the MRFP are considered internal IMS interfaces.

# 4.3.1.6.2 Node Configuration

The MRFC should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the MRFC as part of an IMS core network depends highly on the test description to be executed.

#### 4.3.1.7 MRFP

#### 4.3.1.7.1 Relevant Interfaces

The Media Resource Function Processor (MRFP) is a media plane node that implements all media-related functions. The Mp interface between the MRFP and the MRFC is considered an internal IMS interface.

### 4.3.1.7.2 Node Configuration

The MRFP should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the MRFP as part of an IMS core network depends highly on the test description to be executed.

#### 4.3.1.8 MGCF

#### 4.3.1.8.1 Relevant Interfaces

The Media Gateway Controller Function (MGCF) does call control protocol conversion between SIP and ISUP. It also controls the resources in a <u>Media Gateway</u> across an <u>H.248</u> interface. The Mg reference point between the MGCF and an I-CSCF in the same network domain is used as a PO against which NNI interoperability tests are validated. The E1 reference point to the CS network is used to verify the codings of the ISUP messages.

#### 4.3.1.8.2 Node Configuration

The MGCF should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the MGCF as part of an IMS core network depends highly on the test description to be executed.

#### 4.3.1.9 MGF

#### 4.3.1.9.1 Relevant Interfaces

The Media Gateway Function (MGF) interfaces with the media plane of the CS network, by converting between RTP and PCM. It can also transcode when the <u>codecs</u> do not match. The reference points of the MGF with other entities are out of the scope of the test descriptions in the present document.

#### 4.3.1.9.2 Node Configuration

The MGF should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the MGF as part of an IMS core network depends highly on the test description to be executed.

#### 4.3.1.10 SGF

#### 4.3.1.10.1 Relevant Interfaces

The Signalling Gateway Function (SGF) interfaces with the signalling plane of the CS. It transforms lower layer protocols as <u>Stream Control Transmission Protocol</u> (SCTP) into <u>Message Transfer Part</u> (MTP) protocol), to pass <u>ISDN User Part</u> (ISUP) from the MGCF to the CS network.

### 4.3.1.10.2 Node Configuration

The SGF should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the SGF as part of an IMS core network depends highly on the test description to be executed.

### 4.3.2 External IMS core Nodes

#### 4.3.2.1 UE

#### 4.3.2.1.1 Relevant Interfaces

The UE is considered to act as a stimulus node in this test specification. The Gm interface between the P-CSCF and the UE is used as a Point of Control and Observation (PCO) for NNI interoperability tests.

#### 4.3.2.1.2 Node Configuration

The UE should be configured to support the pre-requisites outlined in clause 4.2. The test descriptions in the present document assume that a UE supports basic call and messaging functionality, target refresh based on UPDATE and on re-INVITE method, message transport via UDP and TCP, and the use of at least one of the supplementary services HOLD (see TS 124 410 [10]), CDIV (see TS 124 404 [11]), ACR-CB (see TS 124 411 [12]) or OIP/OIR (see TS 124 407 [13]). In the case that a UE does not meet one or more of these features, only a selected subset of the test descriptions in the present document should be used for IMS core network interoperability testing, i.e. test descriptions which do not contain any pass criteria related to these features.

#### 4.3.2.2 AS

#### 4.3.2.2.1 Relevant Interfaces

Interworking between external Application Servers (AS) and the IMS core is under the scope of the present document. The ISC interface between the S-CSCF and the AS is used as a Point of Observation (PO) for NNI interoperability tests.

#### 4.3.2.2.2 Node Configuration

The AS should be configured to support the pre-requisites outlined in clause 4.2. The test descriptions in the present document assume that an AS supports the use of the supplementary services HOLD (see TS 124 410 [10]), CDIV (see TS 124 404 [11]), ACR-CB (see TS 124 411 [12]), OIP/OIR (see TS 124 407 [13]), IPTV(see TS 183 063 [14]) or Conference (see TS 124 247 [15]). In the case that an AS does not support one or more of these supplementary services, only a selected subset of the test descriptions in the present document should be used for IMS core network interoperability testing, i.e. test descriptions which do not contain any pass criteria related to these supplementary services.

# 4.3.3 Supporting IMS Nodes

#### 4.3.3.1 DNS

### 4.3.3.1.1 Relevant Interfaces

The Domain Name Service (DNS) is considered as a supporting entity in this test specification. It is assumed that each IMS has its own local DNS which is connected to the common interconnect DNS.

### 4.3.3.1.2 Node Configuration

The common DNS should be configured for appropriate resource record handling as required to support proper resolution of all SIP URIs in Request URIs and Route headers. In addition, either the local or common DNS must support ENUM functionality in order to resolve Tel URIs into SIP URIs. As an example, a DNS should have an entry to map E.164 number 0633348273 to the SIP URI of userSIP.

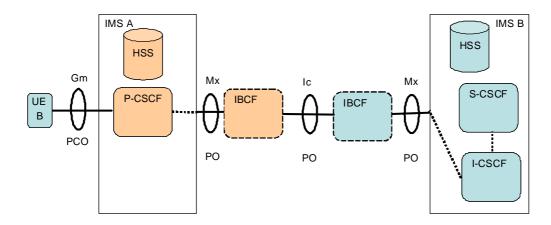
# 4.3.4 Test Configurations

The following architectural test configurations are referenced in the IMS NNI interoperability TDs in the present document. They are intended to give a general rather than a specific view of the required IMS core network SUT(s) connectivity and associated UE(s), AS(s), and DNS(s).

NOTE: Note that in the following figures observable interfaces are indicated as a solid line, non-observable interfaces indicated as dashed lines, and IBCFs are assumed to act in a "pass-through" mode if topology hiding is not required by a test description. In addition, local DNS servers are not shown.

# Roaming Registration

# CF\_ROAM\_REG



Precondition:

Different network operators performing origination and termination, UE\_B roaming in visited network A (ROAM), UE\_B not yet registered (REG), neither UE\_A nor AS involved, IBCF is involved but no topology hiding performed

Test configuration for:

Registration requests and responses from UE\_B

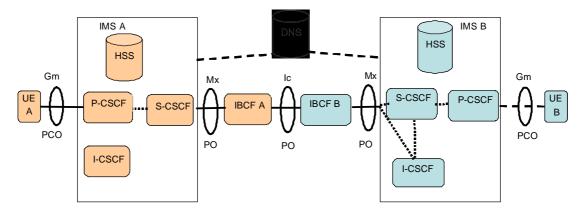
Example:

REGISTER prior to IMS VoIP voice call from UE\_B

Figure 1: CF\_ROAM\_REG

### Interworking Call

# CF\_INT\_CALL



#### Precondition:

Different network operators performing origination and termination, both UEs or only UE A in home networks (INT), both UE's registered, no AS, a common interconnect DNS and local DNSs for each IMS may be involved, IBCF is involved, topology hiding may apply

Test configuration for:

Requests and responses between UE\_A and UE\_B in call (CALL) and messaging scenarios Unsuccessful initial requests and responses from UE\_A (when UE\_B is not registered)

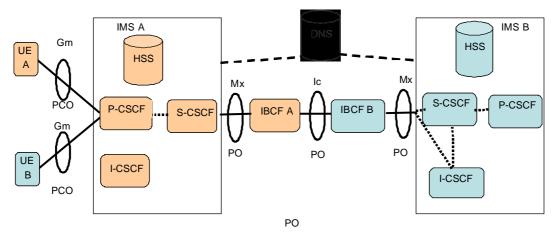
Example:

Initial INVITE in IMS VoIP voice call from UE\_A to UE\_B

Figure 2: CF\_INT\_CALL

### Roaming Call

### CF ROAM CALL



#### Precondition

Different network operators performing origination and termination, UE\_B roaming (ROAM) via IMS\_A, UE\_A in home network, both UEs are registered, no AS, IBCF is involved, topology hiding may apply

Test configuration for:

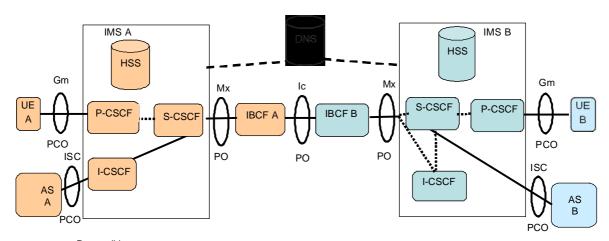
Requests and responses between UEB and UE\_A in call (CALL) and messaging scenarios Example:

Initial INVITE in IMS VoIP voice call from UE\_B to UE\_A

Figure 3: CF\_ROAM\_CALL

# Interworking Application Server

# CF\_INT\_AS



#### Precondition:

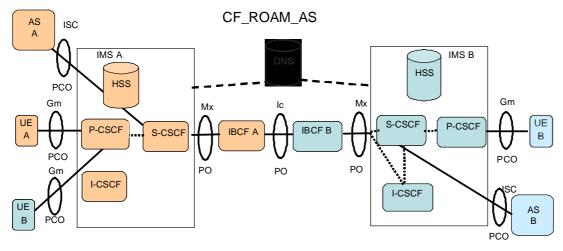
Different network operators performing origination and termination, UE\_A and UE\_B in home networks (INT), both UEs registered, AS for UE\_A and UE\_B (AS), IBCF is involved, topology hiding may apply Test configuration for:

Requests and responses between ASes and UEs

#### Example:

Initial INVITE in IMS VoIP voice call unconditionally forwarded to UE\_B by AS\_A (CFU). AS\_A acts as routing AS

Figure 4: CF\_INT\_AS



#### Precondition:

Different network operators performing origination and termination, UE\_B roaming (ROAM) via IMS\_A, UE\_A in home network, both UEs or registered, AS for UE\_A and UE B may be involved (AS), IBCF is involved, topology hiding may apply

#### Test configuration for:

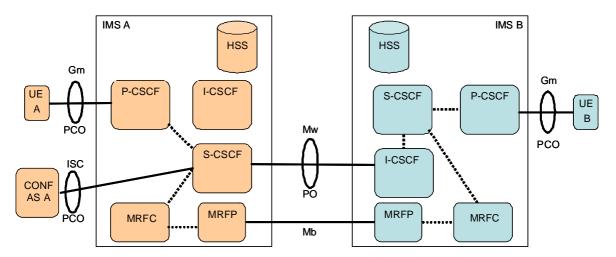
Requests and responses between AS\_B and UEs

Unsuccessful initial requests and responses from UE\_A (when UE\_B and AS\_B are not available)

Initial INVITE IMS VoIP voice call unconditionally forwarded to UE\_B by AS\_B (CFU). AS\_B acts as routing AS

Figure 5: CF\_ROAM\_AS

# CF\_INT\_CONF\_CALL



#### Precondition:

Different network operators performing origination and termination, both UEs or only UE A in home networks (INT), both UE's registered, CONF AS is involved in IMS A, IMS A and IMS B both include MRFC and MRFP

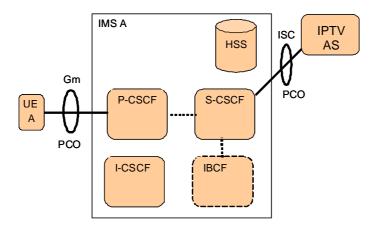
Test configuration for:

Requests and responses between UE\_A and UE\_B in an Ad-Hoc Conference Call (CONF\_CALL) Example:

Initial INVITE in from UE\_A to initiate an Ad-Hoc Conference call in IMS A, and subsequent invitation to UE\_B to join (via REFER method from UE\_A)

Figure 6: CF\_INT\_CONF\_CALL





#### Precondition:

UE A registered in home network, IPTV-AS is involved

Test configuration for:

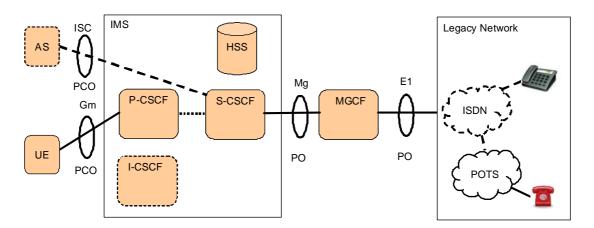
Requests and responses between UE\_A and AS\_A

Example:

Initial INVITE from UE\_A to AS\_A to initiate a IPTV Broadcast session.

Figure 7: CF\_IPTV

#### CF PSTN



Precondition:

Single network with UE in home networks and registered, AS and I-CSCF may be involved Test configuration for:

Requests and responses between IUE and POTS or ISDN phone

Example:

Initial INVITE from UE to POTS phone

Figure 8: CF\_PSTN

# 4.4 Use Cases

Use cases are the basis for interoperability test descriptions. Each use case defines both a generic test sequence, i.e. a set of user stimuli and observations for any number of involved IMS external entities (IMS UE, DNS Server, and AS), and a monitor view of all the resulting messages exchanged at the outer IMS core network interfaces, i.e. a call flow for user, Gm, Mw, Ic, DNS, and ISC interfaces. The test sequence and call flow are correlated using grey shading.

For call and messaging related use cases presented in this clause that involve UE interaction it is assumed to follow the registration and subscription procedure described in clause 4.2.4 for each UE involved in the test. These procedures are not shown here to reduce the size of the call flows.

Test descriptions defined in clause 4.5 then reference and specialize one of the use cases presented in this clause, i.e. generic test sequence and call flow, according to the needs of the one or more test purposes which are associated with a test description.

# 4.4.1 IMS Registration in a Visited Network

# 4.4.1.1 Description

UE\_B registers in a visiting network. The call flow path and node configuration for this use case corresponds to CF\_ROAM\_REG.

The test sequence typically associated with this use case when an established session is released is as follows (CFW step numbers refer the call flow step numbering).

Step	Action	CF_ROAM_REG
1	User B triggers registration to IMS B	Step 1
2	User B is informed about successful registration	Step 22

# 4.4.1.2 UC\_01\_R: SIP message flow for IMS registration with CF ROAM

The expected call flow sequence is:

Step			Dir	ection			Message	Comment
	U	U	I	I	I	I		
	s	E	M	В				
	е	В	S	C	C	S		
	r B		A	FA	F	В		
1		$\rightarrow$		<del>  ^</del>	В			User B triggers registration to IMS B
2			$\rightarrow$				REGISTER	UE_B sends a REGISTER to IMS_A
3			1				REGISTER	IMS_A forwards the REGISTER to IBCF_A
4				1	$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF_B
5					<u> </u>	<b>─</b>	REGISTER	IBCF B forwards the REGISTER to IMS B
6							401 Unauthorized	IMS_B responds with 401 Unauthorized to
					•	•		IBCF_B
7				K			401 Unauthorized	IBCF_B forwards the 401 Unauthorized to
8							401 Unauthorized	IBCF_A IBCF A forwards the 401 Unauthorized to
0			+				401 Onaumonzeu	IMS_A
9		$\leftarrow$					401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
10		_					REGISTER	UE_B sends the same REGISTER containing
								authentication challenge response to IMS_A
11			-	$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF A
12				}	$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
13						<del></del>	REGISTER	IBCF_B forwards the REGISTER to IMS B
14					K		200 OK	IMS_B responds with 200 OK
15				K			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
16							200 OK	IBCF_A forwards the 200 OK response to
								IMS_A
17		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_B
18			-	$\longrightarrow$			SUBSCRIBE	IMS_A sends a SUBSCRIBE to IBCF_A
19				}	$\longrightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE to IBCF_B
20					-	$\longrightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
21					<b>*</b>	<u>:</u>	200 OK	IMS_B responds with a 200 OK or 202
22							or 202 Accepted 200 OK	Accepted IBCF_B forwards 200 OK or 202 Accepted to
~~				K			or 202 Accepted	IBCF_A
23							200 OK	IBCF_A forwards 200 OK or 202 Accepted to
							or 202 Accepted	IMS_A
24					K	<u>:</u>	NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing
25							NOTIFY	UE_B's registration status IBCF_B forwards NOTIFY to IBCF_A
26			_				NOTIFY	IBCF_A forwards NOTIFY to IMS_A
27							200 OK	IMS_A responds to the NOTIFY with a 200 OK
28				1			200 OK	IBCF_A forwards 200 OK response to IBCF_B
39					1		200 OK	IBCF_B forwards 200 OK response to IMS_B
30						1	SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event
			$\rightarrow$					package) to IMS_A
31			-	$\longrightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IBCF_A
32				-	$\longrightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE request to IBCF_B
33					-	<b></b>	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE request to IMS_B
34							200 OK or	IMS_B responds with 200 OK or 202 Accepted
							202 Accepted	
35				k			200 OK or 202 Accepted	IBCF_B forwards the 200 OK or 202 Accepted response to IBCF_A
36							200 OK or	IBCF_A forwards the 200 OK or 202 Accepted
			•				202 Accepted	response to IMS_A
			•		•	•		

Step	Direction				Message	Comment		
	U s e r B	U E B	I M S A	I B C F A	- B C F B	I M S B		
37		$\leftarrow$					200 OK or 202 Accepted	IMS_A forwards the 200 OK or 202 Accepted response to UE_B
38					NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status		
39				←			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
40	<b>├</b>			NOTIFY	IBCF_A forwards the NOTIFY to IMS_A			
41		$\leftarrow$					NOTIFY	IMS_A forwards the NOTIFY to UE_B
42			$\longrightarrow$				200 OK	UE_B responds to the NOTIFY with a 200 OK
43				$\longrightarrow$			200 OK	IMS_A forwards the 200 OK to IBCF_A
44					$\longrightarrow$		200 OK	IBCF_A forwards the 200 OK to IBCF_B
45						$\rightarrow$	200 OK	IBCF_B forwards the 200 OK to IMS_B
46	$\leftarrow$							User B is informed about successful registration

# 4.4.2 User-initiated VoIP call setup and release

### 4.4.2.1 Normal Call

# 4.4.2.1.1 Description

UE\_A places an IMS VoIP call to UE\_B. Once the media path is established, the originating user releases the call. The call flow path and node configuration for this use case corresponds to CF\_INT\_CALL in case of interworking and CF\_ROAM\_CALL in case of roaming.

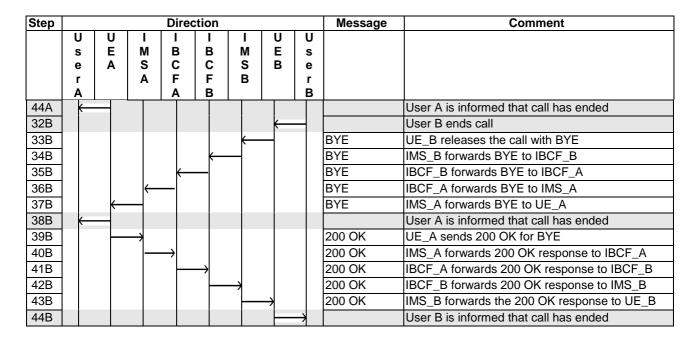
The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering).

# 4.4.2.1.2 UC\_02\_I: SIP Call Flow "Normal Call" with CF\_INT\_CALL

The test sequence and expected call flow sequence when user A calls user B in an interworking scenario is:

Step	Action	CF_INT_CALL
1	User A calls User B	Step 1
2	User B is informed of incoming call of User A	Step 12
3	User A is informed that UE_B is ringing	Step 18
4	User B answers call	Step 19
5	User A is informed that call has been answered	Step 25
6	User B is informed that the call is established	Step 31
7A	User A ends call	Step 32A
7B	User B ends call	Step 32B
8A	User B is informed that call has ended	Step 38A
8B	User A is informed that call has ended	Step 38B
9A	User A is informed that call has ended	Step 44A
9B	User B is informed that call has ended	Step 44B

Step				Dire	ction				Message	Comment
	U	U	I	I	I	ı	U	U	3	
	s	E	M	В	В	M	E	s		
	e	Α	S	С	C	S	В	e		
	r A		Α	F	F B	В		r B		
1		$\rightarrow$		Î	1					User A calls User B
2									INVITE	UE_A sends INVITE with the first SDP offer
		_	$\longrightarrow$							indicating all desired medias and codecs that
										UE_A supports
3		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional
4									INVITE	response IMS_A forwards INVITE to IBCF_A
5				$\neg$					100 Trying	IBCF_A responds with a 100 Trying provisional
3			$\leftarrow$	-					100 Hyllig	response
6					$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				,					100 Trying	IBCF_B responds with a 100 Trying provisional
										response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>k</b> -				100 Trying	IMS_B responds with a 100 Trying provisional
10									INVITE	response IMS_B forwards INVITE to UE_B
11									100 Trying	UE_B optionally responds with a 100 Trying
' '						$\leftarrow$	$\dashv$		100 Hyilig	provisional response
12								$\rightarrow$		User B is informed of incoming call of User A
13									180 Ringing	UE_B responds to initial INVITE with 180
										Ringing to indicate that it has started alerting
14					$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to
15									180 Ringing	IBCF_B IBCF_B forwards 180 Ringing response to
15				←					160 Kinging	IBCF_A
16									180 Ringing	IBCF_A forwards 180 Ringing response to
										IMS_A
17		<b>←</b>							180 Ringing	IMS_A forwards the 180 Ringing response to
40	,	-								UE_A
18										User A is informed that UE_B is ringing User B answers call
19 20									200 OK	UE_B responds INVITE with 200 OK to indicate
20						$\leftarrow$			200 OK	that the call has been answered
21					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
22				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
23			$\leftarrow$	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
24		$\leftarrow$							200 OK	IMS_A forwards 200 OK response to UE_A
25	$\leftarrow$									User A is informed that call has been answered
26									ACK	UE_A acknowledges the receipt of 200 OK for
			1						1016	INVITE
27				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
28					$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
29						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
30							$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
31								7		User B is informed that the call is established
32A									BYE	User A ends call
33A 34A				\					BYE	UE_A releases the call with BYE IMS_A forwards BYE to IBCF_A
34A 35A				7					BYE	IBCF_A forwards BYE to IBCF_B
36A									BYE	IBCF_B forwards BYE to IBCF_B
37A							$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
38A									DIL	User B is informed that call has ended
39A								1	200 OK	UE_B sends 200 OK for BYE
40A					_	`			200 OK	IMS_B forwards 200 OK response to IBCF_B
41A				<b>k</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
42A			<b>←</b>	_ `					200 OK	IBCF_A forwards 200 OK response to IMS_A
43A		<u> </u>							200 OK	IMS_A forwards the 200 OK response to UE_A
	I	1,	ı	I	1	I	I	I	L	

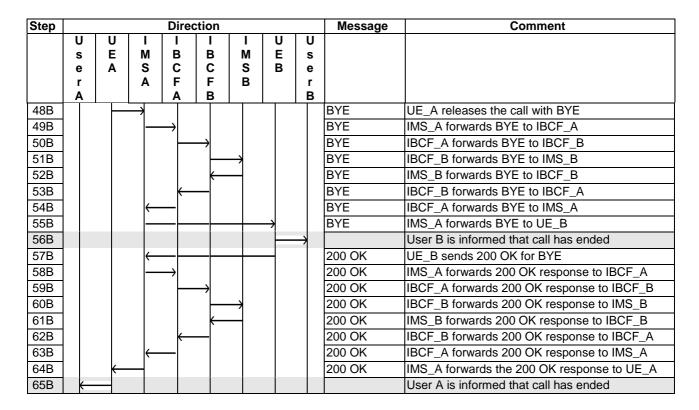


# 4.4.2.1.3 UC\_02\_R: SIP Call Flow "Normal Call" with CF\_ROAM\_CALL

The expected call flow sequence when user A calls user B in a roaming scenario is:

Step				Direc	ction				Message	Comment
	U	Ū	I	I	I	I	U E	U		
	s e	E	M S	B	B	M S	B	s e		
	r	_ ^	Ā	F	F	B		r		
	À			Α	В	_		В		
1		$\rightarrow$								User A calls User B
2									INVITE	UE_A sends INVITE with the first SDP offer
		_	$\rightarrow$							indicating all desired medias and codecs that
										UE_A supports
3		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional
<u> </u>									IN IV // TE	response
4				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional
6									INVITE	response IBCF_A forwards INVITE to IBCF_B
7					$\neg$					
/				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						_			INVITE	IBCF_B forwards INVITE to IMS_B
9						1			100 Trying	IMS_B responds with a 100 Trying provisional
					$\leftarrow$				100 Trying	response
10					$\leftarrow$				INVITE	IMS_B forwards INVITE to IBCF_B
11									100 Trying	IBCF_B responds with a 100 Trying provisional
										response
12				$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
13					_				100 Trying	IBCF_A responds with a 100 Trying provisional
					1					response
14			$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
15				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional
										response
16							$\rightarrow$		INVITE	IMS_A forwards INVITE to UE_B
17			$\leftarrow$						100 Trying	UE_B optionally responds with a 100 Trying
40										provisional response
18								7	100 D: :	User B is informed of incoming call of User A
19			$\leftarrow$			_	_		180 Ringing	UE_B responds to initial INVITE with 180
		ļ	ļ				l			Ringing to indicate that it has started alerting

Step				Direc	ction				Message	Comment
•	U		I	ı	I	I	U	U		
	s			В	В	M	E	S		
	e		S A	C F	C F	S	В	e		
	r A	'	^	A	В			r B		
20				<del>)</del>				Ī	180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
21					$\rightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to
22									180 Ringing	IBCF_B IBCF_B forwards 180 Ringing response to
23					_				180 Ringing	IMS_B IMS_B forwards 180 Ringing response to
24				_	_				180 Ringing	IBCF_B IBCF_B forwards 180 Ringing response to
25									180 Ringing	IBCF_A IBCF_A forwards 180 Ringing response to
			$\leftarrow$	_						IMS_A
26		<del>(</del>							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
27	←									User A is informed that UE_A is ringing
28							$\leftarrow$			User B answers call
29			$\leftarrow$	-					200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
30				→					200 OK	IMS_A forwards 200 OK response to IBCF_A
31					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
32						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
33					←				200 OK	IMS_B forwards 200 OK response to IBCF_B
34				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
35			$\leftarrow$	-					200 OK	IBCF_A forwards 200 OK response to IMS_A
36		<del>(                                    </del>							200 OK	IMS_A forwards 200 OK response to UE_A
37	←									User A is presented that call in process
38		<b>├</b> ───							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
39				→					ACK	IMS_A forwards ACK to IBCF_A
40					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
41						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
42					$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
43				$\leftarrow$					ACK	IBCF_B forwards ACK to IBCF_A
44			$\leftarrow$	-					ACK	IBCF_A forwards ACK to IMS_A
45				_			$\rightarrow$		ACK	IMS_A forwards ACK to UE_B
46								$\rightarrow$		User B is informed that the call is in progress
47A	$\vdash$	$\rightarrow$								User A ends call
48A									BYE	UE_A releases the call with BYE
49A				→					BYE	IMS_A forwards BYE to IBCF_A
50A					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
51A					-	$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
52A					⊬	_			BYE	IMS_B forwards BYE to IBCF_B
53A				$\leftarrow$	_				BYE	IBCF_B forwards BYE to IBCF_A
54A			$\leftarrow$	-					BYE	IBCF_A forwards BYE to IMS_A
55A				_	_	+	$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
56A								<del>)</del>		User B is informed that call has ended
57A			$\leftarrow$	-					200 OK	UE_B sends 200 OK for BYE
58A				→					200 OK	IMS_A forwards 200 OK response to IBCF_A
59A				-	$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
60A					-	$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
61A					←	_			200 OK	IMS_B forwards 200 OK response to IBCF_B
62A				$\leftarrow$	_				200 OK	IBCF_B forwards 200 OK response to IBCF_A
63A			$\leftarrow$	-					200 OK	IBCF_A forwards 200 OK response to IMS_A
64A		<b>k</b>	ł						200 OK	IMS_A forwards the 200 OK response to UE_A
65A	⊬									User A is informed that call has ended
47B	H	$\rightarrow$								User A ends call



The test sequence and expected call flow sequence when user B calls user A in a roaming scenario is:

Step	Action	CF_ROAM_CALL
1	User B calls User A	Step 1
2	User A is informed of incoming call of User B	Step 18
3	User B is informed that UE_A is ringing	Step 27
4	User A answers call	Step 28
5	User B is informed that call has been answered	Step 37
6	User A is informed that the call is established	Step 46
7A	User A ends call	Step 47A
7B	User B ends call	Step 47B
8A	User B is informed that call has ended	Step 56A
8B	User A is informed that call has ended	Step 56B
9A	User A is informed that call has ended	Step 65A
9B	User B is informed that call has ended	Step 65B

Step				)irecti	on				Message	Comment
	U	U	I	I	I	I	U	U		
	S				B C	M S	E B	S		
	e r			F	F	B	-	e r		
	A	-	-	A	В			В		
1							$\leftarrow$			User B calls User A
2			١,						INVITE	UE_B sends INVITE with the first SDP offer
			$\leftarrow$							indicating all desired medias and codecs that UE_B supports
3									100 Trying	IMS_A responds with a 100 Trying provisional
							$\rightarrow$			response
4				•					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$	-					100 Trying	IBCF_A responds with a 100 Trying provisional
6					4				INVITE	response IBCF_A forwards INVITE to IBCF_B
7									100 Trying	IBCF_B responds with a 100 Trying provisional
-				$\leftarrow$						response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional
10					_				INVITE	response IMS_B forwards INVITE to IBCF_B
11					`				100 Trying	IBCF_B responds with a 100 Trying provisional
						$\neg$			, ,	response
12				$\leftarrow$	-				INVITE	IBCF_B forwards INVITE to IBCF_A
13					÷				100 Trying	IBCF_A responds with a 100 Trying provisional
14				_					INVITE	response IBCF_A forwards INVITE to IMS_A
15			ľ.						100 Trying	IMS_A responds with a 100 Trying provisional
				<b>'</b>						response
16		←							INVITE	IMS_A forwards INVITE to UE_A
17		<del></del>	,						100 Trying	UE_A optionally responds with a 100 Trying provisional response
18	<u></u>									User A is informed of incoming call of User B
19									180 Ringing	UE_A responds to initial INVITE with 180
										Ringing to indicate that it has started alerting
20			<u> </u>	<b>&gt;</b>					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
21									180 Ringing	IBCF_A forwards 180 Ringing response to
					7					IBCF_B
22						$\rightarrow$			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
23					$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
24				$\leftarrow$	-				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
25			<del></del>	-					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
26									180 Ringing	IMS_A forwards the 180 Ringing response to
							7		3 3	UE_B
27								$\rightarrow$		User B is informed that UE_A is ringing
28		$\rightarrow$							200 014	User A answers call
29		<del> </del>	1						200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
30			<u> </u>	•					200 OK	IMS_A forwards 200 OK response to IBCF_A
31					→				200 OK	IBCF_A forwards 200 OK response to IBCF_B
32						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
33					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
34			].	$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
35			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
36 37									200 OK	IMS_A forwards 200 OK response to UE_B User B is presented that call in process
38									ACK	UE_B acknowledges the receipt of 200 OK for
			$\vdash$							INVITE

Step			D	irecti	on				Message	Comment
			<b>I</b>	1	I	ı	U	U		
			M E		В	M	E	s		
	-		S   C		C	S	В	е		
	r A	<b>'</b>	A   F		F B	В		r B		
39	<del>-                                    </del>		${\longrightarrow}$	1	<del>}</del>		1		ACK	IMS_A forwards ACK to IBCF_A
40			,		4				ACK	IBCF_A forwards ACK to IBCF_B
41						_			ACK	IBCF_B forwards ACK to IMS_B
42									ACK	IMS_B forwards ACK to IBCF_B
43									ACK	IBCF_B forwards ACK to IBCF_A
44			$\leftarrow$	`					ACK	IBCF_A forwards ACK to IMS_A
45			`						ACK	IMS_A forwards ACK to UE_A
46									HOIL	User A is informed that the call is in progress
47A	<u> </u>									User A ends call
48A									BYE	UE_A releases the call with BYE
49A		1							BYE	IMS_A forwards BYE to IBCF_A
50A					>				BYE	IBCF_A forwards BYE to IBCF_B
51A					<u> </u>	_			BYE	IBCF_B forwards BYE to IMS_B
52A									BYE	IMS_B forwards BYE to IBCF_B
53A									BYE	IBCF_B forwards BYE to IBCF_A
54A			$\leftarrow$	`					BYE	IBCF_A forwards BYE to IMS_A
55A							_		BYE	IMS_A forwards BYE to UE_B
56A							1_	_	DIE	User B is informed that call has ended
57A			$\leftarrow$					1	200 OK	UE_B sends 200 OK for BYE
58A			`						200 OK	IMS_A forwards 200 OK response to IBCF_A
59A			,		4				200 OK	IBCF_A forwards 200 OK response to IBCF_B
60A					<u> </u>	_			200 OK	IBCF_B forwards 200 OK response to IMS_B
61A									200 OK	IMS_B forwards 200 OK response to IBCF_B
62A				<u></u>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
63A			$\leftarrow$	`					200 OK	IBCF_A forwards 200 OK response to IMS_A
64A		$\leftarrow$	`						200 OK	IMS_A forwards the 200 OK response to UE_A
65A	-	Ì							200 011	User A is informed that call has ended
47B	<u>`</u>				,		,			User A ends call
48B	•								BYE	UE_A releases the call with BYE
49B		<b>1</b>	$\longrightarrow$						BYE	IMS_A forwards BYE to IBCF_A
50B			,		>				BYE	IBCF_A forwards BYE to IBCF_B
51B					<u> </u>	<b>→</b>			BYE	IBCF_B forwards BYE to IMS_B
52B									BYE	IMS_B forwards BYE to IBCF_B
53B				$\leftarrow$	_[`				BYE	IBCF_B forwards BYE to IBCF_A
54B			<b>←</b>	ľ					BYE	IBCF_A forwards BYE to IMS_A
55B							$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
56B								$\rightarrow$		User B is informed that call has ended
57B			$\leftarrow$						200 OK	UE_B sends 200 OK for BYE
58B			——						200 OK	IMS_A forwards 200 OK response to IBCF_A
59B			<b>'</b>		<b>&gt;</b>				200 OK	IBCF_A forwards 200 OK response to IBCF_B
60B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
61B					<u></u>	1			200 OK	IMS_B forwards 200 OK response to IBCF_B
62B				$\longleftarrow$	_[`				200 OK	IBCF_B forwards 200 OK response to IBCF_A
63B			<u></u>	ľ					200 OK	IBCF_A forwards 200 OK response to IMS_A
64B			,						200 OK	IMS_A forwards the 200 OK response to UE_A
65B	<u></u>	È								User A is informed that call has ended
000	`									Soot 7 to informed that ball had blided

# 4.4.3 User-initiated call hold and resume

UE\_A places an IMS VoIP call to UE\_B. Once the media path is established:

- a) The originating user puts the call on hold, stopping the media stream. The originating user then resumes the call.
- b) The terminating user puts the call on hold, stopping the media stream. The terminating user then resumes the call.

The call flow path and node configuration for this use case corresponds to CF\_INT\_CALL in case of interworking and CF\_ROAM\_CALL in case of roaming.

Depending on the UE this feature may be implemented either using reINVITE or UPDATE where UPDATE is only an optional feature for the UE. However, an IMS shall be able to process UPDATE requests as they may be received when inter working with a PSTN.

# 4.4.3.1 User-initiated call hold and resume using reINVITE

### 4.4.3.1.1 Description

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A calls User B	1	1
2	User B is informed of incoming call of User A	12	18
3	User A is informed that UE_B is ringing	18	27
4	User B answers call	19	28
5	User A is informed that call has been answered	25	37
6	User B is presented that call is established	31	46
7A	User A puts call on hold	32A	47A
7B	User B puts call on hold	32B	47B
8A	User B is informed that call on hold	49A	64A
8B	User A is informed that call on hold	49B	64B
9A	User A resumes call	55A	82A
9B	User B resumes call	55B	82B
10A	User B is informed that call is resumed	66A	99A
10B	User A is informed that call is resumed	66B	99B
11A	User A is informed that call is resumed	72A	108A
11B	User B is informed that call is resumed	72B	108B
12	User A ends call	73	109
13	User B is informed that call has ended	79	118
14	User A is informed that call has ended	85	127

4.4.3.1.2 UC\_03\_I: SIP Call Flow "call hold and resume" using reINVITE with CF\_INT\_CALL

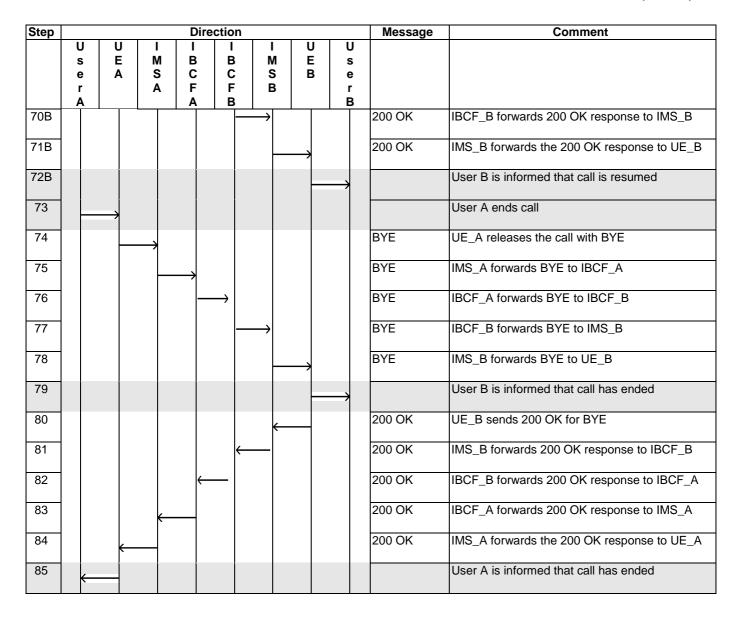
The expected call flow sequence is:

Step				Dire	ction				Message	Comment
	U	U	I	1	I	ı	ı C	U		
	S	E A	M S	B	B	M S	E B	s e		
	e r	A	A	F	F	В	В	r		
	Ā			A	В.			В		
1		$\rightarrow$								User A calls User B
2			-						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
10							$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
11						←			100 Trying	UE_B optionally responds with a 100 Trying provisional response
12								$\rightarrow$		User B is informed of incoming call of User A
13						<b>←</b>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14					$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15				$\leftarrow$					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16			←						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17		$\leftarrow$							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	<b>←</b>									User A is informed that UE_B is ringing
19							<del>-</del>			User B answers call
20						<del>(</del>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
22				$\leftarrow$	-				200 OK	IBCF_B forwards 200 OK response to IBCF_A
23			←	$\dashv$					200 OK	IBCF_A forwards 200 OK response to IMS_A
24		<b>←</b>							200 OK	IMS_A forwards 200 OK response to UE_A
25	<b>←</b>									User A is informed that call has been answered
26			$\longrightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE

Step			[	Directio	n			Message	Comment
	U s	U E	I I M E	I 	I	U M E	U		
	е	Α	s c	;   C	;   5	8 B	е		
	r A		A   F			5	r B		
27			<del></del>					ACK	IMS_A forwards ACK to IBCF_A
28				$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
29					$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
30								ACK	IMS_B forwards ACK to UE_B
31							$\rightarrow$		User B is presented that call is in progress
32A		<del>)</del>							User A puts call on hold
33A			>					INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
34A		←						100 Trying	IMS_A responds with a 100 Trying provisional response
35A			<b></b>					INVITE	IMS_A forwards INVITE to IBCF_A
36A			<del></del>					100 Trying	IBCF_A responds with a 100 Trying provisional response
37A				$ \longrightarrow$	,			INVITE	IBCF_A forwards INVITE to IBCF_B
38A				<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
39A					$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
40A					<del></del>			100 Trying	IMS_B responds with a 100 Trying provisional response
41A								INVITE	IMS_B forwards INVITE to UE_B
42A						<del></del>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
43A							$\rightarrow$		User B is informed that call is on hold
44A						<del></del>		200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "recvonly"
45A					<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
46A				<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
47A			<del></del>					200 OK	IBCF_A forwards 200 OK response to IMS_A
48A		<b></b>	-					200 OK	IMS_A forwards the 200 OK response to UE_A
49A	<del>(</del>								User A is informed that call is on hold
50A			>					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
51A								ACK	IMS_A forwards ACK to IBCF_A
52A				$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
53A					$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
54A								ACK	IMS_B forwards ACK to UE_B

Step				Directio	n			Message	Comment
		J   1 E   N	/	I 	I M	U	U s		
	e /	A   S	s c	; c	S	В	е		
	r A	<b>'</b>	Α   F		l l		r B		
55A									User A resumes call
56A								INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
57A		<del></del>						100 Trying	IMS_A responds with a 100 Trying provisional response
58A								INVITE	IMS_A forwards INVITE to IBCF_A
59A			<b></b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
60A				$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
61A				<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
62A								INVITE	IBCF_B forwards INVITE to IMS_B
63A								100 Trying	IMS_B responds with a 100 Trying provisional response
64A								INVITE	IMS_B forwards INVITE to UE_B
65A					<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
66A									User B is informed that call is resumed
67A								200 OK	UE_B responds to INVITE with 200 OK
					<del> </del>				indicating media attribute "sendrecv"
68A								200 OK	IMS_B forwards 200 OK response to IBCF_B
69A				<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
70A			<del></del>					200 OK	IBCF_A forwards 200 OK response to IMS_A
71A		<del></del>						200 OK	IMS_A forwards the 200 OK response to UE_A
72A	<b>—</b>								User A is informed that call is resumed
32B						<b>←</b>			User B puts call on hold
33B					+			INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
34B						<b>──</b>		100 Trying	IMS_B responds with a 100 Trying provisional response
35B					<del></del>			INVITE	IMS_B forwards INVITE to IBCF_B
36B					$\longrightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
37B				←—				INVITE	IBCF_B forwards INVITE to IBCF_A
38B				<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
39B			<b></b>					INVITE	IBCF_A forwards INVITE to IMS_A
40B								100 Trying	IMS_A responds with a 100 Trying provisional response
41B		<b></b>						INVITE	IMS_A forwards INVITE to UE_A

Step				Direc	tion				Message	Comment
	U s	U	I M	I B	I B I	I   U		U s		
	е	Ā	S	С	C s	S E		е		
	r A		Α	F A	F I	3		r B		
42B			$\rightarrow$			•	,		100 Trying	UE_A optionally responds with a 100 Trying provisional response
43B	<b>←</b>									User A is informed that call is on hold
44B			$\rightarrow$						200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "recvonly"
45B				$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
46B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
47B					$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
48B						<b></b>			200 OK	IMS_B forwards the 200 OK response to UE_B
49B								$\rightarrow$		User B is informed that call is on hold
50B						$\longleftarrow$			ACK	UE_B acknowledges the receipt of 200 OK for INVITE
51B					<del></del>				ACK	IMS_B forwards ACK to IBCF_B
52B				<b>←</b>	_				ACK	IBCF_B forwards ACK to IBCF_B
53B			$\leftarrow$						ACK	IBCF_B forwards ACK to IMS_A
54B		<b>←</b>							ACK	IMS_A forwards ACK to UE_A
55B							$\leftarrow$	-		User B resumes call
56B						<del></del>			INVITE	UE_B sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
57B						$\longrightarrow$			100 Trying	IMS_B responds with a 100 Trying provisional response
58B					<del></del>				INVITE	IMS_B forwards INVITE to IBCF_B
59B					$\longrightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
60B				$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
61B					$\rightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
62B			<b>←</b>						INVITE	IBCF_A forwards INVITE to IMS_A
63B				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
64B		<del>-</del>	$\dashv$						INVITE	IMS_A forwards INVITE to UE_A
65B			$\longrightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
66B	<b>←</b>									User A is informed that call is resumed
67B			$\rightarrow$						200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"
68B				$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
69B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B



4.4.3.1.3 UC\_03\_R: SIP Call Flow "call hold and resume" using reINVITE with CF\_ROAM\_CALL

The expected call flow sequence is:

Step				Direc	ction				Message	Comment
	U s e r A	U E A	M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
1		$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
4			-	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B

	U	-								Message	Comment
	S	U E	I M	I B	I B		N	UE	U s		
	e	A	S	C	C		S	В	e		
	r A		Α	F	F		В		r B		
7				<del>-</del> -						100 Trying	IBCF_B responds with a 100 Trying provisional
8					L	$\longrightarrow$				INVITE	response IBCF_B forwards INVITE to IMS_B
9					•					100 Trying	IMS_B responds with a 100 Trying provisional response
10					€	<del>(</del>				INVITE	IMS_B forwards INVITE to IBCF_B
11					-	$\longrightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
12				$\leftarrow$						INVITE	IBCF_B forwards INVITE to IBCF_A
13					$\rightarrow$					100 Trying	IBCF_A responds with a 100 Trying provisional response
14			$\leftarrow$	_						INVITE	IBCF_A forwards INVITE to IMS_A
15				$\rightarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
16							>			INVITE	IMS_A forwards INVITE to UE_B
17			$\leftarrow$							100 Trying	UE_B optionally responds with a 100 Trying provisional response
18									<del>)</del>		User B is informed of incoming call of User A
19			←		_					180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
20			-	$\rightarrow$						180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
21					$\rightarrow$					180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
22					ŀ	$\longrightarrow$				180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
23					•	(				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
24				←						180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
25			<b>←</b>							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
26		<b>←</b>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
27	<del></del>										User A is informed that UE_B is ringing
28								<b>—</b>			User B answers call
29			$\leftarrow$							200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
30				$\rightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
31					$\rightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
32						$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B

Step				Dire	ction				Message	Comment
	U s	U E	I M	I B	I B	I M	U E	U s		
	е	Ā	S	С	С	S	В	е		
	r A		Α	F A	F B	В		r B		
33					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
34				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
35			$\leftarrow$	-					200 OK	IBCF_A forwards 200 OK response to IMS_A
36		$\leftarrow$							200 OK	IMS_A forwards 200 OK response to UE_A
37	<b>—</b>									User A is informed that call has been answered
38			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
39			-	$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
40					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
41						$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
42					$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
43				$\leftarrow$					ACK	IBCF_B forwards ACK to IBCF_A
44			$\leftarrow$	_					ACK	IBCF_A forwards ACK to IMS_A
45			-				$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
46								$\rightarrow$		User B is presented that call is in progress
47A		$\rightarrow$						·		User A puts call on hold
48A			$\rightarrow$						INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
49A		<del>(</del>							100 Trying	IMS_A responds with a 100 Trying provisional response
50A			-	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
51A			$\leftarrow$	-					100 Trying	IBCF_A responds with a 100 Trying provisional response
52A					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
53A				$\leftarrow$	-				100 Trying	IBCF_B responds with a 100 Trying provisional response
54A					$\vdash$	$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
55A					$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
56A					<b>←</b>	$\dashv$			INVITE	IMS_B forwards INVITE to IBCF_B
57A					-	$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
58A				$\leftarrow$	-				INVITE	IBCF_B forwards INVITE to IBCF_A
59A					$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
60A			$\leftarrow$	_					INVITE	IBCF_A forwards INVITE to IMS_A

Step				Dire	ction				Message	Comment
	U s	U E	l M	I B	I B	I M	U E	U s		
	e	Ā	S	С	С	S	В	e		
	r A		Α	F	F B	В		r B		
61A				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
62A							$\rightarrow$		INVITE	IMS_A forwards INVITE to UE_B
63A			$\leftarrow$						100 Trying	UE_B optionally responds with a 100 Trying provisional response
64A							F	$\rightarrow$		User B is informed that call is on hold
65A			$\leftarrow$						200 OK	UE_B responds to INVITE with 200 OK indicating attribute "recvonly" inactive
66A				$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
67A					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
68A					-	$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
69A					<b>(</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
70A				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
71A			<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
72A		<b>←</b>							200 OK	IMS_A forwards 200 OK response to UE_A
73A			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
74A				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
75A					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
76A						$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
77A					<b>(</b>				ACK	IMS_B forwards ACK to IBCF_B
78A				$\leftarrow$					ACK	IBCF_B forwards ACK to IBCF_A
79A			$\leftarrow$	_					ACK	IBCF_A forwards ACK to IMS_A
80A							$\rightarrow$		ACK	IMS_A forwards ACK to UE_B
81A	$\leftarrow$									User A is informed that call is on hold
82A		$\rightarrow$								User A resumes call
83A			$\rightarrow$						INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
84A		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
85A				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
86A			$\leftarrow$	-					100 Trying	IBCF_A responds with a 100 Trying provisional response
87A					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
88A				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response

B9A  90A  91A  92A  93A  94A  95A  96A  97A  98A  99A  90A  90A  90A  91A  92A  94A  95A  95A  96A  97A  97A  98A  99A  99A  99A  90A  90A  90A  90	
89A 90A 91A 92A 93A 94A 95A 96A 97A 98A 99A 100A 99A 100A 100A 100A 100A 100A	
89A 90A 91A 91A 92A 93A 94A 95A 96A 97A 98A 99A 99A 100 Trying IBCF_A responds with a 100 Trying progresponse INVITE IBCF_A forwards INVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying progresponse INVITE IBCF_A forwards INVITE to IMS_A 100 Trying IBCF_A responds with a 100 Trying progresponse INVITE IBCF_A forwards INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying progresponse INVITE IMS_A forwards INVITE to UE_B 100 Trying IMS_A responds with a 100 Trying progresponse INVITE IMS_A forwards INVITE to UE_B 100 Trying UE_B optionally responds with a 100 Trying progresponse 100 Trying UE_B optionally responds with a 100 Trying progresponse 100 Trying UE_B optionally responds with a 100 Trying progresponse 100 Trying UE_B optionally responds to INVITE with 200 OK indicating media attribute "sendrecv" 200 OK IMS_A forwards 200 OK response to IE	
90A 91A 92A 93A 94A 95A 96A 97A 98A 99A 99A 99A 99A 99A 99A 99A 90A 90A 90	
91A  92A  93A  94A  95A  95A  96A  97A  98A  98A  99A  99A  99A  90A  90A  90	
91A  92A  93A  94A  94A  95A  96A  97A  98A  99A  99A  90A  90A  90A  90A  90	visional
93A  94A  95A  96A  97A  98A  98A  99A  90A  90A  90A  90A  90	
94A 95A 96A 97A 98A 98A 99A 99A 99A 99A 99A 99A 99A 99	visional
95A  96A  97A  98A  99A  100 Trying IMS_A responds with a 100 Trying proving response INVITE to UE_B  100 Trying UE_B optionally responds with a 100 Trying proving proving IMS_A forwards INVITE to UE_B  100 Trying UE_B optionally responds with a 100 Trying proving UE_B optionally responds with a 100 Trying User B is informed that call is resumed  100A  200 OK UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IE	
96A 97A 98A 99A 100 Trying IMS_A responds with a 100 Trying proversion response INVITE IMS_A forwards INVITE to UE_B 100 Trying UE_B optionally responds with a 100 Trying user B is informed that call is resumed 100A 200 OK UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv" 200 OK IMS_A forwards 200 OK response to IE	visional
97A  98A  99A  100 Trying UE_B optionally responds with a 100 T provisional response  User B is informed that call is resumed  200 OK UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IE	
98A  99A  100 Trying UE_B optionally responds with a 100 T provisional response  User B is informed that call is resumed  200 OK UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IE	/isional
provisional response  User B is informed that call is resumed  200 OK UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IE	
100A  101A  Color   Description   Color   Colo	rying
101A indicating media attribute "sendrecv" 200 OK IMS_A forwards 200 OK response to IE	
	BCF_A
102A   200 OK   IBCF_A forwards 200 OK response to	BCF_B
103A 200 OK IBCF_B forwards 200 OK response to	MS_B
104A 200 OK IMS_B forwards 200 OK response to IE	BCF_B
105A 200 OK IBCF_B forwards 200 OK response to	BCF_A
106A 200 OK IBCF_A forwards 200 OK response to	MS_A
107A 200 OK IMS_A forwards the 200 OK response	o UE_A
108A User B is informed that call has ended	
47B User B puts call on hold	
48B	ting
49B 100 Trying IMS_A responds with a 100 Trying proving response	visional
50B INVITE IMS_A forwards INVITE to IBCF_A	
51B (————————————————————————————————————	visional
52B INVITE IBCF_A forwards INVITE to IBCF_B	
53B 100 Trying IBCF_B responds with a 100 Trying proresponse	visional
54B INVITE IBCF_B forwards INVITE to IMS_B	

Step			1	Dire	ction	,			Message	Comment
	Us	U	I M	I B	I B	I M	UE	Us		
	e r	Α	S A	C F	C F	S B	В	e r		
	À	<u> </u>		A	В			В	400 T- :	IMC Proposide with a 400 Text
55B									100 Trying	IMS_B responds with a 100 Trying provisional response
56B					$\leftarrow$				INVITE	IMS_B forwards INVITE to IBCF_B
57B						$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
58B				$\leftarrow$	_				INVITE	IBCF_B forwards INVITE to IBCF_A
59B					$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
60B			$\leftarrow$	_					INVITE	IBCF_A forwards INVITE to IMS_A
61B				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
62B		$\leftarrow$							INVITE	IMS_A forwards INVITE to UE_A
63B			$\rightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
64B	$\leftarrow$									User A is informed that call is on hold
65B			$\rightarrow$						200 OK	UE_A responds to INVITE with 200 OK indicating attribute "recvonly" inactive
66B			-	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
67B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
68B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
69B					<del>(</del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
70B				$\leftarrow$	_				200 OK	IBCF_B forwards 200 OK response to IBCF_A
71B			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
72B							$\rightarrow$		200 OK	IMS_A forwards 200 OK response to UE_B
73B			$\leftarrow$	_			$\dashv$		ACK	UE_B acknowledges the receipt of 200 OK for INVITE
74B				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
75B					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
76B						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
77B					$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
78B				←	_				ACK	IBCF_B forwards ACK to IBCF_A
79B			$\leftarrow$	_					ACK	IBCF_A forwards ACK to IMS_A
80B		<del>-</del>							ACK	IMS_A forwards ACK to UE_A
81B	$\leftarrow$									User A is informed that call is on hold
82B							(			User B resumes call

83B 84B 85B 86B 87B 89B 90B 90B 91B 92B 93B 94B 96B 97B 96B 97B 97B 97B 98B 97B 98B 97B 98B 98B 99B 97B 97B 98B 98B 99B 98B 99B 99B 99B 99B 99B 99	Step				Dire	ction				Message	Comment
RA A A F B B B B B B B B B B B B B B B B		_		I M	I B	l B	I M		_		
83B 84B 85B 86B 86B 87B 88B 89B 90B 90B 91B 92B 97B 96B 97B 97B 97B 97B 97B 97B 97B 97B 97B 97		е		S	С	С	S		е		
media attribute "sendreor" (Call Resume) 100 Trying IMS. A responds with a 100 Trying provisional response INVITE INS. A forwards INVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_B INVITE IBCF_A INVITE IBCF_B INVITE IDCF_B				A .			B				
Response	83B			$\leftarrow$							media attribute "sendrecv" (Call Resume)
100 Trying   IBCF_A forwards INVITE to IBCF_B	84B							$\rightarrow$			response
response INVITE IBCF_A forwards INVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B forwards INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IBCF_B forwards INVITE to IBCF_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IBCF_B forwards INVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_A forwards INVITE to IBCF_A  100 Trying IMS_A responds with a 100 Trying provisional response INVITE IBCF_A forwards INVITE to IMS_A  100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to IMS_A  100 Trying UE_A optionally response with a 100 Trying provisional response INVITE IMS_A forwards INVITE to UE_A  100 Trying UE_A optionally response with a 100 Trying provisional response User A is informed that call is resumed  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	85B				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
100 Trying   IBCF_B responds with a 100 Trying provisional response   INVITE   IBCF_B forwards INVITE to IMS_B   100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards INVITE to IBCF_B   100 Trying   IBCF_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards INVITE to IBCF_A   100 Trying   IBCF_B forwards INVITE to IBCF_A   100 Trying   IBCF_B forwards INVITE to IBCF_A   100 Trying   IBCF_A responds with a 100 Trying provisional response   INVITE   IBCF_A forwards INVITE to IMS_A   100 Trying   IMS_A responds with a 100 Trying provisional response   INVITE   IMS_A forwards INVITE to UE_A   100 Trying   USE_A optionally response with a 100 Trying provisional response   INVITE   IMS_A forwards INVITE with 200 OK indicating media attribute year of the provisional response   User A is informed that call is resumed   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_B   200 OK   IMS_B forwards 200 OK response to IBCF_B   200 OK   IMS_B forwards 200 OK response to IBCF_B   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IMS_A forwards 200 OK   200	86B			$\leftarrow$						100 Trying	response
Sepanse   INVITE   IBCF_B forwards INVITE to IMS_B	87B					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
90B 91B 92B 92B 93B 93B 94B 94B 94B 95B 96B 96B 96B 97B 98B 98B 98B 100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards INVITE to IBCF_A   IBCF_B forwards INVITE to IBCF_A   IBCF_A forwards INVITE to IMS_A   INVITE   IBCF_A forwards INVITE to IBCF_A   IMS_A forwards INVITE with 200 OK   IMS_A forwards 200 OK response to IBCF_A   IMS_A forwards 200 OK response to IBCF_A   IMS_A forwards 200 OK response to IBCF_B   IMS_A forwards 200 OK response to IBCF_B   IMS_B forwards 200 OK response for IBCF_B   IMS_B forwards 200 OK response for IBCF_B   IMS_	88B				<del>(</del>					100 Trying	
Page	89B						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
92B 93B 94B 94B 94B 95B 96B 96B 97B 98B 99B 100 Trying   IBCF_A responds with a 100 Trying provisional response   INVITE   IBCF_A forwards INVITE to IBCF_A   100 Trying   IBCF_A forwards INVITE to IMS_A   100 Trying   IBCF_A forwards INVITE to IMS_A   100 Trying   IMS_A responds with a 100 Trying provisional response   INVITE   IMS_A forwards INVITE to UE_A   100 Trying   UE_A optionally responds with a 100 Trying provisional response   User A is informed that call is resumed   User A is informed that call is resumed   200 OK   IMS_A forwards 200 OK response to IBCF_A   200 OK   IBCF_A forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_A   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK response to IBCF_B   200 OK   IBCF_B forwards 200 OK	90B					←				100 Trying	· · · · · · · · · · · · · · · · · ·
93B 94B 94B 95B 96B 96B 97B 98B 98B 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBSF_A forwards INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to UE_A 100 Trying IMS_A forwards INVITE to UE_A 100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed that call is resumed 100B 101B 102B 103B 104B 105B 106B 107B 107B 108B 109B 109B 109B 109B 109B 109B 109B 109	91B					$\leftarrow$				INVITE	-
94B 95B 96B 97B 98B 99B 100 Trying IBCF_A forwards INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IBCF_A forwards INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to UE_A 100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed that call is resumed 200 OK UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv" 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IBCF_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to UE_B USER B is informed that call is resumed USER A ends call	92B						$\rightarrow$			100 Trying	1
95B 96B 97B 97B 98B 99B 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to UE_A 100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed that call is resumed 100B 101B 101B 102B 103B 104B 106B 106B 107B 108B 109B 109B 109B 109B 109B 109B 109B 109	93B				$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
96B 97B 98B 98B 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to UE_A 100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed that call is resumed 101B 102B 103B 104B 105B 106B 107B 108B 109B 100B 100B 100B 100B 100B 100B 100	94B					$\rightarrow$				100 Trying	•
97B  98B  100 Trying UE_A optionally responds with a 100 Trying provisional response  User A is informed that call is resumed  200 OK UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  USER B is informed that call is resumed  USER B is informed that call is resumed	95B			$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
98B  99B  100 Trying UE_A optionally responds with a 100 Trying provisional response  User A is informed that call is resumed  200 OK UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_B  200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A	96B				$\rightarrow$					100 Trying	
provisional response  User A is informed that call is resumed  200 OK  UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"  200 OK  IMS_A forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_A forwards 200 OK response to IBCF_A	97B		$\leftarrow$							INVITE	IMS_A forwards INVITE to UE_A
100B 101B 101B 101B 102B 102B 103B 104B 105B 105B 106B 107B 108B 109 109 100 100 100 100 100 100 100 100	98B			$\rightarrow$						100 Trying	
indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	99B	<del></del>									User A is informed that call is resumed
101B  102B  103B  104B  105B  106B  107B  108B  109  109  100 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	100B			$\rightarrow$						200 OK	
103B 104B 105B 105B 106B 107B 108B 109 109 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_B User B is informed that call is resumed User A ends call	101B				$\longrightarrow$					200 OK	•
104B  105B  106B  107B  108B  109  109  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	102B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
105B  106B  107B  108B  109  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	103B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
106B  107B  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	104B					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
107B  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call	105B				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
108B User B is informed that call is resumed User A ends call	106B			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
109 User A ends call	107B			-				$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
	108B										User B is informed that call is resumed
110 BYE UE_A releases the call with BYE	109		7								User A ends call
	110			$\rightarrow$						BYE	UE_A releases the call with BYE

Step				Dire	ectio	n				Message	Comment
	U s	U	I M	I B	l B		I M	U E	U		
	e	Ā	S	C	C		S	В	e		
	r A		Α	F	F B		В		r B		
111				$\xrightarrow{\mid A \mid}$	<u>  B</u>					BYE	IMS_A forwards BYE to IBCF_A
112					$\longrightarrow$					BYE	IBCF_A forwards BYE to IBCF_B
113						<del></del>				BYE	IBCF_B forwards BYE to IMS_B
114					+					BYE	IMS_B forwards BYE to IBCF_B
115				$\leftarrow$						BYE	IBCF_B forwards BYE to IBCF_A
116			$\leftarrow$	_						BYE	IBCF_A forwards BYE to IMS_A
117								<del>)</del>		BYE	IMS_A forwards BYE to UE_B
118									$\rightarrow$		User B is informed that call has ended
119			<b>←</b>		_					200 OK	UE_B sends 200 OK for BYE
120				$\rightarrow$						200 OK	IMS_A forwards the 200 OK response to IBCF_A
121					$\longrightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
122					-	$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
123					•					200 OK	IMS_B forwards 200 OK response to IBCF_B
124				$\leftarrow$						200 OK	IBCF_B forwards 200 OK response to IBCF_A
125			$\leftarrow$							200 OK	IBCF_A forwards 200 OK response to IMS_A
126		<b>(</b>								200 OK	IMS_A forwards the 200 OK response to UE_A
127	<b>(</b>										User A is informed that call has ended

### 4.4.3.2 User-initiated call hold and resume using UPDATE

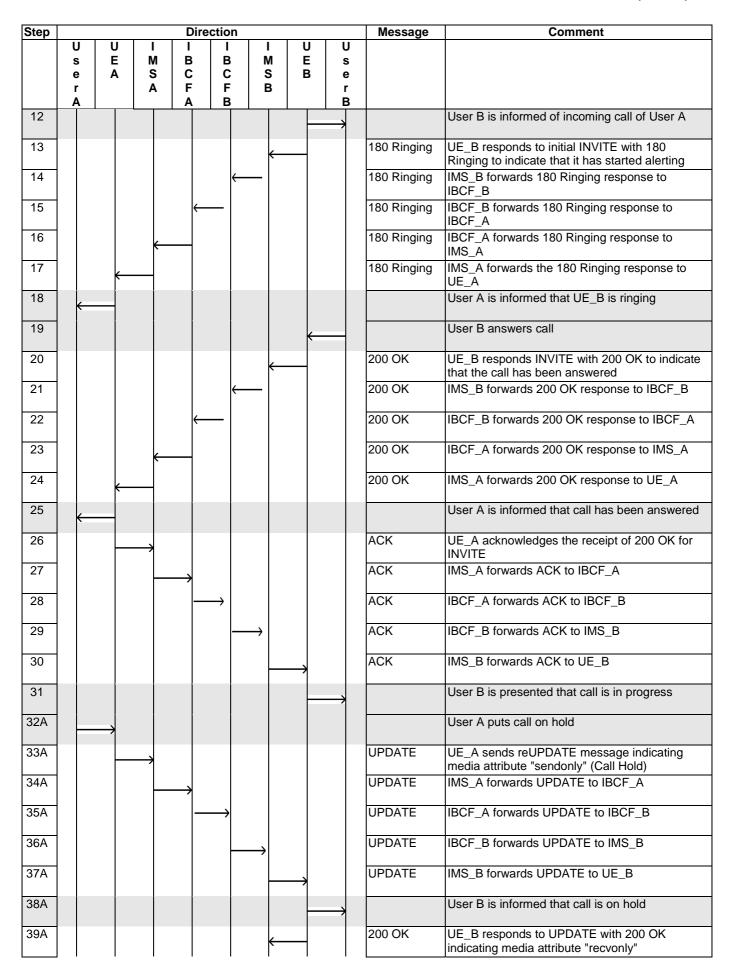
#### 4.4.3.2.1 Description

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A calls User B	1	1
2	User B is informed of incoming call of User A	12	18
3	User A is informed that UE_B is ringing	18	27
4	User B answers call	19	28
5	User A is informed that call has been answered	25	37
6	User B is informed that call is established	31	46
7A	User A puts call on hold	32A	47A
7B	User B puts call on hold	32B	47B
8A	User B is informed that call on hold	38A	56A
8B	User A is informed that call on hold	38B	56B
9A	User A resumes call	50A	66A
9B	User B resumes call	50B	66B
10A	User B is informed that call is resumed	56A	75A
10B	User A is informed that call is resumed	56B	75B
11A	User A is informed that call is resumed	62A	84A
11	User A is informed that call is resumed	62B	84B
12	User A ends call	63	85
13	User B is informed that call has ended	69	94
14	User A is informed that call has ended	75	103

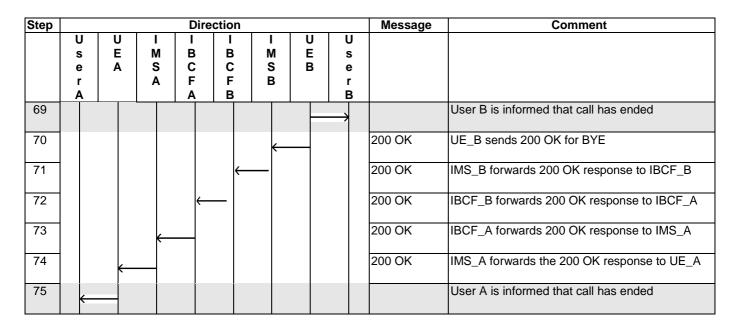
# 4.4.3.2.2 UC\_04\_I: SIP Call Flow "call hold and resume" using UPDATE with CF\_INT\_CALL

Step				Dire	ction				Message	Comment
	U s e r A	U E A	I M S A	I B C F	B C F B	I M S B	U E B	U s e r B		
1		$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			<b>←</b>						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$	-				100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$	_			100 Trying	IMS_B responds with a 100 Trying provisional response
10							$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
11						<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response



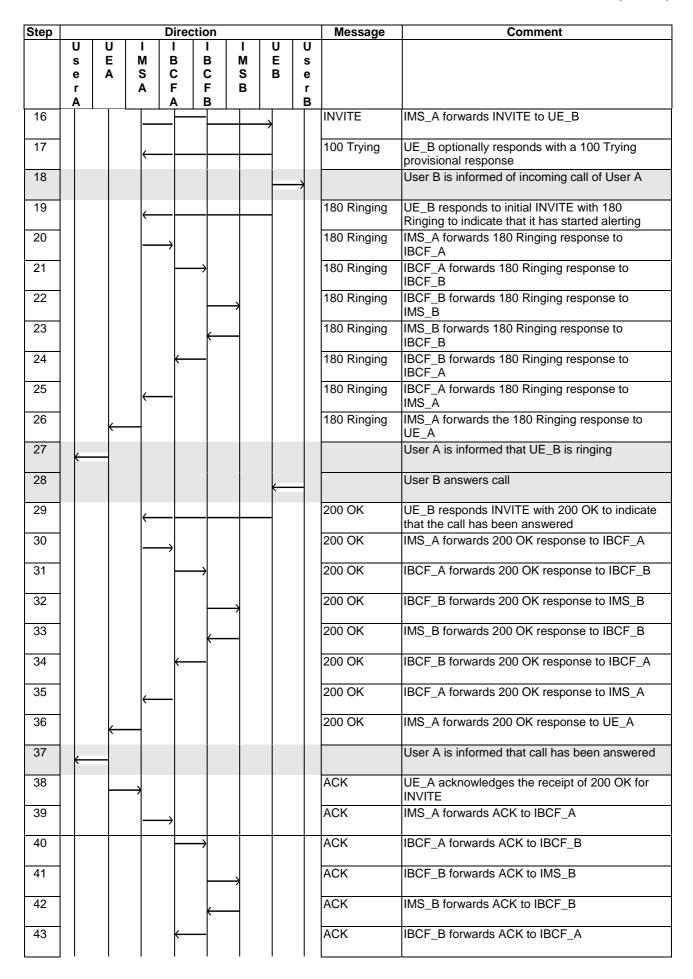
Step					Di	rection	1				Message	Comment
	U s	L		I M	I B	I B		/	U E	U s		
	е	<u> </u>		S	C F	C		3	В	е		
	r A			A	A	В		•		r B		
40A						,	<del></del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
41A					<del>(</del>						200 OK	IBCF_B forwards 200 OK response to IBCF_A
42A				<b>—</b>							200 OK	IBCF_A forwards 200 OK response to IMS_A
43A			<del></del>								200 OK	IMS_A forwards the 200 OK response to UE_A
44A												User A resumes call
45A				<del>-</del>							UPDATE	UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
46A					$\rightarrow$						UPDATE	IMS_A forwards UPDATE to IBCF_A
47A					-	$\longrightarrow$					UPDATE	IBCF_A forwards UPDATE to IBCF_B
48A						-	$\longrightarrow$				UPDATE	IBCF_B forwards UPDATE to IMS_B
49A									<b>→</b>		UPDATE	IMS_B forwards UPDATE to UE_B
50A									F	$\rightarrow$		User B is informed that call is resumed
51A								←	-		200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "sendrecv"
52A						•	<del></del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
53A					<del>(</del>						200 OK	IBCF_B forwards 200 OK response to IBCF_A
54A				<b>←</b>	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
55A			<del></del>	_							200 OK	IMS_A forwards the 200 OK response to UE_A
56A	•											User A is informed that call is resumed
32B									<b>←</b>	-		User B puts call on hold
33B								$\longleftarrow$	-		UPDATE	UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)
34B						ŀ	<del></del>				UPDATE	IMS_B forwards UPDATE to IBCF_B
35B					<del>(</del>						UPDATE	IBCF_B forwards UPDATE to IBCF_A
36B				<b>—</b>							UPDATE	IBCF_A forwards UPDATE to IMS_A
37B			<del></del>	_							UPDATE	IMS_A forwards UPDATE to UE_A
38B	ŧ											User A is informed that call is on hold
39B				<del>-</del>							200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"
40B					$\rightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
41B					-	$\longrightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
42B							$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B

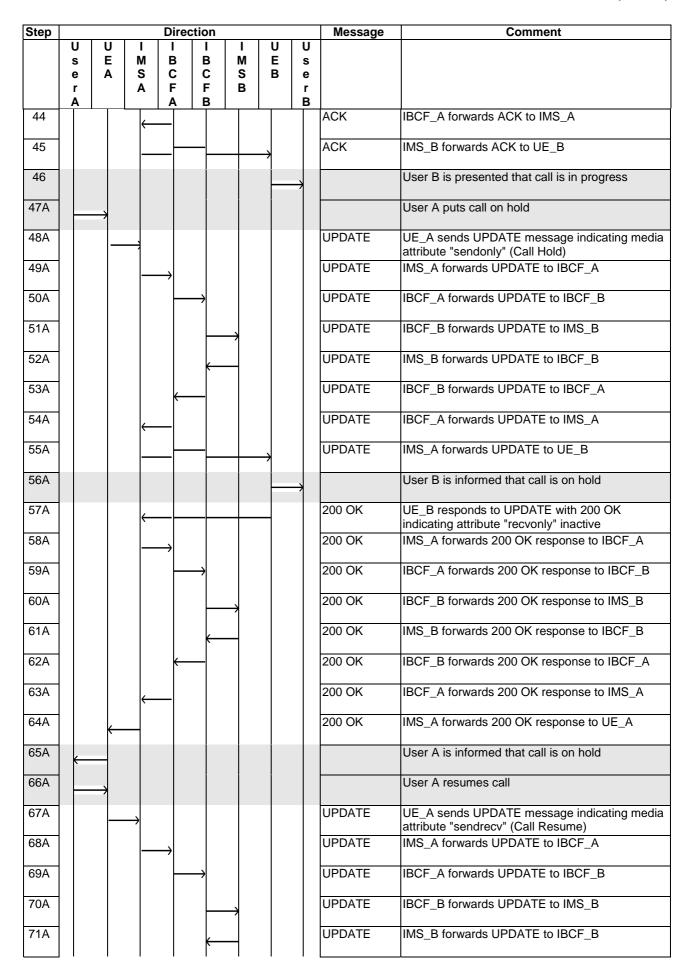
Step				Direc	ction				Message	Comment
	U s	U	I M	I B	I B I		U E	U s		
	e r	Α	S	C F			В	e r		
	Å			Ą	В			B		
43B						<b></b>	*		200 OK	IMS_B forwards the 200 OK response to UE_B
44B								$\rightarrow$		User B is informed that call is on hold
45B						<b></b>	_		ACK	UE_B acknowledges the receipt of 200 OK for UPDATE
46B					<del></del>	-			ACK	IMS_B forwards ACK to IBCF_B
47B				$\leftarrow$	_				ACK	IBCF_B forwards ACK to IBCF_B
48B			←						ACK	IBCF_B forwards ACK to IMS_A
49B		<b>←</b>							ACK	IMS_A forwards ACK to UE_A
50B							<b></b>			User B resumes call
51B						<b>—</b>	-		UPDATE	UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
52B					<del>(</del>				UPDATE	IMS_B forwards UPDATE to IBCF_B
53B				<b>←</b>					UPDATE	IBCF_B forwards UPDATE to IBCF_A
54B			$\leftarrow$						UPDATE	IBCF_A forwards UPDATE to IMS_A
55B		<b>←</b>							UPDATE	IMS_A forwards UPDATE to UE_A
56B	<b>←</b>	+								User A is informed that call is resumed
57B		$\vdash$	$\rightarrow$						200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
58B				$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
59B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
60B					$\longrightarrow$	•			200 OK	IBCF_B forwards 200 OK response to IMS_B
61B							•		200 OK	IMS_B forwards the 200 OK response to UE_B
62B								$\rightarrow$		User B is informed that call is resumed
63		$\longrightarrow$								User A ends call
64			$\rightarrow$						BYE	UE_A releases the call with BYE
65				$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
66					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
67					$\longrightarrow$				BYE	IBCF_B forwards BYE to IMS_B
68							*		BYE	IMS_B forwards BYE to UE_B



4.4.3.2.3 UC\_04\_R: SIP Call Flow "call hold and resume" using UPDATE with CF\_ROAM\_CALL

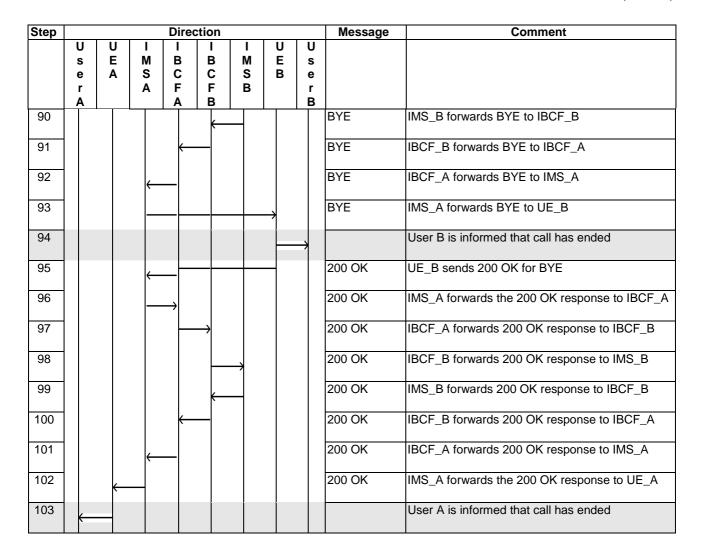
Step				Direc	ction				Message	Comment
	U s e r A	U E A	M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
1		$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					←				100 Trying	IMS_B responds with a 100 Trying provisional response
10					<b>←</b>				INVITE	IMS_B forwards INVITE to IBCF_B
11						$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
12				<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
13					$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
14			$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
15				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response





Step				Dire	ction				Message	Comment
	U s	U	М —	I B	I B	I M	U	U		
	e	 Α	S A	C F	C F	S	В	e r		
72A	A			A	В	<u>                                     </u>		В	UPDATE	IBCF_B forwards UPDATE to IBCF_A
72A				$\leftarrow$					UPDATE	
73A			←						UPDATE	IBCF_A forwards UPDATE to IMS_A
74A				_			$\rightarrow$		UPDATE	IMS_A forwards UPDATE to UE_B
75A							E	$\rightarrow$		User B is informed that call is resumed
76A			$\leftarrow$			+	-		200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "sendrecv"
77A				$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
78A					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
79A						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
80A					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
81A				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
82A			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
83A		$\leftarrow$	4						200 OK	IMS_A forwards the 200 OK response to UE_A
84A	+									User B is informed that call has resumed
47B							$\leftarrow$			User B puts call on hold
48B			$\leftarrow$				_		UPDATE	UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)
49B				$\rightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
50B					$\rightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
51B						$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
52B					<b>←</b>				UPDATE	IMS_B forwards UPDATE to IBCF_B
53B				<b>←</b>					UPDATE	IBCF_B forwards UPDATE to IBCF_A
54B			$\leftarrow$	_					UPDATE	IBCF_A forwards UPDATE to IMS_A
55B		<b></b>	4						UPDATE	IMS_A forwards UPDATE to UE_A
56B	+									User A is informed that call is on hold
57B			$\rightarrow$						200 OK	UE_A responds to UPDATE with 200 OK indicating attribute "recvonly" inactive
58B			_	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
59B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
60B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
61B					<b>—</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B

S	Step				Dire	ction				Message	Comment
Record   R				M				E			
200 OK		r	A		F	F		В	r		
200 OK IMS_A forwards 200 OK response to UE_B  User A is informed that call is on hold  User B resumes call  UPDATE UE_A sends UPDATE message indicating media attribute sendrecy* (Call Resume)  UPDATE IMS_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  USER B informed that call is resumed  USER A ends call  USER A ends call  USER A ends call  BYE IBCF_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_A	62B	Î			<del>                                     </del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
User A is informed that call is on hold  User B resumes call  UPDATE  UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE  UPDATE  UPDATE  UPDATE  IMS_A forwards UPDATE to IBCF_A  UPDATE  IBCF_B forwards UPDATE to IBCF_B  UPDATE  IBCF_B forwards UPDATE to IBCF_A  UPDATE  IBCF_B forwards UPDATE to IBCF_A  UPDATE  UPDATE  IBCF_B forwards UPDATE to IBCF_A  UPDATE  UPDATE  IBCF_A forwards UPDATE to IBCF_A  UPDATE  UPDATE  IBCF_A forwards UPDATE to IBCF_A  UPDATE  USer A is informed that call is resumed  200 OK  USer A is informed that call is resumed  200 OK  IBCF_A forwards 200 OK response to IBCF_A  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_B  200 OK  IBCF_B forwards 200 OK response to IBCF_B  USer B is informed that call is resumed  User A ends call  USer A ends call  USer A ends call  USer A forwards 200 OK response to UE_B  USer B is informed that call is resumed  User A ends call  USer A forwards 200 OK response to UE_B  USer B is informed that call is resumed  USer A ends call  USer A ends call  USer A forwards BYE to IBCF_A  BYE  IBCF_A forwards BYE to IBCF_B	63B			<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
User B resumes call  UPDATE UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume) UPDATE IMS_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IMS_A forwards UPDATE to UE_A  USer A is informed that call is resumed  USer A is informed that call is resumed  UBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IB	64B			_				$\rightarrow$		200 OK	IMS_A forwards 200 OK response to UE_B
UPDATE UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume) UPDATE IMS_A forwards UPDATE to IBCF_A UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards 200 OK response to IBCF_A  UPDATE IBCF_A forwards BYE to IBCF_A	65B	<b>←</b>									User A is informed that call is on hold
attribute "sendrecv" (Call Resume) UPDATE IMS_A forwards UPDATE to IBCF_A UPDATE IBCF_A forwards UPDATE to IBCF_B UPDATE IBCF_B forwards UPDATE to IBCF_B UPDATE IBCF_B forwards UPDATE to IBCF_B UPDATE IBCF_B forwards UPDATE to IBCF_A UPDATE IBCF_B forwards UPDATE to IBCF_A UPDATE IBCF_B forwards UPDATE to IBCF_A UPDATE IBCF_B forwards UPDATE to IMS_A UPDATE IMS_A forwards UPDATE to UE_A  UPDATE IMS_A forwards UPDATE to UE_A  UPDATE IMS_A forwards UPDATE with 200 OK indicating media attribute "sendrecv" 200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK IBC	66B							<b>—</b>			User B resumes call
See	67B			<b>←</b>						UPDATE	UE_A sends UPDATE message indicating media attribute "sendrecy" (Call Resume)
TOB  TOB  TOB  TOB  TOB  TOB  TOB  TOB	68B			_	$\longrightarrow$					UPDATE	
T1B  72B  73B  74B  74B  74B  75B  76B  76B  76B  77B  78B  78B  78B  78	69B					$\rightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
T2B  73B  74B  77B  77B  77B  77B  77B  78B  78	70B						$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
T3B  74B  74B  75B  76B  77B  77B  77B  78B  78B  78B  78	71B					<b>←</b>				UPDATE	IMS_B forwards UPDATE to IBCF_B
T4B  T5B  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  USE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  USER B is informed that call is resumed  USER B is informed that call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IMS_A forwards BYE to IBCF_B	72B				<b>←</b>					UPDATE	IBCF_B forwards UPDATE to IBCF_A
T5B T6B T6B T7B T7B T8B T8B T8B T8B T8B T8B T8B T8B T8B T8	73B			<b>←</b>						UPDATE	IBCF_A forwards UPDATE to IMS_A
76B 77B 77B 78B 78B 79B 80B 81B 82B 83B 84B 84B 85 86 87 88	74B		<del>(</del>							UPDATE	IMS_A forwards UPDATE to UE_A
indicating media attribute "sendrecv"  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	75B	+									User A is informed that call is resumed
T7B	76B	Т	-	$\rightarrow$						200 OK	
79B 80B 81B 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	77B			_	$\longrightarrow$					200 OK	S .
80B 81B 82B 82B 83B 84B 84B 85 86 87 88  BYE  BYE  BYE  BYE  BYE  BYE  BYE	78B					$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
81B 82B 82B 83B 84B 84B 85 86 87 88  BYE  DOWN BCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  BYE  UE_A releases the call with BYE  BYE  BYE  IMS_A forwards BYE to IBCF_A  BYE  BYE  BYE  BYE  BYE  BYE  BYE  BY	79B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
82B  83B  84B  84B  85  86  87  88  BYE  BYE  BYE  BYE  BYE  BYE  BYE	80B					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
83B  84B  85  User B is informed that call is resumed  User A ends call  BYE  BYE  UE_A releases the call with BYE  BYE  BYE  BYE  BYE  BYE  BYE  BYE	81B				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
84B  85  User B is informed that call is resumed  User A ends call  BYE  UE_A releases the call with BYE  BYE  BYE  BYE  BYE  BYE  BYE  BYE	82B			<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
85  BYE  User A ends call  BYE  UE_A releases the call with BYE  BYE  BYE  IMS_A forwards BYE to IBCF_A  BYE  BYE  IBCF_A forwards BYE to IBCF_B	83B			_	-			$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
86  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	84B										User B is informed that call is resumed
87  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	85		$\longrightarrow$								User A ends call
88 BYE IBCF_A forwards BYE to IBCF_B	86			$\rightarrow$						BYE	UE_A releases the call with BYE
	87			_	$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
89 BYE IBCF_B forwards BYE to IMS_B	88				-	$\longrightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
	89						$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B



## 4.4.4 IMS message exchange between UEs in different networks

#### 4.4.4.1 Description

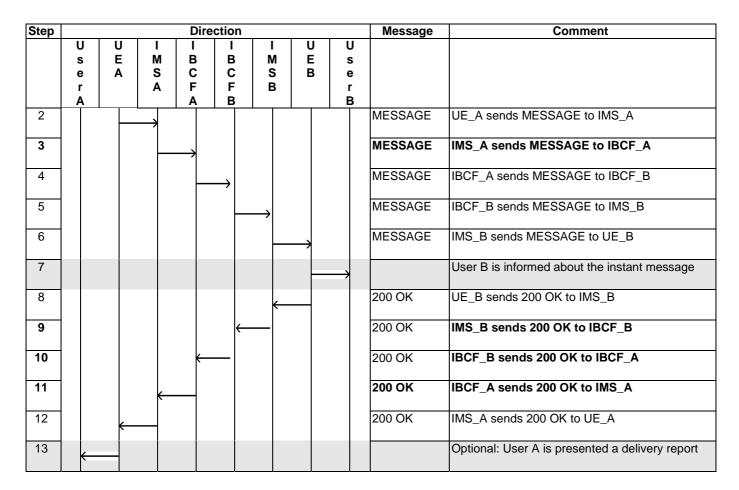
The UE\_A sends a MESSAGE to UE\_B located in a different network.

The test sequence typically associated with this use case when an established session is released is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A sends an instant message	Step 1	Step 1
2	User B is informed about the instant message	Step 7	Step 10
3	Optional: User A is presented a delivery report	Step 13	Step 19

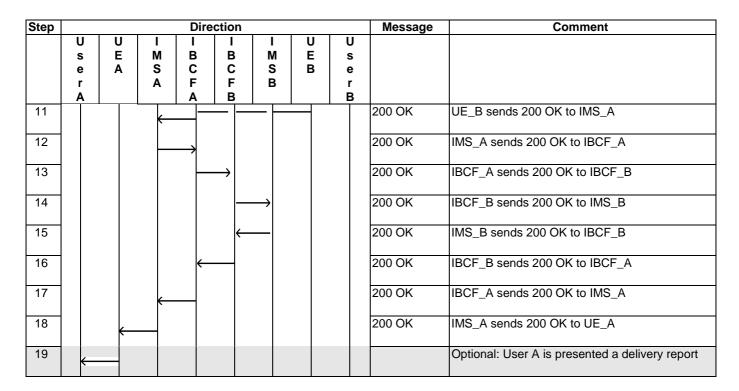
#### 4.4.4.2 UC\_05\_I: SIP Call flow for IMS Message Exchange with CF\_INT\_CALL

Step				Dire	ction					Message	Comment
	U s	U	I M	I B	I B	I M	U	ľ	J :		
	e	Ā	S	C	C	S	В	ė			
	A		Α	A	В	Б		E	3		
1		$\rightarrow$									User A sends an instant message to user B



4.4.4.3 UC\_05\_R: SIP Call Flow for IMS Message Exchange with CF\_ROAM\_CALL

Step				Dire	ction				Message	Comment
	U s e r A	ЪШС	I M S A	I B C F A	I B C F B	И S B	U E B	U s e r B		
1		$\rightarrow$								User A sends an instant message to user B
2			$\rightarrow$						MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
4					$\rightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
5						$\rightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
6					$\leftarrow$	-			MESSAGE	IMS_B sends MESSAGE to IBCF_B
7				$\leftarrow$					MESSAGE	IBCF_B sends MESSAGE to IBCF_A
8			<b>←</b>						MESSAGE	IBCF_A sends MESSAGE to IMS_A
9					_	_ _	$\rightarrow$		MESSAGE	IMS_A sends MESSAGE to UE_B
10								$\rightarrow$		User B is informed about the instant message



# 4.4.5 Supplementary Service Anonymous Communication Rejection (ACR)

#### 4.4.5.1 Description

UE\_A makes an IMS VoIP call to UE\_B. UE\_A is subscribed to OIR service in permanent mode or default presentation restricted temporary mode, UE\_B is subscribed to ACR supplementary service. The call flow path and node configuration for this use case corresponds to CF\_INT\_AS when UE\_B is in home network and to CF\_ROAM\_AS when UE\_B is roaming in IMS\_A.

The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_AS
1	User A calls User B	Step 1
2	User A is informed that call has been rejected due to ACR	Step 23

Step	Action	CF_ROAM_AS
1	User B calls User A	Step 1
2	User B is informed that call has been rejected due to ACR	Step 32

# 4.4.5.2 UC\_06\_I: SIP message flow for SS ACR with CF\_INT\_AS

Step					Direct	ion					Message	Comment
	U s	U E	U s	U E	I M	A S	I B	I B	I M	AS		
	e	Ā	e	В	S	A	С	С	S	В		
	r A		r B		A		F A	F B	В			
1		*										User A calls User B
2					>						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and
3		<b></b>									100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the OIR IFC in IMS_A
4						<del>-</del>					INVITE	IMS_A forwards the INVITE to IMS_A AS
5					←						100 Trying	IMS_A AS optionally responds with a 100 Trying provisional response
6					←						INVITE	IMS_A AS returns modified INVITE including Privacy header (value "id" or
7						<del>-</del>					100 Trying	IMS_A responds with a 100 Trying provisional response
8							<del>&gt;</del>				INVITE	IMS_A forwards INVITE to IBCF_A
9					<b></b>		-				100 Trying	IBCF_A responds with a 100 Trying provisional response
10								$\rightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
11							$\leftarrow$	_			100 Trying	IBCF_B responds with a 100 Trying provisional response
12									$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
13								<b>←</b>	_		100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the ACR IFC in IMS_B
14									-	$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
15									$\leftarrow$		100 Trying	AS optionally responds with a 100 Trying provisional response
16									$\leftarrow$		433 Anonymity	IMS_B AS responds with 433 Anonymity Disallowed to IMS_B
17								$\leftarrow$	$\blacksquare$		433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IBCF_B
18							<b>—</b>	_			433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IBCF_A
19					<b></b>		-				433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IMS_A
20						<del>-</del>					433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to IMS_A AS
21					<b></b>						433 Anonymity	IMS_A AS forwards, possibly modified, 433 Anonymity Disallowed to IMS_A
22		<b></b>			-						433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to UE_A
23	<del></del>											User A is informed that the call has been rejected due to ACR
24					>						ACK	UE_A sends ACK to IMS_A
	1	ı	ı	1	1		1	1	1	1	<u> </u>	

Step					Direc	tion		Message	Comment				
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I B C F A	B C F B	;	I M S B	A S B		
25						$\rightarrow$			•			ACK	IMS_A forwards the ACK to IMS_A AS
26					<b>-</b>							ACK	IMS_A AS forwards, possibly modified, ACK to IMS_A
27							$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
28								$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
29								_		>		ACK	IBCF_B forwards ACK to IMS_B
30											$\rightarrow$	ACK	IMS_B forwards ACK to IMS_B AS

4.4.5.3 UC\_06\_R: SIP message flow for SS ACR with CF\_ROAM\_AS

Step	Direction											Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I B C F A	I B C F B	I M S B	A S B		
1				$\rightarrow$								User B calls User A
2					$\rightarrow$						INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and
3				←							100 Trying	IMS_A responds with a 100 Trying provisional response
4							$\rightarrow$				INVITE	IMS_A sends INVITE to IBCF_A
5					<b>←</b>		_				100 Trying	IBCF_A responds with a 100 Trying provisional response
6								$\rightarrow$			INVITE	IBCF_A sends INVITE to IBCF_B
7								_			100 Trying	IBCF_B responds with a 100 Trying provisional response
8									$\rightarrow$		INVITE	IBCF_B sends INVITE to IMS_B
9								<b></b>			100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the OIR IFC in IMS_B
10										$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
11									$\leftarrow$		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
12									<del></del>		INVITE	IMS_B AS returns modified INVITE including Privacy header (value "id" or
13										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
14								<del></del>			INVITE	IMS_B forwards INVITE to IBCF_B
15									$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response

Step	•				Directi	on					Message	Comment
	U s e r A	U E A	U s e r B	U E B	M S A	A S A	I B C F A	I B C F B	I M S B	A S B		
16							<u> </u>	-			INVITE	IBCF_B forwards INVITE to IBCF_A
17							-	>			100 Trying	IBCF_A responds with a 100 Trying provisional response
18					<b></b>		1				INVITE	IBCF_A forwards INVITE to IMS_A
19						$\qquad \qquad $	,				100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the ACR IFC in IMS_A
20						>					INVITE	IMS_A forwards the INVITE to IMS_A AS
21					<del></del>						100 Trying	AS optionally responds with a 100 Trying provisional response
22					<del></del>						433 Anonymity	IMS_A AS responds with 433 Anonymity Disallowed to IMS_A
23						;	•				433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to IBCF_A
24							- ;	>			433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IBCF_B
25									>		433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IMS_B
26										$\rightarrow$	433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IMS_B AS
27									←		433 Anonymity	IMS_B AS forwards, possibly modified, 433 Anonymity Disallowed to IMS_B
28								←			433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IBCF_B
29							<del></del>	-			433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IBCF_A
30					<del></del>		-				433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IMS_A
31				<b></b>							433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to UE_B
32			<del></del>	_								User B is informed that the call has been rejected due to ACR
33					<del>)</del>						ACK	UE_B sends ACK to IMS_A
34						<del>                                     </del>					ACK	IMS_A sends ACK to IBCF_A
35								>			ACK	IBCF_A sends ACK to IBCF_B
36									>		ACK	IBCF_B sends ACK to IMS_B
37										$\rightarrow$	ACK	IMS_B forwards the ACK to IMS_B AS
38									$\leftarrow$	-	ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
39								<b></b>			ACK	IMS_B forwards ACK to IBCF_B
40							<del></del>	-			ACK	IBCF_B forwards ACK to IBCF_A
41					<del></del>		•				ACK	IBCF_A forwards ACK to IMS_A
42						>					ACK	IMS_A forwards ACK to IMS_A AS

## 4.4.6 Supplementary Service Outgoing Communication Barring (OCB)

#### 4.4.6.1 Description

UE\_B places an IMS VoIP call to UE\_A. UE\_B is subscribed to OCB service and based on the UE\_B identity the OCB service is invoked. The call flow path and node configuration for this use case corresponds to CF\_INT\_AS when UE\_B is in home network and to CF\_ROAM\_AS when UE\_B is roaming in IMS\_A..

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_AS	CF_ROAM_AS
1	User B calls User A	Step 1	Step 1
2	User B is informed that call was declined	Step 12	Step 17

#### 4.4.6.2 UC\_07\_I: SIP message flow for SS OCB with CF\_INT\_AS

Ctorr					Disc	-4!				Manager	Commant
Step						ction		 		Message	Comment
	U s	U	L			и I I И В	B	мΙ	A S		
	e	Ā	6			SC		S	В		
	r		ľ	_		Ā		В	_		
	A		E			A					
1				$\longrightarrow$							User B calls User A
2										INVITE	UE B sends INVITE with the first SDP offer
						$\longrightarrow$					indicating all desired media and codecs that
3					<del>(                                    </del>					100 Trying	IMS_B responds with a 100 Trying provisional response
4										INVITE	UE_B sends INVITE with the first SDP offer
							$\longrightarrow$				indicating all desired media and codecs that
5										100 Trying	IMS_B responds with a 100 Trying provisional
											response
6										INVITE	UE_B sends INVITE with the first SDP offer
								7			indicating all desired media and codecs that
7										100 Trying	IMS_B responds with a 100 Trying provisional
											response
											INVITE triggers the OCB IFC in IMS_B
8									$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
9										100 Trying	AS optionally responds with a 100 Trying
								$\leftarrow$			provisional response
10								<b>—</b>		603 Decline	IMS_B AS returns 603 Decline to IMS_B
11					<b>.</b>			4		603 Decline	IMS_B forwards the 603 Decline to UE_B
12				<b>(</b>							User B is informed that call was declined
13										ACK	UE_B sends ACK to IMS_B
13								<del>)</del>		AUK	OF D SELICS VOIL IO IINIS D
14								_		ACK	IMS_B forwards ACK to IMS_B AS
'										,	Io_b forwards / for to five_b / fo

## 4.4.6.3 UC\_07\_R: SIP message flow for SS OCB with CF\_ROAM\_AS

Step			Di	rection				Message	Comment
		J U E s	U	I I	I B	I M	A S		
		A e	В	S C	C	S	В		
	r A	r B		A F		В			
1			$\rightarrow$						User B calls User A
2				<b>→</b>				INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and codecs that UE_B supports
3			<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5				←—				100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7					<del></del>			100 Trying	IBCF_B responds with a 100 Trying provisional response
8					_	<b></b>		INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
									INVITE triggers the OCB IFC in IMS_B
10						-	$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
11						<del>(</del>		100 Trying	AS optionally responds with a 100 Trying provisional response
12						<del>(</del>		603 Decline	IMS_B AS returns 603 Decline to IMS_B
13					<b>←</b>			603 Decline	IMS_B forwards the 603 Decline to IBCF_B
14					←—			603 Decline	IBCF_B forwards the 603 Decline to IBCF_A
15				<del></del>				603 Decline	IBCF_A forwards the 603 Decline to IMS_A
16				_				603 Decline	IMS_A forwards the 603 Decline to UE_B
17	<b>(</b>								User B is informed that call was declined
18				$\rightarrow$				ACK	UE_B sends ACK to IMS_A
19				$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
20								ACK	IBCF_A forwards ACL to IBCF_B
21						$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
22							$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS

## 4.4.7 Supplementary Service Originating Identification Presentation (OIP)

#### 4.4.7.1 Description

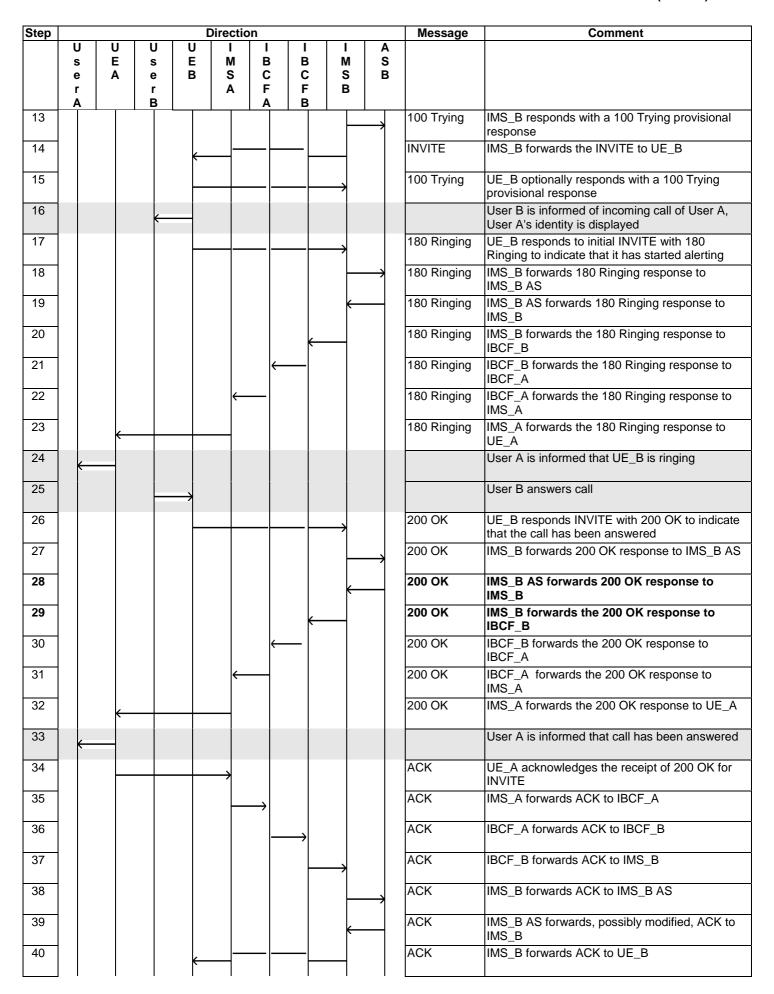
UE\_A places an IMS VoIP call to UE\_B. UE\_B is subscribed to OIP service. The call flow path and node configuration for this use case corresponds to CF\_INT\_AS when UE\_B is in home network and to CF\_ROAM\_AS when UE\_B is roaming in IMS\_A.

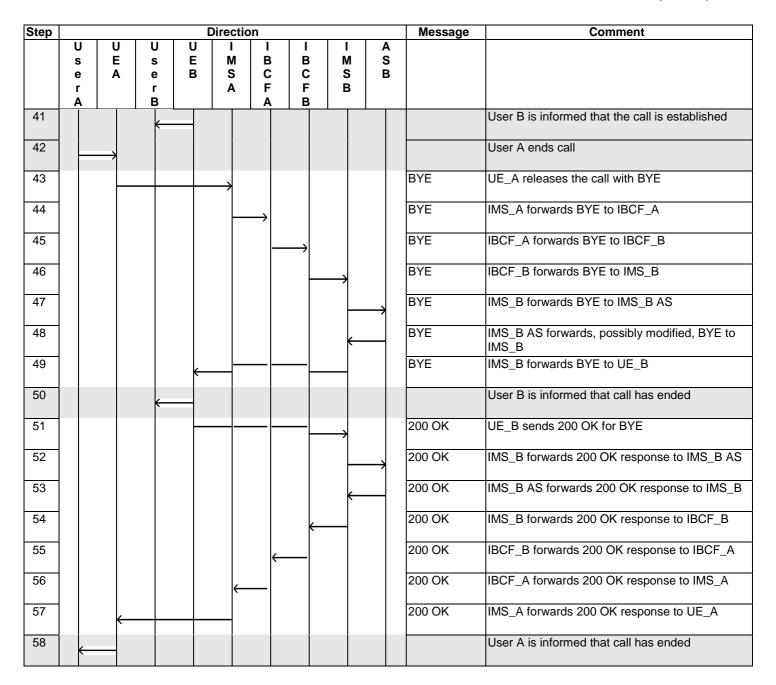
The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_AS	CF_ROAM_AS
1	User A calls User B	Step 1	Step 1
2	User B is informed of incoming call of User A, user A's identity is displayed	Step 16	Step 22
3	User A is informed that UE_B is ringing	Step 24	Step 33
4	User B answers call	Step 25	Step 34
5	User A is informed that call has been answered	Step 33	Step 45
6	User B is informed that the call is established	Step 41	Step 56
7	User A ends call	Step 42	Step 57
8	User B is informed that call has ended	Step 50	Step 68
9	User A is informed that call has ended	Step 58	Step 79

### 4.4.7.2 UC\_08\_I: SIP message flow for SS OIP with CF\_INT\_AS

Step					Direction	on				Message	Comment
	U	U	U	U	I	ı	ı	I	Α		
	S	E	S	E	M	В	В	M	S		
	e	Α	e	В	S	C	C	S B	В		
	r A		B		A	A	В	В			
1		$\rightarrow$	 Ī								User A calls User B
2		-			$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that UE_A supports
3		€								100 Trying	IMS_A responds with a 100 Trying provisional response
4					_	$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5					←	_				100 Trying	IBCF_A responds with a 100 Trying provisional response
6							$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7						<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
8								$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
9							<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the OIP IFC in IMS_B
10									$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
11								<b>←</b>		100 Trying	AS optionally responds with a 100 Trying provisional response
12								<b>←</b>		INVITE	IMS_B AS returns, possibly modified, INVITE to IMS_B



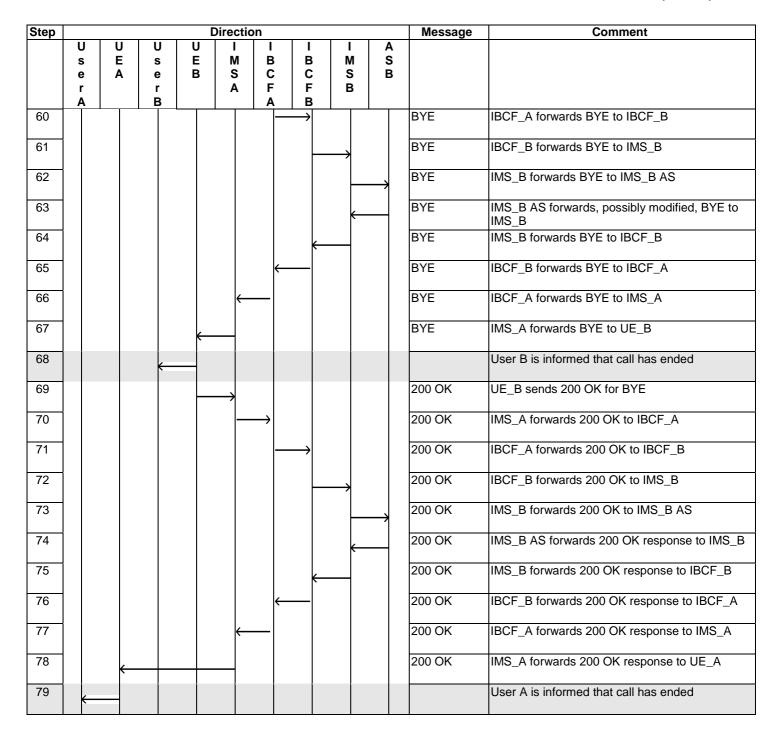


#### 4.4.7.3 UC\_08\_R: SIP message flow for SS OIP with CF\_ROAM\_AS

Step					Directio	n				Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	I B C F A	I B C F B	I M S B	A S B		
1		$\rightarrow$									User A calls User B
2					$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A

Step				ı	Directio	n				Message	Comment
	U s	υE	s C	υш	I M	I B	I B	I M	AS		
	e	Ā	e	В	S	С	С	S	В		
	r A		r B		Α	F	F B	В			
5	Î				$\longleftarrow$					100 Trying	IBCF_A responds with a 100 Trying provisional response
6							$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7						←				100 Trying	IBCF_B responds with a 100 Trying provisional response
8								$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
9							<del></del>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the OIP IFC in IMS_B
10									<b></b>	INVITE	IMS_B forwards the INVITE to IMS_B AS
11								$\leftarrow$		100 Trying	AS optionally responds with a 100 Trying provisional response
12								<b>←</b>		INVITE	IMS_B AS returns, possibly modified, INVITE to IMS_B
13									$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
14							<b>←</b>			INVITE	IMS_B forwards the INVITE to IMS_A
15								$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
16						<b>←</b>				INVITE	IMS_B forwards INVITE to IBCF_B
17							$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
18					←					INVITE	IBCF_B forwards INVITE to IBCF_A
19					_	$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
20				<b>←</b>						INVITE	IMS_A forwards the INVITE to UE_B
21					$\longrightarrow$					100 Trying	UE_B optionally responds with a 100 Trying provisional response
22			←								User B is informed of incoming call of User A, User A's identity is displayed
23					$\rightarrow$					180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
24						$\rightarrow$				180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
25							$\longrightarrow$			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
26								$\rightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
27									$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
28								<b>←</b>		180 Ringing	IMS_B AS forwards 180 Ringing response to IMS_B
29							<del></del>	$\dashv$		180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
30						$\leftarrow$				180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
31					←					180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A

			Direction	n			Message	Comment
	U E A	s	U I E M B S A	I I B B C C F F A B	S	A S B		
32	<del></del>				,		180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
33	<b>-</b>							User A is informed that UE_B is ringing
34								User B answers call
35			<b></b>				200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
36				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to IBCF_A
37				$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
38					<del></del>		200 OK	IBCF_B forwards 200 OK response to IMS_B
39					_	$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
40					←		200 OK	IMS_B AS forwards 200 OK response to IMS_B
41					<b></b>		200 OK	IMS_B forwards the 200 OK response to IBCF_B
42				<del></del>			200 OK	IBCF_B forwards the 180 Ringing response to IBCF_A
43			<b>←</b>	_			200 OK	IBCF_A forwards the 180 Ringing response to IMS_A
44	<b>├</b>						200 OK	IMS_A forwards the 200 OK response to UE_A
45	<b>←</b>							User A is informed that call has been answered
46			<b></b>				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
47				$\rightarrow$			ACK	IMS_A forwards ACK to IBCF_A
48				$\longrightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
49					<del></del>		ACK	IBCF_B forwards ACK to IMS_B
50					_	$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS
51					<b>+</b>		ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
52					<b>—</b>		ACK	IMS_B forwards ACK to IBCF_B
53				<del></del>			ACK	IBCF_B forwards ACK to IBCF_A
54			<b> </b>	_			ACK	IBCF_A forwards ACK to IMS_A
55			$\leftarrow$				ACK	IMS_A forwards ACK to UE_B
56		<b>(</b>						User B is informed that the call is established
57	$\longrightarrow$							User A ends call
58			<b></b>				BYE	UE_A releases the call with BYE
59				$\rightarrow$			BYE	IMS_A forwards BYE to IBCF_A



## 4.4.8 Supplementary Service Originating Identification Restriction (OIR)

#### 4.4.8.1 Description

UE\_B places an IMS VoIP call to UE\_A. UE\_A is subscribed to OIP service, UE\_B is subscribed to OIR service in permanent mode or default presentation restricted temporary mode. The call flow path and node configuration for this use case corresponds to CF\_INT\_AS when UE\_B is in home network and to CF\_ROAM\_AS when UE\_B is roaming in IMS\_A.

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_AS	CF_ROAM_AS
1	User B calls User A	Step 1	Step 1
2	User A is informed of incoming call of User B, user B's identity	Step 20	Step 26
	is not displayed		
3	User B is informed that UE_A is ringing	Step 30	Step 39
4	User A answers call	Step 31	Step 40
5	User B is informed that call has been answered	Step 41	Step 53
6	User A is informed that the call is established	Step 49	Step 64
7	User A ends call	Step 50	Step 65
8	User B is informed that call has ended	Step 60	Step 78
9	User A is informed that call has ended	Step 68	Step 89

## 4.4.8.2 UC\_09\_I: SIP message flow for SS OIR with CF\_INT\_AS

Step					Dire	ction						Message	Comment
Stop	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I B C F A	I B C F B	I M S B		3	mossage	Sommen
1				$\rightarrow$									User B calls User A
2				-					$\rightarrow$			INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and codecs that UE_B supports
3				<b>←</b>							-	100 Trying	IMS_B responds with a 100 Trying provisional response
													INVITE triggers the OIR IFC in IMS_B
4									-	$\longrightarrow$	Ī	INVITE	IMS_B forwards the INVITE to IMS_B AS
5									€			100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
6									€			INVITE	IMS_B AS returns modified INVITE including Privacy header (value "id" or "header") to IMS_B
7									-	$\longrightarrow$	,	100 Trying	IMS_B responds with a 100 Trying provisional response
8								<del>(</del>			Ī	INVITE	IMS_B forwards the INVITE to IBCF_B
9									<b></b>		,	100 Trying	IBCF_B responds with a 100 Trying provisional response
10											Ī	INVITE	IBCF_B forwards the INVITE to IBCF_A
11								$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
12					←						Ī	INVITE	IBCF_A forwards the INVITE to IMS_A
13							$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
													INVITE triggers the OIP IFC in IMS_A
14						$\rightarrow$						INVITE	IMS_A forwards the INVITE to IMS_A AS
15					<b>←</b>	$\blacksquare$						100 Trying	IMS_A AS optionally responds with a 100 Trying provisional response

Step				[	Directio	n					Message	Comment
-	U s e	U E A	s		I A VI S S A	В			I M S	A S B		
	r A		r B		A	F	F	:	В			
16	A		В [		<u> </u>	A					INVITE	IMS_A AS returns modified INVITE including modified From and P-Asserted headers to
17					$\longrightarrow$						100 Trying	IMS_A IMS_A responds with a 100 Trying provisional response
18		<b>(</b>	_		-						INVITE	IMS_A forwards the INVITE to UE_A
19				<del></del>							100 Trying	UE_A optionally responds with a 100 Trying provisional response
20	←	-										User A is informed of incoming call of User B, user B's identity is not displayed
21				<del>                                     </del>	•						180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
22					$\longrightarrow$						180 Ringing	IMS_A forwards the 180 Ringing to IMS_A AS
23					<del></del>						180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing to IMS_A
24						$\longrightarrow$					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
25							$\longrightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
26									<del>)</del>		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
27										$\rightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
28									<b>—</b>		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B
29				←					4		180 Ringing	IMS_B forwards the 180 Ringing response to UE_B
30			<b></b>									User B is informed that UE_A is ringing
31		$\rightarrow$										User A answers call
32											200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
33					$\longrightarrow$						200 OK	IMS_A forwards the 200 OK to IMS_A AS
34					<del></del>						200 OK	IMS_A AS forwards, possibly modified, 200 OK to IMS_A
35						$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
36							$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
37									<del>)</del>		200 OK	IBCF_B forwards 200 OK response to IMS_B
38										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
39									<b>—</b>		200 OK	IMS_B AS forwards, possibly modified, 200 OK response to IMS_B
40				←					_		200 OK	IMS_B forwards the 200 OK response to UE_B
41			<del></del>									User B is informed that call has been answered
42									>		ACK	UE_B acknowledges the receipt of 200 OK for INVITE
								]				IIIVI1E

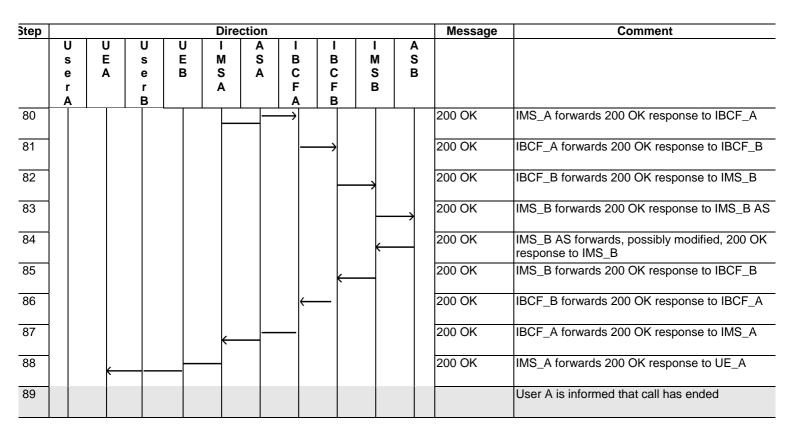
Step					D	Direction	on				Message	Comment
	U s	U E	U s	U	I N		A I	I I		I A VI S		
	e	Ā	e	В	S	3	Ā			S B		
	Ą		В					Ą Ė				
43										$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS
44										<del></del>	ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
45									←		ACK	IMS_B forwards ACK to IBCF_B
46								$\leftarrow$	_		ACK	IBCF_B forwards ACK to IBCF_A
47						<b></b>					ACK	IBCF_A forwards ACK to IMS_A
48		<b>←</b>									ACK	IMS_A forwards ACK to UE_A
49	$\leftarrow$											User A is informed that the call is established
50	-	$\rightarrow$										User A ends call
51				-	$\longrightarrow$						BYE	UE_A releases the call with BYE
52							>				BYE	IMS_A forwards BYE to IMS_A AS
53					ŀ	<del></del>					BYE	IMS_A AS forwards, possibly modified, BYE to IMS_A
54							$\longrightarrow$				BYE	IMS_A forwards BYE to IBCF_A
55								$\longrightarrow$			BYE	IBCF_A forwards BYE to IBCF_B
56											BYE	IBCF_B forwards BYE to IMS_B
57										$\longrightarrow$	BYE	IMS_B forwards BYE to IMS_B AS
58										<b></b>	BYE	IMS_B AS forwards BYE to IMS_B
59				+							BYE	IMS_B forwards BYE to UE_B
60			<b>←</b>									User B is informed that call has ended
61									-	,	200 OK	UE_B sends 200 OK for BYE
62										<del></del>	200 OK	IMS_B forwards 200 OK response to IMS_B AS
63										<del></del>	200 OK	IMS_B AS forwards, possibly modified, 200 OK response to IMS_B
64									←	-	200 OK	IMS_B forwards 200 OK response to IBCF_B
65								<del></del>			200 OK	IBCF_B forwards 200 OK response to IBCF_A
66						<del></del>					200 OK	IBCF_A forwards 200 OK response to IMS_A
67		<b>←</b>									200 OK	IMS_A forwards 200 OK response to UE_A
68												User A is informed that call has ended

## 4.4.8.3 UC\_09\_R: SIP message flow for SS OIR with CF\_ROAM\_AS

Step					Dire	ction					Message	Comment
	U s	U E	U	U	I M	A S	I B	I B	l M	A		
	е	Ā	е	В	S	Ā	С	С	S	В		
	r A		r B		A		F A	F B	В			
1				$\rightarrow$								User B calls User A
2					$\rightarrow$						INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and codecs that UE_B supports
3				<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
4							$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5					<b>←</b>						100 Trying	IBCF_A responds with a 100 Trying provisional response
6								$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7							<b>-</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
8									$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
9								<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the OIR IFC in IMS_B
10										<b>→</b>	INVITE	IMS_B forwards the INVITE to IMS_B AS
11									€		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
12									€		INVITE	IMS_B AS returns modified INVITE including Privacy header (value "id" or "header") to IMS_B
13									-	<b>──</b>	100 Trying	IMS_B responds with a 100 Trying provisional response
14								<b>←</b>			INVITE	IMS_B forwards the INVITE to IBCF_B
15									$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
16							<u> </u>				INVITE	IBCF_B forwards the INVITE to IBCF_A
17							_	$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
18					$\leftarrow$						INVITE	IMS_B forwards the INVITE to IMS_A
19							$\rightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the OIP IFC in IMS_A
20						$\rightarrow$					INVITE	IMS_A forwards the INVITE to IMS_A AS
21					<b>←</b>						100 Trying	IMS A AS optionally responds with a 100 Trying provisional response
22					<b>←</b>						INVITE	IMS_A AS returns modified INVITE including modified From and P-Asserted headers to IMS_A
23						$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response

					Dire	ction						Message	Comment
	U s	U E	U s	U E	I M	A S	I B	I B	I M		3		
	e r	Α	e r	В	S A	Α	C F	C F	S B		3		
24	A   	<u> </u>	В				A	<u>  B</u>				INVITE	IMS_A forwards the INVITE to UE_A
25						$\rightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
26	←												User A is informed of incoming call of User B, user B's identity is not displayed
27					$\rightarrow$							180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
28						$\rightarrow$						180 Ringing	IMS_A forwards the 180 Ringing to IMS_A AS
29					←							180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing to IMS_A
30							$\longrightarrow$					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
31								$\longrightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
32									$\longrightarrow$			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
33										<del></del>		180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
34									•			180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B
35								<b>←</b>				180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
36							<b>←</b>					180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
37						<b>←</b>						180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
38				$\leftarrow$								180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
39			<b>←</b>										User B is informed that UE_A is ringing
40	H	$\rightarrow$											User A answers call
41					$\rightarrow$							200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
42						$\rightarrow$						200 OK	IMS_A forwards the 200 OK to IMS_A AS
43					<b>←</b>							200 OK	IMS_A AS forwards, possibly modified, 200 OK to IMS_A
44						_	$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
45								$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
46									$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
47										<del></del>		200 OK	IMS_B forwards 200 OK response to IMS_B AS
48									K	<u>,                                      </u>		200 OK	IMS_B AS forwards, possibly modified, 200 OK response to IMS_B
49								<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IBCF_B
50							$\leftarrow$					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
51					←							200 OK	IBCF_A forwards the 200 OK response to IMS_A

Step				[	Directio	n				Message	Comment
	U s	U	_	U E I	I A		I B	I	I S		
	e r	A	r		S A	C F	C F	S			
52	A		B	<u> </u>		A	. B			200 OK	IMS_A forwards the 200 OK response to UE_B
53			<b>—</b>								User B is informed that call has been answered
54				<del></del>						ACK	UE_B acknowledges the receipt of 200 OK for INVITE
55						$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
56							$\longrightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
57								$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
58									$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS
59								•	(	ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
60							<del>(</del>			ACK	IMS_B forwards ACK to IBCF_B
61							<del></del>			ACK	IBCF_B forwards ACK to IBCF_A
62					<del></del>					ACK	IBCF_A forwards ACK to IMS_A
63		<b></b>								ACK	IMS_A forwards ACK to UE_A
64	<b>←</b>										User A is informed that the call is established
65		$\rightarrow$									User A ends call
66										BYE	UE_A releases the call with BYE
67					$\longrightarrow$					BYE	IMS_A forwards BYE to IMS_A AS
68					<del></del>					BYE	IMS_A AS forwards, possibly modified, BYE to IMS_A
69						$\longrightarrow$				BYE	IMS_A forwards BYE to IBCF_A
70							<b>─</b>			BYE	IBCF_A forwards BYE to IBCF_B
71								<b>→</b>		BYE	IBCF_B forwards BYE to IMS_B
72									$\longrightarrow$	BYE	IMS_B forwards BYE to IMS_B AS
73								•	(	BYE	IMS_B AS forwards BYE to IMS_B
74							<del>(</del>			BYE	IMS_B forwards BYE to IBCF_B
75										BYE	IBCF_B forwards BYE to IBCF_A
76					<del></del>					BYE	IBCF_A forwards BYE to IMS_A
77				<del></del>						BYE	IMS_A forwards BYE to UE_B
78			<del></del>								User B is informed that call has ended
79				<b>—</b>						200 OK	UE_B sends 200 OK for BYE
		1		1	i l	l	I	ļ			



# 4.4.9 Supplementary Service HOLD

#### 4.4.9.1 Description

 $UE_A$  places an IMS VoIP call to  $UE_B$  which places the call on HOLD.  $UE_A$  will be notified by the AS that the call is on hold.  $UE_B$  will resume the call, and  $UE_A$  will be informed by the AS that the call is resumed.

The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering):

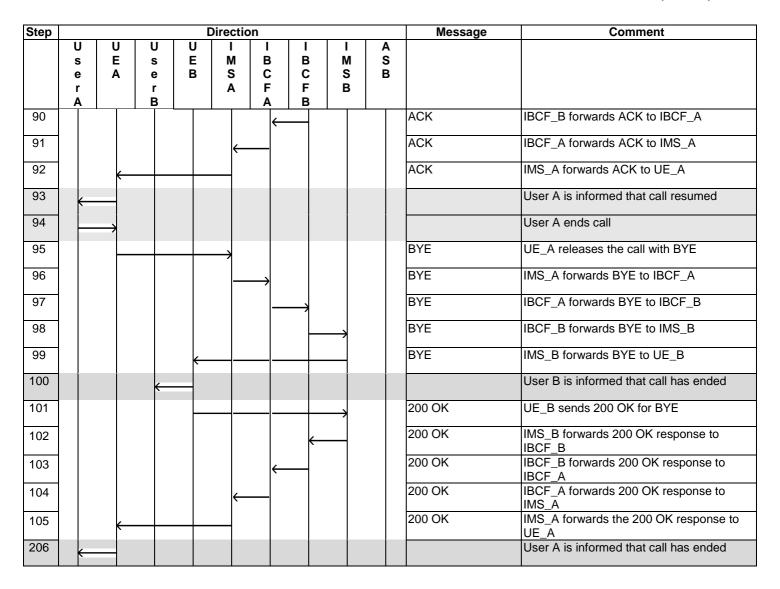
Step	Action	CF_INT_AS	CF_ROAM_AS
1	User A calls User B	1	1
2	User B is informed of incoming call of User A	12	18
3	User A is informed that UE_B is ringing	18	27
4	User B answers call	19	28
5	User A is informed that call has been answered	25	37
6	User B is informed that call is established	31	46
7	User B puts call on hold	32	47
8	User A is informed that call on hold with AS	47	68
	tone		
9	User B is informed that call on hold	55	79
10	User B resumes call	63	90
11	User B is informed that call is resumed	85	121
12	User A is informed that call is resumed	93	132
13	User A ends call	94	133
14	User B is informed that call has ended	100	142
15	User A is informed that call has ended	106	151

4.4.9.1.1 UC\_10\_I: SIP Call Flow "call hold and resume with AS tone" using reINVITE with CF\_INT\_AS

U U U U U I I I I I I I I I I I I I I I	Step					ction				Message	Comment
e						l I // B	l R				
User A calls User B  User A calls User B  User A calls User B  INVITE UE A sends INVITE with the first SDP offer indicating all desired media and codecs that UE A supports  100 Trying IMS A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to IBCF_A  100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_A INVITE IBCF_B INVITE ID IMS_B INVITE ID IMS_B INVITE ID IMS_B INVITE IBCF_B INVITE ID IMS_B INVITE ID			_		5 S	S C	С	:   5	3		
1 User A calls User B  INVITE  UE, A sends INVITE with the first SDP offer indicating all desired media and codes that UE. A supports 100 Trying IMS, A responds with a 100 Trying provisional response INVITE  IMS, A forwards INVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE  IBCF_A responds with a 100 Trying provisional response INVITE  IBCF_B forwards INVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response INVITE  IBCF_B forwards INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE  IMS_B forwards INVITE to UE_B  100 Trying UE_B optionally responds with a 100 Trying provisional response User B is informed of incoming call of User A  13 IBO Ringing  IBCF_B responds to initial INVITE with 180 Ringing response to IBCF_B  15 IBO Ringing  IMS_B responds to initial INVITE with 180 Ringing response to IBCF_B  180 Ringing  IMS_B responds to initial INVITE with 180 Ringing response to IBCF_B  180 Ringing  IMS_B responds to initial INVITE with 180 Ringing response to IBCF_B  180 Ringing  IMS_B responds to initial INVITE with 180 Ringing response to IBCF_B  180 Ringing  IMS_B responds to InVITE with 180 Ringing response to IBCF_B  180 Ringing  IMS_B responds to INVITE with 200 OK to IBCF_B response to IMS_B respon					A				3		
offer indicating all desired media and codects that Use A supports  100 Trying	1		<del>,</del>								User A calls User B
100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards INVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_B 100 Trying IBCF_A forwards INVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B IMS_B responds with a 100 Trying provisional response INVITE IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B IMS_B responds with a 100 Trying provisional response IMS_B responds with a 100 Trying provisional response IMS_B responds with a 100 Trying IMS_B forwards INVITE to UE_B 100 Trying IMS_B forwards INVITE to UE_B 1100 Trying IMS_B forwards IMS_B forwards with a 100 Trying provisional response IMS_B forwards with a 100 Trying provisional response IMS_B forwards with a 100 Trying provisional response IMS_B forwards with a 100 Trying IMS_B forwards with a 100 Trying provisional response IMS_B forwards IMS_B forwards with a 100 Trying provisional response IMS_B forw	2				<b>─</b>					INVITE	offer indicating all desired media and
INVITE   IMS_A forwards INVITE to IBCF_A	3									100 Trying	IMS_A responds with a 100 Trying
Provisional response   INVITE to IBCF_B   INVITE   IBCF_A forwards INVITE to IBCF_B   INVITE   IBCF_A forwards INVITE to IBCF_B   INVITE   IBCF_B responds with a 100 Trying   IBCF_B responds with a 100 Trying   INVITE   IBCF_B forwards INVITE to IMS_B   INVITE   IBCF_B forwards INVITE to IMS_B   INVITE   IMS_B forwards INVITE to UE_B   INVITE   IMS_B forwards INVITE with 100   INVITE   IMS_B forwards INVITE with 100   INVITE   IMS_B forwards INVITE with 180   INVITE   IMS_B forwards the 180 Ringing response to IBCF_B   INVITE   INVITE   IMS_B forwards the 180 Ringing response to IBCF_B   INVITE   IMS_B forwards the 180 Ringing response to IBCF_B   IMS_B forwards the 180 Ringing response to IMS_A   INVITE   IMS_B forwards INVITE   IMS_B forwards the 180 Ringing response to IMS_B forwards 200 CM response to IMS_B forwards	4									INVITE	provisional response IMS_A forwards INVITE to IBCF_A
INVITE   IBCF_A forwards INVITE to IBCF_B	5					·				100 Trying	
Invite   I	6						<b></b>			INVITE	IBCF_A forwards INVITE to IBCF_B
INVITE   IBCF_B forwards INVITE to IMS_B	7						<del></del>			100 Trying	
Invite   Invite   Imstead   Imste	8							<del></del>	,	INVITE	
INVITE   IMS_B forwards INVITE to UE_B	9							<del></del>		100 Trying	
Trying provisional response User B is informed of incoming call of User A  180 Ringing UE, B responds to initial INVITE with 180 Ringing to indicate that it has started alerting 180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B 180 Ringing IBCF_B forwards the 180 Ringing response to IMS_A 180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_B IMS_B forwards 200 OK response to IMS_B forwards 200 OK response to IMS_B forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 200 OK IMS_A 200 OK IMS_A 200 OK IMS	10			•	<del></del>					INVITE	
12   User B is informed of incoming call of User A   User A   User A   User A   Iso Ringing to indicate that it has started alterting   180 Ringing   IMS_B forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_B forwards the 180 Ringing response to IBCF_A   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_A   180 Ringing   IBCF_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to UE_A   User A is informed that UE_B is ringing   User B answers call   User B answers call	11							<del></del>		100 Trying	
18   18   18   18   18   18   18   18	12			<del></del>							User B is informed of incoming call of
180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B forwards the 180 Ringing response to IBCF_A 180 Ringing IBCF_B forwards the 180 Ringing response to IMS_A 180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A IMS_A forwards the 180 Ringing response to UE_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_A 180 Ringing IMS_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards to INVITE with 200 OK to indicate that the call has been answered 180 Ringing response to IMS_A 180 Ringing IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to UE_A 180 Ringing IMS_A forwards the 200 OK response to UE_A 180 Ringing IMS_A forwards the 200 OK response to UE_A 180 Ringing IMS_A 180 Ringing IMS_A forwards the 200 OK response to UE_A 280 OK IMS_A 280 OK IMS_A 180 Ringing	13							<b></b>		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started
response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_A  180 User A is informed that UE_B is ringing  190 User B answers call  200 OK UE_B responds to INVITE with 200 OK to indicate that the call has been answered  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A  200 OK UE_A acknowledges the receipt of 200 OK for INVITE	14							<del></del>		180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
response to IMS_A  180 Ringing	15						$\leftarrow$			180 Ringing	response to IBCF_A
180 Ringing IMS_A forwards the 180 Ringing response to UE_A  User A is informed that UE_B is ringing  User B answers call  200 OK UE_B responds to INVITE with 200 OK to indicate that the call has been answered indicate that the call has been answered IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A  200 OK UE_A  200 OK UE_A  200 OK USER A is informed that call has been answered  UE_A acknowledges the receipt of 200 OK for INVITE	16					<del></del>				180 Ringing	
User A is informed that UE_B is ringing  User B answers call  200 OK UE_B responds to INVITE with 200 OK to indicate that the call has been answered 200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A  200 OK UE_A ON UE_A  200 OK UE_A ON UE_A  200 OK UE_A acknowledges the receipt of 200 OK for INVITE	17		<del></del>							180 Ringing	IMS_A forwards the 180 Ringing response
20 OK UE_B responds to INVITE with 200 OK to indicate that the call has been answered 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_A 200 OK UE_A User A is informed that call has been answered ACK UE_A acknowledges the receipt of 200 OK for INVITE	18	<del>(</del>									
indicate that the call has been answered  20 OK IMS_B forwards 200 OK response to IBCF_B  20 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A  User A is informed that call has been answered  ACK UE_A acknowledges the receipt of 200 OK for INVITE	19		-	<b>─</b>							User B answers call
21 22 23 24 25 26 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_A  USer A is informed that call has been answered  ACK UE_A acknowledges the receipt of 200 OK for INVITE	20									200 OK	
22 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_A 25 User A is informed that call has been answered ACK UE_A acknowledges the receipt of 200 OK for INVITE	21							<del></del>		200 OK	IMS_B forwards 200 OK response to
23 24 25 26 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_A USer A is informed that call has been answered ACK UE_A acknowledges the receipt of 200 OK for INVITE	22						<del></del>			200 OK	IBCF_B forwards 200 OK response to
24 25 26 200 OK IMS_A forwards the 200 OK response to UE_A UE_A User A is informed that call has been answered ACK UE_A acknowledges the receipt of 200 OK for INVITE	23					$\longleftarrow$				200 OK	IBCF_A forwards 200 OK response to
25 26 User A is informed that call has been answered ACK UE_A acknowledges the receipt of 200 OK for INVITE	24		<del>-  </del>							200 OK	IMS_A forwards the 200 OK response to
ACK UE_A acknowledges the receipt of 200 OK for INVITE	25	(									User A is informed that call has been answered
	26									ACK	UE_A acknowledges the receipt of 200
	27					$\longrightarrow$				ACK	

Step						ction					Message	Comment
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	e	A		_		s c	;   C	;   ;	S	В		
	r A		l E		4	A F		_	В			
28	Î			,				'			ACK	IBCF_A forwards ACK to IBCF_B
29									*		ACK	IBCF_B forwards ACK to IMS_B
30					<b></b>						ACK	IMS_B forwards ACK to UE_B
31				<del>(</del>								User B is informed that call is established
32				$\longrightarrow$								User B puts call on hold
33								;	>		INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
34					<del></del>						100 Trying	IMS_B responds with a 100 Trying provisional response
35										$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
36									<u></u>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
37									$\leftarrow$		INVITE	AS_B sends reINVITE to IMS_B
38										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
39								<del>(</del>	-		INVITE	IMS_B forwards reINVITE to IBCF_B
40									•		100 Trying	IBCF_B responds with a 100 Trying provisional response
41							<b></b>				INVITE	IBCF_B forwards reINVITE to IBCF_A
42							$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
43						<b></b>					INVITE	IBCF_A forwards reINVITE to IMS_A
44											100 Trying	IMS_A responds with a 100 Trying provisional response
45			(			_					INVITE	IMS_A forwards reINVITE to UE_A
46					;	•					100 Trying	UE_A optionally responds with a 100 Trying provisional response
47	<b>←</b>											User A is informed that call is on hold with AS tone
48						•					200 OK	UE_A responds to reINVITE with 200 OK indicating media attribute "recvonly"
49						$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
50											200 OK	IBCF_A forwards 200 OK response to IBCF_B
51								<u> </u>	*		200 OK	IBCF_B forwards 200 OK response to IMS_B
52										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to
53									<u></u>		200 OK	AS_B AS_B forwards 200 OK response to
54					<b></b>						200 OK	IMS_B IMS_b forward the 200 OK to UE_B
55				<del>(</del>								User B is informed that the call is on hold
56									>		ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
57									_	$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
58									<u></u>		ACK	AS_B forwards ACK to IMS_B
<u> </u>	l l	ļ	ļ		I	I			I	I	L	

Step						ection	1	_				Message	Comment
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	е	Ā	è		В	S	С	С	S	•	В		
	r A		ľ			A	F A	F B	В	8			
59			ı					· (				ACK	IMS_B forwards ACK to IBCF_B
60							<b>←</b>					ACK	IBCF_B forwards ACK to IBCF_A
61						$\leftarrow$						ACK	IBCF_A forwards ACK to IMS_A
62		€				_						ACK	IMS_A forwards ACK to UE_A
63													User B resumes call
64									$\longrightarrow$			INVITE	UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)
65					<del></del>	-						100 Trying	IMS_B responds with a 100 Trying provisional response
66											$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
67										<del></del>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
68										<b>←</b>		INVITE	AS_B forwards INVITE to IMS_B
69									•		$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
70								<del>(</del>				INVITE	IMS_B sends reINVITE to IBCF_B
71									$\longrightarrow$			100 Trying	IBCF_B responds with a 100 Trying
72							<b>←</b>					INVITE	provisional response IBCF_B sends reINVITE to IBCF_A
73								<b>→</b>				100 Trying	IBCF_A responds with a 100 Trying
74						$\leftarrow$						INVITE	provisional response IBCF_A sends reINVITE to IMS_A
75							$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying
76		€										INVITE	provisional response IMS_A forwards reINVITE to UE_A
77						<b>→</b>						100 Trying	UE_A optionally responds with a 100
78						<b>-</b>						200 OK	Trying provisional response UE_A sends the 200 OK indicating media
79												200 OK	attribute "sendrecv" to IMS_A IMS_A forwards 200 OK response to
80												200 OK	IBCF_A IBCF_A forwards 200 OK response to
								$\rightarrow$				200 OK	IBCF_B IBCF_B forwards 200 OK response to
81									$\longrightarrow$				IMS_B
82											$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
83										<del></del>	$\dashv$	200 OK	AS_B forwards the 200 OK for INVITE
84					<del></del>							200 OK	IMS_B forwards 200 OK to UE_B
85				<del>(</del>									User B is informed that call is resumed
86									$\longrightarrow$			ACK	UE_B sends ACK to IMS_B
87											$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
88										<del></del>		ACK	AS_B forwards ACK to IMS_B
89								<del>(</del>				ACK	IMS_B forwards ACK to IBCF_B



4.4.9.1.2 UC\_10\_R: SIP Call Flow "call hold and resume with AS tone" using reINVITE with CF\_ROAM\_AS

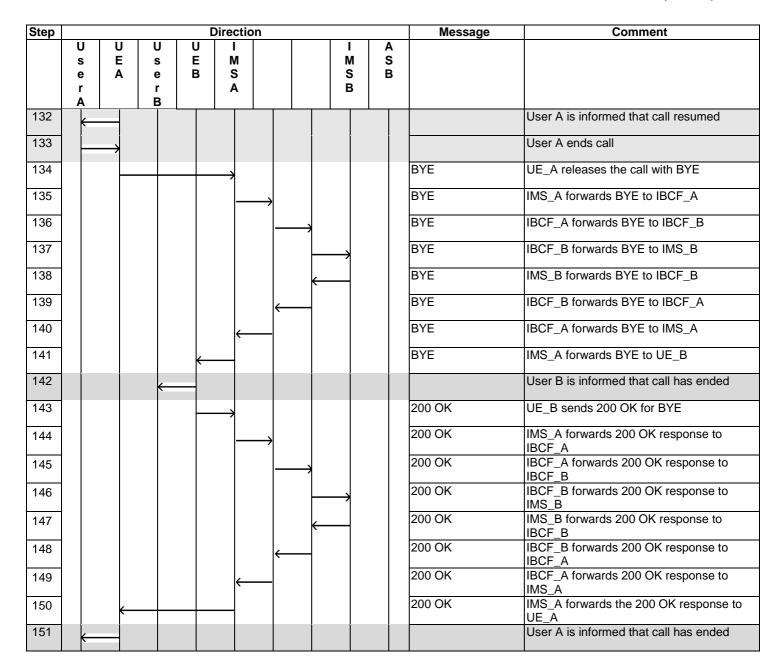
Step				[	Directio	n				Message	Comment
	U s e r A	U E A	U s e r B	U E B	M S A			I M S B	A S B		
1	È	$\rightarrow$									User A calls User B
2					$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that UE_A supports
3		←								100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5					←					100 Trying	IBCF_A responds with a 100 Trying provisional response
6						_	$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7						$\leftarrow$	$\blacksquare$			100 Trying	IBCF_B responds with a 100 Trying provisional response

	U s	U	υl				Message	Comment
		E		J =   N	,	I A M S		
	е	_	e E	3   9	8	S B		
	r A		r B	'	\	В		
8						$\rightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
9					<b>←</b>		100 Trying	IMS_B responds with a 100 Trying provisional response
10					<u> </u>		INVITE	IMS_B forwards INVITE to IBCF_B
11						$\longrightarrow$	100 Trying	IBCF_B responds with a 100 Trying
12					<u></u>		INVITE	provisional response IBCF_B forwards INVITE to IBCF_A
13							100 Trying	IBCF_A responds with a 100 Trying provisional response
14					<b>←</b>		INVITE	IBCF_A forwards INVITE to IMS_A
15					<b></b>		100 Trying	IMS_A responds with a 100 Trying provisional response
16				<del></del>			INVITE	IMS_A forwards INVITE to UE_B
17				<del></del>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
18			-					User B is informed of incoming call of User A
19				<del></del>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
20					<b>─</b>		180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
21							180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
22						<b>→</b>	180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
23					<b>←</b>		180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
24					<del></del>		180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
25					<b>←</b>		180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
26		←					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
27	<del></del>	-						User A is informed that UE_B is ringing
28			$\longrightarrow$		i			User B answers call
29							200 OK	UE_B responds to INVITE with 200 OK to indicate that the call has been answered
30					$\longrightarrow$		200 OK	IMS_A forwards 200 OK response to IBCF_A
31							200 OK	IBCF_A forwards 200 OK response to IBCF_B
32						<b>→</b>	200 OK	IBCF_B forwards 200 OK response to IMS_B
33					<del> </del>		200 OK	IMS_B IMS_B forwards 200 OK response to IBCF_B
34					<b>←</b>		200 OK	IBCF_B forwards 200 OK response to IBCF_A
35					<u> </u>		200 OK	IBCF_A forwards 200 OK response to IMS_A
36		<b></b>					200 OK	IMS_A forwards the 200 OK response to UE_A
37	<b>—</b>							User A is informed that call has been answered

Step				Dir	ection				Message	Comment
	_	_		D E	I M		I M	AS		
		_		В	S		S	В		
	r A		r B		Α		В			
38					<del> </del>				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
39					$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
40					-	<b></b>			ACK	IBCF_A forwards ACK to IBCF_B
41							<b>→</b>		ACK	IBCF_B forwards ACK to IMS_B
42						<b>←</b>			ACK	IMS_B forwards ACK to IBCF_B
43					(←				ACK	IBCF_B forwards ACK to IBCF_A
44					<b></b>				ACK	IBCF_A forwards ACK to IMS_A
45				<del></del>	-				ACK	IMS_A forwards ACK to UE_B
46			<del></del>							User B is informed that call is established
47										User B puts call on hold
48					+				INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
49				←					100 Trying	IMS_A responds with a 100 Trying provisional response
50					<b>──</b>				INVITE	IMS_A forwards INVITE to IBCF_A
51					<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
52					_				INVITE	IBCF_A forwards INVITE to IBCF_B
53					€				100 Trying	IBCF_B responds with a 100 Trying provisional response
54							<b>→</b>		INVITE	IBCF_B forwards INVITE to IMS_B
55						<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
56								$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
57							<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
58							<b>—</b>		INVITE	AS_B sends reINVITE to IMS_B
59								$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying
60						<b>—</b>			INVITE	provisional response IMS_B forwards reINVITE to IBCF_B
61							$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying
62					<b> </b>				INVITE	provisional response IBCF_B forwards INVITE to IBCF_A
63						<b>—</b>			100 Trying	IBCF_A responds with a 100 Trying
64									INVITE	provisional response IBCF_A forwards INVITE to IMS_A
65									100 Trying	IMS_A responds with a 100 Trying
66		<u></u>							INVITE	provisional response IMS_A forwards reINVITE to UE_A
67									100 Trying	UE_A optionally responds with a 100
68										Trying provisional response  User A is informed that call is on hold with
										AS tone

Section   Sect	Step				Dire	ction				Message	Comment
Fig.		s	E s	s l	≣   1			l l	S		
200 OK   UE A responds to reliNVITE with 200 OK indicating media attribute "revovnly"		r		r	_				В		
200 OK   IMS_A forwards 200 OK response to   IBCF_A   180	69			3 <u> </u> 						200 OK	
200 OK	70					$\longrightarrow$				200 OK	IMS_A forwards 200 OK response to
200 OK	71						$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to
200 OK	72							$\longrightarrow$		200 OK	IBCF_B forwards 200 OK response to
200 OK	73								$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to
200 OK IMS_B forwards 200 OK response to IBCF B 100 Wards 200 OK response to IBCF B 100 Wards 200 OK response to IBCF B 100 Wards 200 OK 100 O	74							<b>←</b>		200 OK	AS_B forwards 200 OK response to
200 OK	75						<del>(</del>			200 OK	IMS_B forwards 200 OK response to
BCF_A forwards 200 OK response to IMS_A 200 OK   IMS_A forward the 200 OK to UE_B	76						<del></del>			200 OK	IBCF_B forwards 200 OK response to
200 OK	77					<del></del>				200 OK	IBCF_A forwards 200 OK response to
ACK UE_B acknowledges the receipt of 200 OK for relNVITE ACK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IBCF_A ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to IMS_A ACK IMS_B forwards ACK to IMS_B INVITE IMS_A responds with a 100 Trying provisional response INVITE IBCF_A sends reINVITE to IBCF_B INVITE IBCF_A sends reINVITE to IBCF_B INVITE IBCF_B sends reINVITE to IMS_B INVITE IBCF_B sends reINVITE to IMS_B INVITE IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B responds with a 100 Trying provisional response	78				<del></del>					200 OK	
OK for reINVITE  ACK IMS_A forwards ACK to IBCF_A  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_A  ACK IMS_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to IMS_A  IMS_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to IMS_A  INVITE IMS_A sends reINVITE to IBCF_A  IMS_A sends reINVITE to IBCF_B  INVITE IBCF_A sends reINVITE to IBCF_B  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IMS_B  INVITE IBCF_B sends reINVITE to IMS_B  INVITE IBCF_B sends reINVITE to IMS_B	79			<del>(</del>							User B is informed that the call is on hold
ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to IMS_B  ACK AS_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_A  IMS_A forwards ACK to UE_A  INVITE UE_B sends second relNVITE message indicating media attribute "sendrecv" (Call Resume)  INVITE IMS_A sends relNVITE to IBCF_A  INVITE IBCF_A sends relNVITE to IBCF_B  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B sends relNVITE to IBCF_B  INVITE IBCF_B sends relNVITE to IBCF_B  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B responds with a 100 Trying provisional response	80					•				ACK	
ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IMS_B ACK AS_B forwards ACK to IMS_B ACK AS_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_A ACK IBCF_B forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to UE_A  90 User B resumes call INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume) 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IBCF_A responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IBCF_B responds with a 100 Trying provisional response	81					$\longrightarrow$				ACK	
ACK IMS_B forwards ACK to AS_B ACK AS_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to IMS_A ACK IMS_A forwards ACK to UE_A  IMS_A forwards ACK to IMS_A  IMS_A forwards ACK to IMS_B  IMS_A forwards ACK to I	82						<b>─</b>			ACK	IBCF_A forwards ACK to IBCF_B
ACK AS_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to UE_A  90 User B resumes call INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume) 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A sends reINVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B	83									ACK	IBCF_B forwards ACK to IMS_B
ACK IMS_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  User B resumes call  INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  INVITE IMS_A responds with a 100 Trying provisional response  INVITE IMS_A sends reINVITE to IBCF_A  100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IMS_B  IMS_B responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IMS_B	84								$\longrightarrow$	ACK	
ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  BY IMS_A forwards ACK to UE_A  User B resumes call  INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  INVITE IMS_A responds with a 100 Trying provisional response  INVITE IMS_A sends reINVITE to IBCF_A  INVITE IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_A sends reINVITE to IBCF_B  INVITE IBCF_B sends reINVITE to IBCF_B  INVITE IBCF_B sends reINVITE to IMS_B  INVITE IBCF_B sends reINVITE to IMS_B  INVITE IBCF_B sends reINVITE to IMS_B	85							←			
ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  User B resumes call  INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  100 Trying IMS_A responds with a 100 Trying provisional response  INVITE IMS_A sends reINVITE to IBCF_A  100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_A sends reINVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IBCF_B sends reINVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response	86						<del>(</del>				
90  91  91  92  93  94  95  96  97  98  ACK  IMS_A forwards ACK to UE_A  User B resumes call  UU_B B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  100 Trying  IMS_A responds with a 100 Trying provisional response  INVITE  IMS_A sends reINVITE to IBCF_A  100 Trying  IBCF_A responds with a 100 Trying provisional response  INVITE  IBCF_B responds with a 100 Trying provisional response  INVITE  IBCF_B sends reINVITE to IMS_B  100 Trying  IMS_B responds with a 100 Trying provisional response  INVITE  IBCF_B sends reINVITE to IMS_B	87						<del></del>				
90 User B resumes call  INVITE UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  91						<del></del>					
91 92 93 94 95 96 97 98  INVITE  UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)  INVITE  IMS_A responds with a 100 Trying provisional response  INVITE  IMS_A sends reINVITE to IBCF_A  INVITE  IBCF_A responds with a 100 Trying provisional response  INVITE  IBCF_B responds with a 100 Trying provisional response  INVITE  IBCF_B responds with a 100 Trying provisional response  INVITE  IBCF_B sends reINVITE to IMS_B  INVITE  IBCF_B responds with a 100 Trying provisional response  INVITE  IBCF_B responds with a 100 Trying provisional response	89		<del></del>			_				ACK	IMS_A forwards ACK to UE_A
91 92 93 94 95 96 97 98 98  indicating media attribute "sendrecv" (Call Resume) 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A sends reINVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_A sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	90										
92 93 94 94 95 96 97 98 98 98 90 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A sends reINVITE to IBCF_A IMS_A sends reINVITE to IBCF_B INVITE IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B INVITE IBCF_B sends reINVITE to IMS_B IMS_B responds with a 100 Trying provisional response IMS_B responds with a 100 Trying provisional response	91				:					INVITE	indicating media attribute "sendrecv" (Call
93 94 95 96 97 98 98 INVITE IMS_A sends reINVITE to IBCF_A 100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_A sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	92				←	_				100 Trying	IMS_A responds with a 100 Trying
95 96 97 98 98 provisional response INVITE IBCF_A sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	93					$\longrightarrow$				INVITE	
95 96 97 98 INVITE IBCF_A sends reINVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	94					<del></del>				100 Trying	
97 98 98 INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	95						<b>─</b>			INVITE	
97 98 INVITE IBCF_B sends reINVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response	96						$\leftarrow$			100 Trying	
provisional response	97							$\longrightarrow$		INVITE	
	98						<del>(</del>			100 Trying	
	99								$\longrightarrow$	INVITE	

Step					Direct	ion				Message	Comment
-	U s	U E	U s	U	I M			I M	A S		
	е	Ā	е	В	S			S B	В		
	r A		r B		A			В			
100								$\leftarrow$		100 Trying	AS_B optionally responds with a 100 Trying provisional response
101								←		INVITE	AS_B forwards INVITE to IMS_B
102									$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
103							$\leftarrow$			INVITE	IMS_B sends reINVITE to IBCF_B
104								$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
105						<b>←</b>				INVITE	IBCF_B sends reINVITE to IBCF_A
106							<b>—</b>			100 Trying	IBCF_A responds with a 100 Trying
107					4					INVITE	provisional response IBCF_A sends reINVITE to IMS_A
108					_	$\longrightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
109		<b>←</b>								INVITE	IMS_A forwards reINVITE to UE_A
110					<b></b>					100 Trying	UE_A optionally responds with a 100 Trying provisional response
111					<b>→</b>					200 OK	UE_A sends the 200 OK indicating media
112					_	$\longrightarrow$				200 OK	attribute "sendrecv" to IMS_A IMS_A forwards 200 OK response to
113							$\rightarrow$			200 OK	IBCF_A IBCF_A forwards 200 OK response to
114								$\rightarrow$		200 OK	IBCF_B IBCF_B forwards 200 OK response to
115									$\longrightarrow$	200 OK	IMS_B IMS_B forwards 200 OK response to
116								<b>←</b>		200 OK	AS_B AS_B forwards the 200 OK for INVITE
117							←			200 OK	IMS_B forwards 200 OK to IBCF_B
118						←				200 OK	IBCF_B forwards 200 OK to IBCF_A
119					<del>(</del>					200 OK	IBCF_A forwards 200 OK to IMS_A
120				<b>←</b>						200 OK	IMS_A forwards 200 OK to UE_B
121			<b>←</b>								User B is informed that call is resumed
122				F	$\rightarrow$					ACK	UE_B sends ACK to IMS_A
123					_	$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
124							$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
125								$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
126									$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
127								<b>←</b>		ACK	AS_B forwards ACK to IMS_B
128							<del></del>			ACK	IMS_B forwards ACK to IBCF_B
129						←				ACK	IBCF_B forwards ACK to IBCF_A
130					<del>(</del>					ACK	IBCF_A forwards ACK to IMS_A
131		$\leftarrow$								ACK	IMS_A forwards ACK to UE_A
		l	I	I	I	I	l	I	I		



# 4.4.10 Supplementary Service Call Forward Unconditional (CFU)

#### 4.4.10.1 Description

UE\_A places an IMS VoIP call to UE\_B which has CFU activated towards user UE\_B2 which is located in IMS\_A. UE\_A may be notified by the AS that the call is forwarded. UE\_B2 answers the call without previous ringing indication. The call is released by UE\_A.

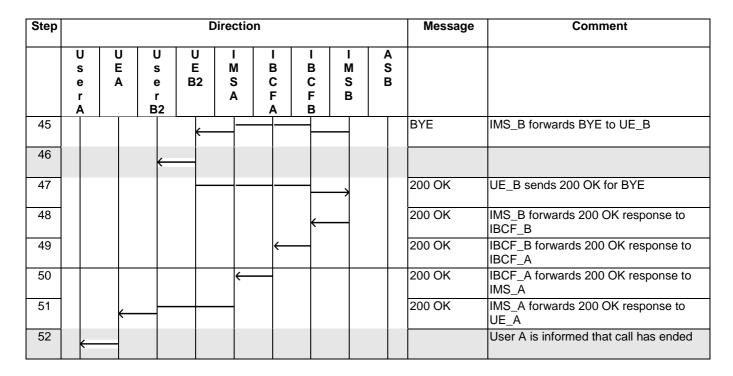
The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_AS	CF_ROAM_AS
1	User A calls User B	1	1
2	User A may be informed of call diversion	17	11
3	User B2 is informed of incoming call of User A	22	18
4	User B2 answers call	23	19
5	User A is informed that call has been answered	31	26
6	User B2 is informed that call is established	39	32
7	User A ends call	40	33
8	User B2 is informed that call has ended	46	37
9	User A is informed that call has ended	52	42

# 4.4.10.1.1 UC\_11\_I: SIP Call Flow "Communication Forwarding unconditional" with CF\_INT\_AS

Step					Directio	n				Message	Comment
	U s e r A	U E A	U s e r B2	U E B2	I M S A	I B C F A	I B C F B	M S B	A S B		
1	H	$\rightarrow$									User A calls User B
2		-			$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5					<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
6							$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7						<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
8								$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
9							<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the CFU IFC in IMS_B
10									$\longrightarrow$	INVITE	IMS_B forwards the INVITE to AS_B
11								<b>←</b>		100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
											AS_B applies the CDIV CFU procedure
12								<b>←</b>		181 Call is being	AS_B indicates optionally to IMS_B that call has been forwarded
13							<b>←</b>			181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
14						←				181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
15					<b>←</b>					181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
16		<b>—</b>								181 Call is being	IMS_A indicates that call to UE_B has been forwarded

U	Step			D	Direction					Message	Comment
User A may be informed of call diversion  INVITE		s l e /	E s A e r	E	S	C F	C F	S	S		
new request UR and history header to 100 Trying IMS B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to UE_B2 100 Trying UE_B2 optionally responds with a 100 Trying provisional response User B2 is informed of incoming call of User A 100 Trying UE_B2 optionally responds with a 100 Trying provisional response User B2 is informed of incoming call of User A 100 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been 200 OK in IMS_B forwards 200 OK response to NaS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 100 OK IMS_B forwards 200 OK response to IBCF_B forwards 200 OK response to IBCF_B forwards 200 OK response to IBCF_A forwards 200 OK response to IBCF_B forwards 200 OK response to IBC	17	k—					Ī				User A may be informed of call diversion
100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards the INVITE to UE_B2   100 Trying   UE_B2 optionally responds with a 100 Trying provisional response   User B2 is informed of incoming call of User A   User B2 is informed of incoming call of User A   User B2 is informed of incoming call of User A   User B2 is informed of incoming call of User A   User B2 is informed of incoming call of User A   User B2 is informed of incoming call of User A   User B2 is informed to Invite with 200 OK to indicate that the call has been   200 OK   User B2 responds to INVITE with 200 OK to indicate that the call has been   200 OK   IMS_B   Invite of Imster A   100 OK   IMS_B   Invite of Imster A   100 OK   Imster	18							<b>←</b>	_	INVITE	
INVITE   IMS_B forwards the INVITE to UE_B2	19								$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying
Trying provisional response	20			←						INVITE	
User BZ is informed of incoming call of User A User BZ answers call  200 OK UE_BZ responds to INVITE with 200 OK to indicate that the call has been 200 OK in IMS B forwards 200 OK response to IMS A 200 OK IMS B forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards 200 OK response to IMS A 200 OK IMS A forwards ACK to IMS BEED ACK IMS BEED ACK IMS B forwards ACK to IMS B ACK IMS B forw	21							$\rightarrow$		100 Trying	
User B2 answers call  24  25  26  26  27  28  29  30  31  31  32  34  35  36  37  38  39  40  40  41  42  43	22		<b>←</b>								User B2 is informed of incoming call of
bio indicate that the call has been 200 OK IMS_B forwards 200 OK response to AS_B 200 OK AS_B returns, possibly modified, 200 OK to IMS_B 200 OK IMS_B forwards 200 OK response to IMS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_B forwards 200 OK response to IMS_A forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B 200 OK IMS_B forwards ACK to IMS_B 200 OK IMS_B	23		_	$\longrightarrow$							
25	24							$\rightarrow$		200 OK	
26 27 28 20 OK AS_B returns, possibly modified, 200 OK to IMS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IBCF_A 200 OK IMS_A forwards 200 OK response to UE_A 200 OK IMS_A forwards 200 OK response to UE_A 200 OK IMS_A forwards 200 OK response to UE_A 200 OK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IMS_B returns, possibly modified, ACK to IMS_B ACK IMS_B returns, possibly modified, ACK to IMS_B ACK IMS_B returns, possibly modified, ACK to IMS_B ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established User A ends call BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_B	25								$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to
27 28 29 30 30 31 31 32 32 33 34 35 36 37 38 39 40 40 41 41 42 43	26							<b>←</b>		200 OK	AS_B returns, possibly modified, 200 OK
28 29 30 30 31 31 32 32 33 34 35 36 37 38 39 40 40 41 41 42 43	27						<b>←</b>			200 OK	IMS_B forwards 200 OK response to
29 30 31 31 32 32 33 34 35 36 37 38 39 40 40 41 41 42 43  200 OK   BCF_A forwards 200 OK response to IMS_A 200 OK   IMS_A 200 OK   IMS_A 200 OK   IMS_A 200 OK   IMS_A 300 OK   IMS_B 300 OK   IMS_A 300 OK   IMS_A 300 OK   IMS_A 300 OK   IMS_B 300	28					<b>←</b>				200 OK	IBCF_B forwards 200 OK response to
30 31 31 32 33 34 35 36 37 38 39 40 40 41 41 42 43  200 OK IMS_A forwards 200 OK response to UE_A USer A is informed that call has been answered  ACK UE_A acknowledges the receipt of 200 OK for INVITE ACK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to IMS_B ACK IMS_B returns, possibly modified, ACK to IMS_B ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established User A ends call  BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B	29				<del></del>					200 OK	IBCF_A forwards 200 OK response to
31 32 33 34 35 36 37 38 39 40 40 41 42 43  User A is informed that call has been answered  ACK UL_A acknowledges the receipt of 200 OK for INVITE  ACK IIMS_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established  User A ends call  BYE UL_A releases the call with BYE  BYE IBCF_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	30									200 OK	IMS_A forwards 200 OK response to
ACK UE_A acknowledges the receipt of 200 OK for INVITE ACK IIMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to AS_B ACK AS_B returns, possibly modified, ACK to IMS_B ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established User A ends call  BYE UE_A releases the call with BYE BYE IBCF_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B	31	<del></del>									User A is informed that call has been
ACK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IMS_B ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to AS_B ACK IMS_B forwards ACK to ACK to IMS_B ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established User A ends call BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B	32			_	$\rightarrow$					ACK	UE_A acknowledges the receipt of 200
ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to AS_B  ACK AS_B returns, possibly modified, ACK to IMS_B  ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established  User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	33					$\rightarrow$				ACK	
36 37 38 39 40 40 41 42 43 ACK IMS_B forwards ACK to AS_B ACK IMS_B returns, possibly modified, ACK to IMS_B ACK IMS_B forwards ACK to UE_B2 User B2 is informed that call is established User A ends call BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B	34						$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
ACK AS_B returns, possibly modified, ACK to IMS_B ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	35							$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
IMS_B  ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established  User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	36								$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
38  39  40  41  42  43  ACK IMS_B forwards ACK to UE_B2  User B2 is informed that call is established  User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	37							<b>←</b>		ACK	
established User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	38			<b>←</b>			_	_		ACK	
40 41 42 43 User A ends call  BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B	39		<b>←</b>								
42 BYE IMS_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B	40	$\longrightarrow$									
43 BYE IBCF_A forwards BYE to IBCF_B	41				$\rightarrow$					BYE	UE_A releases the call with BYE
	42					$\rightarrow$				BYE	IMS_A forwards BYE to IBCF_A
44 BYE IBCF_B forwards BYE to IMS_B	43						$\rightarrow$			BYE	IBCF_A forwards BYE to IBCF_B
	44							$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B



4.4.10.1.2 UC\_11\_R: SIP Call Flow "Communication Forwarding unconditional" with CF\_ROAM\_AS

Step				D	irectio	n				Message	Comment
	U s e r A	U E A	U s e r B2	U E B2	M S A	I B C F A	I B C F B	I M S B	A S B		
1		$\rightarrow$									User A calls User B
2					$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4					_	$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5					$\leftarrow$	_				100 Trying	IBCF_A responds with a 100 Trying provisional response
6							$\rightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7						$\leftarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
8								<b>→</b>		INVITE	IBCF_B forwards INVITE to IMS_B
9							<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the CFU IFC in IMS_B
10									$\rightarrow$	INVITE	IMS_B forwards the INVITE to AS_B
11								<b>←</b>		100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
											AS_B applies the CDIV CFU procedure

12 U U U U U U U B S E M M B B M M S F T F B B M M S S C C C C S S B B C C C C C S S B B C C C C	Step		Direction			Message	Comment
18 Call is been forwarded call has been forwarded b		s E s e A e r r	E M B2 S	C C F	M S S B		
131 Call is list, Bindicates to IBCF, B that call has being been forwarded in the period been forwarded. The period been forwarded in the period been forwarded. The period been forwarded in the period been forwarded. The period been forwarded in the period been forwarded been forwarded. The period been forwarded been forwarded been forwarded been forwarded been forwarded. The period been forwarded been forwa	12				<u> </u>		
181 Call is BCF_B indicates to IBCF_A that call has being been forwarded.  181 Call is IBCF_A indicates to IMS_A that call has being been forwarded.  181 Call is IBCF_A indicates to IMS_A that call has being been forwarded.  181 Call is IBCF_A indicates to IMS_A that call has been forwarded.  181 Call is IBCF_A indicates that call to UE_B has been forwarded.  181 Call is IBCF_A indicates that call to UE_B has been forwarded.  182 USer A may be informed of call diversion.  183 INVITE AS_B returns modified INVITE including new request URI and history header to revisional response.  184 INVITE IBCF_B responds with a 100 Trying provisional response.  185 INVITE IBCF_B forwards the INVITE to IBCF_A responds with a 100 Trying provisional response.  186 INVITE IBCF_B forwards the INVITE to IBCF_A responds with a 100 Trying provisional response.  187 IBCF_A responds with a 100 Trying provisional response.  187 IBCF_A responds with a 100 Trying provisional response.  188 INVITE IBCF_B forwards the INVITE to IMS_A responds with a 100 Trying provisional response.  189 INVITE IBCF_B forwards the INVITE to IBCF_A responds with a 100 Trying provisional response.  189 INVITE IBCF_B forwards the INVITE to IMS_A responds with a 100 Trying provisional response.  180 IBCF_A responds to INVITE to IMS_B response to INVITE with 200 OK to Indicate that the call has been used.  200 OK UE_B2 responds to INVITE with 200 OK to Indicate that the call has been leading to the provisional response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_B.  200 OK IBCF_B forwards 200 OK response to IBCF_B.  200 OK IBCF_B forwards 200 OK response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_A.  200 OK IBCF_B forwards 200 OK response to IBCF_B.  200 OK IBCF_B forwards 200 OK response to IBCF_B.  200 OK IBCF_B forwards 200 OK response to IBCF_B.  200 OK IBCF_B forwards 200 OK re	13			<b>—</b>		181 Call is	IMS_B indicates to IBCF_B that call has
181 Call is BCF. A indicates to IMS. A that call has being been forwarded 181 Call is being less of mowarded 181 Call is being IMS. A indicates that call to UE. B has been forwarded User A may be informed of call diversion User A may be informed of call diversion 18 lower of the call has been forwarded 181 Call is being IMS. A indicates that call to UE. B has been forwarded User A may be informed of call diversion 19 lower request URI and history header to 100 Trying IMS. B responds with a 100 Trying new request URI and history header to 100 Trying IMS. B responds with a 100 Trying provisional response INVITE IMS. B forwards the INVITE to IBCF_B 100 Trying IMS. A responds with a 100 Trying provisional response INVITE IMS. A responds with a 100 Trying provisional response INVITE IMS. A forwards the INVITE to IMS. A 100 Trying IMS. A responds with a 100 Trying provisional response INVITE IMS. A forwards the INVITE to IMS. A 100 Trying IMS. A forwards the INVITE to UE. B2 100 Trying IMS. A forwards the INVITE to UE. B2 100 Trying IMS. A forwards the INVITE to UE. B2 100 Trying IMS. A forwards the INVITE to UE. B2 100 Trying IMS. A forwards the INVITE to UE. B2 100 Trying IMS. A forwards 200 OK response to IMS. A forwards 200 OK response to IMS. B 100 Trying IMS. B forwards 200 OK response to IMS. B 100 Trying IMS. B 100 Tryin	14			<b>←</b>		181 Call is	IBCF_B indicates to IBCF_A that call has
18   18   18   18   18   18   18   18	15		<b>←</b>	_		181 Call is	IBCF_A indicates to IMS_A that call has
User A may be informed of call diversion  INVITE  AS_B returns modified INVITE including new request URI and history header to to 100 Trying ImS_B responds with a 100 Trying provisional response INVITE to IBCF_B  INVITE  IBCF_B responds with a 100 Trying provisional response INVITE to IBCF_A  INVITE  IBCF_B responds with a 100 Trying provisional response INVITE IBCF_A forwards the INVITE to IBCF_A  INVITE  IBCF_A responds with a 100 Trying provisional response INVITE  IBCF_A forwards the INVITE to IMS_A  Invite  IBCF_A forwards very the Invite I	16					181 Call is	IMS_A indicates that call to UE_B has
new request URI and history header to  19 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B IMS_B forwards the INVITE to IBCF_A  100 Trying IBCF_A responds with a 100 Trying provisional response INVITE IBCF_A forwards the INVITE to IMS_A  100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to IMS_A  100 Trying IMS_A forwards the INVITE to IMS_A  100 Trying US_B 2 optionally response with a 100 Trying provisional response  INVITE IMS_A forwards the INVITE to US_B2  100 Trying US_B 2 optionally response with a 100 Trying provisional response  User B2 answers call  29  200 OK US_B2 responds to INVITE with 200 OK to indicate that the call has been  200 OK IMS_A forwards 200 OK response to IMS_B  100 OK IMS_B forwards 200 OK response to IMS_B  100 OK I	17					being	
19	18					INVITE	
INVITE   IMS_B forwards the INVITE to IBCF_B	19				<b>——</b>	100 Trying	IMS_B responds with a 100 Trying
Provisional response   INVITE   IBCF_B forwards the INVITE to IBCF_A	20			<b>←</b>		INVITE	-
INVITE   IBCF_B forwards the INVITE to IBCF_A	21				*	100 Trying	
provisional response INVITE IBCF_A forwards the INVITE to IMS_A  100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to UE_B2  100 Trying UE_B2 optionally responds with a 100 Trying provisional response User B2 is informed of incoming call of User A  100 Trying UE_B2 optionally responds with a 100 Trying provisional response User B2 is informed of incoming call of User A  100 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A	22			<del></del>		INVITE	-
INVITE   IBCF_A forwards the INVITE to IMS_A	23			<b></b>		100 Trying	
provisional response  INVITE IMS_A forwards the INVITE to UE_B2  100 Trying UE_B2 optionally responds with a 100 Trying provisional response  User B2 is informed of incoming call of User A  User B2 answers call  200 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  30 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  31 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to IMS_A	24		<b>←</b>			INVITE	
INVITE   IMS_A forwards the INVITE to UE_B2	25			*		100 Trying	
Trying provisional response  User B2 is informed of incoming call of User A  User B2 answers call  200 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been  200 OK IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A	26					INVITE	
User B2 is informed of incoming call of User A  User B2 answers call  200 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_B forwards 200 OK response to IBCF_A  200 OK IMS_B forwards 200 OK response to IMS_A forwards 200 OK response to IMS_A	27					100 Trying	
User B2 answers call  200 OK UE_B2 responds to INVITE with 200 OK to indicate that the call has been 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IBCF_B 200 OK IBCF_B 200 OK IBCF_B 500 OK response to IMS_B 200 OK IMS_B 600 OK 100	28	<b>←</b>					User B2 is informed of incoming call of
to indicate that the call has been  200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to AS_B  200 OK IMS_B returns, possibly modified, 200 OK to IMS_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IBCF_A	29		$\rightarrow$				
31 32 33 33 34 35 36 37 38 39 200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IMS_B forwards 200 OK response to IMS_B 200 OK IMS_B forwards 200 OK response to AS_B 200 OK AS_B returns, possibly modified, 200 OK to IMS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_B 200 OK IBCF_A forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to IMS_A	30					200 OK	
32 33 34 35 36 37 38 39 30 30 31 31 32 32 33 33 34 35 36 37 38 38 39 30 31 31 32 32 33 33 34 35 36 36 37 38 38 38 38 38 39 30 30 30 30 30 30 30 30 30 30 30 30 30	31			*		200 OK	IMS_A forwards 200 OK response to
33 34 35 36 37 38 39 200 OK IBCF_B forwards 200 OK response to IMS_B 200 OK IMS_B 200 OK response to AS_B 200 OK AS_B returns, possibly modified, 200 OK to IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B 200 OK IBCF_A 200 OK IMS_A 200 OK response to IMS_A 200 OK IMS_A 200 OK IMS_A 200 OK response to	32					200 OK	IBCF_A forwards 200 OK response to
34 35 36 37 38 39 200 OK IMS_B forwards 200 OK response to AS_B 200 OK AS_B returns, possibly modified, 200 OK to IMS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A 200 OK IMS_A forwards 200 OK response to	33				*	200 OK	IBCF_B forwards 200 OK response to
35 36 37 38 39 200 OK AS_B returns, possibly modified, 200 OK to IMS_B 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to	34				<b></b>	200 OK	IMS_B forwards 200 OK response to
36 37 38 39 200 OK IMS_B forwards 200 OK response to IBCF_B 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to	35				<b>—</b>	200 OK	AS_B returns, possibly modified, 200 OK
37 38 39 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to	36			<del> </del>		200 OK	IMS_B forwards 200 OK response to
38 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK response to	37			<b>—</b>		200 OK	IBCF_B forwards 200 OK response to
39 200 OK IMS_A forwards 200 OK response to	38			_		200 OK	IBCF_A forwards 200 OK response to
, , , , , , , , , , , , , , , , , , ,	39	<u> </u>				200 OK	

Step			D	irectio	n				Message	Comment
	U U S E A r A	U s e r B2	U E B2	M S A	I B C F A	I B C F B	M S B	A S B		
40	<u> </u>									User A is informed that call has been answered
41		+	+	$\rightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
42					$\rightarrow$				ACK	IMS_A forwards ACK to IBCF_A
43						$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
44							$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
45								$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
46							<b>←</b>		ACK	AS_B returns, possibly modified, ACK to IMS_B
47						<b>←</b>			ACK	IMS_B forwards ACK to IBCF_B
48					$\leftarrow$				ACK	IBCF_B forwards ACK to IBCF_A
49				<b>←</b>					ACK	IBCF_A forwards ACK to IMS_A
50			$\leftarrow$						ACK	IMS_A forwards ACK to UE_B2
51		<b>←</b>								User B2 is informed that call is established
52	<b></b>									User A ends call
53				$\rightarrow$					BYE	UE_A releases the call with BYE
54					$\rightarrow$				BYE	IMS_A forwards BYE to IBCF_A
55						$\rightarrow$			BYE	IBCF_A forwards BYE to IBCF_B
56							$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B
57						<b>←</b>			BYE	IMS_B forwards BYE to IBCF_B
58					$\leftarrow$				BYE	IBCF_B forwards BYE to IBCF_A
59				←					BYE	IBCF_A forwards BYE to IMS_A
60			$\leftarrow$						BYE	IMS_A forwards BYE to UE_B
61		$\leftarrow$								
62				$\rightarrow$					200 OK	UE_B sends 200 OK for BYE
63					$\rightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
64						$\rightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
65							$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
66						<b>—</b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
67					$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A

Step					Directio	n				Message	Comment	
	U s e r A	U E A	U s e r B2	U E B2	I M S A	I B C F A	I B C F B	N S	11 5	A S B		
68					<b>←</b>			•	•		200 OK	IBCF_A forwards 200 OK response to IMS_A
69		$\leftarrow$									200 OK	IMS_A forwards 200 OK response to UE_A
70	<b>←</b>											User A is informed that call has ended

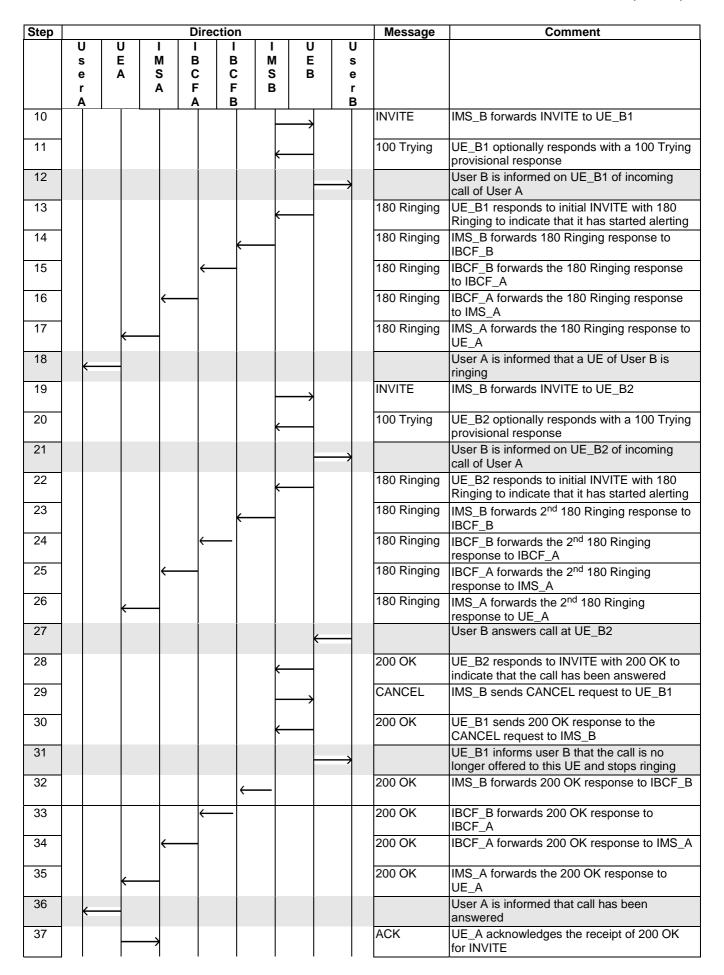
# 4.4.10.1.3 UC\_12: SIP Call Flow "Normal Call" with 2 UEs registered to same public identity

The test sequence and expected call flow sequence when user A calls user B with 2 UEs, i.e. UE\_B1 and UEB2, in an interworking scenario is:

Step	Action	CF_INT_CALL
1	User A calls User B	Step 1
2	User B is informed of incoming call of User A on UE_B1	Step 12
3	User B is informed of incoming call of User A on UE_B2	Step 21
4	User A is informed that a UE of User B is ringing	Step 18
5	User B answers call on UE_B2	Step 27
6	User B is informed at UE_B1 that the call is no longer offered	Step 31
7	User A is informed that call has been answered	Step 36
8	User B is informed that the call is established	Step 42
9A	User A ends call	Step 43A
9B	User B ends call	Step 43B
10A	User B is informed that call has ended	Step 49A
10B	User A is informed that call has ended	Step 49B
11A	User A is informed that call has ended	Step 55A
11B	User B is informed that call has ended	Step 55B

Note that steps 6 and 7 may happen in different order.

Step				Direc	ction				Message	Comment	
	U s e r A	U E A	I M S A	I B C F A	I B C F B	M S B	U E B	6	J s e r 3		
1		$\rightarrow$									User A calls User B
2			$\rightarrow$							INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$						INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$					INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$	_					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>←</b>					100 Trying	IMS_B responds with a 100 Trying provisional response



Step			Dire	ection				Message	Comment
	U U		l B	l B	I M	U E	U s		
	e A	S	C	C F	S	В	e r		
20	A		A	B			B	ACK	IMC A forwards ACK to IDCE A
38								ACK	IMS_A forwards ACK to IBCF_A
39				$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
40					$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
41						$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
42							$\rightarrow$		User B is informed that the call is established
43A	$\longmapsto$								User A ends call
44A		<b></b>						BYE	UE_A releases the call with BYE
45A		_	$\longrightarrow$					BYE	IMS_A forwards BYE to IBCF_A
46A			-	<b>─</b>				BYE	IBCF_A forwards BYE to IBCF_B
47A					$\longrightarrow$			BYE	IBCF_B forwards BYE to IMS_B
48A						$\longrightarrow$		BYE	IMS_B forwards BYE to UE_B
49A							$\rightarrow$		User B is informed that call has ended
50A					<b>←</b>			200 OK	UE_B sends 200 OK for BYE
51A				<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
52A			<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
53A		<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
54A		<del></del>						200 OK	IMS_A forwards the 200 OK response to UE_A
55A	<del></del>								User A is informed that call has ended
43B						<b>←</b>			User B ends call
44B					<b>←</b>			BYE	UE_B releases the call with BYE
45B				<b>←</b>				BYE	IMS_B forwards BYE to IBCF_B
46B			<b>←</b>					BYE	IBCF_B forwards BYE to IBCF_A
47B		<b>←</b>						BYE	IBCF_A forwards BYE to IMS_A
48B		<b>-</b>						BYE	IMS_A forwards BYE to UE_A
49B	<b>—</b>								User A is informed that call has ended
50B		<b></b>						200 OK	UE_A sends 200 OK for BYE
51B		_	$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
52B			_	<b></b>				200 OK	IBCF_A forwards 200 OK response to
									IBCF_B

Step					Direct	ion					Message	Comment
	U s e r A	E A	١ :	S A	I B C F	I B C F B	I M S B	U E B		U s e r B		
53B	Î						$\rightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
54B								$\longrightarrow$			200 OK	IMS_B forwards the 200 OK response to UE_B
55B									<del></del>			User B is informed that call has ended

#### 4.4.11 Addition of media stream

#### 4.4.11.1 Description

UE\_A and UE\_B are in an established session with one or more media streams. While in the established session, UE\_A adds a new media stream. It is assumed that both UEs are registered in their respective networks.

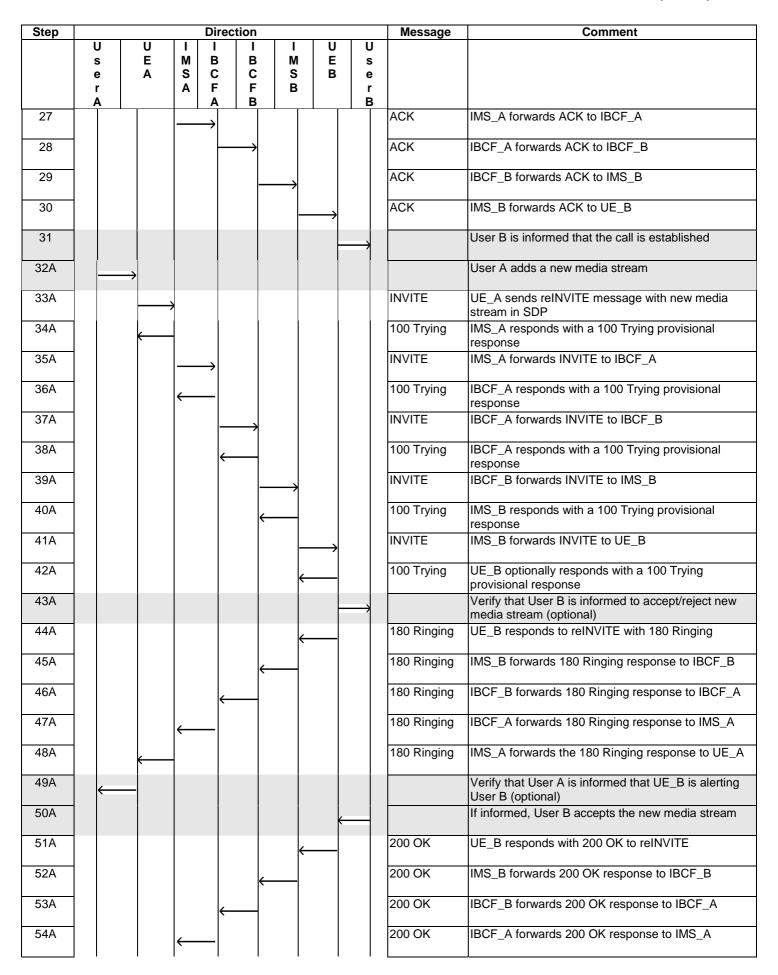
The test sequence and expected call flow sequence for addition of multimedia stream can be illustrated when adding a new media stream, for example, adding a chat/text session during an existing IMS VoIP call:

Step	Action	CF_INT_CALL
1	User A calls User B	1
2	User B is informed of incoming call of User A	12
3	User A is informed that UE_B is ringing	18
4	User B answers call	19
5	User A is informed that call has been answered	25
6	User B is presented that call is established	31
7A	User A adds a new media stream	32A
7B	User B adds a new media stream	32B
8A	User B may be informed to accept/reject new media stream	43A
8B	User A may be informed to accept/reject new media stream	43B
9A	User A may be informed that UE_B is alerting User B	49A
9B	User B may be informed that UE_A is alerting User A	49B
10A	If informed, User B accepts the new media stream	50A
10B	If informed, User A accepts the new media stream	50B
11A	User A is informed that new media stream has been accepted	56A
11B	User B is informed that new media stream has been accepted	56B
12	User A ends call	62
13	User B is informed that call has ended	68
14	User A is informed that call has ended	74

NOTE: Please note that the call flow sequences described in this clause are not limited to multimedia stream handling scenarios where remote user interaction is required. In other words these call flow sequences may be observed for a call scenario where remote user interaction is not invoked. For example, these same call flows may apply to a scenario where a user removes the video stream from a multimedia audio+video session (remote user interaction is highly unlikely in this case but the same call flows illustrated in this clause may be observed nevertheless).

# 4.4.11.1.1 UC\_13: SIP Call Flow "Addition of media stream using reINVITE"

Step		1	Di	rection		,	,	Message	Comment
	U s	U	I I	I B	I M	U	U		
	e	Ā	S C	;	S	В	е		
	r A		AF		В		r B		
1		$\rightarrow$							User A calls User B
2			·					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A
3	1	<b></b>	-					100 Trying	IMS_A responds with a 100 Trying provisional response
4	1		$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5	1		<b></b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
6	1							INVITE	IBCF_A forwards INVITE to IBCF_B
7	1			<del></del>				100 Trying	IBCF_B responds with a 100 Trying provisional response
8	1				$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9	1			<b>├</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
10	1				_	$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
11	1				<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
12							$\rightarrow$		User B is informed of incoming call of User A
13					<b>←</b>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14				<b>←</b>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15	1			←—				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16	1		<del></del>					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17	1	<b></b>	-					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	$\vdash$								User A is informed that UE_B is ringing
19						<b>(</b>			User B answers call
20					<b>←</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21	]			<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
22	1			<b>—</b>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
23	1		<del></del>					200 OK	IBCF_A forwards 200 OK response to IMS_A
24	1	<b>(</b>	_					200 OK	IMS_A forwards 200 OK response to UE_A
25	←								User A is informed that call has been answered
26			<b>&gt;</b>					ACK	UE_A acknowledges the receipt of 200 OK for INVITE



Step			[	Directio	n			Message	Comment
	U s	U E	I M	I B	I I B M	U	U		
	e	Ā	S	C	c s	В	e		
	r A		Α		F B B		r B		
55A		<del></del>						200 OK	IMS_A forwards the 200 OK response to UE_A
56A	<b>←</b>	_							User A is informed that new media stream has been accepted
57A								ACK	UE_A acknowledges the receipt of 200 OK for INVITE
58A				>				ACK	IMS_A forwards ACK to IBCF_A
59A					$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
60A					$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
61A						<b>──</b>		ACK	IMS_B forwards ACK to UE_B
32B						<del>(</del>			User B adds a new media stream
33B						<del></del>		INVITE	UE_B sends reINVITE message with new media stream in SDP
34B						$\longrightarrow \hspace{-0.1cm} \mid$		100 Trying	IMS_B responds with a 100 Trying provisional response
35B					<del></del>			INVITE	IMS_B forwards INVITE to IBCF_B
36B					$\longrightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
37B				$\leftarrow$				INVITE	IBCF_B forwards INVITE to IBCF_A
38B					$\rightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
39B			<del></del>	_				INVITE	IBCF_A forwards INVITE to IMS_A
40B				<del>&gt;</del>				100 Trying	IMS_A responds with a 100 Trying provisional response
41B		<del></del>						INVITE	IMS_A forwards INVITE to UE_A
42B								100 Trying	UE_A optionally responds with a 100 Trying provisional response
43B	<b>←</b>								Verify that User A is informed to accept/reject new media stream (optional)
44B								180 Ringing	UE_A responds to reINVITE with 180 Ringing
45B				<b>&gt;</b>				180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
46B					<del>)</del>			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
47B					$\longrightarrow$			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
48B						<b>──</b>		180 Ringing	IMS_B forwards the 180 Ringing response to UE_B
49B									Verify that User B is informed that UE_A is alerting User A (optional)
50B		<del>&gt;</del>							If informed, User A accepts the new media stream
51B		<b></b>						200 OK	UE_A responds with 200 OK to reINVITE
52B				<b>→</b>				200 OK	IMS_A forwards 200 OK response to IBCF_A
	]	I	I	1	1	I	I	L	

Step			Di	rection				Message	Comment
	U	U E	I I	I B	I M	U E	U		
	s e	A	s c	; C	S	В	s e		
	r A		AF		В		r B		
53B			, , , ,				B	200 OK	IBCF_A forwards 200 OK response to IBCF_B
54B					$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
55B						$\longrightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
56B							$\rightarrow$		User B is informed that new media stream has been accepted
57B					<b>←</b>			ACK	UE_B acknowledges the receipt of 200 OK for INVITE
58B				<b>←</b>				ACK	IMS_B forwards ACK to IBCF_B
59B				<b>←</b>				ACK	IBCF_B forwards ACK to IBCF_A
60B			<del></del>					ACK	IBCF_A forwards ACK to IMS_A
61B		<b></b>						ACK	IMS_A forwards ACK to UE_A
62		$\rightarrow$						BYE	User A releases the call
63			>					BYE	UE_A sends BYE to indicate that the call has ended
64			$\longrightarrow$					BYE	IMS_A forwards the BYE to IBCF_A
65				<b>──</b>				BYE	IBCF_A forwards the BYE to IBCF_B
66					$\longrightarrow$			BYE	IBCF_B forwards the BYE to IMS_B
67						$\longrightarrow$		BYE	IMS_B forwards the BYE to UE_B
68						-	$\longrightarrow$		User B is informed that call has ended
69					<b>←</b>			200 OK	UE_B responds to the BYE with 200 OK
70				<del>-</del>				200 OK	IMS_B forwards the 200 OK response to IBCF_B
71				<del></del>				200 OK	IBCF_B forwards the 200 OK response to IBCF_A
72			<del></del>					200 OK	IBCF_A forwards the 200 OK response to IMS_A
73		<del></del>						200 OK	IMS_A forwards the 200 OK response to UE_A
74	-								User A is informed that call has ended

#### 4.4.12 Removal of media stream

## 4.4.12.1 Description

UE\_A and UE\_B are in an established session with multiple media streams. While in the established session, UE\_A removes a media stream. It is assumed that both UEs are registered in their respective networks.

The test sequence and expected call flow sequence for multimedia session handling (when remote user interaction shall be avoided) can be illustrated when removing a media stream from a multimedia session with multiple streams (e.g. remove the chat/text stream from an IMS VoIP + chat multi-stream session):

Step	Action	CF_INT_CALL Using UPDATE	CF_INT_CALL Using reINVITE
1	User A initiates a multimedia session with at least two streams with User B	1	1
2A	User A removes one of the media streams	62A	62A
2B	User B removes one of the media streams	62B	62B
3A	User B is informed that the media stream has been removed	68A	73A
3B	User A is informed that the media stream has been removed	68B	73B
4	User A releases the call	74	84
5	User B is informed that call has ended	80	90
6	User A is informed that call has ended	86	96

NOTE: Please note that the call flow sequences described in this clause depict multimedia streaming handling scenarios where remote user interaction is not invoked. For example, remote user interaction is highly unlikely in an IMS VoIP audio session where a user decides to switch to some other audio codec.

#### 4.4.12.1.1 UC\_14: SIP Call Flow "Removal of media streams using UPDATE"

Step				Dire	ection				Message	Comment
	U s e r A	U E A	M S A	I B C F A	- B C F B	I M S B	U E B	U s e r B		
1		$\rightarrow$								User A initiates a multimedia session with at least two streams with User B
62A		$\rightarrow$								User A removes one of the media streams
63A		$\vdash$	$\rightarrow$						UPDATE	UE_A sends UPDATE to IMS_A
64A				$\rightarrow$					UPDATE	IMS_A forwards the UPDATE to IBCF_A
65A					$\longrightarrow$				UPDATE	IBCF_A forwards the UPDATE to IBCF_B
66A					-	$\rightarrow$			UPDATE	IBCF_B forwards the UPDATE to IMS_B
67A							$\rightarrow$		UPDATE	IMS_B forwards the UPDATE to UE_B
68A							F	$\rightarrow$		User B is informed that the media stream has been removed
69A						<b>←</b>			200 OK	UE_B responds with 200 OK to UPDATE
70A					<b>—</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
71A				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
72A			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
73A		<b>←</b>	$\dashv$						200 OK	IMS_A forwards the 200 OK response to UE_A

Step			Dir	rection			Message	Comment
		U I E M	l B	l B		U U E s		
	e /	A S		C	S I	B e r		
	À	^	A	В		, B		
62B						-		User B removes one of the media streams
63B					<b></b>	-	UPDATE	UE_B sends UPDATE to IMS_B
64B				←	_		UPDATE	IMS_B forwards the UPDATE to IBCF_B
65B			←				UPDATE	IBCF_B forwards the UPDATE to IBCF_A
66B			$\longleftarrow$				UPDATE	IBCF_A forwards the UPDATE to IMS_A
67B		<del></del>					UPDATE	IMS_A forwards the UPDATE to UE_A
68B	<del>(</del>							User A is informed that the media stream has been removed
69B		$\longrightarrow$					200 OK	UE_A responds with 200 OK to UPDATE
70B			$\longrightarrow$				200 OK	IMS_A forwards the 200 OK response to IBCF_A
71B			-				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
72B					$\rightarrow$		200 OK	IBCF_B forwards the 200 OK response to IMS_B
73B							200 OK	IMS_B forwards the 200 OK response to UE_B
74	;							User A releases the call
75		<b></b>					BYE	UE_A sends BYE to IMS_A
76							BYE	IMS_A sends BYE to IBCF_A
77			_	$\longrightarrow$			BYE	IBCF_A sends BYE to IBCF_B
78					$\rightarrow$		BYE	IBCF_B forwards the BYE to IMS_B
79							BYE	IMS_B forwards the BYE to UE_B
80								User B is informed that call has ended
81					←		200 OK	UE_B sends 200 OK response for BYE
82				←	$\dashv$		200 OK	IMS_B forwards the 200 OK response to IBCF_B
83			<del>(</del>				200 OK	IBCF_B forwards the 200 OK response to IBCF_A
84							200 OK	IBCF_A forwards the 200 OK response to IMS_A
85		<del></del>					200 OK	IMS_A forwards the 200 OK response to UE_A
86	<b>(</b>							User A is informed that call has ended

4.4.12.1.2 UC\_15: SIP Call Flow "Removal of media streams using reINVITE"

Step				Dir	ection				Message	Comment
	U	Ū	I	I	I	I NA	Ū	U		
	s e	E A	M S	B	B	M S	E B	s e		
	r		Ā	F	F	В		r		
1	<u> </u>			A	В			В		Lloor A initiates a multimodia acceion with at
1	H	$\rightarrow$								User A initiates a multimedia session with at least two streams with User B
62A	H	$\rightarrow$						1		User A removes one of the media streams
63A			$\rightarrow$						INVITE	UE_A sends reINVITE to IMS_A
64A		<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
65A				$\rightarrow$					INVITE	IMS_A forwards the reINVITE to IBCF_A
66A			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
67A				_					INVITE	IBCF_A forwards the reINVITE to IBCF_B
68A				<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
69A						$\rightarrow$			INVITE	IBCF_B forwards the reINVITE to IMS_B
70A					<b>←</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
71A							$\rightarrow$		INVITE	IMS_B forwards the reINVITE to UE_B
72A						←			100 Trying	UE_B optionally responds with a 100 Trying provisional response
73A								$\rightarrow$		User B is informed that the media stream has been removed
74A						<b>(</b>			200 OK	UE_B responds with 200 OK to reINVITE
75A					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IBCF_B
76A				<b>←</b>					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
77A			$\leftarrow$						200 OK	IBCF_A forwards the 200 OK response to IMS_A
78A		$\leftarrow$							200 OK	IMS_A forwards the 200 OK response to UE_A
79A			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for reINVITE
80A				$\rightarrow$					ACK	IMS_A forwards the ACK to IBCF_A
81A					$\longrightarrow$				ACK	IBCF_A forwards the ACK to IBCF_B
82A						$\rightarrow$			ACK	IBCF_B forwards the ACK to IMS_B
83A							$\rightarrow$		ACK	IMS_B forwards the ACK to UE_B
62B							$\leftarrow$			User B removes one of the media streams
63B						<b>←</b>			INVITE	UE_B sends reINVITE to IMS_B
64B							$\rightarrow$		100 Trying	IMS_B responds with a 100 Trying provisional response

Step				Dir	rection				Message	Comment
	U s	U	I M	I B	l B	I M	U E	U s		
	е	Ā	S	С	С	S	В	е		
	r A		Α	F	F B	В		r B		
65B					<del></del>				INVITE	IMS_B forwards the reINVITE to IBCF_B
66B						$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
67B				+					INVITE	IBCF_B forwards the reINVITE to IBCF_A
68B				_	$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
69B			$\leftarrow$						INVITE	IBCF_A forwards the reINVITE to IMS_A
70B				<b>→</b>					100 Trying	IMS_A responds with a 100 Trying provisional response
71B		←							INVITE	IMS_A forwards the reINVITE to UE_A
72B			$\rightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
73B	<b>(</b>									User A is informed that the media stream has been removed
74B			$\rightarrow$						200 OK	UE_A responds with 200 OK to reINVITE
75B				$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
76B				_	$\longrightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
77B						$\rightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B
78B							$\rightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
79B						<b>←</b>			ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
80B					←				ACK	IMS_B forwards ACK to IBCF_B
81B				+					ACK	IBCF_B forwards ACK to IBCF_A
82B			$\leftarrow$						ACK	IIBCF_A forwards ACK to IMS_A
83B		←							ACK	IMS_A forwards ACK to UE_A
84	L	$\longrightarrow$								User A releases the call
85			$\rightarrow$						BYE	UE_A sends BYE to IMS_A
86			-	$\longrightarrow$					BYE	IMS_A forwards BYE to IBCF_A
87				-	$\longrightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
88						$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
89							$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
90								$\rightarrow$		User B is informed that call has ended
91						<b>←</b>			200 OK	UE_B sends 200 OK for BYE
92					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to
		l				1	1			IBCF_B

Step				Dire	ction				Message	Comment
	U	U	I	I	I	I	U	U		
	S	Е	M	В	В	M	E	s		
	е	Α	S	С	С	S	В	е		
	r		Α	F	F	В		r		
	Α			Α	В			В		
93				←						IBCF_B forwards the 200 OK response to IBCF_A
94			$\leftarrow$							IBCF_A forwards the 200 OK response to IMS_A
95		←							200 OK	IMS_A forwards the 200 OK response to UE_A
96	<b>←</b>									User A is informed that call has ended

## 4.4.13 Ad-hoc Conferencing service

#### 4.4.13.1 Description

UE A registered on IMS network A, initiates an ad-hoc conf call via CONF AS, connected over ISC interface to IMS core A, and subsequently invites UE B (registered in IMS B) to join the conf. This Use Case requires support for MRFC and MRFP functionalities on IMS\_A.

The test sequence when user A initiates an ad-hoc conference call and invites user B to join it, in an interworking scenario is:

Step	Action	CF_INT_CONF
		CALL
1	User A initiates an ad-hoc conference call	Step 1
2	User A is informed the Ad Hoc Conference Call is being set up	Step 4
3	User A is informed the Ad Hoc Conference Call is established	Step 9
4	User A invites user B to join the ad-hoc conference call	Step 12
5	User B is informed of incoming invitation from User A to join	Step 31
	the Conference Call	
6	User A is notified that User B is being invited to join the call	Step 39
7	User B joins the conference	Step 47
8	User A is notified that User B has joined the conference	Step 55
9	User B leaves the conference	Step 58
10	User B is informed that the conference has ended	Step 69
11	User A is notified that user B has left the conference	Step 72

NOTE 1: The proposed test configuration shown in CF\_INT\_CONF\_CALL indicates CONF AS A (AS+MRFC+MRFP) resources in IMS A, hence the UC refers to UE\_A as conference initiator in IMS A, and UE\_B, although the same UC applies alternatively for UE\_B as conference initiator in IMS B and UE\_A as participant in IMS A, which involves a CONF AS B connected to IMS B, not shown in the test configuration for simplicity purposes.

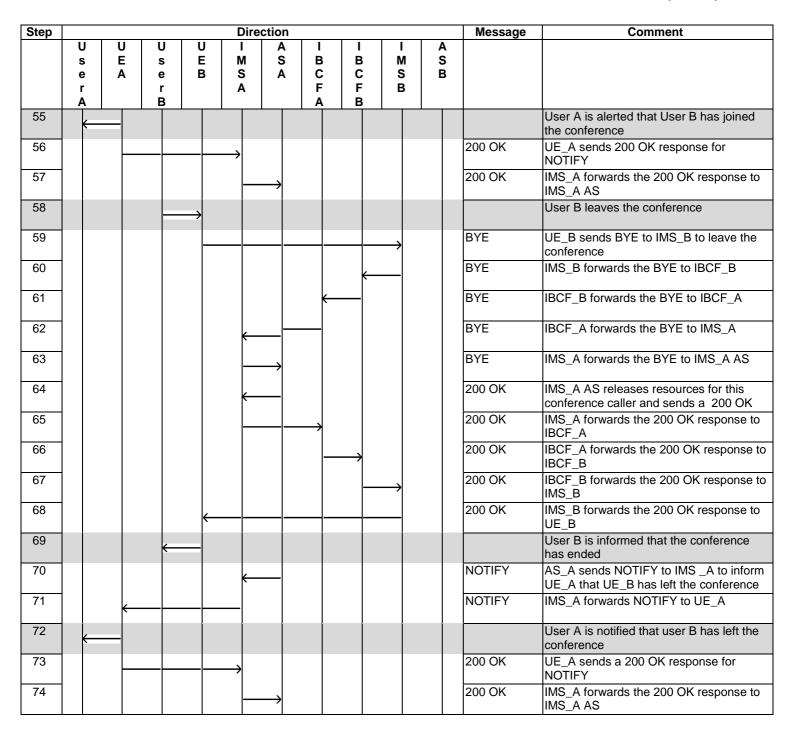
NOTE 2: For the purpose of IMS NNI conformance testing, the proposed test configuration refers to the ISC interface as an optional Point of Observation (PO), where the SIP signalling passing through it might be observed but not considered part of the conformance testing.

This proposal is consistent with the most common interoperability scenario where one vendor provides the complete solution for the conference service, integrated into a 3<sup>rd</sup> party IMS core via ISC interface.

4.4.13.2 UC\_16: SIP Call Flow "Ad-hoc Conference call"

Step				Direction					Message	Comment
		J U E s	U E	I A M S	l B	I B	I M	A S		
	e	A e	В	S A	С	С	S	В		
	r A	r B		A	F A	F B	В			
1										User A initiates an ad-hoc conference call
2				→					INVITE	UE_A sends INVITE to IMS_A with information for all commonly supported
3		<del></del>		_					100 Trying	IMS_A responds with a 100 Trying provisional response
4	<b>(</b>									User A is informed the Ad Hoc Conference Call is being set up
5				$\longrightarrow$					INVITE	IMS_A forwards INVITE to IMS_A AS
6				<del></del>					100 Trying	IMS_A AS responds with a 100 Trying provisional response
7				<del></del>					200 OK	IMS_A AS responds with a 200 OK to IMS_A, with isfocus parameter.
8		<del></del>		_					200 OK	IMS_A forwards the 200OK response to UE_A
9	<b>(</b>									User A is informed the Ad Hoc Conference Call is established
10				<b>→</b>					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
11				$\longrightarrow$					ACK	IMS_A forwards the ACK to IMS_A AS
12	$\longrightarrow$									User A invites user B to join the ad-hoc conference call
13				<b>→</b>					REFER	UE_A sends REFER message to IMS_A, with Refer-To : <ue_b td="" uri<=""></ue_b>
14				$\longrightarrow$					REFER	IMS_A forwards the REFER to IMS_A AS
15				<del></del>					202 Accepted	IMS_A AS responds with a 202 Accepted
16		<del></del>		_					202 Accepted	IMS_A forwards the 202 Accepted response to UE_A
17				<del></del>					NOTIFY	IMS_A AS sends a NOTIFY to IMS_A to inform the conference initiator the
18		<del></del>		_					NOTIFY	IMS_A forwards the NOTIFY to UE_A
19				$\rightarrow$					200 OK	UE_A responds with 200 OK to IMS_A
20				$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IMS_A AS
21				<u> </u>					INVITE	IMS_A AS sends INVITE to UE_B with conference-factory URI (received in the
22				$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
23					$\longrightarrow$				INVITE	IMS_A forwards the INVITE to IBCF_A
24				<del></del>					100 Trying	IBCF_A responds with a 100 Trying provisional response
25						$\rightarrow$			INVITE	IBCF_A forwards the INVITE to IBCF_B
26					<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
	1	ı l	ı	ı l	1	I	ı	ı	1	P. ·

Step				Direction	n				Message	Comment
		U U E s	U E		A I S B	l B B	I M	A S		
	e r	A e	В		A C	; c	S	В		
27	A	<u> </u>			A	_		1	INVITE	IBCF_B forwards the INVITE to IMS_B
							$\longrightarrow$			
28							<del></del>		100 Trying	IMS_B responds with a 100 Trying provisional response
29			←		_				INVITE	IMS_B forwards the INVITE to UE_B
30							<b>──</b>		100 Trying	UE_B responds with a 100 Trying provisional response
31		<b>←</b>								User B is informed of incoming invitation from User A to join the Conference Call
32					-		<b>─</b>		180 Ringing	UE_B sends a 180 ringing to IMS_B
33							<del></del>		180 Ringing	IMS_B forwards the 180 ringing to IBCF_B
34						<del></del>			180 Ringing	IBCF_B forwards the 180 ringing to IBCF_A
35				←	_				180 Ringing	IBCF_A forwards the 180 ringing to IMS_A
36					•				180 Ringing	IMS_A forwards the 180 ringing to IMS_A AS
37				<b></b>	_				NOTIFY	Upon reception of 180 Ringing from UE_B, IMS_A AS sends NOTIFY with
38		<del></del>							NOTIFY	IMS_A forwards the NOTIFY to UE_A
39	<b>(</b>									User A is notified that User B is being invited to join the call
40				$\rightarrow$					200 OK	UE_A responds with 200 OK to IMS_A for NOTIFY
41					•				200 OK	IMS_A forwards the 200 OK response to IMS_A AS
42							<b>──</b>		200 OK	UE_B responds with 200 OK to IMS_B for INVITE
43							<del></del>		200 OK	IMS B forwards the 200 OK response to IBCF_B
44						<del></del>			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
45				<b>←</b>					200 OK	IBCF_A forwards the 200 OK response to IMS_A
46					•				200 OK	IMS A forwards the 200 OK response to IMS_A AS
47			$\longrightarrow$							User B joins the conference
48							<b>→</b>		ACK	UE_B acknowledges the 200 OK for INVITE
49							<b></b>		ACK	IMS B forwards the ACK to IBCF_B
50						←—			ACK	IBCF_B forwards the ACK to IBCF_A
51				←	-				ACK	IBCF_A forwards the ACK to IMS_A
52									ACK	IMS A forwards the ACK to IMS_A AS
53				<b></b>	-				NOTIFY	AS_A sends NOTIFY to UE_A to inform it has successfully joined the conference
54		<del></del>							NOTIFY	IMS_A forwards NOTIFY to UE_A
	I	1 1	Į	I	I	1 1	1	1		



#### 4.4.14 Presence service

The use case for the presence service is defined in TS 102 901 [17].

#### 4.4.15 IPTV service

#### 4.4.15.1 Broadcast (BC) Session

#### 4.4.15.1.1 Description

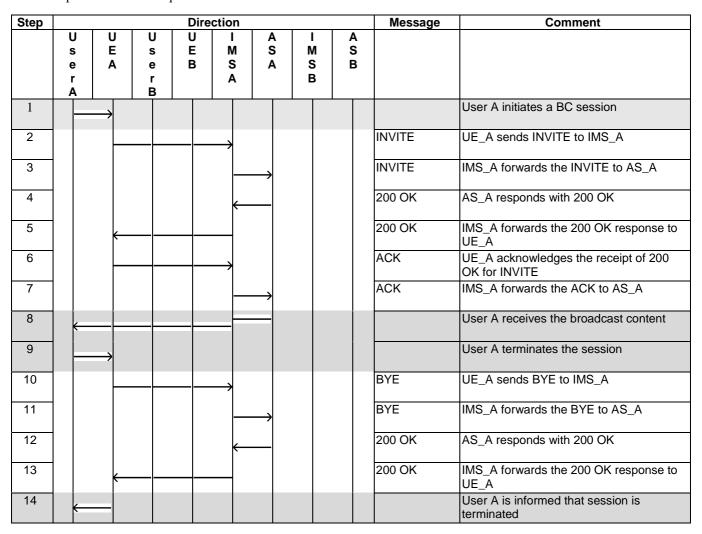
UE\_A starts a session initiation procedure to join a multicast channel. This test requires the use of application server as specified in [14]. The call flow path and node configuration for this use case corresponds to CF\_IPTV.

#### 4.4.15.1.2 UC 19: BC session

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_IPTV
1	User A initiates a BC session	Step 1
2	User A receives the broadcast content	Step 8
3	User A terminates the session	Step 9
4	User A is informed that session is terminated	Step 14

The expected call flow sequence is:



#### 4.4.15.2 Content on Demand (CoD) Session

#### 4.4.15.2.1 Description

UE\_A starts a session initiation procedure for a streaming session of a selected content. The document [14] specifies two methods for establishing a streaming session (called RTSP Method 1 and 2). This test requires the use of application server, playing the roles of Service control Function (SCF) and Media Function (MF), as specified in [14]. The call flow path and node configuration for this use case corresponds to CF IPTV.

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_IPTV	CF_IPTV
		RTSP Method 1	RTSP Method 2
1	User A initiates a CoD session (content selection)	Step 1	Step 1
2	User A starts receiving the streaming content	Step 26	Step 14
3	User A terminates the session	Step 27	Step 15
4	User A is informed that session is terminated	Step 36	Step 24

# 4.4.15.2.2 UC\_20: CoD session establishing content control channel and content delivery channels separately (RTSP Method 1)

Step				Dire	ction				Message	Comment
	U s	U E	U s	U E	I M	A S	I M	A S		
	e	Ā	e	В	S	A	S	В		
	r A		r B		Α		В			
1		$\rightarrow$								User A initiates a CoD session (content selection)
2					$\rightarrow$				INVITE	UE_A sends a INVITE to IMS_A
3						$\longrightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (SCF)
4					←				INVITE	AS_A forwards the INVITE to IMS_A
5						$\rightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (MF)
6					←				200 OK	AS_A (MF) responds with 200 OK
7						$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
8					<del>(                                    </del>				200 OK	AS_A forwards the 200 OK response to IMS_A
9		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
10					$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
11						$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
12					←				ACK	AS_A forwards the ACK to IMS_A
13						$\longrightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
										UE_A sets up RTSP with AS_A (MF)
14					$\rightarrow$				INVITE	UE_A sends reINVITE message indicating media attribute " a=recvonly "
15						$\rightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A (SCF)
16					←	_			INVITE	AS_A forwards the reINVITE to IMS_A
17						$\longrightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A (MF)
18					←				200 OK	AS_A (MF) responds with 200 OK
19						$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)

Step				Dire	ection			Message	Comment	
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I M S B	A S B		
20					<u></u>				200 OK	IMS_B forwards the 200 OK response to IMS_A
21		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
22					$\longrightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for reINVITE
23						$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
24					<b>←</b>				ACK	AS_A forwards the ACK to IMS_A
25					_	$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
26	<b>←</b>									User A starts receiving the streaming content
27	H	$\rightarrow$								User A terminates the session
28				_	$\longrightarrow$				BYE	UE_A sends a BYE to IMS_A
29					_	$\rightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
30					<b>←</b>				BYE	AS_A forwards the BYE to IMS_A
31						$\rightarrow$			BYE	IMS_A forwards the BYE to AS_A (MF)
32					←				200 OK	AS_A (MF) responds with 200 OK
33						$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
34					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IMS_A
35		<b>—</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
36	<b>(</b>									User A is informed that session is terminated

# 4.4.15.2.3 UC\_21: CoD session establishing content control channel and content delivery channels separately using RTSP Method 2

The expected call flow sequence is:

Step				Dire	ction			Message	Comment	
	U	Ū	U	U	I	Α	I	Α		
	s e	E A	s e	E B	M S	S	M S	S		
	r	^	r		A	_ ^	В			
	Α		В							
1		$\rightarrow$								User A initiates a CoD session (content
2									INVITE	selection) UE_A sends a INVITE to IMS_A
3									INVITE	IMS_A forwards the INVITE to AS_A
3						$\longrightarrow$			IIIVII L	(SCF)
4					←				INVITE	AS_A forwards the INVITE to IMS_A
5						$\rightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (MF)
6					$\leftarrow$				200 OK	AS_A (MF) responds with 200 OK
7						$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
8					←				200 OK	AS_A forwards the 200 OK response to IMS_A
9		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
10					$\longrightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
11						$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
12					$\leftarrow$				ACK	AS_A forwards the ACK to IMS_A
13						$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
14										UE_A starts receiving the streaming content
15		$\rightarrow$								User A terminates the session
16					$\longrightarrow$				BYE	UE_A sends a BYE to IMS_A
17						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
18					$\leftarrow$				BYE	AS_A forwards the BYE to IMS_A
19						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (MF)
20					$\leftarrow$				200 OK	AS_A (MF) responds with 200 OK
21						$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
22					$\leftarrow$	_			200 OK	IMS_B forwards the 200 OK response to IMS_A
23		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
24	<b>←</b>									User A is informed that session is terminated

### 4.4.15.3 Request for Network PVR offline capture

#### 4.4.15.3.1 Description

UE\_A starts a N-PVR offline capture procedure to record a live programme that has not started yet. Once the capture has finished, UE\_A establishes a CoD session to receive the streaming content using RTSP Method 1 or RTSP Method 2. The scope of this Use Case is to describe the capturing procedure, since CoD session is already described in the previous clause. This test requires the use of an application server, as specified in [14]. The call flow path and node configuration for this use case corresponds to CF\_IPTV.

### 4.4.15.3.2 UC\_22: Request for Network PVR offline capture.

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CF_INT_IPTV
1	User A requests to record a live programme that has not started yet	Step 1
2	User A is informed that recording has started	Step 6

The expected call flow sequence is:

Step	Direction									Message	Comment
	C	C	U	U	ı	Α	ı	1	4		
	S	Е	S	E	M	S	M		S		
	е	Α	е	В	S	Α	S	1	3		
	r		r B		Α		В				
1	Α		<u> </u>								Lloor a requests to record a live
1		$\rightarrow$									User a requests to record a live programme that has not started yet
2					$\longrightarrow$					MESSAGE	UE_A sends a MESSAGE to IMS_A
3						$\longrightarrow$				MESSAGE	IMS_A forwards the MESSAGE to AS_A
4					$\leftarrow$					200 OK	AS_A responds with 200 OK
5		_								200 OK	IMS_A forwards the 200 OK response to
											UE_A
6											User A is informed that recording has started

# 4.4.16 IMS-PSTN Interoperability

### 4.4.16.1 IMS-to-PSTN call

#### 4.4.16.1.1 Description

UE\_A places an IMS VoIP call to a user that is located in a PSTN environment (UE\_B). Once the media path is established, the originating user or the destination user releases the call. The call flow path and node configuration for this use case corresponds to CF\_PSTN.

## 4.4.16.1.2 UC\_20: IMS-to-PSTN call

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CFW
1	User A calls User B	Step 1
2	User B is informed of incoming call of User A	Step 13
3	User A is informed that UE_B is ringing	Step 17
4	User B answers call	Step 18
5	User A is informed that call has been answered	Step 22
6	User A and B can communicate	Step 25
7	User A ends call	Step 26A
8	User B is informed that call has ended	Step 30A
9	User A is informed that call has ended	Step 34A
10	User B ends call	Step 26B
11	User B is informed that call has ended	Step 29B
12	User A is informed that call has ended	Step 32B

The expected call flow sequence is:

Step			Dire	ection				Message	Comment
	U s	U E	I M	M G	PS		U s		
	е	A	S	С	Т	(	е		
	r A		Α	F	N		r B		
1		$\rightarrow$							User A calls User B
2			$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<del>(</del>						100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$				INVITE	IMS_A forwards INVITE to MGCF
5			$\leftarrow$					100 Trying	MGCF responds with a 100 Trying provisional response
6			$\leftarrow$					183 Session Progress	MGCF responds with 183 Session Progress response
7		$\leftarrow$						183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
8			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A
9			_	$\rightarrow$				PRACK	IMS_A forwards PRACK to MGCF
10			$\leftarrow$	_				200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
11		←	_					200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
12					$\rightarrow$			IAM	MGCF sends IAM to PSTN
13						$\rightarrow$			User B is informed of incoming call of User A
14				<b>←</b>				ACM/CPG	PSTN responds with ACM/CPG
15			<b>←</b>					180 Ringing	MGCF sends 180 Ringing response to IMS_A
16		<b>←</b>	$\dashv$					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
17	<b>—</b>								User A is informed that UE_B is ringing
18					<b>←</b>				User B answers call

Step			Dire	ection			Message	Comment
	U s	U E	I M	M G	P S	U s		
	e r	Α	S A	C F	T N	e r		
19	A					В	ANM	PSTN sends ANM to MGCF
20							200 OK	MGCF sends 200 OK response to IMS_A
21							200 OK	IMS_A forwards 200 OK response to UE_A
22	<u> </u>							User A is informed that call has been
23			$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for
24				$\rightarrow$			ACK	INVITE IMS_A forwards ACK to MGCF
25								User A and B can communicate
26A		$\rightarrow$						User A ends call
27A			$\rightarrow$				BYE	UE_A sends BYE
28A				$\rightarrow$			BYE	IMS_A forwards BYE to MGCF
29A					$\rightarrow$		REL	MGCF sends REL to PSTN
30A					_	$\rightarrow$		User B is informed that call has ended
31A				$\leftarrow$	_		RLC	PSTN sends RLC response to MGCF
32A			$\leftarrow$				200 OK	MGCF sends 200 OK response to IMS_A
33A		<b>-</b>					200 OK	IMS_A forwards the 200 OK response to UE_A
34A	<b>←</b>							User A is informed that call has ended
26B					<b>←</b>	4		User B ends call
27B				$\leftarrow$			REL	PSTN sends BYE to MGCF
28B					$\rightarrow$		RLC	MGCF responds RLC to PSTN
29B						$\rightarrow$		User B is informed that call has ended
30B			$\leftarrow$	_			BYE	MGCF sends BYE to IMS_A
31B		<b>—</b>	$\dashv$				BYE	IMS_A forwards BYE to UE_A
32B	<b>—</b>							User A is informed that call has ended
33B			$\rightarrow$				200 OK	UE_A sends 200 OK for BYE
34B			_	$\rightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF

#### 4.4.16.2 PSTN-to-IMS call

#### 4.4.16.2.1 Description

UE\_B that is located in a PSTN environment places a call towards UE\_A that is located in the IMS. Once the media path is established, the originating user or the destination user releases the call. The call flow path and node configuration for this use case corresponds to CF\_PSTN.

#### 4.4.16.2.2 UC\_21: PSTN-to-IMS call

The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

Step	Action	CFW
1	User B calls User A	Step 1
2	User A is informed of incoming call of User B	Step 17
3	User B is informed that UE_A is ringing	Step 21
4	User A answers call	Step 22
5	User A is informed that call has been answered	Step 16
6	User A and B can communicate	Step 28
7	User A ends call	Step 29A
8	User B is informed that call has ended	Step 34A
9	User A is informed that call has ended	Step 37A
10	User B ends call	Step 29B
11	User B is informed that call has ended	Step 32B
12	User A is informed that call has ended	Step 35B

The expected call flow sequence is:

Step			Dire	ction			Message	Comment
	U s e r A	U E A	I M S A	M G C F	P S T N	U s e r B		
1					<b>—</b>			User B calls User A
2				$\leftarrow$			IAM	PSTN send IAM to MGCF
3			<b>←</b>				INVITE	MGCF sends INVITE to IMS_A (SDP with precondition status, MIME subtype "telephone-event" §6.4.1)
4			-	$\rightarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
5		<b>←</b>					INVITE	IMS_A forwards INVITE to UE_A
6			$\rightarrow$				100 Trying	UE_A optionally responds with a 100 Trying provisional response
7			$\rightarrow$				183 Session Progress	UE_A sends 183 Session Progress response to IMS_A
8			-	$\rightarrow$			183 Session Progress	IMS_A forwards 183 Session Progress response to MGCF
9			$\leftarrow$				PRACK	MGCF responds with PRACK to IMS_A
10		<b>—</b>					PRACK	IMS_A forwards PRACK to UE_A
11			$\rightarrow$				200 OK (PRACK)	UE_A responds with 200 OK to IMS_A
12				$\rightarrow$			200 OK (PRACK)	IMS_A forwards 200 OK to MGCF
13			$\leftarrow$	_			UPDATE	MGCF sends UPDATE to IMS_A

Step			Dire	ction	_		Message	Comment
	U s	U E	I M	M G	PS	U		
	е	Ā	S	С	Т	е		
	r A		Α	F	N	r B		
14		<b>←</b>					UPDATE	IMS_A forwards UPDATE to UE_A
15			$\rightarrow$				200 OK (UPDATE)	UE_A responds with 200 OK to IMS_A
16				$\rightarrow$			200 OK (UPDATE)	IMS_A forwards 200 OK to MGCF
17	<b>(</b>							User A is informed of incoming call of User B
18			$\rightarrow$				180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
19			_	$\rightarrow$			180 Ringing	IMS_A forwards 180 Ringing response to MGCF
20					$\rightarrow$		ACM/CPG	MGCF send ACM/CPG to PSTN
21						$\rightarrow$		User B is informed that UE_A is ringing
22		$\rightarrow$						User A answers the call
23			$\rightarrow$				200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
24				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF
25					$\rightarrow$		ANM	MGCF sends ANM to PSTN
26			$\leftarrow$				ACK	MGCF sends ACK to PSTN
27		$\leftarrow$					ACK	IMS_A forwards ACK to UE_A
28	<u> </u>	+						User A and B can communicate
29A		$\rightarrow$						User A ends call
30A			$\rightarrow$				BYE	UE_A releases the call with BYE
31A				$\rightarrow$			BYE	IMS_A forwards BYE to MGCF
32A					$\rightarrow$		REL	MGCF sends REL to PSTN
33A				<del>(</del>	$\neg$		RLC	PSTN sends response RLC to MGCF
34A						$\rightarrow$		User B is informed that call has ended
35A			$\leftarrow$				200 OK	MGCF sends 200 OK response to IMS_A
36A		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
37A	<b>(</b>							User A is informed that call has ended
29B					<b>—</b>			User B ends call
30B				$\leftarrow$			REL	PSTN sends REL to MGCF
31B					$\rightarrow$		RLC	MGCF sends RLC to PSTN
		1	1	ı	1	1		

Step			Dire	ction			Message	Comment
	U s e r A	U E A	I M S A	M G C F	P S T N	U s e r B		
32B						$\rightarrow$		User B is informed that call has ended
33B			<b>←</b>	_			BYE	MGCF sends BYE to IMS_A
34B		<del>(</del>					BYE	IMS_A forwards BYE to UE_A
35B	<u> </u>							User A is informed that call has ended
36B			$\rightarrow$				200 OK	UE_A sends 200 OK for BYE
37B				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF

## 4.5 Test Descriptions

This clause introduces interoperability test descriptions (TDs) which realize one or more IMS NNI test purposes of TS 186 011-1 [2].

Each TD is defined on the basis of one of the generic use cases forms presented in the previous clause. Each test sequence step in a TD includes also a reference to a specific call flow step of the generic use case. Call flow steps which are associated with the test body are repeated after each TD and include any modifications necessary to adapt the generic use case. In the adapted call flow steps that are associated with user interactions are shown shaded and steps which have pass criteria are associated with are shown in bold.

Note that the expected test sequence may only show the Call Flow that affects the test.

In the tabulations which follow, all references are to TS 124 229 [1].

# 4.5.1 General Capabilities

# 4.5.1.1 SIP messages longer than 1 500 bytes

Interoperability Test Description									
Identifier:	TD_IMS_MESS_0001								
Summary:	IMS network shall support SIP messages greater than 1 500 bytes								
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	<b>Test Purp</b>	ose	Specification Reference						
	TP_IMS_4	002_1	TS 124 229 [1], clause 4.2A ¶1						
Use Case ref.:	UC_05_I								
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A and IMS_A configured to use TCP for transport</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered user of IMS_B using any user identity</li> <li>MESSAGE request and response has to be supported at II-NNI (TS 129 165 [16] see tables 6.1 and 6.3)</li> </ul>								
Test Sequence:	Step								
	1	User A sends message to User B	with at least 1 500 characters						
	2	Verify that user B receives messa	age from user A						
Conformance	Check								
Criteria:	1 TP_IMS_4002_01 in CFW step 4 (MESSAGE) ensure that {    when { UE_A sends a MESSAGE to UE_B         containing a Message_Body greater than 1 300 bytes }    then { IMS_B receives the MESSAGE         containing the Message_Body greater than 1 300 bytes } }								

Step				Dire	ection				Message	Comment
•	U s e r A	U E A	I M S A	I B C F A	I B C F B	I M S B	U E B	U s e r B		
1		<b>—</b>								User A sends an instant message to user B
2		$\vdash$	$\rightarrow$						MESSAGE	UE_A sends MESSAGE to IMS_A
3			_	$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
4					$\longrightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
5						$\rightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B with via header indicating TCP
6							$\longrightarrow$		MESSAGE	IMS_B sends MESSAGE to UE_B
7								$\rightarrow$		User B is informed about the instant message
8						←			200 OK	UE_B sends 200 OK to IMS_B
9					←				200 OK	IMS_B sends 200 OK to IBCF_B
10				<b>←</b>	—				200 OK	IBCF_B sends 200 OK to IBCF_A
11			$\leftarrow$						200 OK	IBCF_A sends 200 OK to IMS_A
12		<b>—</b>							200 OK	IMS_A sends 200 OK to UE_A
13	<b>←</b>									Optional: User A is presented a delivery report

# 4.5.2 Registration and De-registration

# 4.5.2.1 First time registration in a visited IMS network

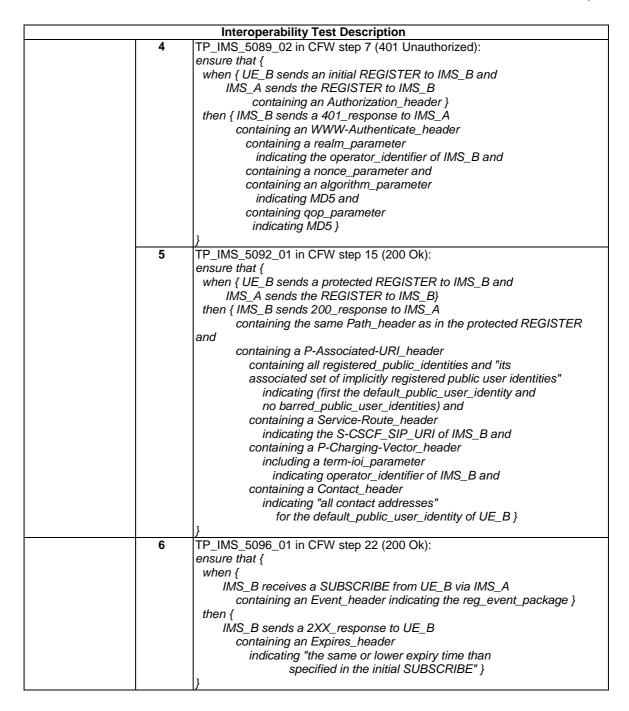
	Interoperability Tes	st Description						
Identifier:	TD_IMS_REG_0001_AKA							
Summary:	First time registration in a visited IMS network							
Configuration:	CF_ROAM_REG							
SUT	IMS_A and IMS_B							
References	Test Purpose	Specification Reference						
	TP_IMS_5011_01	TS_124 229 [1], clauses 5.2.2.1 ¶16						
		(2 <sup>nd</sup> numbered list) and 5.2.2.2						
	TP_IMS_5011_02	TS_124 229 [1], clauses 5.2.2.1 ¶1 ¶16						
		(2 <sup>nd</sup> numbered list) and 5.2.2.2						
	TP_IMS_5044_01	TS 124 229 [1], clause 5.2.3 ¶2						
		(1 <sup>st</sup> numbered list)						
	TP_IMS_5089_01	TS 124 229 [1], clause 5.4.1.2.1A ¶1						
	TP_IMS_5092_01	TS 124 229 [1], clause 5.4.1.2.2F ¶1						
	TP_IMS_5096_01	TS 124 229 [1], clause 5.4.2.1.1 ¶1						
Use Case ref.:	UC_01_R							
Pre-test	HSS of IMS_B is configured							
conditions:	<ul> <li>UE_B IP bearers established</li> </ul>	to IMS_A as per clause 4.2.1						
	<ul> <li>UE_B not registered in IMS_</li> </ul>							
	<ul> <li>IMS_A within the trust domai</li> </ul>	in of IMS_B						
	<ul> <li>UE_B is configured to use Al</li> </ul>	KA authentication						
Test Sequence:	Step							
	<ol> <li>User B registers in IMS E</li> </ol>	B using any valid user identity						
	2 Verify that UE_B shows s	successful registration						
Conformance	Check							
Criteria:	1 TP_IMS_5011_01 in CF\	N step 4 (REGISTER):						
	ensure that {							
		unprotected REGISTER to IMS_A						
		urity-Client_header }						
	then { IMS_A sends the							
	containing a Pati							
		SCF_SIP_URI of IMS_A and						
	containing a Req							
		ath_option_tag and						
		harging-Vector_header						
		icid-value_parameter and orig-ioi_parameter and						
		ong-ioi_parameter and						
		a term-ior_parameter and horization_header						
		integrity-protected_parameter						
	indicating an							
		, Security-Verify_header and						
		Security-Verny_neader and Security-Client_header and						
		isited-Network-ID_header						
		visited network at the home network" }						
1	maioding the							
	}							

	Interoperability Test Description
2	TP_IMS_5011_02 in CFW step 12 (REGISTER):
	ensure that {
	when { UE_B sends a protected REGISTER to IMS_A
	containing a Security-Client_header }
	then { IMS_A sends the REGISTER to IMS_B
	containing a Path_header
	containing P-CSCF_SIP_URI of IMS_A and
	containing a Require_header
	containing a path_option_tag and
	containing a P-Charging-Vector_header
	containing an icid-value_parameter and
	containing an orig-ioi_parameter
	indicating IMS_A and
	not containing a term-ioi_parameter and
	containing a Authorization_header
	containing an integrity-protected_parameter
	indicating yes
	not containing a Security-Verify _header and
	not containing a Security-Client_header and
	containing a P-Visited-Network-ID_header
	indicating "the visited network at the home network" }
3	TP_IMS_5044_01 in CFW step 19 (SUBSCRIBE):
	ensure that {
	when { IMS_A receives a 200_response from IMS_B }
	then { IMS_A sends a SUBSCRIBE to IMS_B
	containing a Request_URI
	indicating "the resource to which the P-CSCF wants
	to subscribe to" and
	containing a From_header
	indicating P-CSCF_SIP_URI of IMS_A and
	containing a To_header
	indicating the default_public_user_identity of UE_B and
	containing an Event_header
	indicating the reg_event_package and
	containing an Expires_header
	set to "a value greater than the one in the Expires_header
	of the 200_response" and
	containing a P-Asserted-Identity_header
	set to the P-CSCF_SIP_URI of IMS_A and
	containing a P-Charging-Vector_header
	containing an icid-value_parameter }
 	} 
4	TP_IMS_5089_01 in CFW step 7 (401 Unauthorized):
	ensure that {
	when { UE_B sends an initial REGISTER to IMS_B and
	IMS_A sends the REGISTER to IMS_B
	containing an Authorization_header
	containing an integrity-protected_parameter indicating no }
	then { IMS_B sends a 401_response to IMS_A
	containing an WWW-Authenticate_header
	containing a realm_parameter
	indicating the operator_identifier of IMS_B and
	containing a nonce_parameter
	(containing a RAND_parameter and
	containing an AUTN_parameter) and
	containing an algorithm_parameter
	indicating AKAv1-MD5 and
	containing an ik_parameter and
	containing a ck_parameter }

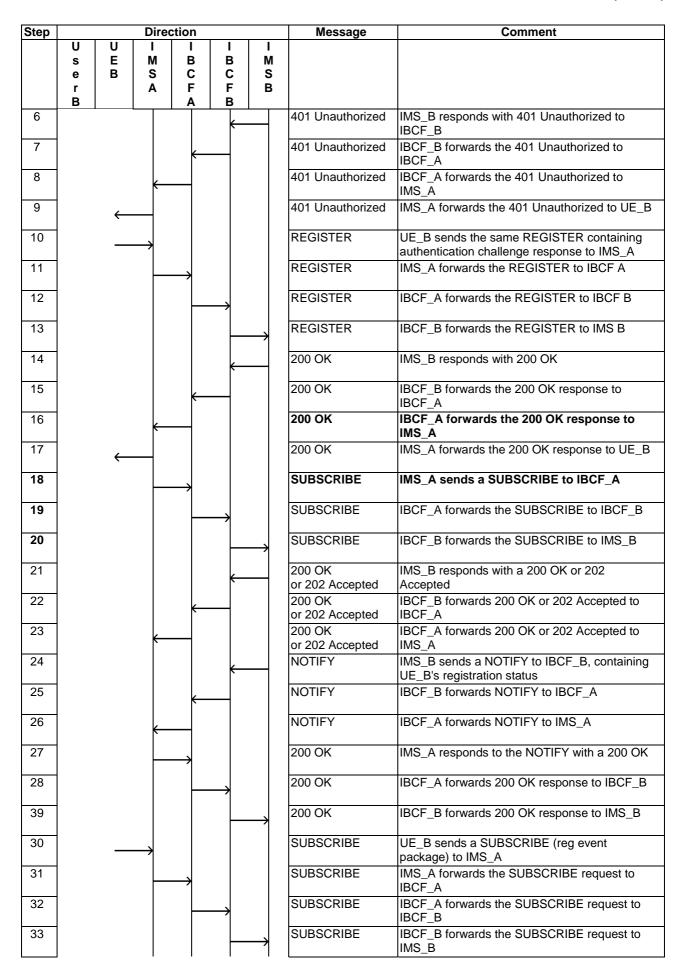
	Interoperability Test Description
5	TP_IMS_5092_01 in CFW step 15 (200 Ok):
	ensure that {
	when { UE_B sends a protected REGISTER to IMS_B and
	IMS_A sends the REGISTER to IMS_B}
	then { IMS_B sends 200_response to IMS_A
	containing the same Path_header as in the protected REGISTER
	and
	containing a P-Associated-URI header
	containing all registered_public_identities and "its
	associated set of implicitly registered public user identities"
	indicating (first the default_public_user_identity and
	no barred_public_user_identities) and
	containing a Service-Route_header
	indicating the S-CSCF_SIP_URI of IMS_B and
	containing a P-Charging-Vector_header
	including a term-ioi_parameter
	indicating operator_identifier of IMS_B and
	containing a Contact_header
	indicating "all contact addresses"
	for the default_public_user_identity of UE_B }
	}
6	TP_IMS_5096_01 in CFW step 22 (200 Ok):
	ensure that {
	when {
	IMS_B receives a SUBSCRIBE from UE_B via IMS_A
	containing an Event_header indicating the reg_event_package }
	then {
	IMS_B sends a 2XX_response to UE_B
	containing an Expires_header
	indicating "the same or lower expiry time than
	specified in the initial SUBSCRIBE" }
	}
•	

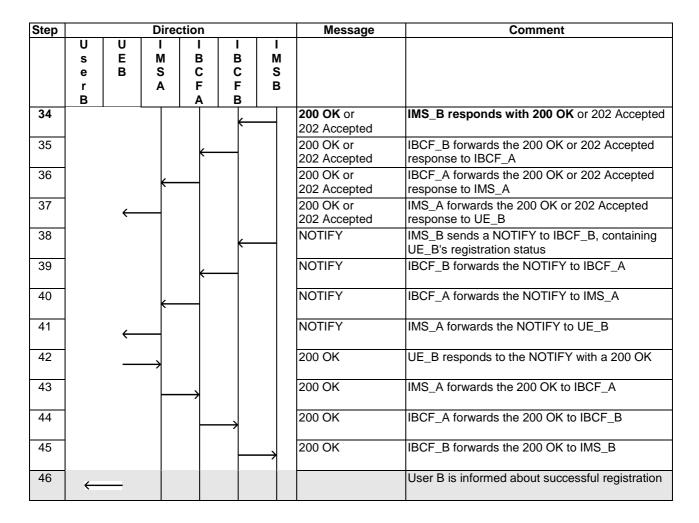
	Interoperability Test Desc	ription							
Identifier:	TD_IMS_REG_0001_MD5								
Summary:	First time registration in a visited IMS network								
Configuration:	CF_ROAM_REG								
SUT	IMS_A and IMS_B								
References	Test Purpose	Specification Reference							
	TP_IMS_5011_03	TS 124 229 [1], clauses 5.2.2.1 ¶16 (2 <sup>nd</sup> numbered list) and 5.2.2.3							
	TP_IMS_5011_04	TS 124 229 [1], clauses 5.2.2.1 ¶16 (2 <sup>nd</sup> numbered list) and 5.2.2.3							
	TP_IMS_5044_01	TS 124 229 [1], clause 5.2.3 ¶2 (1 <sup>st</sup> numbered list)							
	TP_IMS_5089_02	TS 124 229 [1], clause 5.4.1.2.1B ¶1							
	TP_IMS_5092_01	TS 124 229 [1], clause 5.4.1.2.2F ¶1							
	TP_IMS_5096_01	TS 124 229 [1], clause 5.4.2.1.1 ¶1							
Use Case ref.:	UC_01_R								
Pre-test	HSS of IMS_B is configured according	ng to table 1							
conditions:	UE_B IP bearers established to IMS								
	UE_B not registered in IMS_B	_ '							
	IMS_A within the trust domain of IMS	S B							
	UE_B is configured to use MD5 digest authentication								
Test Sequence:	Step								
	User B registers in IMS B using a	any valid user identity							
	2 Verify that UE_B shows success								
		· ·							

0 (		Interoperability Test Description
Conformance	Check	TD INO 5044 00 is OFM at 14 (DECIOTED)
Criteria:	1	TP_IMS_5011_03 in CFW step 4 (REGISTER):
		ensure that { when { UE_B sends an unprotected REGISTER to IMS_A }
		then { IMS_A sends the REGISTER to IMS_B
		containing a Path_header
		containing P-CSCF_SIP_URI of IMS_A and
		containing a Require_header
		containing a path_option_tag and
		containing a P-Charging-Vector_header
		(containing an icid-value_parameter and
		containing an orig-ioi_parameter and
		not containing a term-ioi_parameter) and
		containing a Authorization_header
		(not containing an integrity-protected_parameter or
		containing an integrity-protected_parameter
		indicating ip-assoc-pending) and
		containing a P-Visited-Network-ID_header
		indicating "the visited network at the home network" }
		}
	2	TP_IMS_5011_04 in CFW step 12 (REGISTER): ensure that {
		when { UE B sends a protected REGISTER to IMS_A }
		then { IMS_A sends the REGISTER to IMS_B
		containing a Path_header
		containing a rati_neader containing P-CSCF_SIP_URI of IMS_A and
		containing a Require_header
		containing a require_neader
		containing a path_option_tag and containing a P-Charging-Vector_header
		(containing an icid-value_parameter and
		containing an orig-ioi_parameter
		indicating IMS_A and
		not containing a term-ioi_parameter) and
		containing a Authorization_header
		containing an integrity-protected_parameter
		indicating ip-assoc-yes and
		containing a P-Visited-Network-ID_header
		indicating "the visited network at the home network" }
		}
	3	TP_IMS_5044_01 in CFW step 19 (SUBSCRIBE):
		ensure that {
		when { IMS_A receives a 200_response from IMS_B }
		then { IMS_A sends a SUBSCRIBE to IMS_B
		containing a Request_URI
		indicating "the resource to which the P-CSCF wants
		to subscribe to" and
		containing a From_header
		indicating P-CSCF_SIP_URI of IMS_A and
		containing a To_header
		indicating the default_public_user_identity of UE_B and containing an Event_header
		indicating the reg_event_package and
		containing an Expires_header
		set to "a value greater than the one in the Expires_header
		of the 200_response" and
		containing a P-Asserted-Identity_header
		set to the P-CSCF_SIP_URI of IMS_A and
		containing a P-Charging-Vector_header
		containing a r-charging-vector_neader containing an icid-value_parameter }
	1	oontaining an iola value_parainieter f



Step			Dire	ction			Message	Comment
	U s e r B	U E B	M S A	I B C F A	I B C F B	M S B		
1		$\rightarrow$						User B registers in IMS B
2		_	$\rightarrow$				REGISTER	UE_B sends a REGISTER to IMS_A
3				$\rightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF_A
4					$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF_B
5						$\rightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS_B

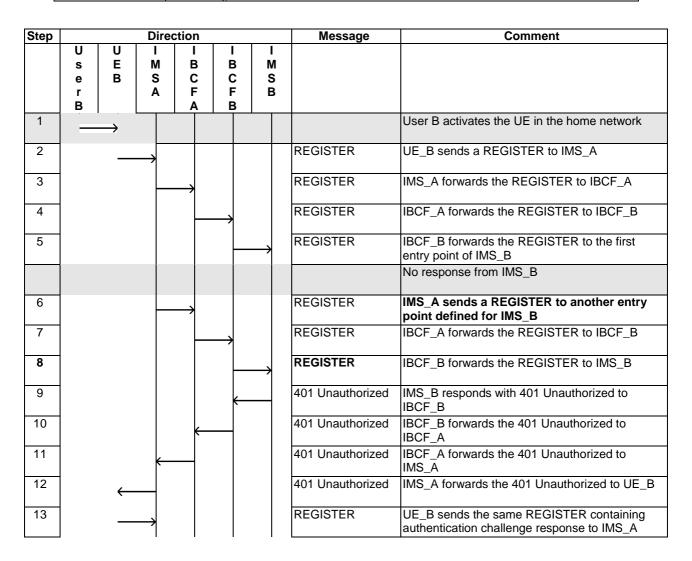




#### 4.5.2.2 No response from first entry point on REGISTER without topology hiding

	Interoperability Tes	t Description							
Identifier:	TD_IMS_REG_0002								
Summary:	IMS network chooses a second entry point to the home network of a user that requested registration, if the first entry point does not answer, without topology hiding.								
Configuration:	CF_ROAM_REG	-							
SUT	IMS_A								
References	Test Purpose	Specification Reference							
	TP_IMS_5203_01	TS 124 229 [1], clause 5.2.2.1 ¶33 (item 6 in 2 <sup>nd</sup> numbered list)							
	TP_IMS_5092_01	TS 124 229 [1], clause 5.4.1.2.2F ¶1							
Use Case ref.:	UC_01_R								
Pre-test conditions:	<ul> <li>HSS of IMS_B is configured according to table 1</li> <li>UE_B IP bearers established to IMS_A as per clause 4.2.1</li> <li>IMS_A configured with multiple entry points for IMS_B</li> <li>IMS_A not configured for topology hiding</li> <li>First entry point determined by the IMS_A pointing to a non-existing component in IMS_B</li> </ul>								
Test Sequence:	Step 14 P 14								
	1 User B registers in IMS B								
	2 Verify that UE_B shows so	uccessful registration							

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5203_01 in CFW step 7 (REGISTER): [I-CSCF] ensure that {   when { IMS_A receives no response from IMS_B }   then { IMS_A sends the REGISTER to another_entry_point of IMS_B } }
	2	TP_IMS_5092_01 in CFW step 18 (200 Ok): ensure that {   when { UE_B sends a protected REGISTER to IMS_B and IMS_A sends the REGISTER to IMS_B}   then { IMS_B sends 200_response to IMS_A containing the same Path_header as in the protected REGISTER and

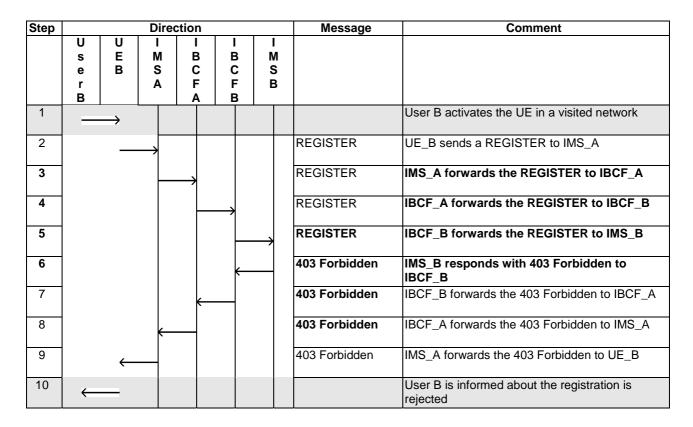


Step			Dire	ction			Message	Comment
	U s	U	I M	I B	ΙВ	I M		
	е	В	S	C	C F	S		
	r B		^	Ą	В			
14				$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF A
15					$\rightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
16						$\rightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS B
17					←		200 OK	IMS_B responds with 200 OK
18				<b>←</b>			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
19			$\leftarrow$				200 OK	IBCF_A forwards the 200 OK response to IMS_A
20		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_B
21				$\longrightarrow$			SUBSCRIBE	IMS_A sends a SUBSCRIBE to IBCF_A
22					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE to IBCF_B
23					_	$\longrightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
24					←		200 OK or 202 Accepted	IMS_B responds with a 200 OK or 202 Accepted
25				<b>←</b>			200 OK or 202 Accepted	IBCF_B forwards 200 OK or 202 Accepted to IBCF_A
26			<b>←</b>				200 OK or 202	IBCF_A forwards 200 OK or 202 Accepted to
27					<b>←</b>		Accepted NOTIFY	IMS_A IMS_B sends a NOTIFY to IMS_A, containing UE_B's registration status
28				<b>-</b>			NOTIFY	IBCF_B forwards NOTIFY to IBCF_A
29			<b>←</b>				NOTIFY	IBCF_A forwards NOTIFY to IMS_A
30				$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
31					$\rightarrow$		200 OK	IBCF_A forwards 200 OK response to IBCF_B
32						$\rightarrow$	200 OK	IBCF_B forwards 200 OK response to IMS_B
33			$\rightarrow$				SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event package) to IMS_A
34				$\longrightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IBCF_A
35					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE request to IBCF_B
36						$\rightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE request to IMS_B
37					<b>←</b>		200 OK or 202 Accepted	IMS_B responds to the SUBSCRIBE with a 200 OK or 202 Accepted
38				$\leftarrow$			200 OK or 202 Accepted	IBCF_B forwards the 200 OK or 202 Accepted response to IBCF_A
39			$\leftarrow$				200 OK or 202 Accepted	IBCF_A forwards the 200 OK or 202 Accepted response to IMS_A
40		$\leftarrow$	$\dashv$				200 OK or 202 Accepted	IMS_A forwards the 200 OK or 202 Accepted response to UE_B
41					←		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status

Step			Dire	ction			Message	Comment
	O o e r B	U E B	I M S A	I B C F A	I B C F B	I M S B		
42				<del></del>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
43			←				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
44		$\leftarrow$					NOTIFY	IMS_A forwards the NOTIFY to UE_B
45		_	$\rightarrow$				200 OK	UE_B responds to the NOTIFY with a 200 OK
46				$\rightarrow$			200 OK	IMS_A forwards the 200 OK to IBCF_A
47					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK to IBCF_B
48						$\rightarrow$	200 OK	IBCF_B forwards the 200 OK to IMS_B
49	<b>←</b>							User B is informed about successful registration

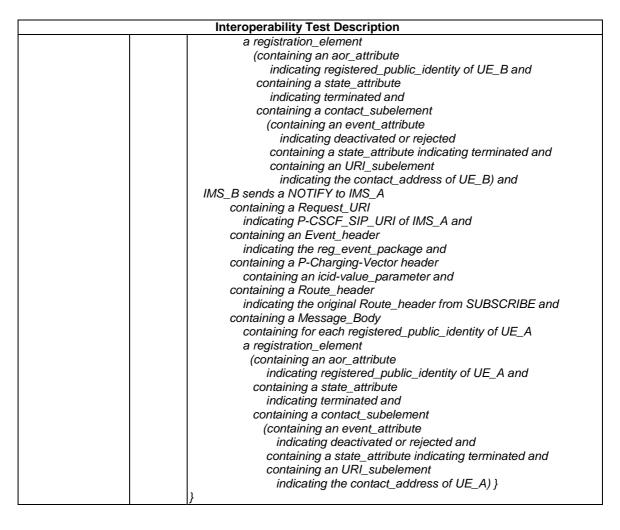
# 4.5.2.3 403 response to REGISTER from an un-trusted domain without topology hiding

		Interoperability Test Descr	ription				
Identifier:	TD_IMS_REG_0003						
Summary:		ork sends 403 response when atte thout topology hiding	mpting registration from a different trust				
Configuration:	CF_ROAM	1_REG					
SUT	IMS_B						
References	Test Purp TP_IMS_5		Specification Reference TS 124 229 [1], clause 5.3.1.2 ¶1				
Use Case ref.:	UC_01_R		· · · · · · · · · · · · · · · · · · ·				
Pre-test conditions:	<ul> <li>HSS of IMS_B is configured according to table 1</li> <li>UE_B IP bearers established to IMS_A as per clause 4.2.1</li> <li>IMS_B not configured for topology hiding</li> <li>IMS_A and IMS_B are in different trust domains</li> </ul>						
Test Seguence:	Step						
rest sequence.	1 2	User B registers in IMS B using a Verify that UE_B shows unsucces					
Conformance Criteria:	Check 1	TP_IMS_5129_01 in CFW step 7 ensure that {  when { UE_B sends a valid initial  and IMS_B receives the RE  then { IMS_B sends a 403_resp }	al REGISTER to IMS_A EGISTER from IMS_A}				



#### 4.5.2.4 Network initiated deregistration by the S-CSCF

	Interoperability Test Descr	iption						
Identifier: TD_I	TD_IMS_REG_0005							
	IMS network can initiate user de-registration, e.g., when a user runs out of credit							
Configuration: CF_F	CF_ROAM_REG							
SUT IMS_	_B							
References Test	Purpose	Specification Reference						
TP_I	MS_5093_01	TS 124 229 [1], clause 5.4.1.5 ¶6						
		(1 <sup>st</sup> numbered list)						
Use Case ref.: UC_0	01_R							
Pre-test •	HSS of IMS_B is configured according	g to table 1						
conditions:	UE_B IP bearers established to IMS_	A as per clause 4.2.1						
•	UE_B registered in IMS_B via IMS_A	using any user identity						
•	IMS_A within the trust domain of IMS	_B						
Test Sequence: Ste	ер							
1	IMS_B is triggered manually to de-register user B							
2	Verify that UE_B shows successful	ul de-registration						
Conformance Che	eck							
Criteria: 1		8 and 56						
	ensure that {							
	, =	when { IMS_B receives a network_originated_deregistration_event }						
	then {							
	IMS_B sends a NOTIFY to IMS							
	containing a Request_UR	l						
	indicating UE_B and	lo .						
	containing an Event_head							
	indicating the reg_even	_, 0						
	containing a P-Charging-\ containing an icid-value							
	containing an icid-value							
		oute_header from SUBSCRIBE and						
	containing a Message_Bo							
		istered_public_identity of UE_B						



Step			Direc	ction			Message	Comment
	U s e r B	U E B	I M S A	I B C F A	I B C F B	I M S B		
								IMS_B is triggered to de-register user B
47					<del>(</del>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's de-registration
48				<b>←</b>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
49			<b>—</b>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
50		$\leftarrow$					NOTIFY	IMS_A sends a NOTIFY to UE_B, containing UE_B's de-registration
51			$\rightarrow$				200 OK	UE_B responds to the NOTIFY with a 200 OK
52				$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to IBCF_A
53					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK response to IBCF_B
54						$\rightarrow$	200 OK	IBCF_B forwards the 200 OK to IMS_B
55					<b>(</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing IMS_A's de-registration
56				←			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A

Step			Direc	ction			Message	Comment
	U s e r B	U E B	I M S A	I B C F A	I B C F B	M S B		
57			<b>←</b>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
58				$\rightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
59					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK response to IBCF_B
60						$\rightarrow$	200 OK	IBCF_B forwards the 200 OK to IMS_B
61	<b>←</b>	_						User B is informed about de-registration

# 4.5.2.5 Network initiated re-authentication by the S-CSCF

	Interoperability Te	st Description							
Identifier:	Interoperability Test Description  TD_IMS_REG_0006								
Summary:	IMS network can initiate user re-authentication								
Configuration:	CF_ROAM_REG								
SUT	IMS_B								
References	Test Purpose Specification Reference								
	TP_IMS_5094_01 TS 124 229 [1], clause 5.4.1.6 ¶2								
Use Case ref.:	UC_01_R	· · · · · · · · · · · · · · · · · · ·							
Pre-test	HSS of IMS_B is configured	according to table 1							
conditions:		d to IMS_A as per clause 4.2.1							
	UE_B registered in IMS_B u								
	IMS_A within the trust doma								
		f IMS_B to re-authenticate UE_B							
Test Sequence:	Step								
		ed to re-authenticate user B							
	2 Verify that UE_B shows								
Conformance	Check								
Criteria:	1 TP_IMS_5094_01 in CF	W steps 48 and 56							
	ensure that {	•							
	when { IMS_B receives	a network_originated_reauthentication_event }							
	then {								
	IMS_B sends a NOTII								
	containing a Req								
	indicating UE_								
	containing an Ev								
		reg_event_package and							
		harging-Vector header							
		icid-value_parameter and							
	containing a Rou								
		original Route_header from SUBSCRIBE and							
	containing a Mes	sage_body each registered_public_identity of UE_B							
	a registration_	•							
		n aor_attribute							
		a registered_public_identity of UE_B and							
		state_attribute							
		active and							
		contact_subelement							
		g an event_attribute							
		g shortened and							
		a state_attribute indicating active and							
1		an URI_subelement							

#### Interoperability Test Description

indicating the contact\_address of UE\_B and containing an expiry\_attribute) and IMS\_B sends a NOTIFY to IMS\_A -- P-CSCF containing a Request\_URI indicating the P-CSCF\_SIP\_URI of IMS\_A and containing an Event\_header indicating the reg\_event\_package and containing a P-Charging-Vector header containing an icid-value\_parameter and containing a Route\_header indicating the original Route\_header from SUBSCRIBE and containing a Message\_Body containing for each registered\_public\_identity of UE\_B a registration\_element (containing an aor\_attribute indicating a registered\_public\_identity of UE\_B and containing a state\_attribute indicating active and containing a contact\_subelement (containing an event\_attribute indicating shortened and containing a state\_attribute indicating active and containing an URI\_subelement indicating the contact address of UE B and containing an expiry\_attribute) }

Step			Dire	ction			Message	Comment
	U	Ū	ı	ı	I	I		
	s e	E B	M S	B	B C	M S		
	r B		Α	F	F B	В		
	В							IMS_B is triggered to re-authenticate user B
47					<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's re-authentication
48				$\leftarrow$			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
49			<b>←</b>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
50		$\leftarrow$					NOTIFY	IMS_B sends a NOTIFY to UE_B, containing UE_ re-authentication
51			$\rightarrow$				200 OK	UE_B responds to the NOTIFY with a 200 OK
52				$\longrightarrow$			200 OK	IMS_A forwards the 200 OK to IBCF_A
53					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK response to IBCF_B
54						$\longrightarrow$	200 OK	IBCF_B forwards the 200 OK response to IMS_B
55					<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing IMS_A's re-authentication
56				←			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
57			$\leftarrow$				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
58				$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
59					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK response to IBCF_B
60						$\longrightarrow$	200 OK	IBCF_B forwards the 200 OK response to IMS_B
61			$\rightarrow$				REGISTER	UE_B sends the same REGISTER containing authentication challenge response to IMS_A
62				$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF A
63					$\rightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
64						$\longrightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS B
65					<b>←</b>		200 OK	IMS_B responds with 200 OK
66				<b>←</b>			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
67			<b>←</b>				200 OK	IBCF_A forwards the 200 OK response to IMS_A
68		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_B
69				$\longrightarrow$			SUBSCRIBE	IMS_A sends a SUBSCRIBE to IBCF_A
70					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE to IBCF_B
71						$\longrightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
72					<b>←</b>		200 OK or 202 Accepted	IMS_B responds with a 200 OK or 202 Accepted
73				_			200 OK or 202	IBCF_B forwards 200 OK or 202 Accepted to
				`			Accepted	IBCF_A

Step			Dire	ction			Message	Comment
	U s e r B	U E B	I M S A	I B C F A	I B C F B	M S B		
74			<b>←</b>				200 OK or 202 Accepted	IBCF_A forwards 200 OK or 202 Accepted to IMS_A
75					←		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's registration status
76				<b>←</b>			NOTIFY	IBCF_B forwards NOTIFY to IBCF_A
77			<b>←</b>				NOTIFY	IBCF_A forwards NOTIFY to IMS_A
78				$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
79					$\rightarrow$		200 OK	IBCF_A forwards 200 OK response to IBCF_B
80						$\longrightarrow$	200 OK	IBCF_B forwards 200 OK response to IMS_B
81			$\rightarrow$				SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event package) to IMS_A
82				$\longrightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IBCF_A
83					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE request to IBCF_B
84						$\rightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE request to IMS_B
85					←		200 OK or 202 Accepted	IMS_B responds to the SUBSCRIBE with a 200 OK or 202 Accepted
86				<b>←</b>			200 OK or 202 Accepted	IBCF_B forwards the 200 OK or 202 Accepted response to IBCF_A
87			<b>←</b>				200 OK or 202 Accepted	IBCF_A forwards the 200 OK or 202 Accepted response to IMS_A
88		$\leftarrow$					200 OK or 202 Accepted	IMS_A forwards the 200 OK or 202 Accepted response to UE_B
89					←		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status
90				<b>←</b>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
91			<b>←</b>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
92		$\leftarrow$					NOTIFY	IMS_A forwards the NOTIFY to UE_B
93			$\longrightarrow$				200 OK	UE_B responds to the NOTIFY with a 200 OK
94				$\longrightarrow$			200 OK	IMS_A forwards the 200 OK to IBCF_A
95					$\rightarrow$		200 OK	IBCF_A forwards the 200 OK to IBCF_B
96						$\longrightarrow$	200 OK	IBCF_B forwards the 200 OK to IMS_B
97			<b>←</b>					User B is informed about successful registration

# 4.5.3 Initial Dialog or Subsequent Procedures

# 4.5.3.1 Initial INVITE Dialog Procedures

## 4.5.3.1.1 Initial INVITE Request Procedures - Originating

#### 4.5.3.1.1.1 Default SIP URI with DNS/ENUM lookup procedure

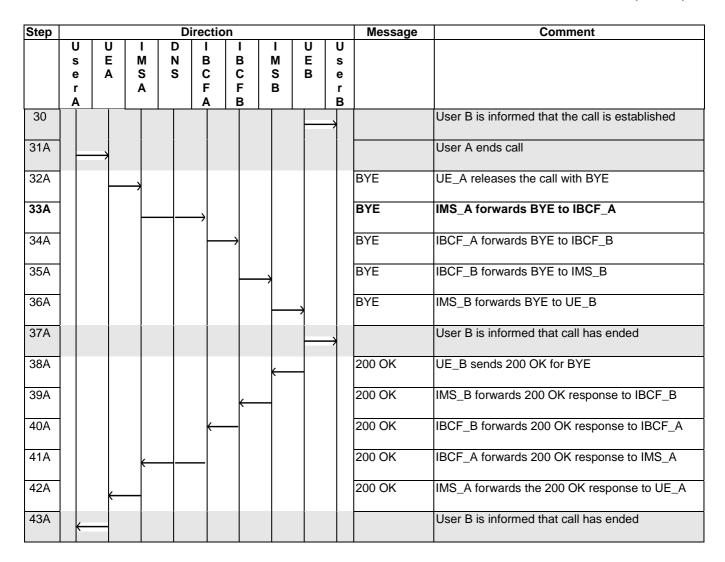
	Interoperability Te	st Description									
Identifier:	TD_IMS_CALL_0001										
Summary:	IMS network can handle establishment of dialogs for users with default SIP URIs and										
,	resolve Tel URI E.164 numbers										
Configuration:	CF_INT_CALL										
SUT	IMS_A and IMS_B										
References	Test Purpose	Specification Reference									
	TP_IMS_5097_01	TS 124 229 [1], clause 5.4.3.2 ¶11									
	116_6667_61	(1 <sup>st</sup> numbered list)									
	TP_IMS_5097_02	TS 124 229 [1], clause 5.4.3.2 ¶11									
		(item 9 in 1 <sup>st</sup> numbered list)									
	TP_IMS_5097_04	TS 124 229 [1], clause 5.4.3.2 ¶11									
		(item 10 in 1 <sup>st</sup> numbered list)									
	TP_IMS_5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119									
	116_6167_62	(item 1 in 8 <sup>th</sup> numbered list)									
	TP_IMS_5107_01	TS 124 229 [1] clause 5 4 3 2 ¶119									
	1	(item 1 in 8 <sup>th</sup> numbered list)									
	TP_IMS_5115_01	ITS 124 229 [1], clause 5.4.3.3 ¶91									
	1	(item 2 in 4 <sup>th</sup> numbered list)									
	TP_IMS_5115_03	TS 124 229 [1], clause 5.4.3.3 ¶92									
	1	(item 3 in 4 <sup>th</sup> numbered list)									
	TP_IMS_5115_02	(item 3 in 4 <sup>th</sup> numbered list) TS 124 229 [1], clause 5.4.3.3 ¶91									
		(item 2 in 4 <sup>th</sup> numbered list)									
	TP_IMS_5115_04	TS 124 229 [1], clause 5.4.3.3 ¶92									
		(item 2 in 4 <sup>th</sup> numbered list)									
	TP_IMS_5131_01	TS 124 229 [1], clause 5.3.2.1 ¶62									
		(after note 10)									
	TP_IMS_5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62									
		(after note 10)									
Use Case ref.:	UC_02_I										
Pre-test	HSS of IMS_A and of IMS B	is configured according to table 1									
conditions:	<ul> <li>UE_A and UE_B have IP be</li> </ul>	arers established to their respective IMS networks									
	as per clause 4.2.1	·									
	UE_A is registered in IMS_A as userSIP_priv according to table 1										
	<ul> <li>UE_B is registered in IMS_B</li> </ul>	as userSIP_priv according to table 1									
	<ul> <li>IMS_A within the trust doma</li> </ul>	in of IMS_B									
	<ul> <li>Common DNS is configured</li> </ul>	with an ENUM entry for the Tel URI E.164 Number									
	of userSIP of IMS_B	·									
Test Sequence:	Step										
		_URI (i.e. userSIP in IMS_B)									
		med of incoming call of User A									
		med that UE_B is ringing									
	4 User B answers the call										
		med that call has been answered									
		med that the call is established									
	7 User A ends the call										
	8 Verify that user B is infor	med that call has ended									
	9 Verify that user A is informed that call has ended										

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5097_01 in CFW step 7 (INVITE):
		ensure that {
		when { UE_A sends an initial INVITE to UE_B }
		then { IMS_B receives the initial INVITE
		not containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_A
		containing a P-Charging-Vector_header
		(containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and
		not containing an access-network-charging-info_parameter and
		not containing at rem-ioi_parameter) and
		containing a Record-Route_header
		indicating the originating S-CSCF_SIP_URI and
		not containing a P- access-network-info header}
		}
	2	TP_IMS_5097_02 in CFW step 7 (INVITE):
		ensure that {
		when { UE_A sends an initial INVITE to UE_B
		then { IMS_B receives the initial INVITE
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_A
		and
		containing a P-Asserted-Identity_header
		indicating the Tel_URI of UE_A }
	3	TD IMS 5007 04 in CEM aton 7 (INIVITE):
	3	TP_IMS_5097_04 in CFW step 7 (INVITE): ensure that {
		when { UE_A sends an initial INVITE to UE_B
		containing a Request_URI
		indicating a Tel_URI}
		then { IMS_A sends a DNS_Query to DNS
		containing the Tel_URI_E.164_Number }
		when { IMS_A receives DNS_Response from DNS
		containing a NAPTR_Resource_Record
		indicating the SIP_URI of UE_B}
		then { IMS_A sends the initial INVITE to IMS_B
		containing a Request_URI indicating the SIP_URI of UE_B
		containing a P-Charging-Vector_header
		not containing an access-network-charging-info_parameter
		}
		[}
	4	TP_IMS_5107_02 in CFW step 27 (ACK):
		ensure that {
		when { UE_A sends ACK to UE_B }
		then { IMS_B receives the ACK
		not containing Route_header indicating the S-CSCF_SIP_URI of IMS_A }
		Indicating the Green _on _on inio_A ;
	5	TP_IMS_5107_01 in CFW step 34A (BYE):
		ensure that {
		when { UE_A sends BYE to UE_B }
		then { IMS_B receives the BYE
		not containing Route_header
		indicating the S-CSCF_SIP_URI of IMS_A }
I		<u>)</u>

		Interoperability Test Description
	6	TP_IMS_5115_01 in CFW step 15 (180 Ringing):
		ensure that {
		when { UE_B sends a 180_response to UE_A }
		then { IMS_A receives the 180_response from IMS_B
		containing a P-Charging-Vector_header
		containing an orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B
		}
	7	TP_IMS_5115_03 in CFW step 15 (180 Ringing):
		ensure that {
		when { UE_B sends a 1xx_response to UE_A
		}
		then { IMS_A receives the 1xx_response from IMS_B
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_B and
		containing a P-Asserted-Identity_header
		indicating the Tel_URI of UE_B }
		}
	8	TP_IMS_5115_02 in CFW step 21 (2xx):
		ensure that {
		when { UE_B sends a 2xx_response to UE_A }
		then { IMS_A receives the 2xx_response from IMS_B
		containing a P-Charging-Vector_header
		containing an orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B
		}
	9	TP_IMS_5115_04 in CFW step 21 (2xx):
		ensure that {
		when { UE_B sends a 2xx_response to UE_A
		}
		then { IMS_A receives the 2xx_response from IMS_B
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_B and
		containing a P-Asserted-Identity_header
		indicating the Tel_URI of UE_B}
		§ = = ,
1	10	TP_IMS_5131_01 in CFW step 15 (180 Ringing):
		ensure that {
		when { UE_B sends a 180_response to UE_A }
		then { IMS_B sends the 180_response to IMS_A
		not containing a P-Charging-Function-Addresses_header }
		[}
1	11	TP_IMS_5131_02 in CFW step 21 (2xx)
		ensure that {
		when { UE_B sends a 2xx_response to UE_A }
		then { IMS_A receives the 2xx_response from IMS_B
		not containing a P-Charging-Function-Addresses_header }
		}
		u

Step				D	irectio	n				Message	Comment
	N e r ∢	D E A	I M S A	D N S	I B C F A	I B C F B	I M S B	U E B	U s e r B		
1		$\rightarrow$									User A calls User B
2			$\rightarrow$							INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports

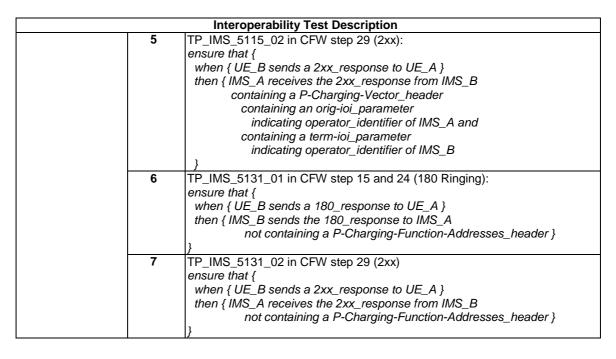
Step				Di	rectio	n				Message	Comment
	U s	UE	I M	Z O	I B	I B	I M	πС	U s		
	е	Ā	S	S	С	С	S	В	е		
	r A		Α		F A	F B	В		r B		
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4a				$\rightarrow$						DNS QUERY	IMS_A sends DNS QUERY to common DNS containing E.164 TEL URI
4b			<b>—</b>	_						DNS RESPONSE	Common DNS sends DNS RESPONSE containing NAPTR resource record to IMS_A
5					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
6			<b>—</b>							100 Trying	IBCF_A responds with a 100 Trying provisional response
7						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
8					<del>(                                    </del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
9							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
10						$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
11								$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
12									<b>→</b>		User B is informed of incoming call of User A
13							<del>(                                    </del>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14						<del>(</del>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15					<b>←</b>					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16			<b>←</b>		_					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17		<b>←</b>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	<b>←</b>										User A is informed that UE_B is ringing
19							<del></del>				User B answers call
20						<del>(</del>				200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21					<b>(</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
22			<b>—</b>		-					200 OK	IBCF_A forwards 200 OK response to IMS_A
23		<b>K</b>								200 OK	IMS_A forwards 200 OK response to UE_A
24	<b>←</b>										User A is informed that call has been answered
25			$\rightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
26					$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
27						$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
28							$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
29								$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
	ı	1	ı	ı	I	1	1	I	ı		1



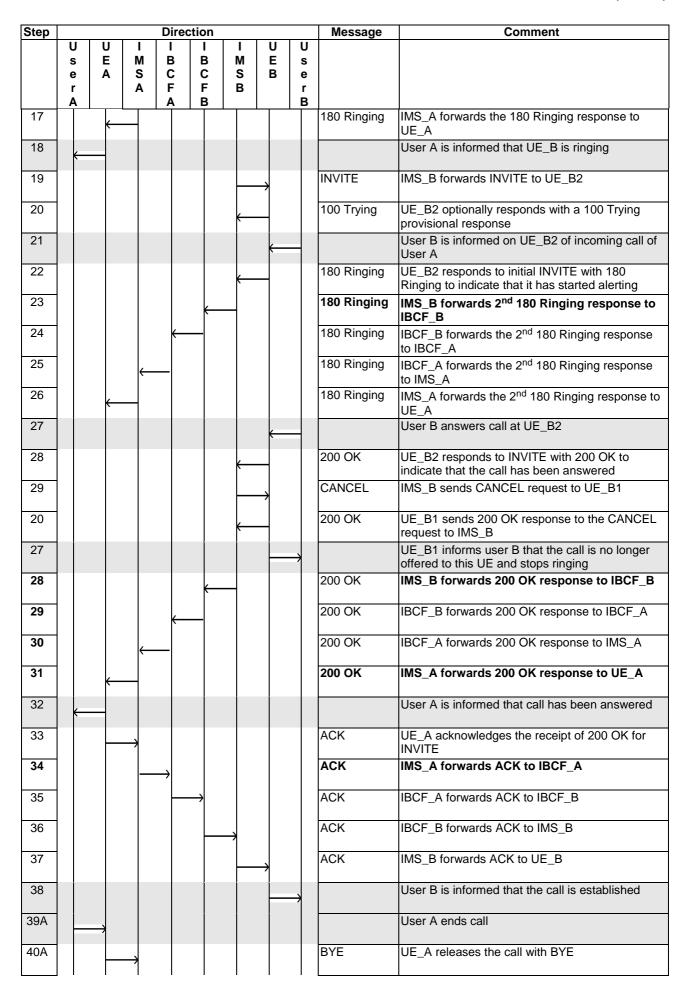
#### 4.5.3.1.1.2 Default SIP URI

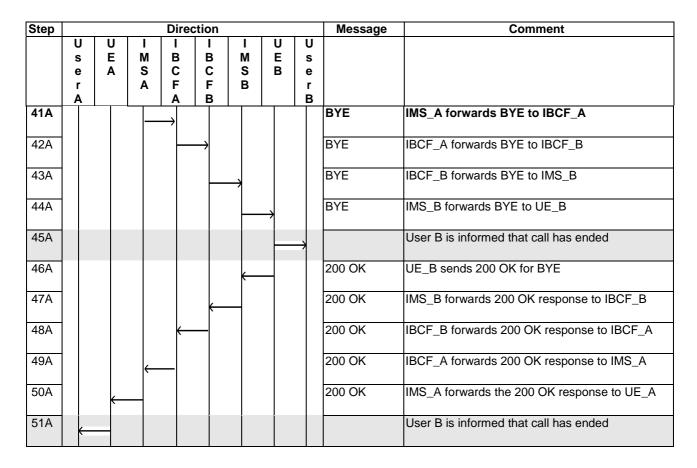
	Interoperability	Test Description								
ldentifier:	TD_IMS_CALL_0001F									
Summary:	IMS network can handle establishment of a call when the call is being offered to									
Configuration:	CF_INT_CALL	multiple terminals  CF INT CALL								
SUT	IMS_A and IMS_B									
References	Test Purpose	Specification Reference								
	TP_IMS_5097_01	TS 124 229 [1], clause 5.4.3.2 ¶11 (1 <sup>st</sup> numbered list)								
	TP_IMS_5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119 (item 1 in 8 <sup>th</sup> numbered list)								
	TP_IMS_5107_01	TS 124 229 [1], clause 5.4.3.2 ¶119 (item 1 in 8 <sup>th</sup> numbered list)								
	TP_IMS_5115_01	TS 124 229 [1], clause 5.4.3.3 ¶91 (item 2 in 4 <sup>th</sup> numbered list)								
	TP_IMS_5115_02	TS 124 229 [1], clause 5.4.3.3 ¶91 (item 2 in 4 <sup>th</sup> numbered list)								
	TP_IMS_5131_01	TS 124 229 [1], clause 5.3.2.1 ¶62 (after note 10)								
	TP_IMS_5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62 (after note 10)								
Use Case ref.:	UC_12									

		Interoperability Test Description
Pre-test	• HS	SS of IMS_A and of IMS B is configured according to table 1
conditions:		E_A and UE_B have IP bearers established to their respective IMS networks
		per clause 4.2.1
		E_A is registered in IMS_A as userSIP_priv according to table 1
		E_B is registered in IMS_B via UE_B1 and UE_B2 as userSIP according to
		ole 1
	• IM	S_A within the trust domain of IMS_B
	1 -	
Test Sequence:	Step	
	1	User A calls User B
	2	Verify that user B is informed of incoming call of User A on UE_B1
	3	Verify that user B is informed of incoming call of User A on UE_B2
	5	Verify that user A is informed that a UE of User B is ringing
		User B answers call on UE_B2
	<u>6</u> 7	Verify that user B is informed at UE_B1 that the call is no longer offered  Verify that user A is informed that call has been answered
	8	Verify that user A is informed that the call is established
	9	User A ends the call
	10	Verify that user B is informed that call has ended
	11	Verify that user A is informed that call has ended
		Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5097_01 in CFW step 6 (INVITE):
		ensure that {
		when { UE_A sends an initial INVITE to UE_B }
		then { IMS_B receives the initial INVITE
		not containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_A
		containing a P-Charging-Vector_header
		(containing an icid-value_parameter and
		containing a orig-ioi_parameter indicating IMS_A and
		not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and
		containing a term-ioi_parameter) and containing a Record-Route_header
		indicating the originating S-CSCF_SIP_URI and
		not containing a P- access-network-info header}
		}
	2	TP_IMS_5107_02 in CFW step 35 (ACK):
		ensure that {
		when { UE_A sends ACK to UE_B }
		then { IMS_B receives the ACK
		not containing Route_header
		indicating the S-CSCF_SIP_URI of IMS_A }
	_	} TD IMO 5407 04: OFM 4 404 (DVF)
	3	TP_IMS_5107_01 in CFW step 42A (BYE):
		ensure that { when { UE_A sends BYE to UE_B }
		then { IMS_B receives the BYE
		not containing Route_header
		indicating the S-CSCF_SIP_URI of IMS_A }
		}
	4	TP_IMS_5115_01 in CFW step 15 and 24 (180 Ringing):
		ensure that {
		when { UE_B sends a 180_response to UE_A }
		then { IMS_A receives the 180_response from IMS_B
		containing a P-Charging-Vector_header
		containing an orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B
		}



Step				Dire	ction				Message	Comment
0.05	U	U E	I	I	ı	I	U E	U	oodage	Commons
	s e	A	M S	B	B C	M S	В	s e		
	r A		Α	F	F B	В		r B		
1	Ê	$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>—</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
10							$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B1
11						<b>—</b>	$\perp$		100 Trying	UE_B1 optionally responds with a 100 Trying provisional response
12								$\rightarrow$		User B is informed on UE_B1 of incoming call of User A
13						<b>←</b>			180 Ringing	UE_B1 responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14					<b>←</b>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15				<b>←</b>					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16			$\leftarrow$	-					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A





#### 4.5.3.1.1.3 Default Tel URI

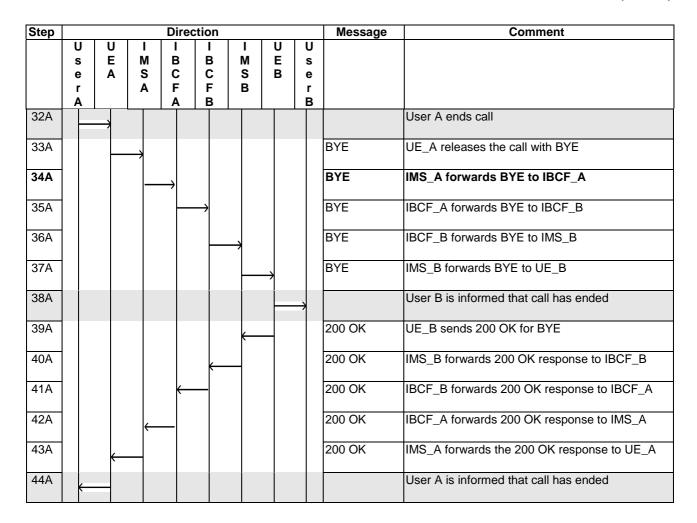
		Test Description										
Identifier:	TD_IMSCALL_0002											
Summary:	IMS network can handle establishment of dialogs for users with default TEL URIs											
Configuration:	CF_INT_CALL	CF_INT_CALL										
SUT	IMS_A and IMS_B	IS_A and IMS_B										
References	Test Purpose	Specification Reference										
	TP_IMS_5097_01	TS 124 229 [1], clause 5.4.3.2 ¶11										
		(1 <sup>st</sup> numbered list)										
	TP_IMS_5097_02	TS 124 229 [1], clause 5.4.3.2 ¶11										
		(item 9 1 <sup>st</sup> numbered list)										
	TP_IMS_5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119										
		(item 1 in 8 <sup>th</sup> numbered list)										
	TP_IMS_5107_01	TS 124 229 [1], clause 5.4.3.2 ¶119										
		(item 1 in 8 <sup>th</sup> numbered list)										
	TP_IMS_5115_01	TS 124 229 [1], clause 5.4.3.3 ¶91										
		(item 2 in 4 <sup>th</sup> numbered list)										
	TP_IMS_5115_03	TS 124 229 [1], clause 5.4.3.3 ¶92										
		(item 2 in 4 <sup>th</sup> numbered list)										
	TP_IMS_5115_02	TS 124 229 [1], clause 5.4.3.3 ¶91										
		(item 2 in 4 <sup>th</sup> numbered list)										
	TP_IMS_5115_04	TS 124 229 [1], clause 5.4.3.3 ¶92										
		(item 2 in 4 <sup>th</sup> numbered list)										
	TP_IMS_5131_01	TS 124 229 [1], clause 5.4.3.3 ¶62										
		(after note 10)										
	TP_IMS_5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62										
		(after note 10)										
Use Case ref.:	UC_02_I											

ĺ		Interoperability Test Description					
Pre-test	• HS	SS of IMS_A and of IMS B is configured according to table 1					
conditions:		E_A and UE_B have IP bearers established to their respective IMS networks					
		E_A and UE_B have IP bearers established to their respective IMS networks sper clause 4.2.1					
		E_A is registered in IMS_A using userTEL_priv according to table 1					
		E_B is registered in IMS_B using userTEL_priv according to table 1					
		L_B is registered in IMS_B using user IEL_priv according to table 1					
	• IIV	S_A within the trust domain or livis_b					
Test Sequence:	Step						
-	1	User A calls user B (i.e. userTEL in IMS_B)					
	2	Verify that user B is informed of incoming call of User A					
	3	Verify that user A is informed that UE_B is ringing					
	4	User B answers the call					
	5	Verify that user A is informed that call has been answered					
	6	Verify that user B is informed that the call is established					
	7	User A ends the call					
	8	Verify that user B is informed that call has ended					
	9	Verify that user A is informed that call has ended					
Conformance	Check						
Criteria:	1	TP_IMS_5097_01 in CFW step 6 (INVITE):					
		ensure that {					
		when { UE_A sends an initial INVITE to UE_B }					
		then { IMS_B receives the initial INVITE					
		not containing a Route_header					
		indicating the S-CSCF_SIP_URI of IMS_A					
		containing a P-Charging-Vector_header					
		(containing an icid-value_parameter and					
		containing a orig-ioi_parameter indicating IMS_A and					
		not containing an access-network-charging-info_parameter and					
		not containing a term-ioi_parameter) and					
		containing a Record-Route_header					
		indicating the originating S-CSCF_SIP_URI and					
		not containing a P- access-network-info header }					
	2	TP_IMS_5097_02 in CFW step 6 (INVITE)					
		ensure that {					
		when { UE_A sends an initial INVITE to UE_B					
		When { OL_A serius an initial invite to OL_B					
		then { IMS_B receives the initial INVITE					
		containing a P-Asserted-Identity_header					
		indicating the SIP_URI of UE_A					
		and					
		containing a P-Asserted-Identity_header					
		indicating the Tel_URI of UE_A}					
		}					
	3	TP_IMS_5107_02 in CFW step 28 (ACK):					
		ensure that {					
		when { UE_A sends ACK to UE_B }					
		then { IMS_B receives the ACK					
		not containing Route_header					
		indicating the S-CSCF_SIP_URI of IMS_A }					
		}					
		TP_IMS_5107_01 in CFW step 35A (BYE):					
	4	= = = · · · /					
	4	ensure that {					
	4	ensure that { when { UE_A sends BYE to UE_B }					
	4	ensure that { when { UE_A sends BYE to UE_B } then { IMS_B receives the BYE					
	4	ensure that {  when { UE_A sends BYE to UE_B }  then { IMS_B receives the BYE  not containing Route_header					
	4	ensure that { when { UE_A sends BYE to UE_B } then { IMS_B receives the BYE					

Interoperability Test Description								
	5	TP_IMS_5115_01 in CFW step 15 (180 Ringing):						
		ensure that {						
		when { UE_B sends a 180_response to UE_A }						
		then { IMS_A receives the 180_response from IMS_B						
		containing a P-Charging-Vector_header						
		containing an orig-ioi_parameter						
		indicating operator_identifier of IMS_A and						
		containing a term-ioi_parameter						
		indicating operator_identifier of IMS_B						
		3 1, 1 1 1 1 1						
	6	TP_IMS_5115_03 in CFW step 15 (180 Ringing):						
		ensure that {						
		when { UE_B sends a 1xx_response to UE_A						
		<b> </b> }						
		then { IMS_A receives the 1xx_response						
		containing a P-Asserted-Identity_header						
		indicating the SIP_URI of UE_B and						
		containing a P-Asserted-Identity_header						
		indicating the Tel_ URI of UE_B }						
		]						
	7	TP_IMS_5115_02 in CFW step 22 (2xx):						
		ensure that {						
		when { UE_B sends a 2xx_response to UE_A }						
		then { IMS_A receives the 2xx_response from IMS_B						
		containing a P-Charging-Vector_header						
		containing an orig-ioi_parameter						
		indicating operator_identifier of IMS_A and						
		containing a term-ioi_parameter						
		indicating operator_identifier of IMS_B						
		}						
	8	TP_IMS_5115_04 in CFW step 22 (2xx):						
		ensure that {						
		when { UE_B sends a 2xx_response to UE_A						
		]}						
		then { IMS_A receives the 2xx_response						
		containing a P-Asserted-Identity_header						
		indicating the SIP_URI of UE_B and						
		containing a P-Asserted-Identity_header						
		indicating the Tel_URI of UE_B }						
		]}						
	9	TP_IMS_5131_01 in CFW step 15 (180 Ringing):						
		ensure that {						
		when { UE_B sends a 180_response to UE_A }						
		then { IMS_B sends the 180_response to IMS_A						
		not containing a P-Charging-Function-Addresses_header }						
		]						
	10	TP_IMS_5131_02 in CFW step 22 (2xx)						
		ensure that {						
		when { UE_B sends a 2xx_response to UE_A }						
		then { IMS_A receives the 2xx_response from IMS_B						
		not containing a P-Charging-Function-Addresses_header }						
		}						
		ν						

Step		Direction							Message	Comment
	U s e r A	U E A	M S A	I B C F A	I B C F B	I M S B	ВШС	U s e r B		
1		<b>—</b>								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<del>(</del>							100 Trying	IMS_A responds with a 100 Trying provisional response

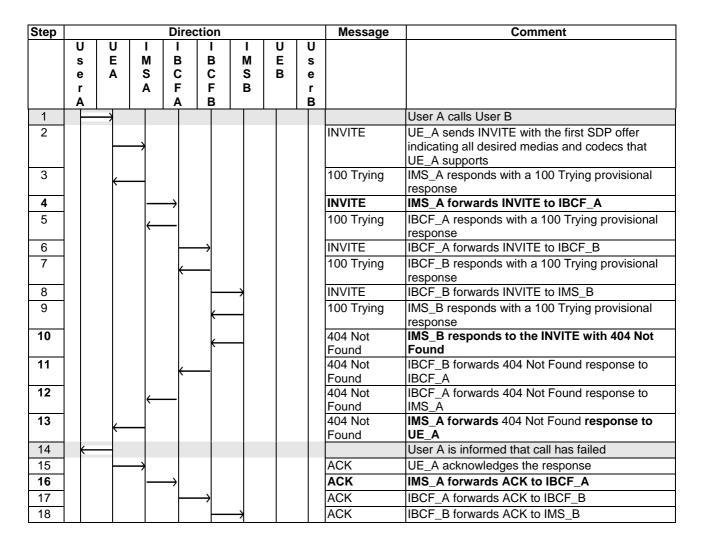
Step			Dii	rectio	n				Message	Comment
	U s	U I E M	l B	I E	 		U E	U s		
	е	A S	C	C	;	S	В	е		
	r A	Α	F A	F		В		r B		
4			$\longrightarrow$	,	•	,			INVITE	IMS_A forwards INVITE to IBCF_A
5		•	<u>-</u>						100 Trying	IBCF_A responds with a 100 Trying provisional response
6			-	$\longrightarrow$					INVITE	IBCF_A forwards INVITE to IBCF_B
7			•						100 Trying	IBCF_B responds with a 100 Trying provisional response
8					<del></del>				INVITE	IBCF_B forwards INVITE to IMS_B
9					<del></del>				100 Trying	IMS_B responds with a 100 Trying provisional response
10						<del></del>			INVITE	IMS_B forwards INVITE to UE_B
11						<b>(</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
12								$\rightarrow$		User B is informed of incoming call of User A
13						<del></del>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14					<del></del>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15			•						180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16			:						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17		<del>(                                    </del>							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	(									User A is informed that UE_B is ringing
19							<b>-</b>			User B answers call
20						<b>‹</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21					<del></del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
22			•						200 OK	IBCF_B forwards 200 OK response to IBCF_A
23			<u>:</u>						200 OK	IBCF_A forwards 200 OK response to IMS_A
24		<b>—</b>							200 OK	IMS_A forwards 200 OK response to UE_A
25	(									User A is informed that call has been answered
26		$\longrightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
27		-	$\longrightarrow$						ACK	IMS_A forwards ACK to IBCF_A
28			-	$\longrightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
29					$\longrightarrow$				ACK	IBCF_B forwards ACK to IMS_B
30						$\longrightarrow$			ACK	IMS_B forwards ACK to UE_B
31								$\rightarrow$		User B is informed that the call is established
30					<del></del>	>		<b>→</b>		IMS_B forwards ACK to UE_B



#### 4.5.3.1.1.4 Rejection of call from barred user

		Interoperability Test [	Description						
Identifier:	TD_IMS_CALL_0003								
Summary:	IMS network does not establish call to barred user								
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	Test Purp	ose	Specification Reference						
	TP_IMS_5	108_05	TS 124 229 [1], clause 5.4.3.3 ¶8 (item 1 in 1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_02_I								
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B using any user identity</li> <li>IMS_A within the trust domain of IMS_B</li> <li>User B has two public identities in IMS_B out of which one of has been barred</li> </ul>								
Test Sequence:	Step								
	1	Jser A calls user B using barred user identity							
	2 Verify that user A is informed that call cannot be established								
	•								

	Interoperability Test Description									
Conformance										
Criteria:	1	TP_IMS_5108_05 in CFW step 11 (404 response):								
		ensure that {								
		when { UE_A sends an initial INVITE to UE_B and								
		IMS_A sends the INVITE to IMS_B								
		containing a Request_URI								
		indicating a barred_user in IMS_B }								
		then { IMS_B sends 404_response to IMS_A }								
		}								



#### 4.5.3.1.1.5 Rejection of call to non-existing user

		Interoperability Test Desc	cription							
Identifier:	TD_IMS_	CALL_0004	<del>-</del>							
Summary:	IMS netwo	ork rejects call to non existing use	er							
Configuration:	CF_INT_CALL									
SUT	IMS_B									
References	Test Purp	pose	Specification Reference							
	TP_IMS_	5132_01	TS 124 229 [1], clause 5.3.2.1 ¶54 (after 5 <sup>th</sup> numbered list)							
Use Case ref.:	UC_01_I		,							
Pre-test conditions:	<ul> <li>HSS of IMS_A and is configured according to table 1</li> <li>UE_A have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>IMS_A within the trust domain of IMS_B</li> </ul>									
Test Sequence:	<b>Step</b> 1 2		ng a non existing identity within IMS_B domain ed that call cannot be established							
Conformance Criteria:	Check 1	IMS_A sends the INVITE t	NVITE _URI ting_user in IMS_B and							

Step	Direction								Message	Comment
	U s e r A	U E A	M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
1										User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				<del>(</del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>(</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
10					<b>(</b>				404 Not Found	IMS_B responds to the INVITE with 404 Not Found
11				$\leftarrow$					404 Not Found	IBCF_B forwards 404 Not Found response to IBCF_A
12			$\leftarrow$	_					404 Not Found	IBCF_A forwards 404 Not Found response to IMS_A

Step				Dire	ction				Message	Comment
	U s e r A	U E A	M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
13		<b>←</b>				•			404 Not Found	IMS_A forwards 404 Not Found response to UE_A
14	<b>—</b>	-								User A is informed that call has failed
15			$\rightarrow$						ACK	UE_A acknowledges the response
16				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
17					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
18						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B

# 4.5.3.1.1.6 Rejection of call to unavailable user

		Interoperability Test Desc	ription								
Identifier:	TD_IMS_0	CALL_0005									
Summary:	IMS network does not establish a call for unavailable user										
Configuration:	CF_INT_CALL										
SUT	IMS_B										
References	Test Purp	ose	Specification Reference								
	TP_IMS_5	5133_01	TS 124 229 [1], clause 5.3.2.1 ¶55 (before 6 <sup>th</sup> numbered list)								
Use Case ref.:	UC_01_I										
Pre-test conditions:	<ul> <li>HSS of IMS_A and IMS_B is configured according to table 1</li> <li>UE_A has IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is not registered in IMS_B</li> </ul>										
Test Sequence:	Step										
	1	User A calls a valid user B identit									
	2	Verify that user A is informed tha	t user B is not reachable or equivalent								
	<u> </u>										
Conformance	Check										
Criteria:	1	TP_IMS_5133_01 in CFW step 1	FW step 11 (4xx):								
		ensure that {									
		when { UE_A sends INVITE to									
		then { IMS_B sends a 4xx_resp }	onse to IMS_A }								

Step		Direction							Message	Comment
	U	Ū	I	Ī	Ī	I	Ū	U		
	s e	E A	M S	B	B	M	E B	s e		
	r	^	Ā	F	F	В		r		
	Ą			Α	В			В		
1		$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		←	_						100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
10					←				4xx	IMS_B responds to the INVITE with 4xx
11				$\leftarrow$					4xx	IBCF_B forwards 4xx response to IBCF_A
12			$\leftarrow$						4xx	IBCF_A forwards 4xx response to IMS_A
13		<b>←</b>	4						4xx	IMS_A forwards 4xx response to UE_A
14	<b>(</b>									User A is informed that call has failed
15			$\rightarrow$						ACK	UE_A acknowledges the response
16			_	$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
17					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
18						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B

# 4.5.3.1.1.7 Initial request to non-registered user with terminating unregistered filter criterion

	Test Description								
Identifier:	TD_IMS_CALL_0006								
Summary:	IMS network can handle initial request to non-registered user with terminating unregistered filter criterion								
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	Test Purpose	Specification Reference							
	TP_IMS_5109_01	TS 124 229 [1], clause 5.3.2.1 ¶76 (after 2 <sup>nd</sup> numbered list)							
Use Case Ref.:	UC_01_I								
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A has no filter criteria defined in HSS</li> <li>IMS_B has terminating unregistered criterion set for UE_B on INVITE indicating SESSION_TERMINATED option and forward the INVITE to AS_B</li> <li>AS_B is unreachable from IMS_B</li> <li>UE_A registered using any user identity</li> <li>UE_B not registered as userNOAS_priv according to table 1</li> </ul>								
Test Sequence:	Step 1 User A calls user B (i.e. userNC 2 Verify that user A is informed th	,							
Pass Criteria:	TP_IMS_5109_01 in CFW step ensure that {     when { UE_A sends INVITE to then { IMS_B receives the INV sends (a 408_response}} }	UE_B}							

Step				Direc	tion				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	I M S B	U E B	U s e r B		
1		-								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		←							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$	_				100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$	$\dashv$			100 Trying	IMS_B responds with a 100 Trying provisional response
10					<b>—</b>				408 Request Timeout or	IMS_B responds to the INVITE with 4xx
11				<del>(</del>	_				408 Request Timeout or	IBCF_B forwards 4xx response to IBCF_A

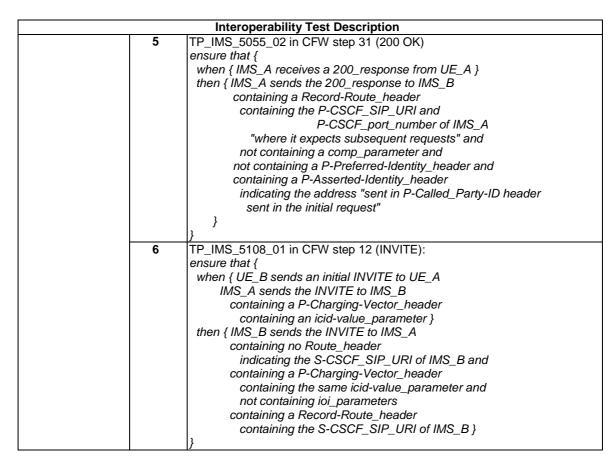
Step				Direc	ction				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	I M S B	U E B	U s e r B		
12			<b>←</b>	_					408 Request Timeout or	IBCF_A forwards 4xx response to IMS_A
13			408 Request Timeout or	IMS_A forwards 4xx response to UE_A						
14	$\vdash$									User A is informed that called user is not reachable

# 4.5.3.1.2 Dialogue Procedures with Roaming

#### 4.5.3.1.2.1 Normal call

		Interoperability Test Description								
Identifier:	TD IMS	CALL_0007								
Summary:		vork handles normal call while UE_B is roaming witho	ut topology hiding							
,	correctly									
Configuration:	CF_ROA									
SUT	IMS_A									
References	Test Pur	pose Specification Re	eference							
	TP_IMS_	_5046_01 TS 124 229 [1], c (1 <sup>st</sup> numbered lis	clause 5.2.6.3.3 ¶1 t)							
	TP_IMS	_5070_01 TS 124 229 [1], c								
			clause 5.4.3.3 ¶126							
	TP_IMS_	_5055_01 TS 124 229 [1], c (1 <sup>st</sup> numbered lis	clause 5.2.6.4.4 ¶1 t)							
	TP_IMS_	(1 <sup>st</sup> numbered list								
	TP_IMS_	5108_01 TS 124 229 [1], c (1 <sup>st</sup> numbered lis	clause 5.4.3.3 ¶5 t)							
Use Case ref.:	UC_02_I	₹								
Pre-test	• H	SS of IMS_A and of IMS B is configured according to	table 1							
conditions:	• U	E_A and UE_B have IP bearers established to IMS_A								
	• U	E_A is registered in IMS_A using any user identity								
	• U	E_B is registered in IMS_B via IMS_A using any user	identity							
	• IN	MS_A within the trust domain of IMS_B								
	• A	Service-Route header list exists for UE_B in P-CSCF								
Test Sequence:	Step									
	1	User B calls User A								
	2	Verify that user A is informed of incoming call of Us	er B							
	3	Verify that user B is informed that UE_A is ringing								
	4	User A answers call								
	5	Verify that user B is informed that call has been ans								
	6	Verify that user A is informed that the call is established	shed							
	7	User A ends call								
	8	Verify that user B is informed that call has ended								
	9	Verify that user A is informed that call has ended								

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5046_01 in CFW step 6 (INVITE) ensure that {
		when { IMS_A receives an initial INVITE from UE_B }
		then { IMS_A sends the INVITE to IMS_B
		containing a topmost Route_header
		not indicating the P-CSCF_SIP_URI of IMS_A and containing a Route_header
		indicating the "list of Service Route header URIs
		from the registration" and
		containing an additional Via_header
		containing ( the P-CSCF_via_port_number and
		(the P-CSCF-FQDN_address or
		the P-CSCF-IP_address)) of IMS_A and
		containing an additional topmost Record-Route_header
		indicating (the P-CSCF_port_number
		'where it awaits subsequent requests' from UE_A and
		(the P-CSCF-FQDN_address or the P-CSCF-IP_address)) of IMS_A and
		not containing P-Preferred-Identity_header and
		containing a P-Asserted-Identity_header
		containing an address of UE_B and
		containing a P-Charging-Vector_header
		containing an icid-value_parameter }
		}
	2	TP_IMS_5070_01 in CFW step 13 (100 Trying)
		ensure that {
		when { IMS_A receives an initial INVITE from IMS_B }
		then { IMS_A sends a 100_response to IMS_B
		}
	3	TP_IMS_5301_01 in CFW step 13 (BYE)
		ensure that {
		when { UE_A sends BYE to UE_B }
		then { IMS_B receives the BYE
		not containing Route_header
		indicating the S-CSCF_SIP_URI of IMS_A
		containing an additional topmost Record-Route_header
		indicating the S-CSCF_SIP_URI of IMS_A
		}
	4	TP_IMS_5055_01 in CFW step 21 (180 Ringing)
		ensure that {
		when { IMS_A receives a 180_response from UE_A }
		then { IMS_A sends a 180_response to IMS_B
		containing a Record-Route_header
		containing the P-CSCF_SIP_URI and
		P-CSCF_port_number of IMS_A
		"where it expects subsequent requests" and not containing a comp_parameter and
		not containing a Comp_parameter and not containing a P-Preferred-Identity_header and
		containing a P-Preferred-Identity_header
		indicating the public identity "sent in P-Called_Party-ID header
		sent in the initial request" }
		13



Step		Direction							Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	I M S B	U E B	U s e r B		
1							<b>←</b>			User B calls User A
2			$\leftarrow$						INVITE	UE_B sends INVITE with the first SDP offer indicating all desired medias and codecs that
3						_	$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9					<b>←</b>	_			100 Trying	IMS_B responds with a 100 Trying provisional response
10					<b>←</b>				INVITE	IMS_B forwards INVITE to IBCF_B
11						$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
12				<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
13					$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response

Step		Directio	n		Message	Comment
	U U I s E M	I I B B	I M	U U E s		
	e A S	CCF	S	B e		
1.1	A	A B		<u> </u>	INVITE	IBCE A forwards INIVITE to IMC A
14		_				IBCF_A forwards INVITE to IMS_A
15		$\rightarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
16	<b>├</b>				INVITE	IMS_A forwards INVITE to UE_A
17					100 Trying	UE_A optionally responds with a 100 Trying provisional response
18						User A is informed of incoming call of User B
19					180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
20		$\rightarrow$			180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
21		$\longmapsto$			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
22			$\longrightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
23					180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
24					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
25	<b>│</b>	_			180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
26				*	180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
27				$\mapsto$		User B is informed that UE_A is ringing
28						User A answers call
29					200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
30		$\rightarrow$			200 OK	IMS_A forwards 200 OK response to IBCF_A
31		$\left \longrightarrow\right $			200 OK	IBCF_A forwards 200 OK response to IBCF_B
32			$\longrightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
33					200 OK	IMS_B forwards 200 OK response to IBCF_B
34					200 OK	IBCF_B forwards 200 OK response to IBCF_A
35	<del> </del>	_			200 OK	IBCF_A forwards 200 OK response to IMS_A
36					200 OK	IMS_A forwards 200 OK response to UE_B
37						User B is presented that call in process
38	<b>←</b>			-	ACK	UE_B acknowledges the receipt of 200 OK for INVITE
39		$\rightarrow \mid  \mid$			ACK	IMS_A forwards ACK to IBCF_A
40					ACK	IBCF_A forwards ACK to IBCF_B
41			$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
						,

Step				Direc	tion				Message	Comment
		_	I M	I B	I B	I M	U	U		
	e r			C F	C F	S	В	e r		
10	À			Ā	В		<u> </u>	В	A 01/	IMO D famous la AOV te IDOE D
42					$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
43				$\leftarrow$					ACK	IBCF_B forwards ACK to IBCF_A
44			$\leftarrow$	_					ACK	IBCF_A forwards ACK to IMS_A
45		←							ACK	IMS_A forwards ACK to UE_A
46	€									User A is informed that the call is in progress
47A										User A ends call
48A			,						BYE	UE_A releases the call with BYE
49A				÷					BYE	IMS_A forwards BYE to IBCF_A
50A					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
51A					_	$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
53A					<b>←</b>				BYE	IMS_B forwards BYE to IBCF_B
54A				$\leftarrow$					BYE	IBCF_B forwards BYE to IBCF_A
55A			$\leftarrow$	_					BYE	IBCF_A forwards BYE to IMS_A
56A				-	_		$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
57A							$\vdash$	$\rightarrow$		User B is informed that call has ended
58A			$\leftarrow$	-	-		-		200 OK	UE_B sends 200 OK for BYE
59A				<del>)</del>					200 OK	IMS_A forwards 200 OK response to IBCF_A
60A					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
61A						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
62A					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
63A				$\leftarrow$	_				200 OK	IBCF_B forwards 200 OK response to IBCF_A
64A			$\leftarrow$	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
65A		←—							200 OK	IMS_A forwards the 200 OK response to UE_A
66A	<del></del>									User B is informed that call has ended

#### 4.5.3.1.2.2 Normal call with hold/resume

		Interoperability Test I	Description								
Identifier:	TD_IMS_	CALL_0008	•								
Summary:	IMS netw	ork handles subsequent INVI	TEs correctly in case of a user initiated call hold								
			aming user on hold and resumes call								
Configuration:	CF_ROA	M_CALL									
SUT	IMS_A										
References	Test Pur		Specification Reference								
	TP_IMS_	_	TS 124 229 [1], clause 5.2.9.2 ¶1								
	TP_IMS_		TS 124 229 [1], clause 5.2.9.2 ¶2								
	TP_IMS_5120_01 TS 124 229 [1], clause 5.4.3.3 ¶99 (item 3 and 5 in 7 <sup>th</sup> numbered list)										
	UC 03 R (item 3 and 5 in 7" numbered list)										
Use Case ref.:	UC_03 R										
Dec tool											
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS needs</li> </ul>										
conditions:			rs established to their respective IMS networks								
		per clause 4.2.1	1. 10 ( ) I   I   I   I   I   I   I   I   I   I								
	UE_A configured to perform user initiated hold/resume using INVITE										
		_A is registered in IMS_A us									
	● UE		a IMS_A using any user identity								
Test Sequence:	Ston										
rest sequence.	Step  1 User A calls User B										
	1 User A calls User B 2 Verify that user B is informed of incoming call of User A										
	3 Verify that user A is informed of incoming call of User A 3 Verify that user A is informed that UE_A is ringing										
	3  Verify that user A is informed that UE_A is ringing 4   User B answers call										
	4 User B answers call 5 Verify that user A is informed that call has been answered										
	6 Verify that user B is informed that call is established										
	6 Verify that user B is informed that call is established 7 User A puts call on hold										
	7 User A puts call on hold  8 Verify that user B is informed that call is on hold										
	9	Verify that user A is informe									
	10	User A resumes call	a that can is on hold								
	11	Verify that user B is informe	d that call is resumed								
	12	Verify that user A is informe									
	13	User A ends call									
	14	Verify that user B is informe	d that call has ended								
	15	Verify that user A is informe									
Conformance	Check										
Criteria:	1		step 59A and 94A (100 Trying):								
		ensure that {									
			sequent INVITE to UE_B and								
		IMS_A receives the IN									
		then { IMS_A sends a 100	_response to IMS_B }								
	2	TD IMS 5092 01 in CEW 6	step 67A and 102A (200 OK):								
		ensure that {	step 67A and 102A (200 OK).								
			200_response from UE_B }								
		then { IMS_A sends the 20									
			arging-Vector_header								
		containing an up									
		access-ne	etwork-charging-info_parameter								
		}									
		}									
	3	TP_IMS_5120_01 in CFW s	step 58A and 93A (INVITE):								
		ensure that {	observation (IND/ITE / LIE D.)								
	1		ubsequent INVITE to UE_B }								
	1	then { IMS_A receives to									
	1		topmost Route_header								
			ting the S-CSCF_SIP_URI  Record-Route, header								
		_	Record-Route_header the S-CSCF_SIP_URI }								
		Containing	uie o-oooi _oir _oixi f								
	ı	IJ									

Step			Dire	ction			Message	Comment
	U s	U I	I I I B	I B	I M	U U E s		
	е	A   5	S C	С	S	Ве		
	r A	/	A F	F B	В	r B		
46			1					User B is presented that call is in progress
47A		<del>)</del>						User A puts call on hold
48A							INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
49A		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
50A			$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
51A			<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
52A				$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
53A			<del>(</del>				100 Trying	IBCF_B responds with a 100 Trying provisional response
54A					$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
55A				<del>-</del>			100 Trying	IMS_B responds with a 100 Trying provisional response
56A				<del>(                                    </del>			INVITE	IMS_B forwards INVITE to IBCF_B
57A					$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
58A			<b>←</b>				INVITE	IBCF_B forwards INVITE to IBCF_A
59A			_	$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
60A			←				INVITE	IBCF_A forwards INVITE to IMS_A
61A			$\longrightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
62A						$\rightarrow$	INVITE	IMS_A forwards INVITE to UE_B
63A			<del></del>				100 Trying	UE_B optionally responds with a 100 Trying provisional response
64A								User B is informed that call is on hold
65A			<del></del>				200 OK	UE_B responds to INVITE with 200 OK indicating attribute "recvonly" inactive
66A			$\longrightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
67A			-	$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
68A					$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
69A				<b>—</b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
70A			<b>←</b>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
71A			<del></del>				200 OK	IBCF_A forwards 200 OK response to IMS_A
72A		$\longleftarrow$					200 OK	IMS_A forwards 200 OK response to UE_A
73A		$\longrightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE

74A	s	U I E M A S		1 1	UU	Message	
	e r	A S		BM			
		I A	C	C S	Ве		
			F A	F B	r B		
75.4			$\longrightarrow$			ACK	IMS_A forwards ACK to IBCF_A
75A				$\rightarrow$		ACK	IBCF_A forwards ACK to IBCF_B
76A				$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
77A				<del></del>		ACK	IMS_B forwards ACK to IBCF_B
78A			$\leftarrow$	_		ACK	IBCF_B forwards ACK to IBCF_A
79A		←				ACK	IBCF_A forwards ACK to IMS_A
80A		-		_	$\longrightarrow$	ACK	IMS_A forwards ACK to UE_B
81A	<b>(</b>						User A is informed that call is on hold
82A		+					User A resumes call
83A		$\longrightarrow$				INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
84A		$\leftarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
85A		-	$\longrightarrow$			INVITE	IMS_A forwards INVITE to IBCF_A
86A		<del> </del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
87A				$\rightarrow$		INVITE	IBCF_A forwards INVITE to IBCF_B
88A			$\leftarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
89A				$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
90A				<del></del>		100 Trying	IMS_B responds with a 100 Trying provisional response
91A				<b>—</b>		INVITE	IMS_B forwards INVITE to IBCF_B
92A				$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
93A			←			INVITE	IBCF_B forwards INVITE to IBCF_A
94A				$\rightarrow$		100 Trying	IBCF_A responds with a 100 Trying provisional response
95A		(←				INVITE	IBCF_A forwards INVITE to IMS_A
96A		-	$\longrightarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
97A		-			$\longrightarrow$	INVITE	IMS_A forwards INVITE to UE_B
98A						100 Trying	UE_B optionally responds with a 100 Trying provisional response
99A					$\rightarrow$		User B is informed that call is resumed
100 A		(←				200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"
101 A		-	$\longrightarrow$			200 OK	IMS_A forwards 200 OK response to IBCF_A

Step				Direc	ction				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	- BCFB	I M S B	ВВΩ	U s e r B		
102 A					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
103 A						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
104 A					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
105 A				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
106 A			$\leftarrow$	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
107 A		<del>(</del>							200 OK	IMS_A forwards the 200 OK response to UE_A
108 A	<b>(</b>									User B is informed that call has ended

# 4.5.3.1.2.3 Subsequent request (other than target refresh)

		Interoperability Test Description
Identifier:	TD_IMS_C	ALL_0009
Summary:		k handles routing information in subsequent requests (other than target
		eived from the UE before forwarding them to another IMS network.
Configuration:	CF_ROAM	CALL
SUT	IMS_A	
References	Test Purpo	
	TP_IMS_50	
		(1 <sup>st</sup> numbered list)
Use Case ref.:	UC_02_R	
Pre-test	• HSS	of IMS_A and of IMS B is configured according to table 1
conditions:	• UE_	B has IP bearers established to their respective IMS networks as per
	claus	se 4.2.1
	• UE_	A registered in IMS_A using any user identity
	• UE_	B is registered in IMS_B via IMS_A using any user identity
Test Sequence:	Step	
	1	User B calls User A
	2	Verify that user A is informed of incoming call of User B
	3	Verify that user B is informed that UE_A is ringing
	4	User A answers call
	5	Verify that user B is informed that call has been answered
	6	Verify that user A is informed that the call is established
	7	User B ends call
	8	Verify that user A is informed that call has ended
	9	Verify that user B is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5052_01 in CFW step 50B (BYE):
		ensure that {
		when { IMS_A receives a BYE from UE_B }
		then { IMS_A sends the BYE to IMS_B
		not containing a Route_header
		indicating the P-CSCF_SIP_URI of IMS_A and
		containing the same Record-Route_header
		as in the previous ACK and
		containing a P-Charging-Vector header
		containing an icid-value_parameter
		}
		}

Step				Direct	ion				Message	Comment
	U s	U E	I M	I B	I B	I M	U	U s		
	e r	Α	S	C F	C F	S B	В	e r		
	A		ζ	A	В			В		
48B			$\leftarrow$						BYE	UE_B releases the call with BYE
49B				$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
50B					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
51B						$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
53B					<b>←</b>				BYE	IMS_B forwards BYE to IBCF_B
54B				<del></del>	_				BYE	IBCF_B forwards BYE to IBCF_A
55B			$\leftarrow$						BYE	IBCF_A forwards BYE to IMS_A
56B		<b>←</b>							BYE	IMS_A forwards BYE to UE_A
57B	<b>-</b>									User A is informed that call has ended
58B			$\rightarrow$						200 OK	UE_A sends 200 OK for BYE
59B				$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
60B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
61B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
62B					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
63B				<del></del>	_				200 OK	IBCF_B forwards 200 OK response to IBCF_A
64B			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
65B							$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_A
66B								$\rightarrow$		User B is informed that call has ended

# 4.5.3.1.2.4 Subsequent target refresh request (INVITE)

		Interoperability Test Des	cription									
Identifier:		CALL_0010										
Summary:												
	IMS network handles subsequent INVITEs correctly in case of a user initiated call hold and resume when roaming caller puts a home user on hold and resumes call  CF_ROAM_CALL											
Configuration:		И_CALL										
SUT	IMS_A		lo array pro									
References	Test Purp		Specification Reference									
	TP_IMS_5		TS 124 229 [1], clause 5.2.6.3.5 ¶1 (1 <sup>st</sup> numbered list)									
	TP_IMS_5		TS 124 229 [1], clause 5.2.9.1 ¶2									
Use Case ref.:	UC_03_R											
Pre-test conditions:  HSS of IMS_A and of IMS B is configured according to table 1  UE_A and UE_B have IP bearers established to their respective II as per clause 4.2.1  UE_B configured to perform user initiated hold/resume using INVI  UE_A registered in IMS_A using any user identity  UE_B is registered in IMS_B via IMS_A using any user identity												
Test Sequence:	Step											
	1	User B calls User A										
	Verify that user A is informed of incoming call of User B											
	3 Verify that user B is informed that UE_A is ringing 4 User A answers call											
	5	Verify that user B is informed the	user B is informed that call has been answered									
	6	Verify that user A is informed th	at call is established									
	7	User B puts call on hold										
	8	Verify that user A is informed that call is on hold										
	9	Verify that user B is informed th	at call is on hold									
	10											
	11	Verify that user A is informed th	at call is resumed									
	12	Verify that user B is informed th	at call is resumed									
	13	User A ends call										
	14	Verify that user B is informed th	at call has ended									
	15	Verify that user A is informed th	at call has ended									
Conformance	Check											
Criteria:	1	TP_IMS_5048_01 in CFW step	52B and 87B (INVITE):									
		ensure that { when { IMS_A receives a substitute of the containing a topmost Receives a substitute of the containing a topmost Received and the containing and the containing a topmost Received and the containing a topmost	sequent INVITE from UE_B } E to IMS_B									
		containing an additional										
		containing ( the P-CS	CF_via_port_number and									
		(the P-CSCF-	FQDN_address or									
		the P-CSCF-I	P_address)) of IMS_A }									
	2	TP_IMS_5080_01 in CFW step ensure that {	52B and 87B (INVITE):									
		when { IMS_A receives subse then { IMS_A sends the INVIT containing a P-Charging-\	E to IMS_B /ector_header									
		containing an updated	access-network-charging-info_parameter}									

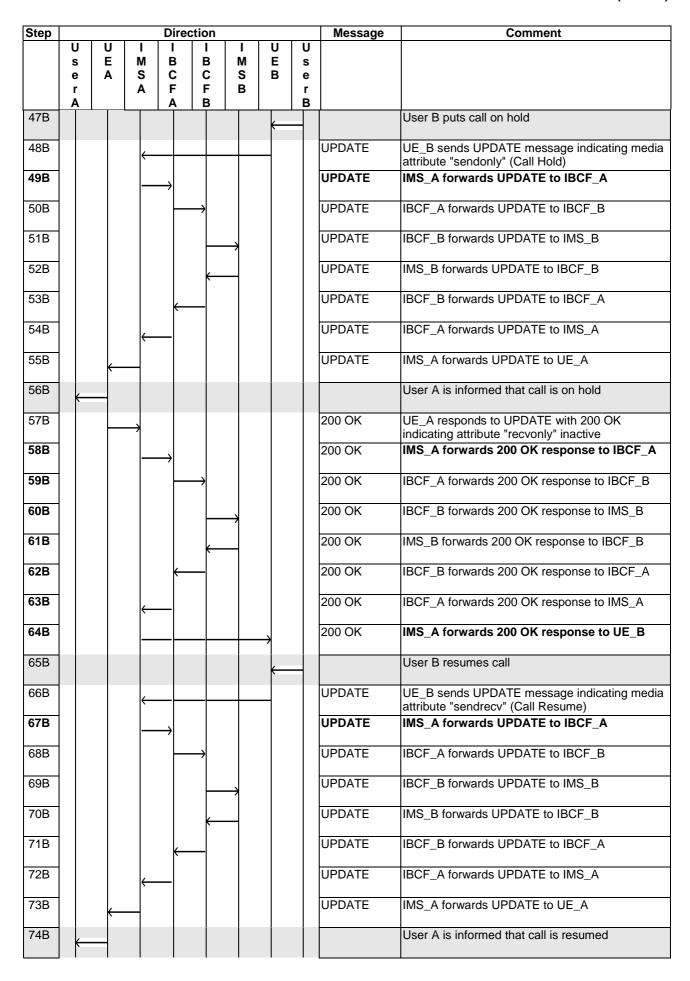
Step				Dire	ction				Message	Comment
	U s	U	I M	I B	I B	I M	ΠC	U s		
	e	Ā	S	С	С	S	В	е		
	r A		Α	F A	F B	В		r B		
47B							<u></u>			User B puts call on hold
48B			$\leftarrow$						INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
49B							$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
50B			_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
51B			$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
52B					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
53B				<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
54B						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
55B					←				100 Trying	IMS_B responds with a 100 Trying provisional response
56B					<del></del>				INVITE	IMS_B forwards INVITE to IBCF_B
57B						$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
58B				<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
59B					$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
60B			$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
61B				$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
62B		$\leftarrow$							INVITE	IMS_A forwards INVITE to UE_A
63B			$\rightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
64B	<b>←</b>	+								User A is informed that call is on hold
65B			$\rightarrow$						200 OK	UE_A responds to INVITE with 200 OK indicating attribute "recvonly" inactive
66B				$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
67B					$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
68B						$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
69B					<b>←</b>	_			200 OK	IMS_B forwards 200 OK response to IBCF_B
70B				<del>(</del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
71B			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
72B							$\rightarrow$		200 OK	IMS_A forwards 200 OK response to UE_B
73B			$\leftarrow$				$\dashv$		ACK	UE_B acknowledges the receipt of 200 OK for INVITE
74B				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A

Step			Direction	on			Message	Comment
	U U s E	l M	I B	I I B M	U	U s		
	e A	S		C S F B	В	e r		
75B	A	<u> </u>		В		В	ACK	IBCF_A forwards ACK to IBCF_B
			,					
76B				$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
77B				$\longleftarrow$			ACK	IMS_B forwards ACK to IBCF_B
78B			<del></del>				ACK	IBCF_B forwards ACK to IBCF_A
79B		<b>←</b>					ACK	IBCF_A forwards ACK to IMS_A
80B							ACK	IMS_A forwards ACK to UE_A
81B								User A is informed that call is on hold
82B					<b>—</b>	_		User B resumes call
83B		$\leftarrow$					INVITE	UE_B sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
84B					$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
85B			$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
86B		<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
87B			<del>                                     </del>				INVITE	IBCF_A forwards INVITE to IBCF_B
88B			<b>(</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
89B				<b></b>			INVITE	IBCF_B forwards INVITE to IMS_B
90B				<del></del>			100 Trying	IMS_B responds with a 100 Trying provisional response
91B				<del></del>			INVITE	IMS_B forwards INVITE to IBCF_B
92B							100 Trying	IBCF_B responds with a 100 Trying provisional response
93B			<b>(</b>				INVITE	IBCF_B forwards INVITE to IBCF_A
94B			;				100 Trying	IBCF_A responds with a 100 Trying provisional response
95B		<b>←</b>					INVITE	IBCF_A forwards INVITE to IMS_A
96B		_	$\rightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
97B							INVITE	IMS_A forwards INVITE to UE_A
98B		<b>—</b>					100 Trying	UE_A optionally responds with a 100 Trying provisional response
99B								User A is informed that call is resumed
100B		$\rightarrow$					200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"
101B		_	$\rightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
102B			<del></del>				200 OK	IBCF_A forwards 200 OK response to IBCF_B
		l	I	1 I	l	l		

Step				Dire	ction				Message	Comment
	U s e r A	Ē	M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
103B		·				$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
104B					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
105B				$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
106B			$\leftarrow$	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
107B							$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
108B								$\rightarrow$		User B is informed that call has ended

# 4.5.3.1.2.5 Subsequent target refresh request (UPDATE), roaming user initiated

		Interoperability Test Des	crintian							
Identifier:	TD IMS	· · · · · · · · · · · · · · · · · · ·	on paron							
Summary:	TD_IMS_CALL_0011  IMS network handles subsequent UPDATEs correctly in case of a user initiated call									
Outilitial y.	hold and resume when roaming caller puts a home user on hold and resumes call									
Configuration:	CF_ROAM_CALL									
SUT	CF_ROAM_CALL  IMS_A									
References	Test Purpose Specification Reference									
Neierences	Test Purpose         Specification Reference           TP_IMS_5080_02         TS 124 229 [1], clause 5.2.9.1 ¶2									
Use Case ref.:	UC_03_R		13 124 229 [1], clause 5.2.9.1   2							
Ose Case lel	UC_03_N									
Pre-test	• HS	SS of IMS_A and of IMS B is con	igured according to table 1							
conditions:			their respective IMS networks as per							
oonaniono.		use 4.2.1	Their respective livio hetworks as per							
		=_A registered in IMS_A								
			itiated hold/resume using UPDATE							
		E_B is registered in IMS_B via IM								
	• 0	E_B is registered in livis_B via livi	5_A							
Test Sequence:	Step									
rest ocquence.	1	User B calls User A								
	2	Verify that user A is informed of	incoming call of Llear A							
	3	Verify that user B is informed th								
	4	User A answers call	at UE_A is filigilig							
	5	Verify that user A is informed th	at call has been answered							
	6	Verify that user B is informed th								
	7		at call is established							
		User B puts call on hold	at call is an hold							
	8		user A is informed that call is on hold							
	9	Verify that user B is informed th	at call is on hold							
	10	User B resumes call	at call to account d							
	11	Verify that user A is informed th								
	12	Verify that user B is informed th	at call is resumed							
	13	User A ends call	at acil has and ad							
	14	Verify that user B is informed th								
	15	Verify that user A is informed th	at call has ended							
Conformance	Chook									
Conformance Criteria:	Check	TD IMC 5000 00 in CEM stars	FOR and COR (LIDDATE):							
Criteria:	1	TP_IMS_5080_02 in CFW step ensure that {	SUB and 68B (UPDATE):							
			quant LIDDATE from LIE D							
		when { IMS_A receives subsethen { IMS_A sends the UPDA								
		containing a P-Charging-								
			rector_neader   access-network-charging-info_parameter}							
		tornaming an updated	access-network-charging-inio_parameter}							
	<u> </u>	Į <i>J</i>								

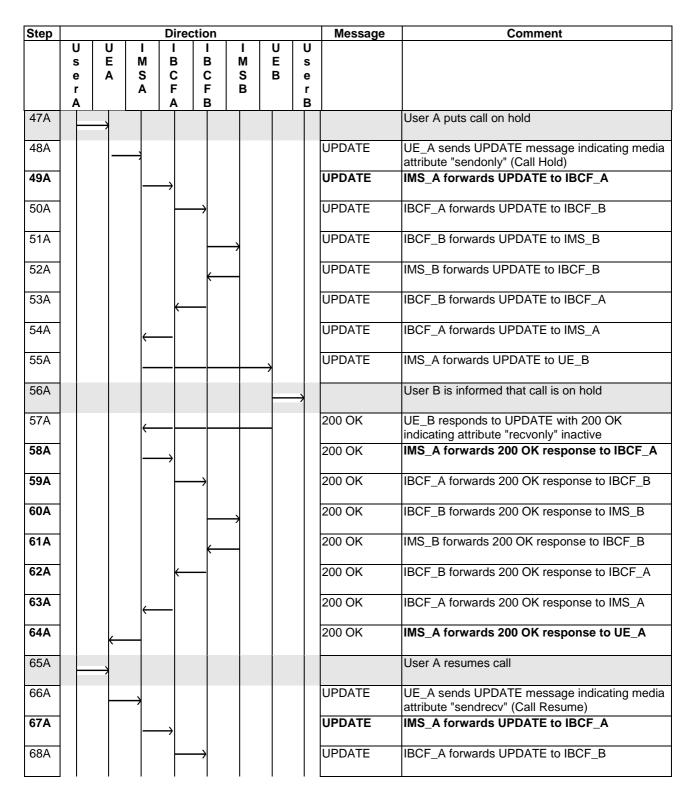


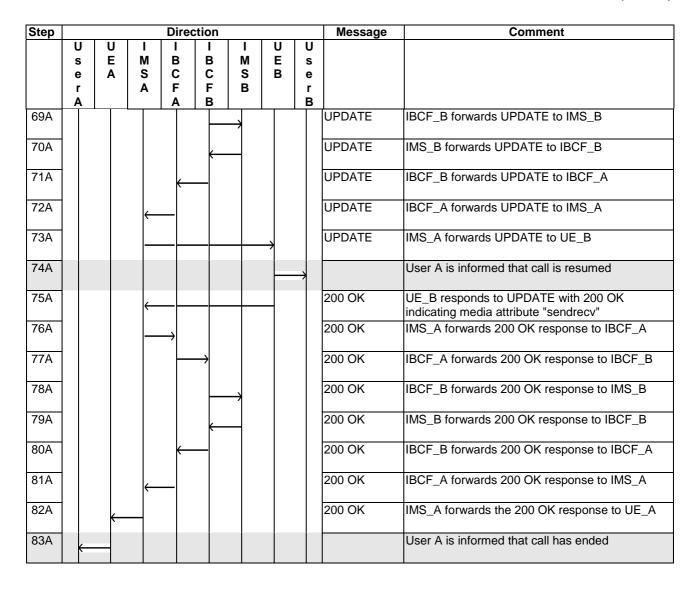
Step		Direction								Message	Comment
	U s e r A	U E A	M S A	I B C F A	I C F		M	U E B	U s e r B		
75B			$\rightarrow$			·	·			200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
76B			_	$\longrightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
77B					$\longrightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
78B					•	$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
79B					(	(				200 OK	IMS_B forwards 200 OK response to IBCF_B
80B				<del>(</del>						200 OK	IBCF_B forwards 200 OK response to IBCF_A
81B			$\leftarrow$							200 OK	IBCF_A forwards 200 OK response to IMS_A
82B			_				<del></del>	,		200 OK	IMS_A forwards the 200 OK response to UE_B
83B									*		User B is informed that call has ended

# 4.5.3.1.2.6 Subsequent target refresh request (UPDATE), home user initiated

		Interoperability Test Descr	ription						
Identifier:	TD_IMS_CALL_0012								
Summary:	IMS network handles subsequent UPDATEs correctly in case of a user initiated call								
	hold and resume when home caller puts a roaming user on hold and resumes call								
Configuration:	CF_ROAM_CALL								
SUT	IMS_A								
References	Test Purp		Specification Reference						
	TP_IMS_	5120_02	TS 124 229 [1], clause 5.4.3.3 ¶99						
			(item 3 and 5 in 7 <sup>th</sup> numbered list)						
Use Case ref.:	UC_03_R								
	1								
Pre-test		$SS$ of IMS_A and of IMS B is config							
conditions:			ablished to their respective IMS networks						
		per clause 4.2.1							
		_A configured to perform user initi							
		_A registered in IMS_A using any							
	• UE	_B is registered in IMS_B via IMS	_A using any user identity						
Test Sequence:	Step								
	1	User A calls User B							
	2	Verify that user B is informed of in							
	3	Verify that user A is informed that	: UE_A is ringing						
	4	User B answers call							
	5	Verify that user A is informed that							
	6	Verify that user B is informed that	call is established						
	7	User A puts call on hold							
	_								
	8								
	9	Verify that user A is informed that							
	9	Verify that user A is informed that User A resumes call	call is on hold						
	9 10 11	Verify that user A is informed that User A resumes call Verify that user B is informed that	call is on hold						
	9 10 11 12	Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that	call is on hold						
	9 10 11 12 13	Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that User A ends call	call is on hold call is resumed call is resumed						
	9 10 11 12	Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that	call is on hold call is resumed call is resumed call has ended						

	Interoperability Test Description									
Conformance	Check									
Criteria:	1	TP_IMS_5120_02 in CFW step 53A and 71A (UPDATE): ensure that {    when { UE_A sends an UPDATE to UE_B }    then { IMS_A receives the UPDATE from IMS_B         containing a topmost Route_header         not indicating the S-CSCF_SIP_URI         containing a Record-Route_header         containing the S-CSCF_SIP_URI } }								



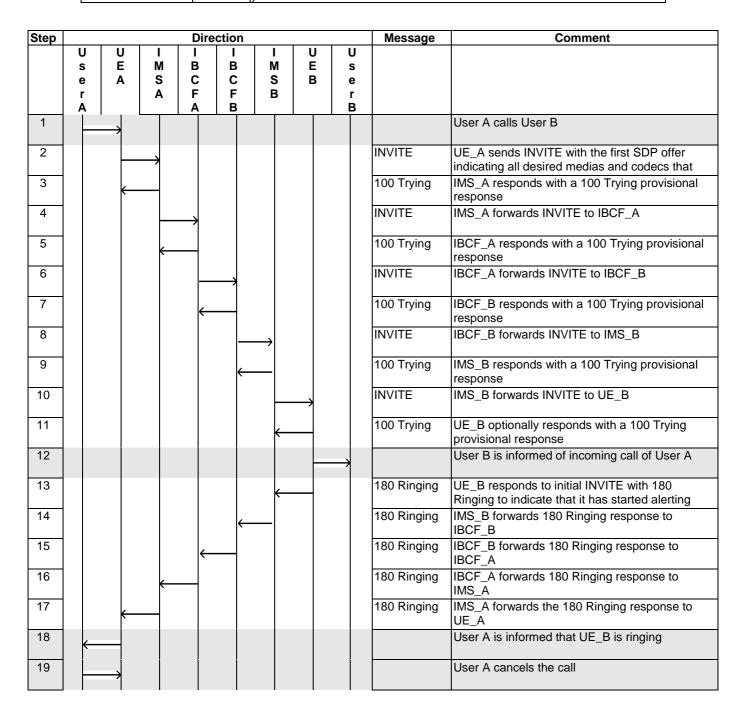


#### 4.5.3.1.3 Subsequent Request Procedures - Originating Network

#### 4.5.3.1.3.1 Call CANCEL by calling user

D_IMS_CALL_0014  MS network handles correctly calling user call	ancelling call before its establishment
, ,	ancelling call before its establishment
F INT CALL	
MS_A	
est Purpose	Specification Reference
P_IMS_5107_03	TS 124 229 [1], clause 5.4.3.2 ¶119 (item 1 in 8 <sup>th</sup> numbered list)
JC_02_I	
<ul> <li>HSS of IMS_A and of IMS B is configured.</li> <li>UE_A and UE_B have IP bearers estages as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using an UE_B is registered in IMS_B using an u</li></ul>	ablished to their respective IMS networks  ny user identity
,	est Purpose P_IMS_5107_03  C_02_I  HSS of IMS_A and of IMS B is config UE_A and UE_B have IP bearers est as per clause 4.2.1 UE_A is registered in IMS_A using ar

	Interoperability Test Description										
Test Sequence:	Step										
	1	User A calls User B									
	2	Verify that user B is informed of incoming call of User A									
	3	Verify that user A is informed that UE_B is ringing									
	4	User A cancels call									
	5	Verify that user B is informed that call has been cancelled									
	6	Verify that user A is informed that call is terminated									
Conformance	Check										
Criteria:	1	TP_IMS_5107_03 in CFW step 24 (CANCEL):									
		ensure that {									
		when { UE_A sends CANCEL to UE_B }									
		then { IMS_B receives the CANCEL									
		not containing Route_header									
		indicating the S-CSCF_SIP_URI of IMS_A									
		]									
		[}									



Step				Dire	ction				Message	Comment
	U	Ū	l I			l I	Ū	U		
	s e	E A	M S	B C	B C	M S	E B	s e		
	r	^	Ä	F	F	В		r		
20	A		$\rightarrow$	A	В			B 	CANCEL	UE_A sends a CANCEL to IMS_A
21		<b>←</b>							200 OK	IMS_A responds with a 200 OK to UE_A
22				$\rightarrow$					CANCEL	IMS_A forwards the CANCEL to IBCF_A
23			<b>—</b>						200 OK	IBCF_A responds with a 200 OK to IMS_A
24					$\rightarrow$				CANCEL	IBCF_A forwards the CANCEL to IBCF_B
25				←					200 OK	IBCF_B responds with a 200 OK to IBCF_A
26					_	$\rightarrow$			CANCEL	IBCF_B forwards the CANCEL to IMS_B
27					$\leftarrow$	_			200 OK	IMS_B responds with a 200 OK to IBCF_B
28							$\longrightarrow$		CANCEL	IMS_B forwards the CANCEL to UE_B
29						$\leftarrow$			200 OK	UE_B responds with a 200 OK to IMS_B
30								$\rightarrow$		User B is informed that call has been cancelled
31						$\leftarrow$			487 Request Terminated	UE_B sends 487 Request Terminated to IMS_B
32							$\longrightarrow$		ACK	IMS_B responds with ACK to UE_B
33					←	-			487 Request Terminated	IMS_B forwards the 487 Request Terminated to IBCF_B
34						$\longrightarrow$			ACK	IBCF_B responds with ACK to IMS_B
35				←	_				487 Request Terminated	IBCF_B forwards the 487 Request Terminated to IBCF_A
36					$\rightarrow$				ACK	IBCF_A responds with ACK to IBCF_B
37			$\leftarrow$						487 Request Terminated	IBCF_A forwards the 487 Request Terminated to IMS_A
38				$\rightarrow$					ACK	IMS_A responds with ACK to IBCF_A
39		<b>←</b>							487 Request Terminated	IMS_A forwards the 487 Request Terminated to UE_A
40			$\rightarrow$						ACK	UE_A responds with ACK to IMS_A
41	<b>←</b>									User A is informed that call is terminated

# 4.5.3.1.3.2 Call CANCEL due to loss of connectivity of calling user during call

	Interoperability T	est Description							
Identifier:	TD_IMS_CALL_0015 IMS network ends call in case calling UE looses connectivity during a call								
Summary:	IMS network ends call in case call	ing UE looses connectivity during a call							
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	Test Purpose Specification Reference								
	TP_IMS_5073_01 TS 124 229 [1], clause 5.2.8.1.2 ¶1 (item 1 in 1 <sup>st</sup> numbered list)								
Use Case ref.:	UC_02_I								
	_								
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B using any user identity</li> <li>IMS_B is supporting (simulated) PDF or PCRF like functionality</li> </ul>								
Test Sequence:	Step								
·	1 User B calls User A 2 Verify that user A is info 3 Verify that user B is info 4 User A answers call 5 Verify that user B is pre	Verify that user A is informed of incoming call of User B Verify that user B is informed that UE_A is ringing User A answers call Verify that user B is presented that call in process Verify that user A is informed that the call is in progress							
		ormed that call has been ended							
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
Conformance	Check								
Criteria:	TP_IMS_5073_01 in C ensure that { when { IMS_B receive then { IMS_B sends a containing Req indicating the containing Froi indicating the containing Call indicating the containing CSe indicating an containing Rou indicating "di containing Rea indicating "50 containing	es "an indication that UE_B is no_longer_available" } BYE to IMS_A quest_URI Contact_header_value of UE_A and header cinitial 200_OK_To_value from UE_A m_header cinitial INVITE_From_value from UE_B and l-ID_header cinitial INVITE_Call_Id_value from UE_B and cq_header incremented Sequence_Number and ute_header calog specific routing information for UE_A" and							

Step				Dire	ction				Message	Comment
•	U	U	ı	ı	I	I	U	U	J -	
	s	E	M	В	В	M	E	s		
	е	Α	S	С	С	S	В	е		
	r		Α	F	F	В		r		
40	Ą			Α	В			В		Han Angerran
19		$\rightarrow$							202.014	User A answers call
20			$\longrightarrow$						200 OK	UE_A responds INVITE with 200 OK to indicate
21									200 OK	that the call has been answered  IMS A forwards the 200 OK response to
				$\longrightarrow$						IBCF_A
22				_	$\rightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
23						$\rightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B
24							$\longrightarrow$		200 OK	IMS_B forwards the 200 OK to UE_B
25							_	$\longrightarrow$		User B is presented that call in process
26						<b>←</b>			ACK	UE_B acknowledges the receipt of 200 OK for INVITE
27					$\leftarrow$	—			ACK	IMS_B forwards ACK to IBCF_B
28				←					ACK	IBCF_B forwards ACK to IBCF_A
29			←						ACK	IBCF_A forwards ACK to IMS_A
30		←							ACK	IMS_A forwards ACK to UE_A
31	<b>←</b>									User A is informed that the call is in progress
32										UE_B looses connectivity
33					$\leftarrow$				BYE	IMS_B forwards BYE to IBCF_B
34				←					BYE	IBCF_B forwards BYE to IBCF_A
35			$\leftarrow$						BYE	IBCF_A forwards BYE to IMS_A
36		←							BYE	IMS_A forwards BYE to UE_A
37										User A is informed that call has ended
38			$\rightarrow$			_			200 OK	UE_A sends 200 OK for BYE
39				$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
40				_	$\rightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
41						$\longrightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B

# 4.5.3.1.3.3 Call failure due to de-registration of calling user during call

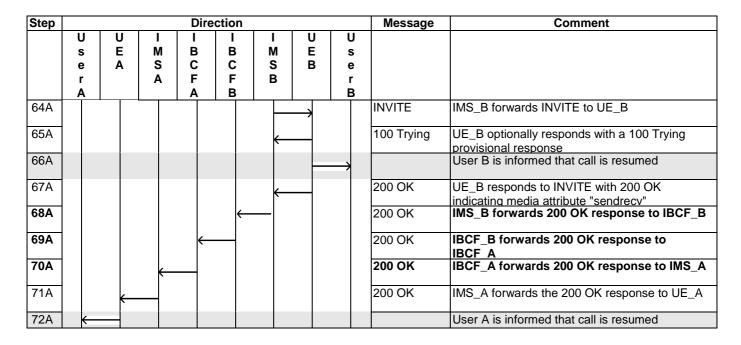
	Interoperability Test Description								
Identifier:	D_IMS_CALL_0016								
Summary:	IMS network ends call in case calling UE is forcefully de-registered in IMS network during a call								
Configuration:	F_INT_CALL								
SUT	MS A								
References	est Purpose Specification Reference	1							
	P_IMS_5139_01 TS 124 229 [1], clause 5. (item 1 and 2 in 1 <sup>st</sup> number	4.5.1.2 ¶1							
Use Case ref.:	IC_02_I								
	*_*= <u>-</u> :								
Pre-test conditions:	HSS of IMS_A and of IMS B is configured according to table 1 UE_A and UE_B have IP bearers established to their respective per clause 4.2.1 UE_A is registered in IMS_A using any user identity UE_B is registered in IMS_B using any user identity There is an ongoing dialogue between UE_A and UE_B	e IMS networks as							
Test Sequence:	Step								
rest sequence.									
	, ,								
	3 Verify that user A is informed that UE_B is ringing 4 User B answers call								
	5 Verify that User A is informed that call has been answered								
	6 Verify that User B is informed that the call is established								
	7 UE_A is forced to be de-registered in IMS_A  8 Verify that user B is informed that call has been ended								
	8   Verily that user B is informed that call has been ended								
Conformance	Check								
Criteria:	TP_IMS_5139_01 in CFW step 34 (BYE): ensure that { when { IMS_A receives a "network internal indication that the of the last public user identity has expired"} then { IMS_A sends a BYE to UE_B containing a Request_URI set to Contact_header_value or containing a To_header set to the To_header of the 200_response to initial INVITE and containing a From_header set to the From_header of the initial INVITE and containing a Call-ID_header set to the Call-ID_header of the initial INVITE and containing a CSeq_header set to "CSeq_header from the calling user incremented by one containing a Route_header set to "routeing information towards the called user as stored for the dialog" and containing a Reason_header and containing "further headers, based on local policy or the requested session release reason" }	f UE_B and							

Step				Dire	ction				Message	Comment
	U	U	I	I	I	I	U E	U		
	s e	E A	M S	B	B C	M S	В	s e		
	r A		Α	F	F B	В		r B		
19	Î				B		<b>←</b>			User B answers call
20						<b>←</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IBCF_B
22				<b>←</b>					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
23			<b>←</b>						200 OK	IBCF_A forwards the 200 OK response to IMS_A
24		←							200 OK	IMS_A forwards the 200 OK to UE_A
25	$\leftarrow$									User A is presented that call in process
26			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
27				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
28					$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
29						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
30							$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
31								$\rightarrow$		User B is informed that the call is in progress
32										UE_A is forced to be de-registered in IMS_A
33				$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
34					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
35						$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
36							$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
37								$\rightarrow$		User B is informed that call has ended
38						<del>(</del>			200 OK	UE_B sends 200 OK for BYE
39					$\leftarrow$				200 OK	IMS_B forwards the 200 OK response to IBCF_B
40				$\leftarrow$					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
41			<b>←</b>						200 OK	IBCF_A forwards the 200 OK response to IMS_A

# 4.5.3.1.3.4 Subsequent target refresh request (INVITE)

		Interoperability Test	Description							
Identifier:	TD_IMS_	CALL_0017	·							
Summary:	IMS netwo	ork handles subsequent IN\	ITEs correctly in case of a user initiated call hold							
	and resume when home caller puts another home user on hold and resumes call									
Configuration:	CF_INT_0	CALL								
SUT	IMS_A									
References	Test Purp		Specification Reference							
	TP_IMS_	5106_01	TS 124 229 [1], clause 5.4.3.2 ¶108							
			(6 <sup>th</sup> numbered list)							
	TP_IMS_	5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123							
Use Case ref.:	110 00 1		(9 <sup>th</sup> numbered list)							
USE Case rel	UC_03_I									
Pre-test		SS of IMS A and of IMS B is	configured according to table 1							
conditions:			ers established to their respective IMS networks							
contantions.		per clause 4.2.1	ers established to their respective livis hetworks							
			ser initiated hold/resume using INVITE							
		_A is registered in IMS_A ι								
		B is registered in IMS_B ι								
	<u> </u>	:: ::::::::::::::::::::::::::::::::	onig any acci racinaly							
Test Sequence:	Step									
•	1	User A calls User B								
	2	Verify that user B is inform	ed of incoming call of User A							
	3	Verify that user A is inform	ed that UE_A is ringing							
	4	User B answers call								
	5		ed that call has been answered							
	6	Verify that user B is inform	ed that call is established							
	7	User A puts call on hold								
	8	Verify that user B is inform								
	9	Verify that user A is inform	d that call is on hold							
	10	User A resumes call	ormed that call is resumed ormed that call is resumed ormed that call has ended							
	11									
	12 13	User A ends call								
	14									
	15	Verify that user A is inform								
	13	Verify that user A is inform	ed that can has ended							
Conformance	Check									
Criteria:	1	TP IMS 5106 01 in CFW	step 37A and 60A (INVITE):							
		ensure that {	,							
		when { UE_A sends a su	bsequent INVITE to UE_B }							
		then { IMS_B receives the								
			Record-Route_header							
			the S-CSCF_SIP_URI of IMS_A and							
			Route_header ting the S-CSCF_SIP_URI of IMS_A and							
			P-Charging-Vector_header							
			ning an access-network-charging-info_parameter							
		}	5							
		}								
	2	TP_IMS_5121_02 (IMS_B	) in CFW step 46A and 69A (200 OK):							
		ensure that {	·							
		when { UE_B sends a 2x								
		then { IMS_A receives the								
			arging-Vector_header							
		not containing a	access-network-charging-info_parameter }							
		<i>}</i>								

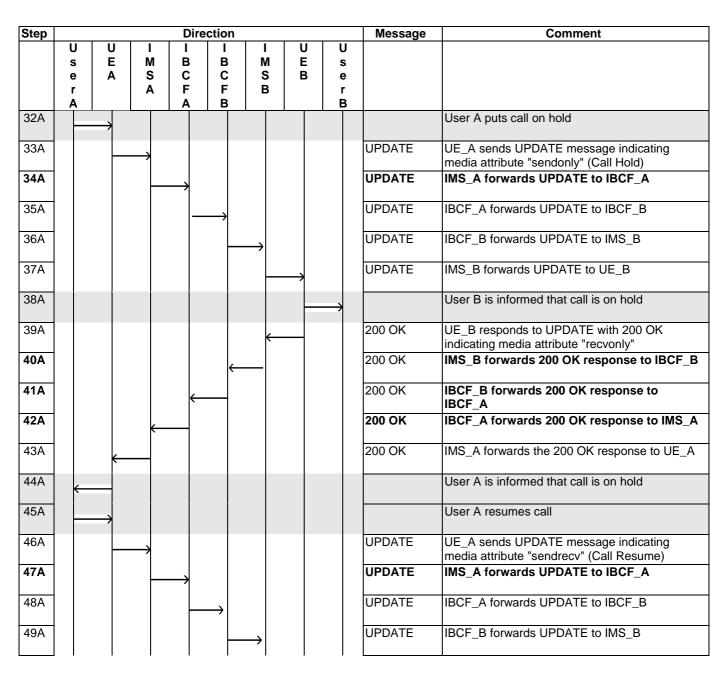
35A  36A  37A  38A  39A  INVITE IMS_A forwards INVI  IMS_A forwards INVI	message indicating nlv" (Call Hold) a 100 Trying provisional  TE to IBCF_A th a 100 Trying TE to IBCF_B a 100 Trying provisional
B A S C C S B B F F B B B B B B B B B B B B B B B	message indicating nlv" (Call Hold) a 100 Trying provisional  TE to IBCF_A th a 100 Trying TE to IBCF_B a 100 Trying provisional
32A 33A 34A 35A 35A 37A 38A 39A 39A 30A 30A 31BVITE 31BCF_A responds with a response INVITE IBCF_A forwards INVITE IBCF_B forwards INVITE	message indicating nlv" (Call Hold) a 100 Trying provisional  TE to IBCF_A th a 100 Trying TE to IBCF_B a 100 Trying provisional
33A  34A  35A  35A  36A  37A  38A  39A  40A  INVITE  UE_A sends reINVITE media attribute "sendo 100 Trying IMS_A responds with a response INVITE IMS_A forwards INVI  BCF_A responds with provisional response INVITE IBCF_A forwards INVI  100 Trying IBCF_A responds with response INVITE IBCF_B forwards INVI  100 Trying IMS_B responds with a response	message indicating nlv" (Call Hold) a 100 Trying provisional  TE to IBCF_A th a 100 Trying TE to IBCF_B a 100 Trying provisional
34A  35A  35A  36A  37A  38A  39A  40A    media attribute "sendo 100 Trying   IMS_A responds with a response   INVITE   IMS_A forwards INVITE   IMS_A forwards INVITE   IBCF_A responds with provisional response   INVITE   IBCF_A forwards INVITE   IBCF_A responds with response   INVITE   IBCF_B forwards INVITE   IBCF_B fo	nlv" (Call Hold) a 100 Trying provisional  TE to IBCF_A th a 100 Trying TE to IBCF_B a 100 Trying provisional
34A 35A 36A 37A 38A 39A 40A  100 Trying IMS_A responds with a response INVITE IMS_A forwards INVITE IBCF_A responds with a response INVITE IBCF_A responds with a provisional response INVITE IBCF_A forwards INVITE IBCF_B forwards IDCF_B f	th a 100 Trying provisional TE to IBCF_A The a 100 Trying TE to IBCF_B TE to IBCF_B TE to IDCF_B
35A 36A 37A 38A 39A 40A  INVITE IMS_A forwards INVI  IBCF_A responds with response  INVITE IBCF_A forwards INVI  INVITE IBCF_B forwards	th a 100 Trying TE to IBCF_B a 100 Trying provisional
37A  38A  39A  40A  provisional response INVITE IBCF_A forwards INVI  100 Trying IBCF_A responds with response INVITE IBCF_B forwards INVI  100 Trying IMS_B responds with response	TE to IBCF_B a 100 Trying provisional
37A 38A 39A 40A  INVITE IBCF_A forwards INVI 100 Trying IBCF_A responds with response INVITE IBCF_B forwards INVI 100 Trying IMS_B responds with response	TE to IBCF_B a 100 Trying provisional
39A  40A  response INVITE IBCF_B forwards INVI  100 Trying IMS_B responds with a response	,
40A  INVITE IBCF_B forwards INVI  100 Trying IMS_B responds with a response	TE to IMS_B
response	
41A INVITE IMS_B forwards INVIT	a 100 Trying provisional
	E to UE_B
42A 100 Trying UE_B optionally response	nds with a 100 Trying
43A User B is informed tha	t call is on hold
44A 200 OK UE_B responds to INV	
45A indicating media attribution 200 OK IMS_B forwards 200 of	OK response to IBCF_B
46A 200 OK IBCF_B forwards 200 IBCF_A	OK response to
	OK response to IMS_A
48A 200 OK IMS_A forwards the 20	00 OK response to UE_A
49A User A is informed that	t call is on hold
50A ACK UE_A acknowledges to INVITE	ne receipt of 200 OK for
51A ACK IMS_A forwards ACK to	o IBCF_A
52A ACK IBCF_A forwards ACK	to IBCF_B
53A ACK IBCF_B forwards ACK	to IMS_B
54A ACK IMS_B forwards ACK to	o UE_B
55A User A resumes call	
56A INVITE UE_A sends reINVITE media attribute "sendre"	
57A 100 Trying IMS_A responds with a response	a 100 Trying provisional
58A INVITE IMS_A forwards INVI	TE to IBCF_A
59A 100 Trying IBCF_A responds with provisional response	
60A INVITE IBCF_A forwards INVI	TE to IBCF_B
61A 100 Trying IBCF_A responds with response	a 100 Trying provisional
62A INVITE IBCF_B forwards INVI	TE to IMS_B
63A 100 Trying IMS_B responds with a response	a 100 Trying provisional

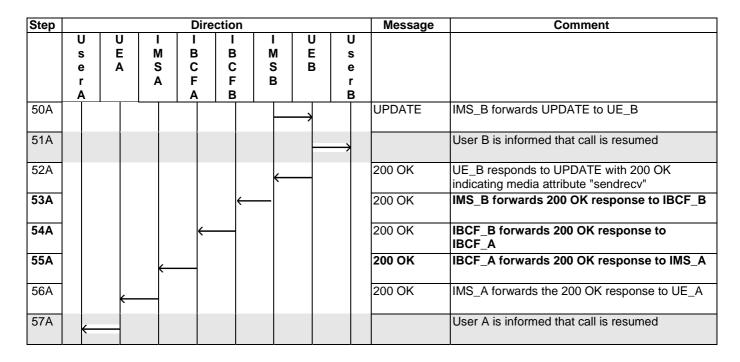


#### 4.5.3.1.3.5 Subsequent target refresh request (UPDATE)

		Interoperability Test Descr	ription					
Identifier:	TD_IMS_CALL_0018							
Summary:	IMS network handles subsequent UPDATEs correctly in case of a user initiated call							
	hold and resume when home caller puts another home user on hold and resumes cal							
Configuration:	CF_INT_CALL							
SUT	IMS_A, IMS_B							
References	Test Pur		Specification Reference					
	TP_IMS_	5106_02	TS 124 229 [1], clause 5.4.3.2 ¶108 (6 <sup>th</sup> numbered list)					
	TP_IMS_	5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)					
Use Case ref.:	UC_03_I		7					
Pre-test	• H	SS of IMS_A and of IMS B is config	jured according to table 1					
conditions:			tablished to their respective IMS networks					
		s per clause 4.2.1						
	<ul> <li>UE_A configured to perform user initiated hold/resume using UPDA</li> </ul>							
	UE_A is registered in IMS_A using any user identity							
	• UI	E_B is registered in IMS_B using a	ny user identity					
Test Sequence:	Step							
	1	User A calls User B						
	2	Verify that user B is informed of incoming call of User A						
	3	Verify that user A is informed that UE_A is ringing						
	4	User B answers call						
	5	Verify that user A is informed that call has been answered						
	6	Verify that user B is informed that call is established						
		User A puts call on hold						
	7							
	8	Verify that user B is informed that						
	8 9	Verify that user B is informed that Verify that user A is informed that						
	8 9 10	Verify that user B is informed that Verify that user A is informed that User A resumes call	t call is on hold					
	8 9 10 11	Verify that user B is informed that Verify that user A is informed that User A resumes call Verify that user B is informed that	t call is on hold t call is resumed					
	8 9 10 11 12	Verify that user B is informed that Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that	t call is on hold t call is resumed					
	8 9 10 11	Verify that user B is informed that Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that User A ends call	t call is on hold t call is resumed t call is resumed					
	8 9 10 11 12	Verify that user B is informed that Verify that user A is informed that User A resumes call Verify that user B is informed that Verify that user A is informed that	t call is on hold t call is resumed t call is resumed t call has ended					

Interoperability Test Description						
Conformance	Check					
Criteria:	1	TP_IMS_5106_02 (IMS_A) in CFW step 35A and 48A (UPDATE):				
		ensure that {				
		when { UE_A sends an UPDATE to UE_B }				
		then { IMS_B receives the UPDATE				
		containing a Record-Route_header				
		containing the S-CSCF_SIP_URI of IMS_A and				
		not containing Route_header				
		indicating the S-CSCF_SIP_URI of IMS_A and				
		containing a P-Charging-Vector_header				
		not containing an access-network-charging-info_parameter				
		}				
}						
	2	TP_IMS_5121_02 (IMS_B) in CFW step 41A and 54A (200 OK):				
		ensure that {				
		when { UE_B sends a 2xx_response to UE_A }				
		then { IMS_A receives the 2xx_response				
		containing a P-Charging-Vector_header				
		not containing a access-network-charging-info_parameter }				
		]}				

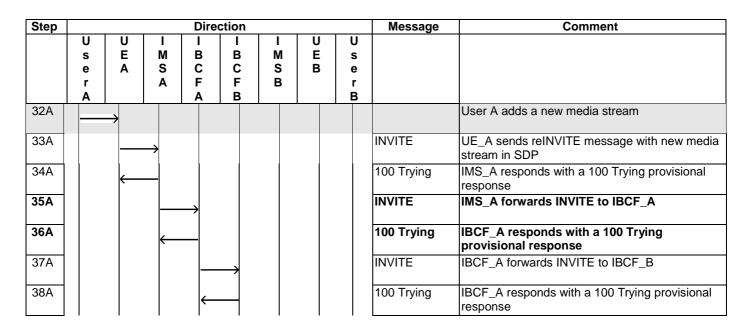




#### 4.5.3.1.3.6 Addition of media streams (reINVITE)

Interoperability Test Description							
Identifier:	TD_IMS_CALL_0019						
Summary:	IMS network handles subsequent INVITEs correctly when adding new media stream.						
Configuration:	CF_INT_CALL						
SUT	IMS_A						
References	Test Purpose	Specification Reference					
	TP_IMS_5106_01	TS 124 229 [1], clause 5.4.3.2 ¶108 (6 <sup>th</sup> numbered list)					
	TP_IMS_5121_01	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)					
	TP_IMS_5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)					
Use Case ref.:	UC_13						
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A and UE_B support multiple media streams (e.g. audio, video, messaging) and support RTP and MSRP</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B using any user identity</li> </ul>						

Interoperability Test Description							
Test Sequence:	Step						
	1	User A calls User B (IMS VoIP call)					
	2	Verify that User B is informed of incoming call of User A					
	3	Verify that User A is informed that UE_A is ringing					
	4	User B answers the call					
	5	Verify that User A is informed that call has been answered					
	6	Verify that User B is informed that call is established					
	7	User A adds a new media stream					
	8	Verify that User B is informed to accept new media stream (optional)					
	9	Verify that User A is informed to accept new media stream (optional)					
	10	If informed, User B accepts the new media stream					
	11	Verify that User A is informed that new media stream has been acce					
	12	User A releases the call					
	13	Verify that user B is informed that call has ended					
	14	Verify that user A is informed that call has ended					
	17	Verify that user A is informed that call has ended					
Conformance	Check						
Criteria:	1	TP_IMS_5106_01 in CFW step 37A:					
Jintona.		ensure that {					
		when { UE_A sends a subsequent INVITE to UE_B }					
		then { IMS_B receives the subsequent INVITE					
		containing a Record-Route header					
		indicating the S-CSCF_SIP_URI of IMS_A and					
		containing a Route_header					
		not indicating the S-CSCF_SIP_URI of IMS_A and					
		containing a P-Charging-Vector_header					
		not containing a access-network-charging-info_parameter }					
		Thot containing a access-network-charging-into_parameter }					
	2	TP_IMS_5121_01 in CFW step 38A, 46A (180 ringing):					
		ensure that {					
		when { UE_B sends a 1xx response to UE_A }					
		then { IMS_A receives the 1xx response					
		containing a P-Charging-Vector_header					
		not containing a access-network-charging-info parameter }					
		The containing a access-network-charging-into_parameter }					
	3	TP_IMS_5121_02 in CFW step 53A, 71 (200 OK):					
		ensure that {					
		when { UE_B sends a 2xx_response to UE_A }					
		then { IMS_A receives the 2xx_response					
		containing a P-Charging-Vector_header					
		not containing a access-network-charging-info_parameter }					



10	Step				Dire	ction				Message	Comment
aga    The state of the state o		U	U	I M	I B	I B	I M	U	U		
A B B B INVITE BCF_B forwards INVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards INVITE to IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards INVITE to UE_B 100 Trying UE_B responds with a 100 Trying provisional response INVITE IMS_B forwards INVITE to IMS_B forwards INVITE with 180 Ringing IBS_B forwards 180 Ringing response to IBS_B forwards Invite With 180 Ringing IBS_B forwards 180 Ringing response to IBS_B forwards Invite With 180 Ringing IBS_B forwards 180 Ringing response to IBS_B forwards Invite With 180 Ringing IBS_B forwards 180 Ringing response to IBS_B forwards Invite With Invite With 180 Ringing IBS_B forwards 180 Ringing response to IBS_B forwards Invite With Invite Wit		е		S	С	С	S		е		
40A 41A 41A 42A 43A 43A 44A 45A 45A 46A 46A 47A 46A 46A 47A 48A 46A 47A 48A 48A 49A 50A 50A 50A 50A 51A 50A 50A 50A 50A 50A 50A 50A 50A 50A 50				A			В				
Response   INVITE   IMS_B forwards INVITE to UE_B	39A						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
42A  43A  43A  44A  44A  45A  45A  46A  47A  48A  48A  48A  48A  48A  48A  48	40A					<b>←</b>				100 Trying	
provisional response  Verify that User B is informed to accept/reject new media stream (optional)  180 Ringing UE B responds to relNVITE with 180 Ringing response to IBCF B 180 Ringing IBCF a forwards 180 Ringing response to IBCF B 180 Ringing IBCF a forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF A 180 Ringing IBCF A forwards 180 Ringing response to IBCF A 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing response to IBCF B 180 Ringing IBCF A forwards 180 Ringing IBCF B 18	41A							$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
44A 45A 46A 46A 46A 46A 46A 46A 46A 46A 46A 46	42A						<b>←</b>			100 Trying	
45A 46A 47A 46A 47A 46A 47A 48A 49A 49A 50A 50A 51A 55A 56A 57A 57A 58A 59A 60A 61A 62 63 64 65 65 65 66 67 67 67 67 67 67 67 67 67 67 67 67	43A							H	$\rightarrow$		
BBCF_B   Browards 180 Ringing response to   BBCF_A	44A						$\leftarrow$			180 Ringing	UE_B responds to reINVITE with 180 Ringing
BIGCF_A	45A					<b>←</b>				180 Ringing	
188 A  48A  49A  50A  51A  51A  52A  53A  64A  55A  56A  57A  57A  58A  59A  60A  61A  62  63  64  65  65  66  66  67  68  68  68  68  68  68  68	46A				$\leftarrow$					180 Ringing	
Verify that User A is informed that UE_B is alerting User B (optional)  If informed, User B accepts the new media stream  200 OK UE_B responds with 200 OK to reINVITE  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBSCF_B  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to UE_A  200 OK IBCF_A forwards 200 OK response to UE_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IBCF_A forwards ACK to IBCF_A  200 OK IBCF_A forwards ACK to	47A			←						180 Ringing	
alerting User B (optional)  If informed, User B accepts the new media stream stream	48A		$\leftarrow$							180 Ringing	
\$\text{stream}\$  200 OK	49A	<b>←</b>									alerting User B (optional)
52A 53A 54A 55A 56A 56A 56A 57A 58A 60A 61A 62 63 64 65 65 66  200 OK 18CF_B forwards 200 OK response to IBCF_B 200 OK 18CF_A forwards 200 OK response to IMS_A 200 OK 18CF_A forwards 200 OK response to IMS_A 200 OK 18CF_A forwards 200 OK response to IMS_A 200 OK 18CF_A forwards the 200 OK response to UE_A  User A is informed that new media stream has been accepted  ACK 18CF_A forwards ACK to IBCF_A  ACK 18CF_B forwards ACK to IBCF_B  ACK 18CF_B forwards ACK to IBCF_B  BYE User A releases the call  BYE USEA sends BYE to indicate that the call has ended  BYE 18CF_A forwards the BYE to IBCF_A  BYE 18CF_A forwards the BYE to IBCF_B	50A							<b>←</b>			·
53A 54A 55A 200 OK IBCF_B forwards 200 OK response to IBCF_A 200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 200 OK response to UE_A  We have a significant of the significant of	51A						<b>←</b>			200 OK	UE_B responds with 200 OK to reINVITE
BCF_A   200 OK   IBCF_A forwards 200 OK response to IMS_A   200 OK   IMS_A forwards the 200 OK response to UE_A   200 OK   IMS_A forwards the 200 OK response to UE_A   200 OK   IMS_A forwards the 200 OK response to UE_A   200 OK   IMS_A forwards that new media stream has been accepted   ACK   UE_A acknowledges the receipt of 200 OK for INVITE   ACK   IMS_A forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IBCF_B   ACK   IBCF_B forwards ACK to IMS_B   ACK   IMS_B forwards ACK to UE_B   BYE   User A releases the call   BYE   UE_A sends BYE to indicate that the call has ended   BYE   IMS_A forwards the BYE to IBCF_A   BYE   IBCF_A forwards the BYE to IBCF_B   IBCF_B   IBCF_A forwards the BYE to IBCF_B	52A					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
55A  56A  57A  58A  59A  60A  61A  62  BYE  User A releases the call  BYE  USER A forwards the 200 OK response to UE_A  USer A is informed that new media stream has been accepted  ACK  UE_A acknowledges the receipt of 200 OK for INVITE  ACK  IMS_A forwards ACK to IBCF_A  ACK  IBCF_A forwards ACK to IBCF_B  ACK  IMS_B forwards ACK to UE_B  BYE  USER A releases the call  BYE  USER A sends BYE to indicate that the call has ended  BYE  IMS_A forwards the BYE to IBCF_A  BYE  IBCF_A forwards the BYE to IBCF_B	53A				←					200 OK	
56A  57A  ACK  UE_A acknowledges the receipt of 200 OK for INVITE  ACK  IMS_A forwards ACK to IBCF_A  ACK  IBCF_B forwards ACK to IBCF_B  ACK  IBCF_B forwards ACK to UE_B  ACK  IMS_B forwards ACK to UE_B  BYE  User A releases the call  BYE  UE_A sends BYE to indicate that the call has ended  BYE  IMS_A forwards the BYE to IBCF_B	54A			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
been accepted  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IBCF_B forwards ACK to UE_B  BYE User A releases the call  BYE UE_A sends BYE to indicate that the call has ended  BYE IMS_A forwards the BYE to IBCF_A  BYE IBCF_A forwards the BYE to IBCF_B	55A		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
INVITE   ACK   IMS_A forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IBCF_B   ACK   IBCF_B forwards ACK to IMS_B   ACK   IBCF_B forwards ACK to UE_B   ACK   IMS_B forwards ACK to UE_B   BYE   User A releases the call   BYE   UE_A sends BYE to indicate that the call has ended   BYE   IMS_A forwards the BYE to IBCF_A   BYE   IBCF_A forwards the BYE to IBCF_B	56A	<b>←</b>									
59A 60A 61A 61A 62 BYE User A releases the call BYE UB_A sends BYE to indicate that the call has ended BYE IMS_A forwards the BYE to IBCF_A BYE IBCF_A forwards ACK to IBCF_B  BYE IBCF_A forwards ACK to IBCF_B	57A			$\rightarrow$						ACK	
60A  61A  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to UE_B  BYE User A releases the call  BYE UE_A sends BYE to indicate that the call has ended  BYE IMS_A forwards the BYE to IBCF_A  BYE IBCF_A forwards the BYE to IBCF_B	58A				$\rightarrow$					ACK	
61A  ACK IMS_B forwards ACK to UE_B  BYE User A releases the call  BYE UE_A sends BYE to indicate that the call has ended  BYE IMS_A forwards the BYE to IBCF_A  BYE IBCF_A forwards the BYE to IBCF_B	59A					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
62 BYE User A releases the call  BYE UL_A sends BYE to indicate that the call has ended  BYE IMS_A forwards the BYE to IBCF_A  BYE IBCF_A forwards the BYE to IBCF_B	60A						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
63 BYE UE_A sends BYE to indicate that the call has ended BYE IMS_A forwards the BYE to IBCF_A  BYE IBCF_A forwards the BYE to IBCF_B	61A							$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
64 BYE IMS_A forwards the BYE to IBCF_A BYE IBCF_A forwards the BYE to IBCF_B	62		$\rightarrow$							BYE	User A releases the call
64 BYE IMS_A forwards the BYE to IBCF_A BYE IBCF_A forwards the BYE to IBCF_B	63			$\rightarrow$						BYE	
	64				$\rightarrow$					BYE	
66 BYE IBCF_B forwards the BYE to IMS_B	65					$\rightarrow$				BYE	IBCF_A forwards the BYE to IBCF_B
	66						$\longrightarrow$			BYE	IBCF_B forwards the BYE to IMS_B

Step				Direc	ction				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	— воғв	I M S B	U E B	U s e r B		
67							<b>→</b>		BYE	IMS_B forwards the BYE to UE_B
68								$\rightarrow$		User B is informed that call has ended
69						$\leftarrow$			200 OK	UE_B responds to the BYE with 200 OK
70					$\leftarrow$				200 OK	IMS_B forwards the 200 OK response to IBCF_B
71				$\leftarrow$					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
72			$\leftarrow$						200 OK	IBCF_A forwards the 200 OK response to IMS_A
73		<del></del>							200 OK	IMS_A forwards the 200 OK response to UE_A
74	<b></b>									User A is informed that call has ended

#### 4.5.3.1.3.7 Modification of an existing media stream (reINVITE)

Interoperability Test Description										
Identifier:	TD_IMS_CALL_0020									
Summary:	IMS network handles subsequent INVITEs and UPDATEs correctly during modification									
	of an existing media stream.									
Configuration:	CF_INT_CALL									
SUT	IMS_A									
References	Test Purpose	Specification Reference								
	TP_IMS_5106_01	TS 124 229 [1], clause 5.4.3.2 ¶108 (6 <sup>th</sup> numbered list)								
	TP_IMS_5121_01	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)								
	TP_IMS_5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)								
Use Case ref.:	UC_13									
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A and UE_B support multiple media streams (e.g. audio, video, messaging) and support RTP and MSRP</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B using any user identity</li> </ul>									

	•	Interoperability Test Description							
Test Sequence:	Step								
	1	User A calls User B (IMS VoIP call)							
	2	Verify that user B is informed of incoming call of User A							
	3	Verify that user A is informed that UE_B is ringing							
	4	User B answers the call							
	5	Verify that user A is informed that call has been answered							
	6	Verify that user B is informed that call is established							
	7	User A adds a new media stream							
	8	erify that User B is informed to accept/reject new media stream (optional)							
	9	Verify that User A is informed that UE_B is alerting User B (optional)							
	10	If informed, verify that User B accepts the new media stream							
	11	Verify that User A is informed that new media stream has been accepted							
		(optional)							
	12	User A modifies the media stream							
	13	Verify that User B is informed to accept/reject media stream modification							
		(optional)							
	14	Verify that User A is informed that UE_B is alerting User B (optional)							
	15	If informed, verify that User B accepts the media stream modification							
	16	Verify that User A is informed that media stream modification has been							
		accepted (optional)							
	17	User B releases the call							
	18	Verify that user A is informed that the call has ended							
	19	Verify that user B is informed that call has ended							
	10	Verify that user B is informed that can has chaed							
Conformance	Check								
Conformance Criteria:	Check 1	TP_IMS_5106_01 in CFW step 37A and 67A (reINVITE):							
Conformance Criteria:	Check 1	TP_IMS_5106_01 in CFW step 37A and 67A (reINVITE):							
		ensure that {							
		ensure that { when { UE_A sends a subsequent INVITE to UE_B }							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE       containing a Record-Route_header       indicating the S-CSCF_SIP_URI of IMS_A and							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE       containing a Record-Route_header       indicating the S-CSCF_SIP_URI of IMS_A and       containing Route_header							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
		ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
	1	ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
	1	ensure that {    when { UE_A sends a subsequent INVITE to UE_B }    then { IMS_B receives the subsequent INVITE							
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							
	1	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE							

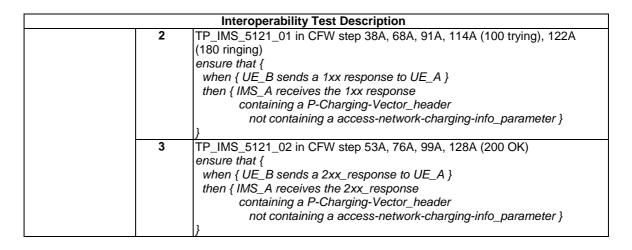
	w media stream  VITE message with new media
e         A         S         C         C         S         B         e         r         A         B         B         B         B         User A adds a new           32A         33A         INVITE         UE_A sends reINV	
32A User A adds a new INVITE UE_A sends reINV	
33A INVITE UE_A sends reINV	
	VITE message with new media
stream in SDP	
	with a 100 Trying provisional
35A INVITE IMS_A forwards I	INVITE to IBCF_A
36A 100 Trying IBCF_A responds provisional responds	s with a 100 Trying
	INVITE to IBCF_B
38A 100 Trying IBCF_A responds response	with a 100 Trying provisional
39A INVITE IBCF_B forwards	INVITE to IMS_B
40A 100 Trying IMS_B responds v	with a 100 Trying provisional
41A INVITE IMS_B forwards IN	NVITE to UE_B
42A 100 Trying UE_B optionally reprovisional respon	esponds with a 100 Trying
43A Verify that User B new media stream	is informed to accept/reject (optional)
44A 180 Ringing UE_B responds to	reINVITE with 180 Ringing
45A 180 Ringing IMS_B forwards 1	80 Ringing response to
46A   180 Ringing   IBCF_B forwards   IBCF_A	180 Ringing response to
IMS_A	180 Ringing response to
	ne 180 Ringing response to
alerting User B (or	-
50A III III III III III III III III III I	B accepts the new media
51A 200 OK UE_B responds w	rith 200 OK to reINVITE
52A 200 OK IMS_B forwards 2	200 OK response to IBCF_B
53A 200 OK IBCF_B forwards	s 200 OK response to
	s 200 OK response to IMS_A
55A 200 OK IMS_A forwards th	ne 200 OK response to UE_A
User A is informed been accepted	d that new media stream has
	ges the receipt of 200 OK for
58A ACK IMS_A forwards A	CK to IBCF_A
59A ACK IBCF_A forwards A	ACK to IBCF_B

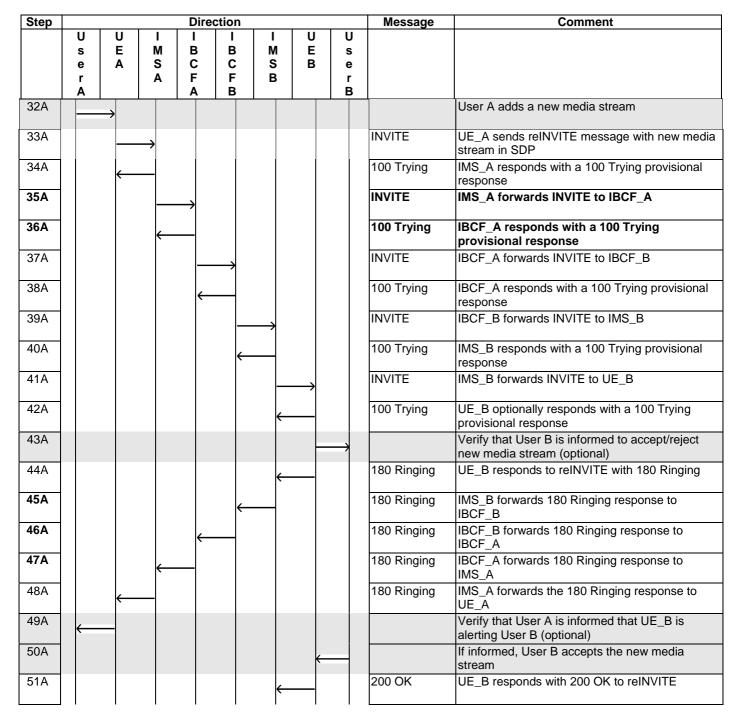
Step				Directi	on				Message	Comment
	U s	U E	I M	I B	I B	I M	υE	U s		
	e	Ā	S	С	С	S	В	e		
	r A		Α	F A	F B	В		r B		
60A					Ĭ—	$\rightarrow$	1	Ĭ	ACK	IBCF_B forwards ACK to IMS_B
61A							$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
62A		<b>&gt;</b>								User A modifies the media stream
63A			>						INVITE	UE_A sends reINVITE message with new media stream in SDP
64A		<b></b>	_						100 Trying	IMS_A responds with a 100 Trying provisional response
65A				<b>→</b>					INVITE	IMS_A forwards INVITE to IBCF_A
66A			<b></b>						100 Trying	IBCF_A responds with a 100 Trying provisional response
67A					<del>)</del>				INVITE	IBCF_A forwards INVITE to IBCF_B
68A				<del></del>	4				100 Trying	IBCF_A responds with a 100 Trying provisional response
69A						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
70A					←	_			100 Trying	IMS_B responds with a 100 Trying provisional response
71A						_	$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
72A						←			100 Trying	UE_B optionally responds with a 100 Trying provisional response
73A								$\rightarrow$		Verify that User B is informed to accept/reject media stream modification (optional)
74A						<b>←</b>			180 Ringing	UE_B responds to reINVITE with 180 Ringing
75A					$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
76A				$\leftarrow$	-				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
77A			<b>-</b>						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
78A		<b></b>	_						180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
79A	<del></del>	-								Verify that User A is informed that UE_B is alerting User B (optional)
80A							<b>(</b>			If informed, User B accepts the media stream modification
81A						$\leftarrow$			200 OK	UE_B responds with 200 OK to reINVITE
82A					$\leftarrow$	_			200 OK	IMS_B forwards 200 OK response to IBCF_B
83A				<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
84A			<b>—</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
85A		←	_						200 OK	IMS_A forwards the 200 OK response to UE_A
86A	<del></del>									User A is informed that media stream modification has been accepted
87A			>						ACK	UE_A acknowledges the receipt of 200 OK for INVITE

Step				Directi	ion				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	I M S B	U E B	U s e r B		
88A				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
89A					→				ACK	IBCF_A forwards ACK to IBCF_B
90A						$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
91A					l		$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
92							<del>(</del>		BYE	User B releases the call
93						<b>←</b>			BYE	UE_B sends BYE to indicate that the call has ended
94					$\leftarrow$				BYE	IMS_B forwards the BYE to IBCF_B
95				←					BYE	IBCF_B forwards the BYE to IBCF_A
96			<b>—</b>						BYE	IBCF_A forwards the BYE to IMS_A
97		<del></del>							BYE	IMS_A forwards the BYE to UE_A
98	<b>←</b>									User A is informed that call has ended
99			$\rightarrow$						200 OK	UE_A responds to the BYE with 200 OK
100				$\rightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
101					$\rightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
102						$\rightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B
103							$\longrightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
104								$\rightarrow$		User B is informed that call has ended

#### 4.5.3.1.3.8 Hold/resume media streams (reINVITE)

		Interoperability Test Desc	ription						
Identifier:		CALL_0021	•						
Summary:	IMS netwo		correctly during hold/resume of media						
	streams								
Configuration:	CF_INT_0	CALL							
SUT	IMS_A	5,122							
References	Test Purp		Specification Reference						
	TP_IMS_	5106_01	TS 124 229 [1], clause 5.4.3.2 ¶108						
	TP_IMS_	5121 01	(6 <sup>th</sup> numbered list) TS 124 229 [1], clause 5.4.3.3 ¶123						
	TF_IIVIS_	3121_01	(9 <sup>th</sup> numbered list)						
	TP_IMS_	5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123						
			(9 <sup>th</sup> numbered list)						
Use Case ref.:	UC_13, U	C_14							
Pre-test	• HS	SS of IMS_A and of IMS B is config	rured according to table 1						
conditions:			tablished to their respective IMS networks						
	as	per clause 4.2.1	·						
			edia streams (e.g. audio, video, messaging)						
		d support RTP and MSRP :_A is registered in IMS_A using a	ny unor identity						
		:_A is registered in IMS_A using a :_B is registered in IMS_B using a							
	<u> </u>		y door labrinty						
Test Sequence:	Step								
	1	User A calls User B (IMS VoIP ca							
	3	Verify that user B is informed of i Verify that user A is informed tha							
	4	Jser B answers the call							
	5	erify that user A is informed that call has been answered							
	6		t user B is informed that call is established						
	7	User A adds a new media stream	edia stream  formed to accept/reject new media stream (optional)						
	8	-	ormed to acceptive lect new media stream (optional) ormed that UE_B is alerting User B (optional)						
	10	-	User B accepts the new media stream						
	11	-	t User A is informed that new media stream has been accepted						
		(optional)							
	12		User A puts one media stream on hold						
	13	Verify that user B is informed that media stream is on hold							
	14	Verify that user A is informed that media stream is on hold							
	15	User A resumes the media stream							
	16 17	Verify that user B is informed that Verify that user A is informed that							
	18	User A removes one of the media							
	19	1	t the media stream has been removed						
	20	User A may be informed that UE							
	21	User A releases the call							
	22	Verify that user B is informed tha							
	23	Verify that user A is informed tha	t call has ended						
Cantarmanaa	Chaale								
Conformance Criteria:	Check 1	TP_IMS_5106_01 in CFW step 3	7Δ 67Δ 90Δ 113Δ (relNI\/ITE):						
Orneria.	'	ensure that {	TA, OTA, SOA, TISA (TEINVITE).						
		when { UE_A sends a subseque							
		then { IMS_B receives the subs							
		containing a Reco	rd-Route_header CSCF_SIP_URI of IMS_A and						
		containing Route_							
		not indicating the	S-CSCF_SIP_URI of IMS_A and						
			arging-Vector_header						
		not containing a	access-network-charging-info_parameter }						
I	L	IJ							





Step				irection			Message	Comment
	U s	U E	I I	I B B	I U M E	U		
	е	Ā	S	; c	S B	е		
<u></u>	r A			I -	В	r B		
52A				←			200 OK	IMS_B forwards 200 OK response to IBCF_B
53A				<b></b>			200 OK	IBCF_B forwards 200 OK response to IBCF_A
54A			<b></b>				200 OK	IBCF_A forwards 200 OK response to IMS_A
55A		<del></del>	_				200 OK	IMS_A forwards the 200 OK response to UE_A
56A	<b>←</b>							User A is informed that new media stream has been accepted
57A		-	>				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
58A			$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
59A				$\longrightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
60A					$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
61A							ACK	IMS_B forwards ACK to UE_B
62A		$\rightarrow$						User A puts one media stream on hold
63A			>				INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
64A		<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional response
65A							INVITE	IMS_A forwards INVITE to IBCF_A
66A			<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
67A				<del></del>			INVITE	IBCF_A forwards INVITE to IBCF_B
68A				<del></del>			100 Trying	IBCF_A responds with a 100 Trying provisional response
69A					$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
70A				<b>←</b>	_		100 Trying	IMS_B responds with a 100 Trying provisional response
71A					$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
72A					<del></del>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
73A					-	$\longrightarrow$		User B is informed that media stream is on hold
74A					<del></del>		200 OK	UE_B responds with 200 OK to reINVITE
75A				←	-		200 OK	IMS_B forwards 200 OK response to IBCF_B
76A				<del></del>			200 OK	IBCF_B forwards 200 OK response to IBCF_A
77A			<del></del>				200 OK	IBCF_A forwards 200 OK response to IMS_A
78A		<b>←</b>	-				200 OK	IMS_A forwards the 200 OK response to UE_A
79A	$\leftarrow$							User A is informed that media stream is on hold

Step				Di	irectio	า			Message	Comment
	U s	U	I M	I B	l B			U U E s		
	е	Ā	S	С	С	5	S	Ве		
	r A		Α	F	F B	_	3	r B		
80A		-	$\rightarrow$	•					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
81A				$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
82A				_	<del></del>				ACK	IBCF_A forwards ACK to IBCF_B
83A						<del></del> >			ACK	IBCF_B forwards ACK to IMS_B
84A	l		ı		I.			<b>→</b>	ACK	IMS_B forwards ACK to UE_B
85A		<b>→</b>								User A resumes the media stream
86A			$\longrightarrow$						INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
87A		$\leftarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
88A				$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
89A			<b>←</b>						100 Trying	IBCF_A responds with a 100 Trying provisional response
90A				-					INVITE	IBCF_A forwards INVITE to IBCF_B
91A				•	<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
92A						<del></del>	•		INVITE	IBCF_B forwards INVITE to IMS_B
93A						<del></del>			100 Trying	IMS_B responds with a 100 Trying provisional response
94A								>	INVITE	IMS_B forwards INVITE to UE_B
95A							<b></b>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
96A										User B is informed that the media stream is resumed
97A							$\leftarrow$	-	200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"
98A						<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
99A				•	(				200 OK	IBCF_B forwards 200 OK response to IBCF_A
100A			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
101A		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
102A	<b>←</b>									User A is informed that media stream is resumed
103A			$\longrightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
104A				$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
105A				-	$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
106A						<del></del>			ACK	IBCF_B forwards ACK to IMS_B
107A								>	ACK	IMS_B forwards ACK to UE_B

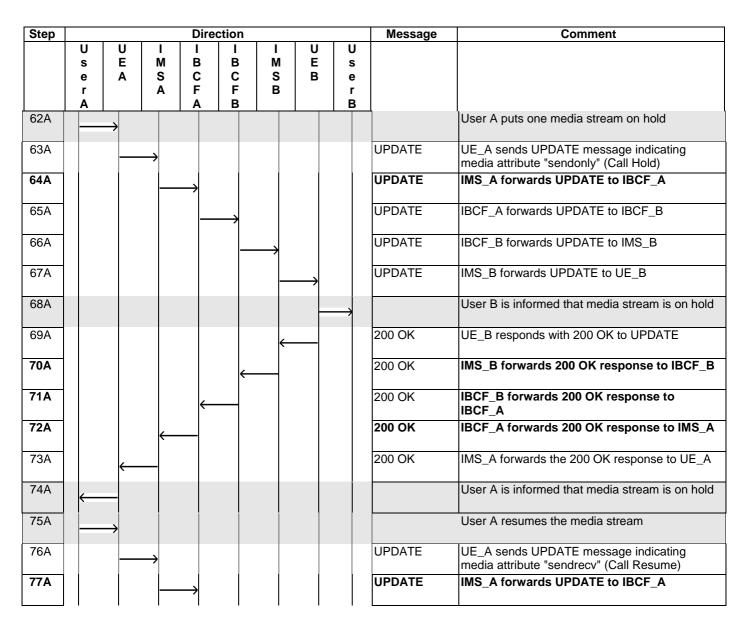
Step				Direct	ion				Message	Comment
	U s	U E	I M	I B	I B	I M	U	U s		
	e	Ā	S	С	С	S	В	e		
	r A		Α	F A	F B	В		r B		
108A		$\rightarrow$								User A removes one of the media streams
109A			$\rightarrow$						INVITE	UE_A sends reINVITE to IMS_A
110A		<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
111A				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
112A			<del></del>						100 Trying	IBCF_A responds with a 100 Trying provisional response
113A					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
114A				$\leftarrow$	_				100 Trying	IBCF_A responds with a 100 Trying provisional response
115A						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
116A					$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
117A							$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
118A						←			100 Trying	UE_B optionally responds with a 100 Trying provisional response
119A							_	$\rightarrow$		User B is informed that the media stream has been removed
120A						<b>←</b>			180 Ringing	UE_B optionally responds to reINVITE with 180 Ringing
121A					←				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
122A				$\leftarrow$	_				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
123A			←						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
124A		$\leftarrow$							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
125A							<b>←</b>			User A may be informed that UE_B is alerting User B (optional)
126A						←			200 OK	UE_B responds to INVITE with 200 OK with SDP where the port number for the video stream
127A					←				200 OK	IMS_B forwards 200 OK response to IBCF_B
128A				$\leftarrow$	$\dashv$				200 OK	IBCF_B forwards 200 OK response to IBCF_A
129A			<b>←</b>	-					200 OK	IBCF_A forwards 200 OK response to IMS_A
130A		$\leftarrow$							200 OK	IMS_A forwards the 200 OK response to UE_A
131A	<b></b>									User A is informed that new media stream has been removed
132A			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE

Step				Direc	ction				Message	Comment
	U	U	I	ı	ı	ı	U	U		
	s	Е	M	В	В	M	E	s		
	е	Α	S	С	С	S	В	е		
	r		Α	F	F	В		r		
	A			Ą	В			B		
133A				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
134A					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
135A						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
136A							$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B

# 4.5.3.1.3.9 Hold/resume media streams (UPDATE)

	1	Interoperability Test Desci	ription									
Identifier:		CALL_0022										
Summary:	IMS netw streams	ork handles subsequent UPDATEs	s correctly during hold/resume of media									
	05 11 17	0.444										
Configuration:		CF_INT_CALL										
SUT References	IMS_A	Consideration Deference										
References	Test Pur	<b>pose</b> 5106_02	Specification Reference TS 124 229 [1], clause 5.4.3.2 ¶108									
	I P_IIVIS_	5106_02	(6 <sup>th</sup> numbered list)									
	TP IMS	5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123									
		<u> </u>	(9 <sup>th</sup> numbered list)									
Use Case ref.:	UC_13, L	JC 14										
	/	_										
Pre-test	• H	SS of IMS_A and of IMS B is config	gured according to table 1									
conditions:			tablished to their respective IMS networks									
		per clause 4.2.1										
			edia streams (e.g. audio, video, messaging)									
		nd support RTP and MSRP										
		E_A is registered in IMS_A using a										
	• U	E_B is registered in IMS_B using a	ny user identity									
Test Sequence:	Step											
rest sequence.	3iep	User A calls User B (IMS VoIP call)										
	2	Verify that user B is informed of in										
	3		A is informed that UE_B is ringing									
	4	User B answers the call										
	5											
	6											
	7	User A adds a new media stream										
	8	Verify that User B is informed to a	accept/reject new media stream (optional)									
	9		t UE_B is alerting User B (optional)									
	10	If informed, verify that User B acc										
	11		t new media stream has been accepted									
		(optional)	•									
	12	User A puts one media stream or	n hold									
	13	Verify that user B is informed that	t media stream is on hold									
	14	Verify that user A is informed that	t media stream is on hold									
	15	User A resumes the media stream	n									
	16	Verify that user B is informed that	t the media stream is resumed									
	17	Verify that user A is informed that										
	18	User A removes one of the media										
	19		t the media stream has been removed									
	20	User A releases the call										
		CCC. / Tologood the can										

		Interoperability Test Description
	21	Verify that user Bis informed that call has ended
	22	Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5106_02 in CFW step 65A, 78A and 101A (UPDATE): ensure that { when { UE_A sends an UPDATE to UE_B } then { IMS_B receives the UPDATE
	2	TP_IMS_5121_02 (IMS_B) in CFW step 71A, 84A and 107A (200 OK): ensure that {   when { UE_B sends a 2xx_response to UE_A }   then { IMS_A receives the 2xx_response       containing a P-Charging-Vector_header       not containing a access-network-charging-info_parameter } }



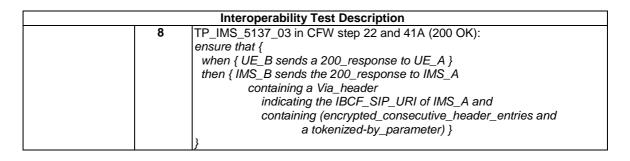
Step				Dire	ction				Message	Comment
	U	U	I	ı	I	I	U	U	oougo	- Common
	s	E	M	В	В	M	E	s		
	e r	Α	S	C F	C F	S B	В	e r		
	Α			Α	В			В		
78A					$\longrightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
79A						$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
80A							$\longrightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
81A								$\rightarrow$		User B is informed that the media stream is resumed
82A						<b>←</b>			200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "sendrecv"
83A					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
84A				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
85A			$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
86A		$\leftarrow$							200 OK	IMS_A forwards the 200 OK response to UE_A
87A	<b>←</b>									User A is informed that media stream is resumed
88A		$\rightarrow$								User A removes one of the media streams
99A			$\rightarrow$						UPDATE	UE_A sends UPDATE to IMS_A
100A				$\rightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
101A				_	$\longrightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
102A						$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
103A							$\longrightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
104A								$\rightarrow$		User B is informed that the media stream has been removed
105A						<b>←</b>			200 OK	UE_B responds to INVITE with 200 OK
106A					$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
107A				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
108A			<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
109A		←							200 OK	IMS_A forwards the 200 OK response to UE_A
110A	$\leftarrow$									User A is informed that new media stream has been removed

### 4.5.3.1.4 Dialogue Procedures - Topology Hiding

#### 4.5.3.1.4.1 Normal call

		Interoperability Test Desc	ription				
Identifier:	TD_IMS_CALL						
Summary:		andles basic call with topolog	gy hiding correctly				
Configuration:	CF_INT_CALL						
SUT	IMS_A						
References	Test Purpose		Specification Reference				
	TP_IMS_5135	_01	TS 124 229 [1], clause 5.10.4.1 ¶7				
			(after note 3)				
	TP_IMS_5137	_01	TS 124 229 [1], clause 5.10.4.2 ¶1				
			(item 7 & 8 in 1 <sup>st</sup> numbered list)				
	TP_IMS_5404	_01	TS 124 229 [1], clause 5.10.2.2 ¶1				
			(item 8 in 1 <sup>st</sup> numbered list)				
	TP_IMS_5408	_01	TS 124 229 [1], clause 5.10.2.3 ¶1				
			(item 4 in 1 <sup>st</sup> numbered list)				
	TP_IMS_5408	_03	TS 124 229 [1], clause 5.10.2.3 ¶1				
			(item 4 in 1 <sup>st</sup> numbered list)				
	TP_IMS_5414	_01	TS 124 229 [1], clause 5.10.3.2 ¶12				
	TD 1140 5407		(item 1 in 1 <sup>st</sup> numbered list)				
	TP_IMS_5137	_02	TS 124 229 [1], clause 5.10.4.2 ¶1				
	TD IMO 5407	00	(1 <sup>st</sup> numbered list) TS 124 229 [1], clause 5.10.4.2 ¶1				
	TP_IMS_5137	_03	15 124 229 [1], clause 5.10.4.2 ¶1   (1st numbered list)				
Use Case ref.:	UC_02_I		(1 numbered list)				
USE Case lei	UC_02_1						
	as per of UE_A is UE_B is	clause 4.2.1 s registered in IMS_A using a s registered in IMS_B using a s registered in IMS_B using a	any user identity				
Test Sequence:	Step						
		r A calls user B					
		ify that user B is informed of i					
		fy that user A is informed that	at UE_B is ringing				
		r B answers the call					
		fy that user A is informed that					
		fy that user B is informed that	at the call is established				
		r A ends the call					
		fy that user B is informed that					
	9 Veri	fy that user A is informed that	at call has ended				
Conformance	Check		(1.1.1.1				
Criteria:		IMS_5135_01 in CFW step 6	6 (INVITE):				
		ure that {	INITE to IMC A )				
		nen { UE_A sends an initial IN					
	the	en { IMS_A sends the initial II	NVITE to IMS_B al topmost Record-Route_header				
			SIP_URI of IMS_A }				
	ı	indicating the IBCF_	_OII _OIN OI IIVIO_A }				
1							

	Interoperability Test Description
2	TP_IMS_5137_01 in CFW step 6 (INVITE):
	ensure that {
	when { UE_A sends an initial INVITE to UE_B }
	then { IMS_A sends the INVITE to IMS_B
	containing a Via_header indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) and
	containing a Route_header
	indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) }
	}
3	TP_IMS_5404_01 in CFW step 6 (INVITE):
	ensure that {
	when { UE_A sends an initial INVITE to UE_B
	containing a P-Charging-Function-Addresses_header }
	then { IMS_A sends the INVITE
	not containing a P-Charging-Function-Addresses_header }
4	TP_IMS_5408_01 in CFW step 28 (ACK):
	ensure that {
	when { UE_A sends an ACK to UE_B }
	then { IMS_A sends the ACK to IMS_B
	containing a Via_header
	indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) and
	containing a Route_header
	indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) }
5	TP_IMS_5408_03 in CFW step 35A (BYE):
•	ensure that {
	when { UE_A sends a BYE to UE_B }
	then { IMS_A sends the BYE to IMS_B
	containing a Via_header
	indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) and
	containing a Route_header
	indicating the IBCF_SIP_URI of IMS_A and
	containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) }
6	TP_IMS_5414_01 in CFW step 7 (100 Trying):
•	ensure that {
	when { UE_A sends an initial INVITE to UE_B and
	IMS_A sends the INVITE to IMS_B}
	then { IMS_B sends a 100_response to IMS_A }
	}
7	TP_IMS_5137_02 in CFW step 15 (180 Ringing):
	ensure that {
	when { UE_B sends a 180_response to UE_A }
	then { IMS_B sends the 180_response to IMS_A
	containing a Via_header
	indicating the IBCF_SIP_URI of IMS_A and containing (encrypted_consecutive_header_entries and
	a tokenized-by_parameter) }
	a tokeriized-by_parameter) }
	<u>,,,</u>



Step				[	Direc	tion				Message	Comment
	U	Ų		. –	<b> </b>	_	I	Ū	U		
	s e	E			B C	B C	M S	E B	s e		
	r	′		Ă	F	F	В		r		
	Ā				Α	В			В		
1											User A calls User B
		(									
2			,							INVITE	UE_A sends INVITE with the first SDP offer
			,	1							indicating all desired medias and codecs that UE_A supports
3										100 Trying	IMS_A responds with a 100 Trying provisional
			<del></del>								response
4					→					INVITE	IMS_A forwards INVITE to IBCF_A
5										100 Trying	IBCF_A responds with a 100 Trying provisional
				$\leftarrow$	_						response
6						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7					_					100 Trying	IBCF_B responds with a 100 Trying provisional
										N 0.75	response
8							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
9						_				100 Trying	IMS_B responds with a 100 Trying provisional
						Ì					response
10								$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
11										100 Trying	UE_B optionally responds with a 100 Trying
											provisional response
12									$\rightarrow$		User B is informed of incoming call of User A
13										180 Ringing	UE_B responds to initial INVITE with 180
											Ringing to indicate that it has started alerting
14						$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15					$\leftarrow$					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16				<del></del>	-					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17			<del>(</del>							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	ŧ										User A is informed that UE_B is ringing
19								<b>(</b>			User B answers call
20							<b>(</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
21						$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
22					<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A

Step				Dire	ction				Message	Comment
	U	U	I	ı	ı	I	U	U		
	s e	E A	M S	B	B	M S	E B	s e		
	r	^	Ā	F	F	В		r		
23	A		<u> </u>	A 	B 			B	200 OK	IBCF_A forwards 200 OK response to IMS_A
24		<b>←</b>							200 OK	IMS_A forwards 200 OK response to UE_A
25	<b>←</b>									User A is informed that call has been answered
26			$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
27				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
28					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
29						$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
30							$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
31								$\rightarrow$		User B is informed that the call is established
32A		$\rightarrow$								User A ends call
33A			$\rightarrow$						BYE	UE_A releases the call with BYE
34A				$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
35A					$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
36A						$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
37A							$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
38A								$\rightarrow$		User B is informed that call has ended
39A						<b>←</b>			200 OK	UE_B sends 200 OK for BYE
40A					<b>—</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
41A				$\leftarrow$	-				200 OK	IBCF_B forwards 200 OK response to IBCF_A
42A			<b>←</b>	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
43A		<b>←</b>	$\blacksquare$						200 OK	IMS_A forwards the 200 OK response to UE_A
44A	<b>K</b>									User B is informed that call has ended

#### 4.5.3.1.4.2 CANCEL call by calling user

		Interoperability Test Descr	ription						
Identifier:	TD_IMS (	CALL 0025	•						
Summary:			call correctly before its establishment with						
	topology h		,						
Configuration:	CF_INT_C								
SUT	IMS_A and IMS_B								
References	Test Purp		Specification Reference						
	TP_IMS_5		TS 124 229 [1], clause 5.10.2.3 ¶1						
		7.00 <u>_</u> 02	(item 4 in 1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_02_I		(Nom 1 iii 1 Hamboroa not)						
000 0000 1011:	00_02_1								
Pre-test	• HS	S of IMS A and of IMS B is confid	rured according to table 1						
conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks</li> </ul>								
		per clause 4.2.1	tablished to their respective livio hetworks						
		_A is registered in IMS_A using a	ny usar idantity						
		_A is registered in IMS_A using all _B is registered in IMS_B using al							
	• IMS	S_A is configured for topology hidi	ng						
Took Common on	Ctor								
Test Sequence:	Step	Harri Arralla Harri D							
	1	User A calls User B							
	2	Verify that user B is informed of incoming call of User A							
	3	Verify that user A is informed that UE_B is ringing							
	4	User A cancels call							
	5	t call has been cancelled							
	6	Verify that user A is informed that	that call is terminated						
Conformance	Check								
Criteria:	1	TP_IMS_5408_02 in CFW step 2	4 (CANCEL):						
		ensure that {							
		when { UE_A sends a CANCEL							
		then { IMS_A sends the CANCE							
		containing a Via_heade							
			SIP_URI of IMS_A and						
			d_consecutive_header_entries and						
			by_parameter) and						
		containing a Route_hea							
			SIP_URI of IMS_A and						
			d_consecutive_header_entries and						
		a tokenized-l	by_parameter) }						
		]}							

Step		Direction								Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	- М S В	U E B	U s e r B		
1		$\rightarrow$								User A calls User B
2			$\rightarrow$						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		←							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
5			←						100 Trying	IBCF_A responds with a 100 Trying provisional response
6					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response

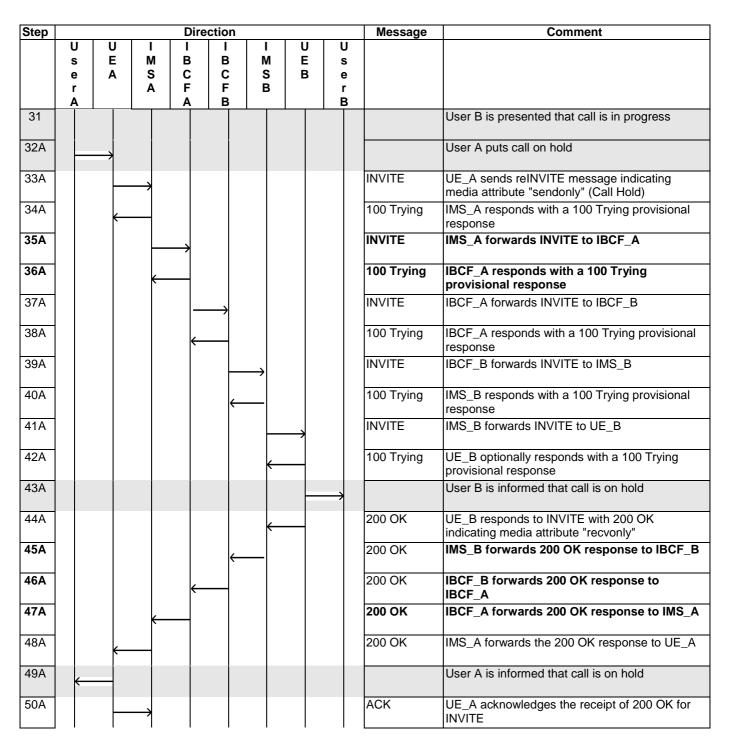
Step			Direc	tion		Message	Comment
	U s	U I E M	I B	I I B M	U U E s		
	е	A S	С	C S	Ве		
	r A	A	F A	F B	r B		
8						INVITE	IBCF_B forwards INVITE to IMS_B
9						100 Trying	IMS_B responds with a 100 Trying provisional response
10					$\rightarrow$	INVITE	IMS_B forwards INVITE to UE_B
11				<del>(</del>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
12							User B is informed of incoming call of User A
13				<del>-</del>		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
14				<del></del>		180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
15			<b>←</b>	-		180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
16		<b> </b>				180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
17		<b>—</b>				180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
18	<b>—</b>						User A is informed that UE_B is ringing
							User A cancels the Call
20		<b></b>				CANCEL	UE_A sends a CANCEL to IMS_A
21		<del></del>				200 OK	IMS_A responds with a 200 OK to UE_A
22			$\longrightarrow$			CANCEL	IMS_A forwards the CANCEL to IBCF_A
23		←				200 OK	IBCF_A responds with a 200 OK to IMS_A
24				$\rightarrow$		CANCEL	IBCF_A forwards the CANCEL to IBCF_B
25			<del></del>			200 OK	IBCF_B responds with a 200 OK to IBCF_A
26						CANCEL	IBCF_B forwards the CANCEL to IMS_B
27						200 OK	IMS_B responds with a 200 OK to IBCF_B
28					<b>→</b>	CANCEL	IMS_B forwards the CANCEL to UE_B
29						200 OK	UE_B responds with a 200 OK to IMS_B
30							User B is informed that call has been cancelled
31				<b>—</b>		487 Request Terminated	UE_B sends 487 Request Terminated to IMS_B
32					<b>→</b>	ACK	IMS_B responds with ACK to UE_B
33						487 Request Terminated	IMS_B forwards the 487 Request Terminated to IBCF_B
34				$\longrightarrow$		ACK	IBCF_B responds with ACK to IMS_B
35			<b>←</b>			487 Request Terminated	IBCF_B forwards the 487 Request Terminated to IBCF_A

Step				Dire	ction				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	M S B	U E B	U s e r B		
36					$\rightarrow$				ACK	IBCF_A responds with ACK to IBCF_B
37			$\leftarrow$	_					487 Request Terminated	IBCF_A forwards the 487 Request Terminated to IMS_A
38				$\rightarrow$					ACK	IMS_A responds with ACK to IBCF_A
39		<b>←</b>							487 Request Terminated	IMS_A forwards the 487 Request Terminated to UE_A
40			$\rightarrow$						ACK	UE_A responds with ACK to IMS_A
41	$\vdash$									User A is informed that call is terminated

#### 4.5.3.1.4.3 Normal call with hold/resume

		Interoperability Test Desc	ription							
Identifier:		CALL_0026								
Summary:			and resume correctly when a home caller							
		aming user on hold and resumes c	all with topology hiding							
Configuration:	CF_ROAM_CALL									
SUT	IMS_A									
References	<b>Test Pur</b>		Specification Reference							
	TP_IMS_	5408_04	TS 124 229 [1], clause 5.10.2.3 ¶1							
			(item 4 in 1 <sup>st</sup> numbered list)							
Use Case ref.:	UC_03_F	₹								
Pre-test	• HS	SS of IMS_A and of IMS B is config	gured according to table 1							
conditions:	UE_A and UE_B have IP bearers established to their respective IMS ne									
	as	per clause 4.2.1								
	• UI	E_A configured to perform user init	iated hold/resume using INVITE							
	• UI	E_A is registered in IMS_A using a	ny user identity							
	UE_B is registered via IMS A in IMS_B using any user identity									
	• IM	IS_A is configured for topology hid	ing							
Test Sequence:	Step									
	1	User A calls User B								
	2	Verify that user B is informed of i								
	3	Verify that user A is informed tha	t UE_A is ringing							
	4	User B answers call								
	5	Verify that user A is informed tha	t call has been answered							
	6	Verify that user B is informed that	t call is established							
	7	User A puts call on hold								
	8	Verify that user B is informed tha								
	9	Verify that user A is informed tha	t call is on hold							
	10	User A resumes call								
	11	Verify that user B is informed tha								
	12	Verify that user A is informed tha	t call is resumed							
	13	User A ends call								
	14	Verify that user B is informed tha								
	15	Verify that user A is informed tha								

	Interoperability Test Description									
Conformance	Check									
Criteria:	1	TP_IMS_5408_04 in CFW step 37A and 60A (INVITE): ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_A sends the INVITE to IMS_B								

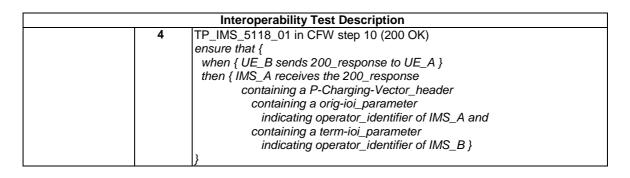


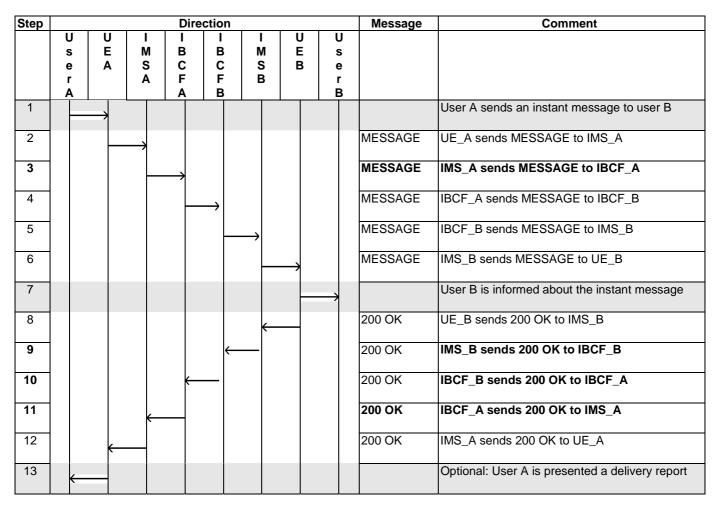
Step				Dire	ction				Message	Comment
	U	U	I	I	ı	I	U	U		
	S	E	M	В	В	M	E	S		
	e r	Α	S A	C	C	S	В	e r		
	Å		^	A	В	"		В		
51A				$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
52A					$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
53A					-	$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
54A							$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
55A	H	$\rightarrow$								User A resumes call
56A			$\rightarrow$						INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
57A		←							100 Trying	IMS_A responds with a 100 Trying provisional response
58A				$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
59A			←						100 Trying	IBCF_A responds with a 100 Trying provisional response
60A					$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
61A				<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
62A						$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
63A					<b></b>	_			100 Trying	IMS_B responds with a 100 Trying provisional response
64A							$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
65A						<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
66A								$\rightarrow$		User B is informed that call is resumed
67A						$\leftarrow$			200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"
68A					<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
69A				←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
70A			<b>←</b>						200 OK	IBCF_A forwards 200 OK response to IMS_A
71A		←							200 OK	IMS_A forwards the 200 OK response to UE_A
72A	$\leftarrow$									User A is informed that call is resumed

# 4.5.4 Messaging

# 4.5.4.1 Messaging with SIP URI public identities

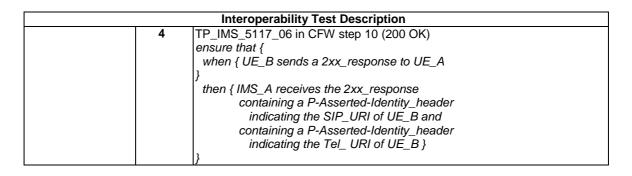
Identifier:	ITD IMS N	Interoperability Test Des MESS 0002	cription						
Summary:			identity correctly without topology hiding						
Configuration:	CF_INT_C		identity correctly without topology maing						
SUT	IMS_B	JALL							
References	Test Purp	200	Specification Peferance						
References			Specification Reference						
	TP_IMS_5		TS 124 229 [1], clause 5.4.3.2 ¶1						
	TP_IMS_5	0097_06	TS 124 229 [1], clause 5.4.3.2 ¶11						
	TD 1140 5	117 00	(item 9 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5	0117_02	TS 124 229 [1], clause 5.4.3.3 ¶100						
	TD 1140 5	1440.04	(item 2 in 5 <sup>th</sup> numbered list)						
	TP_IMS_5	5118_01	TS 124 229 [1], clause 5.4.3.3 ¶105						
			(item 2 in 6 <sup>th</sup> numbered list)						
Use Case ref.:	UC_05_I								
Pre-test	• HSS o	of IMS_A and of IMS B is config	ured according to table 1						
conditions:									
conditions.			ablished to their respective IMS networks as						
		ause 4.2.1	auCID, mais a according to table 4						
		is registered in IMS_A using us							
		is registered in IMS_B using ar	· · · · · · · · · · · · · · · · · · ·						
		A is within the trust domain of IM							
		and UE_B registered with SIP							
		A not configured for topology hid							
			s to be supported at II-NNI (TS 129 165 [16]						
	see Ta	able 6.1 and Table 6.3)							
Test Sequence:	Step								
	1	User A sends message to user	В						
	2	Verify that user B receives mes	sage from user A						
Conformance	Check								
Conformance Criteria:	Check 1	TP_IMS_5097_05 in CFW step	4 (MESSAGE)						
		TP_IMS_5097_05 in CFW step ensure that {	4 (MESSAGE)						
		ensure that { when { UE_A sends a MESSA	AGE to UE_B }						
		ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME	AGE to UE_B }						
		ensure that { when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_	AGE to UE_B } SSAGE header						
		ensure that { when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A						
		ensure that { when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A g-Vector_header						
		ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-vality)	AGE to UE_B } SSAGE header SSIP_URI of IMS_A g-Vector_header ue_parameter and						
		ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valicontaining a orig-ioi_p	AGE to UE_B } SSAGE header SIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and						
		ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_k not containing an acc	AGE to UE_B } SSAGE header SSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and bess-network-charging-info_parameter and						
		ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valicontaining a orig-ioi_p	AGE to UE_B } SSAGE header SSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and bess-network-charging-info_parameter and						
	1	ensure that {  when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valicontaining a orig-ioi_p not containing a term-ly	AGE to UE_B } SSAGE header SSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and bioi_parameter) }						
		ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step	AGE to UE_B } SSAGE header SSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and bioi_parameter) }						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valic containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step ensure that {	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and parameter indicating IMS_A and pess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE)						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and parameter indicating IMS_A and pess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE)						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valic containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and parameter indicating IMS_A and pess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE)						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valic containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the MESSA }	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and parameter indicating IMS_A and pess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valicontaining a orig-ioi_k not containing an accontaining a term-} } TP_IMS_5097_06 in CFW steptensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME containing a P-Asserte	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valic containing a orig-ioi_p not containing an accontaining a terms}  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_U	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms}  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_Ut containing a P-Asserte	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-valic containing a orig-ioi_p not containing an accontaining a terms}  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_U	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a term-} } TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A }						
	1	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms) } TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW step	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A }						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms)  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW step ensure that {	AGE to UE_B } SSAGE headerSIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A } 10 (200 OK)						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms) }  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW step ensure that {   when { UE_B sends a 2xx_reserved in the sends a 2xx_reserved in	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A } 10 (200 OK) Sponse to UE_A }						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_K not containing an accontaining a terms)  TP_IMS_5097_06 in CFW stepensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW stepensure that {   when { UE_B sends a 2xx_resten { IMS_A receives the 2xx then { IMS_A receives the	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A } 10 (200 OK) Sponse to UE_A } Cresponse						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms)  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW step ensure that {   when { UE_B sends a 2xx_resten { IMS_A receives the 2xx containing a P-Charging a	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A g-Vector_header ue_parameter and parameter indicating IMS_A and pass-network-charging-info_parameter and pioi_parameter) }  4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A }  10 (200 OK) Sponse to UE_A } C_response g-Vector_header						
	2	ensure that {   when { UE_A sends a MESSA then { IMS_B receives the ME not containing a Route_indicating the S-CSCI containing a P-Charging (containing an icid-value containing a orig-ioi_p not containing an accontaining a terms)  TP_IMS_5097_06 in CFW step ensure that {   when { UE_A sends a MESSA }   then { IMS_B receives the ME containing a P-Asserte indicating the SIP_UI containing a P-Asserte indicating the Tel_UF }  TP_IMS_5117_02 in CFW step ensure that {   when { UE_B sends a 2xx_resten { IMS_A receives the 2xx containing a P-Charging a	AGE to UE_B } SSAGE header =_SIP_URI of IMS_A g-Vector_header ue_parameter and barameter indicating IMS_A and ess-network-charging-info_parameter and ioi_parameter) } 4 (MESSAGE) AGE to UE_B SSAGE d-Identity_header RI of UE_A and d-Identity_header RI of UE_A } 10 (200 OK) Sponse to UE_A } Cresponse						

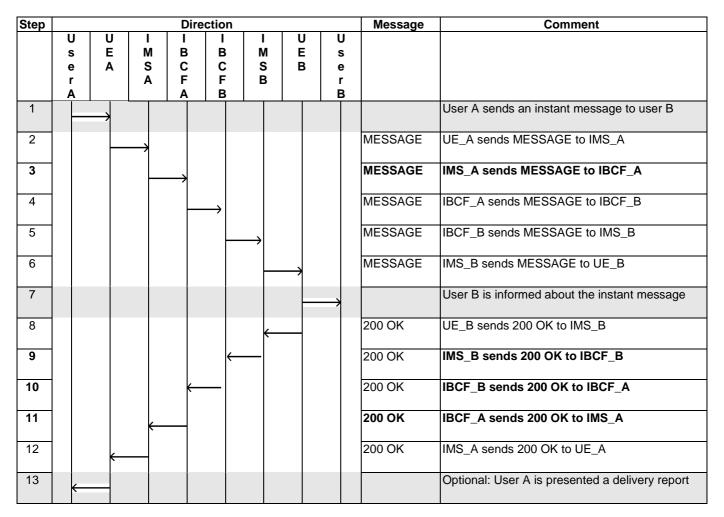




# 4.5.4.2 Messaging with TEL URI identities

	Interoperabili et al.	y Test Description
Identifier:	TD_IMS_MESS_0003	
Summary:		ng with TEL URI identities correctly
Configuration:	CF_INT_CALL	
SUT	IMS_B	<del>_</del>
References	Test Purpose	Specification Reference
	TP_IMS_5097_07	TS 124 229 [1], clause 5.4.3.2 ¶1
	TP_IMS_5117_02	TS 124 229 [1], clause 5.4.3.3 ¶100
		(item 2 in 5 <sup>th</sup> numbered list)
	TP_IMS_5118_01	TS 124 229 [1], clause 5.4.3.3 ¶105
		(item 2 in 6 <sup>th</sup> numbered list)
	TP_IMS_5117_06	TS 124 229 [1], clause 5.4.3.3 ¶100
		(item 1 in 5 <sup>th</sup> numbered list)
Use Case ref.:	UC_05_I	
Pre-test	HSS of IMS_A and of IMS	B is configured according to table 1
conditions:		bearers established to their respective IMS networks as
conditions.	per clause 4.2.1	bearers established to their respective livio hetworks as
		_A using userTEL_priv according to table 1
		_A using userTEL_priv according to table 1 _B using userTEL_priv according to table 1
	<ul> <li>IMS_A is within the trust of</li> </ul>	
	_	esponse has to be supported at II-NNI (TS 129 165 [16]
	see Table 6.1 and Table 6	
	See Table 6.1 and Table 6	)
Test Sequence:	Step	
rest ocquerice.		age to User B (i.e. userTEL in IMS_B)
		ceives message from user A
	2   Verify that user B re	ceives message nom user A
Conformance	Check	
Conformance Criteria:	Check	n CFW step 4 (MESSAGE)
	1 TP_IMS_5097_07 i	n CFW step 4 (MESSAGE)
	1 TP_IMS_5097_07 in ensure that {	• • •
	1 TP_IMS_5097_07 in ensure that {	n CFW step 4 (MESSAGE)  Is a MESSAGE to UE_B
	TP_IMS_5097_07 i ensure that {   when { UE_A send }	• • •
	TP_IMS_5097_07 i ensure that {    when { UE_A send} } then { IMS_B rece	ds a MESSAGE to UE_B
	TP_IMS_5097_07 i ensure that {     when { UE_A send } then { IMS_B rece containing i indicating	ives the MESSAGE to UE_B a P-Asserted-Identity_header the SIP_URI of UE_A and
	TP_IMS_5097_07 i ensure that {     when { UE_A send } then { IMS_B rece containing i indicating	ives the MESSAGE a P-Asserted-Identity_header
	TP_IMS_5097_07 i ensure that {    when { UE_A send } then { IMS_B rece containing a indicating containing a	ives the MESSAGE to UE_B a P-Asserted-Identity_header the SIP_URI of UE_A and
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }	ives the MESSAGE to UE_B ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i	ives the MESSAGE to UE_B ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     then { IMS_B recection containing a indicating containing a indicating } }  TP_IMS_5117_02 is ensure that {	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A } a CFW step 10 (200 OK)
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  The CFW step 10 (200 OK)  Is a 2xx_response to UE_A }
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send     then { IMS_A rece	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A } a CFW step 10 (200 OK) ds a 2xx_response to UE_A } ives the 2xx_response
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send     then { IMS_A rece         containing a	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  n CFW step 10 (200 OK)  is a 2xx_response to UE_A } ives the 2xx_response a P-Charging-Vector_header
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send     then { IMS_A rece         containing a	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A } a CFW step 10 (200 OK) ds a 2xx_response to UE_A } ives the 2xx_response
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     then { IMS_B recession containing a indicating containing a indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A recession containing a not contain} }	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  n CFW step 10 (200 OK) is a 2xx_response to UE_A } ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send     then { IMS_A rece         containing a         not conta     }  TP_IMS_5118_01 i	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  n CFW step 10 (200 OK)  is a 2xx_response to UE_A } ives the 2xx_response a P-Charging-Vector_header
	TP_IMS_5097_07 i ensure that {     when { UE_A send }     then { IMS_B rece         containing a         indicating         containing a         indicating }  TP_IMS_5117_02 i ensure that {     when { UE_B send         then { IMS_A rece         containing a         not conta     }  TP_IMS_5118_01 i ensure that {	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  n CFW step 10 (200 OK)  is a 2xx_response to UE_A } ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }  n CFW step 10 (200 OK)
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B recession containing a indicating containing a indicating indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A recession containing a not	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }  In CFW step 10 (200 OK)
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B rece containing a indicating containing a indicating indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A rece containing a not containin	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Its a 2xx_response to UE_A }  ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }  In CFW step 10 (200 OK)  Its 200_response to UE_A }  ives the 200_response
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     then { IMS_B recession containing a indicating containing a indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A recession containing a not containing a not containing a not containing a then { UE_B send then { UE_B send then { UE_B send then { UE_B send then { IMS_A recession containing a not containing a n	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Its a 2xx_response to UE_A }  ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }  In CFW step 10 (200 OK)  Its 200_response to UE_A }  ives the 200_response a P-Charging-Vector_header
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B recession containing a indicating containing a indicating indicating }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A recession containing a not containing a not containing a not containing a then { UE_B send then { UE_B send then { UE_B send then { IMS_A recession containing a containing containi	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  n CFW step 10 (200 OK)  is a 2xx_response to UE_A } ives the 2xx_response a P-Charging-Vector_header ining a access-network-charging-info_parameter }  n CFW step 10 (200 OK)  is 200_response to UE_A } ives the 200_response a P-Charging-Vector_header join comparameter a P-Charging-Vector_header
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B rece containing a indicating containing a indicating indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A rece containing a not containing a not containing a not containing a containing containing containing containing a containing indication.	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B rece containing a indicating containing a indicating indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A rece containing a not containing a not containing a not containing a containing containing containing containing a containing containing containing containing containing a containing	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)
	TP_IMS_5097_07 is ensure that {     when { UE_A send }     }     then { IMS_B rece containing a indicating containing a indicating indicating } }  TP_IMS_5117_02 is ensure that {     when { UE_B send then { IMS_A rece containing a not containing a not containing a not containing a containing containing containing containing a containing containing containing containing containing a containing	ives the MESSAGE a P-Asserted-Identity_header the SIP_URI of UE_A and a P-Asserted-Identity_header the Tel_URI of UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is a 2xx_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)  Is 200_response to UE_A }  In CFW step 10 (200 OK)





# 4.5.4.3 Messaging with DNS/ENUM lookup procedure

		Interoperability Test Descr	iption							
Identifier:		MESS_0004								
Summary:	IMS netwo	ork handles messaging with DNS/E	ENUM lookup procedure correctly							
Configuration:	CF_INT_C	CALL								
SUT	IMS_A									
References	Test Purp		Specification Reference							
	TP_IMS_5	5097_08	TS 124 229 [1], clause 5.4.3.2 ¶11							
			(item 10 in 1 <sup>st</sup> numbered)							
	TP_IMS_5117_06 TS 124 229 [1], clause 5.4.3.3 ¶44									
Use Case ref.:	ef.: UC_05_I									
Pre-test	LICC	of IMC. A and of IMC. D is configure	ad according to table 4							
conditions:		of IMS_A and of IMS B is configure	lished to their respective IMS networks as							
conditions.		ause 4.2.1	iished to their respective livis hetworks as							
		ause 4.2.1 is registered in IMS_A using any	user identity							
		is registered in IMS_B using user								
		A is within the trust domain of IMS								
		non DNS is configured with a DNS								
			b be supported at II-NNI (TS 129 165 [16]							
		ables 6.1 and 6.3)	be supported at II-MM (10 123 103 [10]							
	000 %	and old								
Test Sequence:	Step									
	1	User A sends message to user B'	s Tel URI (i.e. userTEL in IMS_B)							
	2	Verify that user B receives messa								
Conformance	Check									
Criteria:	1	TP_IMS_5097_08 in CFW step 6	(MESSAGE)							
		ensure that {								
		when { UE_A sends a MESSAG								
		containing a Request_UF	RI							
		indicating a Tel_URI }	om to DNC							
		then { IMS_A sends a DNS_Que containing the Tel_URI_E								
		when { IMS_A receives DNS_Re								
		containing a NAPTR_Res								
		indicating the SIP_URI								
		then { IMS_A sends the MESSA								
		containing a Request_UF								
		indicating a SIP_URI								
		containing a P-Charging-								
		not containing a access	s-network-charging-info_parameter }							
		<b> </b> }								
		TD 1140 5447 00: 0514 4	0 (000 010)							
	2	TP_IMS_5117_06 in CFW step 1:	2 (200 OK)							
		ensure that {	ones to LIE A							
		when { UE_B sends a 2xx_response	UISE IU UE_A							
		then { IMS_A receives the 2xx_r	response							
		containing a P-Asserted-								
		indicating the SIP_URI								
		containing a P-Asserted-								
		indicating the Tel_URI								
		]}	•							
	1	I/								

					Directi	ion				Message	Comment
Step	U	U		D	I	I	1 1	U	U	wiessage	Comment
	s	E	M	N	В	В	M	E	s		
	e	Ā	S	S	C	C	S	В	e		
	r		Α		F	F	В		r		
	Α				Α	В			В		
1		$\rightarrow$									User A sends an instant message to user B
2			$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$						DNS QUERY	IMS_A sends DNS QUERY to common DNS containing E.164 TEL URI
4			<b>←</b>							DNS RESPONSE	Common DNS sends DNS RESPONSE containing NAPTR resource record to IMS_A
5					$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
6						$\longrightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
7							$\longrightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
8								$\longrightarrow$		MESSAGE	IMS_B sends MESSAGE to UE_B
9									$\rightarrow$		User B is informed about the instant message
10							<b>(</b>			200 OK	UE_B sends 200 OK to IMS_B
11						<b>←</b>	_			200 OK	IMS_B sends 200 OK to IBCF_B
12				←	-					200 OK	IBCF_B sends 200 OK to IBCF_A
13			<b>—</b>							200 OK	IBCF_A sends 200 OK to IMS_A
14		←								200 OK	IMS_A sends 200 OK to UE_A
15	$\leftarrow$										Optional: User A is presented a delivery report

### 4.5.4.4 Messaging when roaming

Interoperability Test Description										
Identifier:		MESS_0005								
Summary:		ork handles messaging while roa	aming correctly							
Configuration:	CF_ROAN									
SUT	IMS_A an		I							
References	Test Purp		Specification Reference							
	TP_IMS_5	5108_02	TS 124 229 [1], clause 5.4.3.3 ¶5 (1 <sup>st</sup> numbered list)							
	TP_IMS_5	5118_01	TS 124 229 [1], clause 5.4.3.3 ¶105 (item 2 in 6 <sup>th</sup> numbered list)							
Use Case ref.:	UC_05_R									
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B via IMS_A using any user identity</li> <li>MESSAGE request and response has to be supported at II-NNI (TS 129 165 [16] see tables 6.1 and 6.3)</li> </ul>									
Toot Coguenes	Step									
Test Sequence:		Lloor A gondo magaga to usor	D							
	2	User A sends message to user Verify that user B receives mes								
		verify that user B receives mes	ssage from user A							
Conformance	Check									
Criteria:	1	AGE to UE_B AGE to IMS_B g-Vector_header ue_parameter } SAGE to IMS_A ader SSCF_SIP_URI of IMS_B and g-Vector_header cid-value_parameter and rameters oute_header SF_SIP_URI of IMS_B }								
	o 16 (200 OK)  conse to UE_A }  O_response  ng-Vector_header  _parameter  r_identifier of IMS_A and  i_parameter  r_identifier of IMS_B }									

Step				Dire	ection				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	B C F B	I M S B	U E B	U s e r B		
1							<u> </u>			User B sends an instant message to user A
2			<b>←</b>						MESSAGE	UE_B sends MESSAGE to IMS_A
3				$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
4					<b>→</b>				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
5						$\rightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
6					$\leftarrow$	_			MESSAGE	IMS_B sends MESSAGE to IBCF_B
7				<b>←</b>					MESSAGE	IBCF_B sends MESSAGE to IBCF_A
8			<b>—</b>						MESSAGE	IBCF_A sends MESSAGE to IMS_A
9		<b>←</b>							MESSAGE	IMS_A sends MESSAGE to UE_A
10	<b>←</b>									User A is informed about the instant message
11			$\rightarrow$						200 OK	UE_A sends 200 OK to IMS_A
12				$\rightarrow$					200 OK	IMS_A sends 200 OK to IBCF_A
13					$\longrightarrow$				200 OK	IBCF_A sends 200 OK to IBCF_B
14						$\rightarrow$			200 OK	IBCF_B sends 200 OK to IMS_B
15					$\leftarrow$				200 OK	IMS_B sends 200 OK to IBCF_B
16				$\leftarrow$					200 OK	IBCF_B sends 200 OK to IBCF_A
17			<b>←</b>						200 OK	IBCF_A sends 200 OK to IMS_A
18				_		-	$\rightarrow$		200 OK	IMS_A sends 200 OK to UE_B
19								$\rightarrow$		Optional: User A is presented a delivery report

# 4.5.4.5 Messaging with receiving user not registered

	ı	Interoperability Test Descri	ption							
Identifier:	TD_IMS_MESS	_0006								
Summary:	IMS network handles messaging correctly when receiving user is not registered									
Configuration:	CF_INT_CALL	CF_INT_CALL								
SUT	IMS_B									
References	ences Test Purpose Specification Refere									
	TP_IMS_5114_0	02	TS 124 229 [1], clause 5.4.3.3 ¶85							
			(item 3 in 3 <sup>rd</sup> numbered list)							
Use Case ref.:	UC_05_I									
Pre-test conditions:	<ul> <li>UE_A and L per clause 4</li> <li>UE_A is reg</li> <li>UE_B is not</li> <li>IMS_B is not</li> </ul>	4.2.1  gistered in IMS_A using any user registered in IMS_B  of configured with any filter crirequest and response has to	ished to their respective IMS networks as user identity							
Test Sequence:		A sends message to a valid untail that user A is informed that								
	ı z įveiliy	r triat user A is informed that	user is could not be reached							
Conformance	Check									
Criteria:	1 TP_IN ensur	MS_5114_02 in CFW step 10 re that { rn { UE_A sends a MESSAGE IMS_A sends the MESSAGE n { IMS_B sends a 4xx_respo	E to UE_B and E to IMS_B }							

Step				Dire	ection					Message	Comment
•	U s e r A	U E A	M S A	I B C F A	I B C F B	I M S B	U E B	9	U s e r B		
1		$\rightarrow$									User A sends an instant message to user B
2			$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$						MESSAGE	IMS_A sends MESSAGE to IBCF_A
4					$\longrightarrow$					MESSAGE	IBCF_A sends MESSAGE to IBCF_B
5						$\rightarrow$				MESSAGE	IBCF_B sends MESSAGE to IMS_B
7											IMS_B detects that user B is not registered
9					<b>←</b>	-				4xx Response	IMS_B sends 4xx Response to IBCF_B
10				<b>←</b>						4xx Response	IBCF_B forwards 4xx Response to IBCF_A
11			<b>(</b>							4xx Response	IBCF_A forwards 4xx Response to IMS_A
12		<b>←</b>								4xx Response	IMS_A forwards 4xx Response to UE_A
13	←										Optional: User A is presented a delivery report

# 4.5.4.6 Messaging with receiving user barred

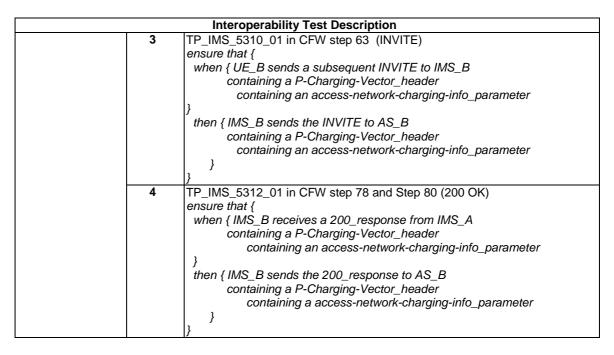
		Interoperability Test	Description						
Identifier:	TD_IMS_N	MESS_0007	-						
Summary:	IMS netwo	rk handles messaging corre	ctly when receiving user has been barred						
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	<b>Test Purp</b>	ose	Specification Reference						
	TP_IMS_5	108_06	TS 124 229 [1], clause 5.4.3.3 ¶6 (item 1 in1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_05_I								
Pre-test conditions:	<ul><li>UE_A per cla</li><li>UE_A</li><li>UE_B</li><li>User I</li><li>MESS</li></ul>	and UE_B have IP bearers ause 4.2.1 is registered in IMS_A using is registered in IMS_B using is barred in IMS_B	•						
Test Sequence:	<b>Step</b> 1 2	User A sends message to L Verify that user A is informe	Jser B d that user B could not be reached						
Conformance	Check								
Criteria:	1	TP_IMS_5108_06 in CFW sensure that { when { UE_A sends a MEA IMS_A sends the MES containing a Reques indicating a barr then { IMS_B sends 404_r }	SSAGE to UE_B and SSAGE to IMS_B st_URI ed_user in IMS_B }						

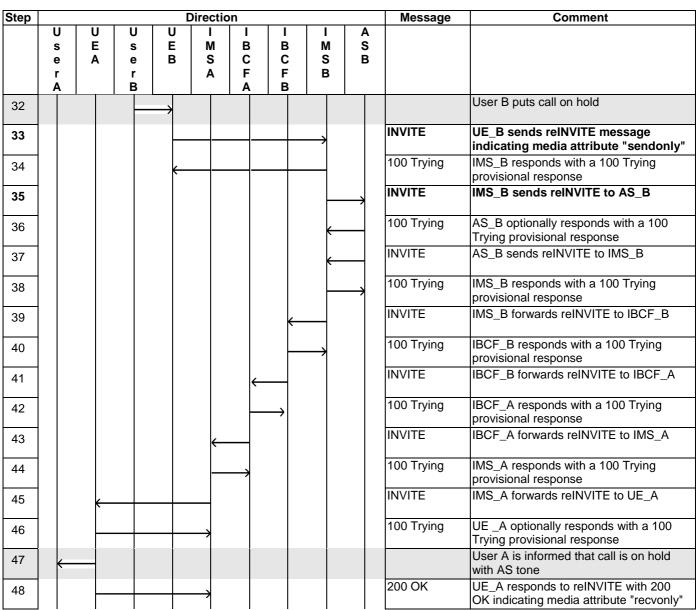
Step			Direction				Message	Comment
Эзэр	U U E E A r A	I M S A	I I B B C C F F A B	M S B	U E B	U s e r B		
1								User A sends an instant message to user B
2		$\rightarrow$					MESSAGE	UE_A sends MESSAGE to IMS_A
3			<del>)</del>				MESSAGE	IMS_A sends MESSAGE to IBCF_A
4			$\longrightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
5				$\rightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
7								IMS_B detects that user B is not registered
9			←	_			404 Not Found	IMS_B sends 404 Response to IBCF_B
10			<del></del>				404 Not Found	IBCF_B forwards 404 Response to IBCF_A
11		<b></b>					404 Not Found	IBCF_A forwards 404 Response to IMS_A
12	<del>-</del>						404 Not Found	IMS_A forwards 404 Response to UE_A
13	<del></del>							Optional: User A is presented a delivery report

# 4.5.5 Supplementary Services

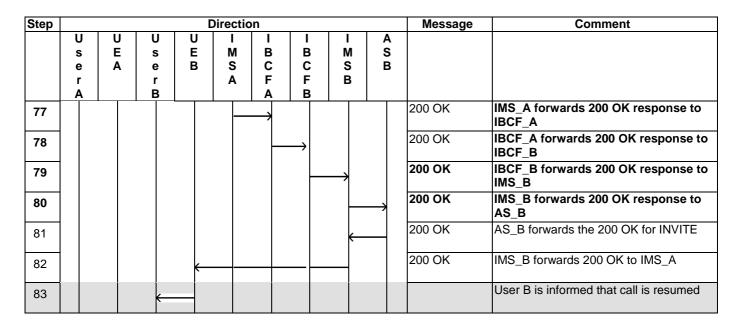
#### 4.5.5.1 Supplementary Service HOLD with AS

		Interoperability Test D	accrintion							
Identifier:	TD_IMS_		escription							
Summary:			ion services based on the example of the HOLD							
Guillilai y.		entary service	on services based on the example of the HOLD							
Configuration:	CF_INT_									
SUT	IMS B									
References	Test Pur	nose	Specification Reference							
rio i o i o i o o o	TP_IMS_5310_01 TS 124 229 [1], clause 5.4.6.1.2 ¶1									
	TP_IMS_		TS 124 229 [1], clause 5.4.6.1.3 ¶1							
Use Case ref.:		JC 10 I								
000 0000 10111	100_10_1									
Pre-test	• HS	SS of IMS A and of IMS B is o	onfigured according to table 1							
conditions:			s established to their respective IMS networks							
		per clause 4.2.1	o obtablioned to their respective line networks							
		E_A is registered in IMS_A usi	ng any user identity							
			ng userHOLD identity according to table 1							
		S_B is configured to contact A								
		E B is subscribed to HOLD se								
		E_B is subscribed to HOLD set SB in same trust domain as IN								
	- AS	וו סמווופ נועסנ עטווומווו dS III	ю <b>Б</b>							
Test Sequence:	Step									
	1	User A calls User B (i.e. use	rHOLD in IMS B)							
	2	Verify that user B is informed								
	3	Verify that user A is informed								
	4	User B answers call	that OL_D is finging							
	5		d that call has been answered							
	6	Verify that user B is informed								
	7	User B puts call on hold	triat can is established							
	8		d that call on hold with AS tone							
	9	Verify that user B is informed								
	10	User B resumes call	triat call off floid							
	11	Verify that user A is informed	that call is resumed							
	12	Verify that user B is informed								
	13	User A ends call	triat cair is resumed							
	14	Verify that user B is informed	that call has ended							
	15	Verify that user A is informed								
	10	Verify that age! 7(13 informed	a that can has chaca							
Conformance	Check									
Criteria:	1	TP_IMS_5310_01 in CFW s	tep 35 (INVITE)							
		ensure that {								
		when { UE_B sends a subs	equent INVITE to IMS_B							
		containing a P-Charg								
		containing an acce	ss-network-charging-info_parameter							
		}								
		then { IMS_B sends the IN								
		containing a P-Charg								
		containing an acce	ss-network-charging-info_parameter							
		}								
		}								
	2		tep 50 and Step 52 (200 OK)							
		ensure that {	00 vooronge from IMC A							
		when { IMS_B receives a 2								
		containing a P-Charg								
		containing an acc	cess-network-charging-info_parameter							
		than (IMS Basinda the so	O reapposes to AS B							
		then { IMS_B sends the 20								
		containing a P-Charg								
		_	ess-network-charging-info_parameter							
		}								
		I/								





Step						ction						Message	Comment
	U s	U	U			I   I VI   E	 	I B	I M		A S		
	e r	Α	e r	E	3 :	S C A F		C F	S B		В		
	Å		B					В					
49							•					200 OK	IMS_A forwards 200 OK response to IBCF_A
50								>				200 OK	IBCF_A forwards 200 OK response to IBCF_B
51									$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
52										<del></del>		200 OK	IMS_B forwards 200 OK response to AS_B
53									<b>←</b>			200 OK	AS_B forwards 200 OK response to IMS_B
54					<del></del>							200 OK	IMS_A forward the 200 OK to UE_B
55				(									User B is informed that the call is on hold
56									$\rightarrow$			ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
57									-	<del></del>		ACK	IMS_B forwards ACK to AS_B
58									<b>←</b>			ACK	AS_B forwards ACK to IMS_B
59					←—				_			ACK	IMS_B forwards ACK to UE_B
60				<del></del>									User B resumes call
61									$\rightarrow$			INVITE	UE_B sends second reINVITE message indicating media attribute
62					<b></b>				_			100 Trying	IMS_B responds with a 100 Trying provisional response
63										<del></del>	•	INVITE	IMS_B sends reINVITE to AS_B
64									<b>←</b>			100 Trying	AS_B optionally responds with a 100 Trying provisional response
65									<b>←</b>			INVITE	AS_B forwards INVITE to IMS_B
66									-	$\longrightarrow$		100 Trying	IMS_B responds with a 100 Trying provisional response
67								$\leftarrow$				INVITE	IMS_B sends reINVITE to IBCF_B
68									$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
69							<del></del>					INVITE	IBCF_B sends reINVITE to IBCF_A
70							- :	>				100 Trying	IBCF_A responds with a 100 Trying provisional response
71						<del></del>						INVITE	IBCF_A sends reINVITE to IMS_A
72							•					100 Trying	IMS_A responds with a 100 Trying provisional response
73		<b>*</b>										INVITE	IMS_A forwards reINVITE to UE_A
74		-			ļ ;	<b>,</b>						100 Trying	UE_A optionally responds with a 100 Trying provisional response
75	<del>(</del>												User A is informed that call is resumed
76		-			;							200 OK	UE_A sends the 200 OK indicating media attribute "sendrecv" to IMS_A



#### 4.5.5.2 Supplementary Service HOLD with AS in roaming

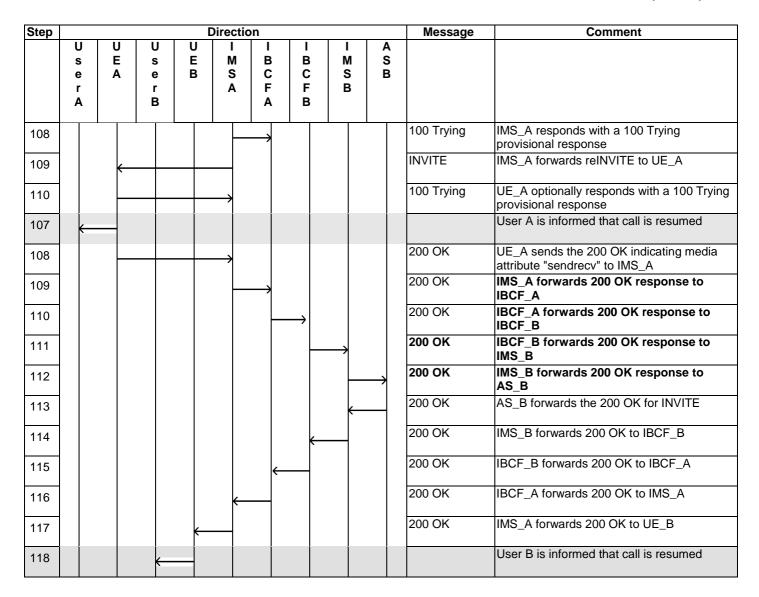
		Interoperability Test Desc	ription							
Identifier:	TD_IMS_SS_0002									
Summary:	IMS network supports properly application services based on the example of the HOLD									
	supplementary service									
Configuration:	CF_ROAM_AS									
SUT	IMS_B									
References	Test Purp		Specification Reference							
	TP_IMS_		TS 124 229 [1], clause 5.4.6.1.2 ¶1							
	TP_IMS_		TS 124 229 [1], clause 5.4.6.1.3 ¶1							
Use Case ref.:	UC_10_R									
	<u> </u>									
Pre-test	HSS of IMS_A and of IMS B is configured according to table 1									
conditions:		A and UE_B have IP bearers established to their respective IMS networks								
	as per clause 4.2.1									
	<ul> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B via IMS_A using userHOLD identity according</li> </ul>									
		S_A using userHOLD identity according to								
		ole 1	) (IIOLD)							
		B is configured to contact AS_B (HOLD)								
		_B is subscribed to HOLD service B in same trust domain as IMS B								
	• AS	B B III same trust domain as livis B								
Test Sequence:	Step									
root ooquonoo.	1	User A calls User B (i.e. userHOI	D in IMS_B)							
	2	Verify that user B is informed of incoming call of User A								
	3	Verify that user A is informed that UE_B is ringing								
	4	User B answers call								
	5	Verify that user A is informed that call has been answered								
	6	Verify that user B is informed that call is established								
	7	User B puts call on hold								
	8	Verify that user A is informed that call on hold with AS tone								
	9	Verify that user B is informed that call on hold								
	10	User B resumes call								
	11	Verify that user A is informed that call is resumed								
	12	Verify that user B is informed that call is resumed								
	13	User A ends call								
	14	Verify that user B is informed tha	t call has ended							
	15	Verify that user A is informed tha								

		Interoperability Test Description
		interoperability rest besomption
Conformance	Check	
Criteria:	1	TP_IMS_5310_01 in CFW step 52 and Step 56 (INVITE) ensure that {   when { UE_B sends a subsequent INVITE to IMS_B
	2	TP_IMS_5312_01 in CFW step 71 and Step 73 (200 OK) ensure that { when { IMS_B receives a 200_response from IMS_A containing a P-Charging-Vector_header containing an access-network-charging-info_parameter } then { IMS_B sends the 200_response to AS_B containing a P-Charging-Vector_header containing a access-network-charging-info_parameter } }
	3	TP_IMS_5310_01 in CFW step 95 and Step 99 (INVITE) ensure that {   when { UE_B sends a subsequent INVITE to IMS_B
	4	ensure that { when { IMS_B receives a 200_response from IMS_A containing a P-Charging-Vector_header containing an access-network-charging-info_parameter } then { IMS_B sends the 200_response to AS_B containing a P-Charging-Vector_header containing a access-network-charging-info_parameter } }

Step					Directio	n				Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	I B C F A	I B C F B	I M S B	A S B		
47				<b>—</b>							User B puts call on hold
48					$\rightarrow$					INVITE	UE_B sends relNVITE message indicating media attribute "sendonly"
49				<b>←</b>						100 Trying	IMS_A responds with a 100 Trying provisional response
50						$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
51					<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response

Step					Dire	ction					Message	Comment
	U s e r A	UEA	s e r B	E	J   N	SC	; C	;	I M S B	A S B		
52							$\stackrel{ }{\longmapsto}$				INVITE	IBCF_A forwards INVITE to IBCF_B
53							←—				100 Trying	IBCF_B responds with a 100 Trying provisional response
54									<del>&gt;</del>		INVITE	IBCF_B forwards INVITE to IMS_B
55								←—			100 Trying	IMS_B responds with a 100 Trying provisional response
56										$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
57									<b>—</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
58									$\leftarrow$		INVITE	AS_B sends reINVITE to IMS_B
59										$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
60								<del></del>			INVITE	IMS_B forwards reINVITE to IBCF_B
61									>		100 Trying	IBCF_B responds with a 100 Trying provisional response
62							<del></del>				INVITE	IBCF_B forwards reINVITE to IBCF_A
63							$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
64						<del></del>					INVITE	IBCF_A forwards reINVITE to IMS_A
65						<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional response
66		€									INVITE	IMS_A forwards reINVITE to UE_A
67		-									100 Trying	UE _A optionally responds with a 100 Trying provisional response
68	←											User A is informed that call is on hold with AS tone
69					$\longrightarrow$						200 OK	UE_A responds to reINVITE with 200 OK indicating media attribute "recvonly"
70						<del></del>					200 OK	IMS_A forwards 200 OK response to IBCF_A
71							$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
72									<del>)</del>		200 OK	IBCF_B forwards 200 OK response to IMS_B
73										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
74									<b>—</b>	$\dashv$	200 OK	AS_B forwards 200 OK response to IMS_B
75								<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
76							<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
77						<del>(</del>					200 OK	IBCF_A forwards 200 OK response to IMS_A
78					<del>(</del>						200 OK	IMS_A forward the 200 OK to UE_B
79				<del></del>								User B is informed that the call is on hold

Step				ı	Direction	on				Message	Comment
	U s	UE	U s	υE	I M	I B	I B	I M	A S		
	e r	Ā	e	В	S	C	C F	S	В		
	Å		В			A	В				
80					$\rightarrow$					ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
81						$\longrightarrow$				ACK	IMS_A forwards ACK to IBCF_A
82							$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
83								$\rightarrow$		ACK	IBCF_A forwards ACK to IMS_B
84									$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
85								<b>←</b>		ACK	AS_B forwards ACK to IMS_B
86							<b>←</b>			ACK	IMS_B forwards ACK to IBCF_B
87						$\leftarrow$				ACK	IBCF_B forwards ACK to IBCF_A
88					<b>←</b>					ACK	IBCF_A forwards ACK to IMS_A
89				<b>←</b>						ACK	IMS_A forwards ACK to UE_B
90				$\rightarrow$							User B resumes call
91					$\rightarrow$					INVITE	UE_B sends second reINVITE message indicating media attribute "sendrecv"
92				$\leftarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
93						$\longrightarrow$				INVITE	IMS_A sends reINVITE to IBCF_A
94					←					100 Trying	IBCF_A responds with a 100 Trying provisional response
95							$\longrightarrow$			INVITE	IBCF_A sends reINVITE to IBCF_B
96						<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
97								$\longrightarrow$		INVITE	IBCF_B sends reINVITE to IMS_B
98							<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
99									$\longrightarrow$	INVITE	IMS_B sends reINVITE to AS_B
100								<del>(</del>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
101								<b>←</b>		INVITE	AS_B forwards INVITE to IMS_B
102									<b>→</b>	100 Trying	IMS_B responds with a 100 Trying provisional response
103							<b>K</b>			INVITE	IMS_B sends reINVITE to IBCF_B
104								$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
105						$\leftarrow$				INVITE	IBCF_B forwards reINVITE to IBCF_A
106							$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
107					<b>←</b>					INVITE	IBCF_A forwards reINVITE to IMS_A

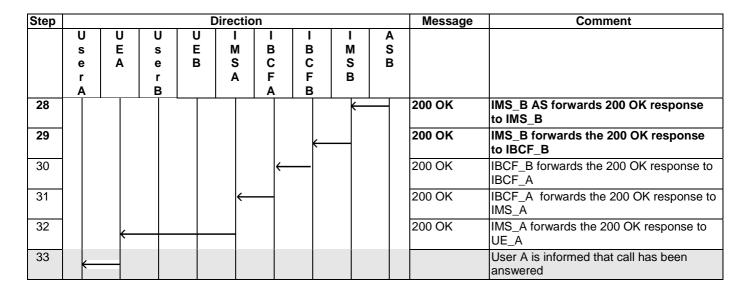


#### 4.5.5.3 Supplementary Service OIP with AS

	Interoperability Tes	st Description							
Identifier:	TD_IMS_SS_0003								
Summary:	IMS network supports properly application services based on the example of the OIP								
0	supplementary service								
Configuration:	CF_INT_AS								
SUT	IMS A and IMS_B								
References	Test Purpose	Specification Reference							
	TP_IMS_5097_02	TS 124 229 [1], clause 5.4.3.2 ¶11							
		(item 9 in 1 <sup>st</sup> numbered list)							
	TP IMS 5108 03	TS 124 229 [1], clause 5.4.3.3 ¶5							
		(item 4 in 1 <sup>st</sup> numbered list)							
	TP IMS 5115 08	TS 124 229 [1], clause 5.4.3.3 ¶89							
		(4 <sup>th</sup> numbered list)							
Use Case ref.:	UC_08_I								
Pre-test	HSS of IMS A and of IMS B	is configured according to table 1							
conditions:	UE_A and UE_B have IP beautiful in the second	arers established to their respective IMS networks							
	as per clause 4.2.1								
	UE_A is registered in IMS_A	• •							
		using userOIP identity according to table 1							
	<ul> <li>IMS_B is configured to conta</li> </ul>	ct AS_B (OIP)							
	UE_B is subscribed to OIP set	ervice							
	<del>-</del>								

		Interoperability Test Description
Test Sequence:	Step	
•	1	User A calls User B (i.e. userOIP in IMS_B)
	2	Verify that user B is informed of incoming call of User A, user A's identity is
		displayed
	3	Verify that user A is informed that UE_B is ringing
	4	User B answers call
	5	Verify that user A is informed that call has been answered
	6	Verify that user B is informed that the call is established
	7	User A ends call
	8	Verify that user B is informed that call has ended
	9	Verify that user A is informed that call has ended
		Volley that door 71 to informed that oall had drided
Conformance	Check	
Criteria:	1	TP_IMS_5097_02 in CFW step 6 (INVITE)
	-	ensure that {
		when { IMS_A receives an initial INVITE from UE_A addressed to UE_B
		}
		then { IMS_A sends the initial INVITE to IMS_B
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_A
		and
		containing a P-Asserted-Identity header
		indicating the Tel_URI of UE_A }
		3 /
	2	TP_IMS_5108_03 in CFW step 10 (INVITE)
		ensure that {
		when { IMS_B receives an initial INVITE from IMS_A addressed to UE_B}
		then { IMS_B sends the INVITE to AS_B
		containing a topmost Route_header
		indicating the SIP_URI of AS_B and
		containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_B and
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter }
		}
	3	TP_IMS_5115_08 in CFW step 30 (200 OK)
		ensure that {
		when { IMS_B receives 200_response from AS_B addressed to UE_A }
		then { IMS_B sends the 200_response to IMS_A
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		including a term-ioi_parameter
		indicating operator_identifier of IMS_B }
		}

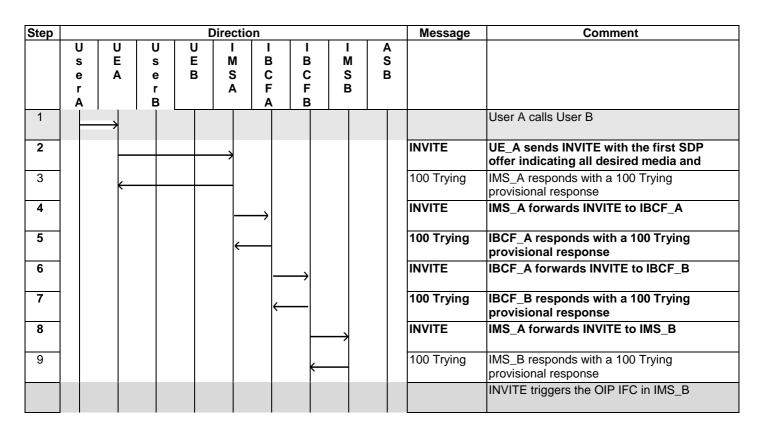
Step				ection				Message	Comment
	U U		U E	I I M B	l B	I M	A S		
	e A		В	s c	С	S	В		
	r A	r B		A F	F B	В			
1									User A calls User B
2	-			>				INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and
3								100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5				<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
6					<b>─</b>			INVITE	IBCF_A forwards INVITE to IBCF_B
7					<del></del>			100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
9					•			100 Trying	IMS_B responds with a 100 Trying provisional response
									INVITE triggers the OIP IFC in IMS_B
10						-	<b></b>	INVITE	IMS_B forwards the INVITE to IMS_B
11						•		100 Trying	AS optionally responds with a 100 Trying provisional response
12						•		INVITE	IMS_B AS returns, possibly modified, INVITE to IMS_B
13							<del></del>	100 Trying	IMS_B responds with a 100 Trying provisional response
14			<b>(</b>	_	<u> </u>			INVITE	IMS_B forwards the INVITE to UE_B
15						$\longrightarrow$		100 Trying	UE_B optionally responds with a 100 Trying provisional response
16		←							User B is informed of incoming call of User A, User A's identity is displayed
17				_		$\longrightarrow$		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started
18						-	$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
19						ŧ		180 Ringing	IMS_B AS forwards 180 Ringing response to IMS_B
20					•			180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
21					<del></del>			180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
22				<del></del>				180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
23				-				180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
24	-								User A is informed that UE_B is ringing
25			$\rightarrow$						User B answers call
26						$\longrightarrow$		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
27							$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS



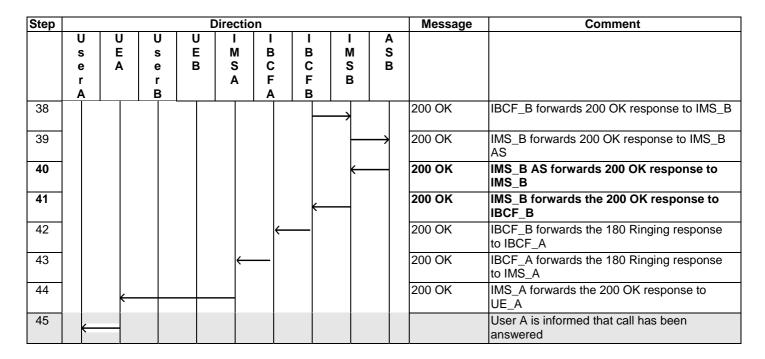
# 4.5.5.4 Supplementary Service OIP with AS in roaming

		Interoperability Tes	t Description					
Identifier:	TD_IMS_	_SS_0004	•					
Summary:	IMS netv	vork supports properly appli	cation services based on the example of the OIP					
	supplementary service							
Configuration:	CF_ROAM_AS							
SUT	IMS_A a	nd IMS_B						
References	Test Pur	pose	Specification Reference					
	TP_IMS_	_5097_02	TS 124 229 [1], clause 5.4.3.2 ¶11 (item 9 in 1 <sup>st</sup> numbered list)					
	TP_IMS_	_5108_03	TS 124 229 [1], clause 5.4.3.3 ¶5 (item 4 in 1 <sup>st</sup> numbered list)					
	TP_IMS_	_5115_08	TS 124 229 [1], clause 5.4.3.3 ¶89 (4 <sup>th</sup> numbered list)					
Use Case ref.:	UC_08_I	R	11					
	• U ta	<ul> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered in IMS_B via IMS_A using userOIP identity according to table 1</li> <li>IMS_B is configured to contact AS_B (OIP)</li> <li>UE_B is subscribed to OIP service</li> </ul>						
Test Sequence:	Step							
	1	Hear A calle Hear B (i.e. i						
		USEI A GAIIS USEI D (I.C. (	userOIP in IMS_B)					
	2	Verify that user B is inform	userOIP in IMS_B) med of incoming call of User A, user A's identity is					
			med of incoming call of User A, user A's identity is					
	2	Verify that user B is information displayed	med of incoming call of User A, user A's identity is					
	3	Verify that user B is informatisplayed Verify that user A is informatiser B answers call	med of incoming call of User A, user A's identity is					
	3 4	Verify that user B is informatisplayed Verify that user A is informatiser B answers call Verify that user A is informatiser.	med of incoming call of User A, user A's identity is med that UE_B is ringing					
	2 3 4 5	Verify that user B is informatisplayed Verify that user A is informatiser B answers call Verify that user A is informatiser.	med of incoming call of User A, user A's identity is med that UE_B is ringing med that call has been answered					
	2 3 4 5 6	Verify that user B is inforr displayed Verify that user A is inforr User B answers call Verify that user A is inforr Verify that user B is inforr	med of incoming call of User A, user A's identity is med that UE_B is ringing med that call has been answered med that the call is established med that call has ended					

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5097_02 in CFW step 6 (INVITE)
		ensure that {
		when { IMS_A receives an initial INVITE from UE_A addressed_to UE_B
		then (IMC A condet the initial INV/ITE to IMC D
		then { IMS_A sends the initial INVITE to IMS_B
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_A and
		containing a P-Asserted-Identity_header
		indicating the Tel_URI of UE_A }
		Indicating the Tel_OTT of OL_A ;
	2	TP_IMS_5108_03 in CFW step 10 (INVITE)
		ensure that {
		when { IMS_B receives an initial INVITE from IMS_A addressed_to UE_B}
		then { IMS_B sends the INVITE to AS_B
		containing a topmost Route_header
		indicating the SIP_URI of AS_B and
		containing a Route_header
		indicating the S-CSCF_SIP_URI of IUT_ and
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter }
		]
	3	TP_IMS_5115_08 in CFW step 37 (200 OK)
		ensure that {
		when { IMS_B receives 200_response from AS_B addressed_to UE_A }
		then { IMS_B sends the 200_response to IMS_A
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter indicating operator_identifier of IMS_A and
		indicating operator_identifier of fivis_A and including a term-ioi_parameter
		indicating a term-ior_parameter indicating operator identifier of IUT }
	l	IJ

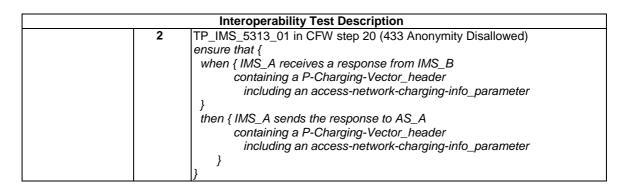


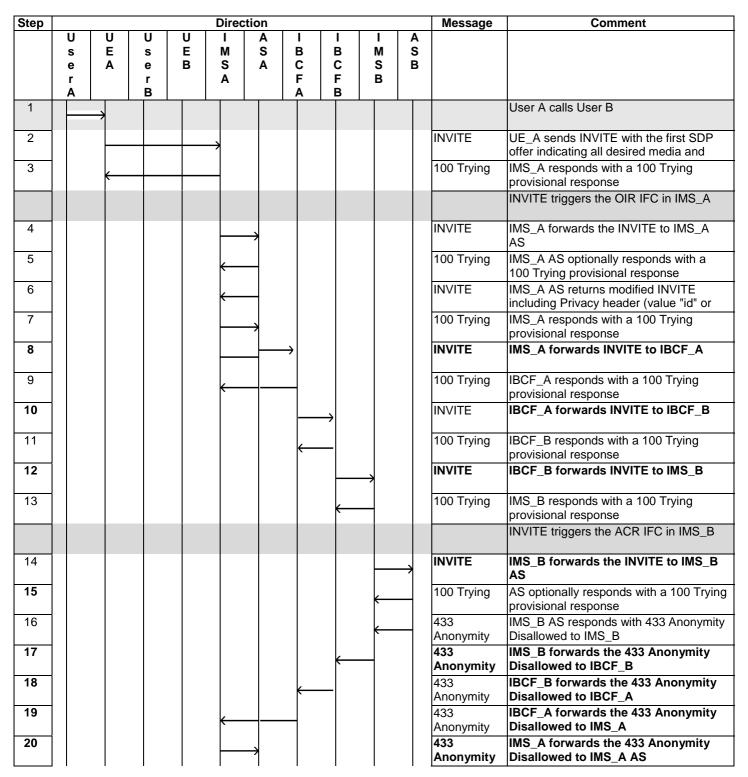
Step				Dire	ction				Message	Comment
	U s	U E		U   E   I	I   I VI   E		I M	A   S		
	e r	_		В	S C A F	) C	S	В		
40	À		В		`   '				INDUTE	IMO D formando do INVITE de IMO D AO
10								$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
11							•		100 Trying	AS optionally responds with a 100 Trying provisional response
12							•		INVITE	IMS_B AS returns, possibly modified, INVITE to IMS_B
13							-	<b></b>	100 Trying	IMS_B responds with a 100 Trying provisional response
14							<del></del>		INVITE	IMS_B forwards the INVITE to IMS_A
15							<del></del>		100 Trying	IMS_A responds with a 100 Trying provisional response
16						<del></del>			INVITE	IMS_B forwards INVITE to IBCF_B
17						$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
18					<del></del>				INVITE	IBCF_B forwards INVITE to IBCF_A
19					$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
20				<b></b>					INVITE	IMS_A forwards the INVITE to UE_B
21				<b></b>					100 Trying	UE_B optionally responds with a 100 Trying provisional response
22			<del></del>							User B is informed of incoming call of User A, User A's identity is displayed
23				<b></b>					180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
24					$\longrightarrow$				180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
25						$\longrightarrow$			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
26									180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
27								$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
28							•		180 Ringing	IMS_B AS forwards 180 Ringing response to IMS_B
29							<del></del>		180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
30						<del></del>			180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
31					<del></del>				180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
32		<b></b>			-				180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
33	←									User A is informed that UE_B is ringing
34				*						User B answers call
35				<b></b> ;					200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
36					$\longrightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
37						$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B

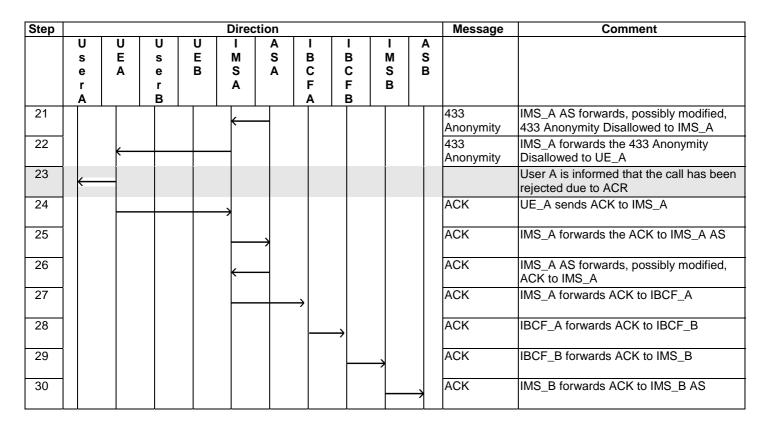


### 4.5.5.5 Supplementary Services OIR and ACR with AS

	Interoperability Te	st Description					
Identifier:	TD_IMS_SS_0005	•					
Summary:	IMS network supports properly appl	ication services based on the example of the OIR					
	and ACR supplementary services						
Configuration:	CF_INT_AS						
SUT	IMS_A and IMS_B						
References	Test Purpose	Specification Reference					
	TP_IMS_5108_03	TS 124 229 [1], clause 5.4.3.3 ¶5 (item 4 in 1 <sup>st</sup> numbered list)					
		(item 4 in 1 <sup>st</sup> numbered list)					
	TP_IMS_5313_01	TS 124 229 [1], clause 5.4.6.1.3 ¶2					
Use Case ref.:	UC_06_I						
Pre-test	HSS of IMS_A and of IMS B	is configured according to table 1					
conditions:	UE_A and UE_B have IP be	arers established to their respective IMS networks					
	as per clause 4.2.1						
	<ul> <li>UE_A is registered in IMS_A</li> </ul>	using userOIR identity according to table 1					
	<ul> <li>UE_B is registered in IMS_B</li> </ul>	using any userACR identity according to table 1					
	<ul> <li>IMS_A is configured to conta</li> </ul>	act AS_A (OIR)					
	UE_B is subscribed to ACR	service					
	<ul> <li>IMS_B is configured to conta</li> </ul>	act AS_B (ACR)					
Test Sequence:	Step						
	1 User A calls User B (i.e.						
	2 Verify that user A is infor	med that call has been rejected due to ACR					
Conformance	Check						
Criteria:	1 TP_IMS_5108_03 in CF	N step 14 (INVITE)					
	ensure that {						
	` <del></del>	n initial INVITE from IMS_A addressed_to UE_B }					
	then { IMS_B sends the	— — — — — — — — — — — — — — — — — — —					
		ost Route_header					
		SIP_URI of AS_B and					
	containing a Rout						
		C-CSCF_SIP_URI of IMS_B and					
		parging-Vector_header					
	including a orig-						
		rator_identifier of IMS_A and					
	not including a t	erm-ioi_parameter }					
Į.	<u> </u>						







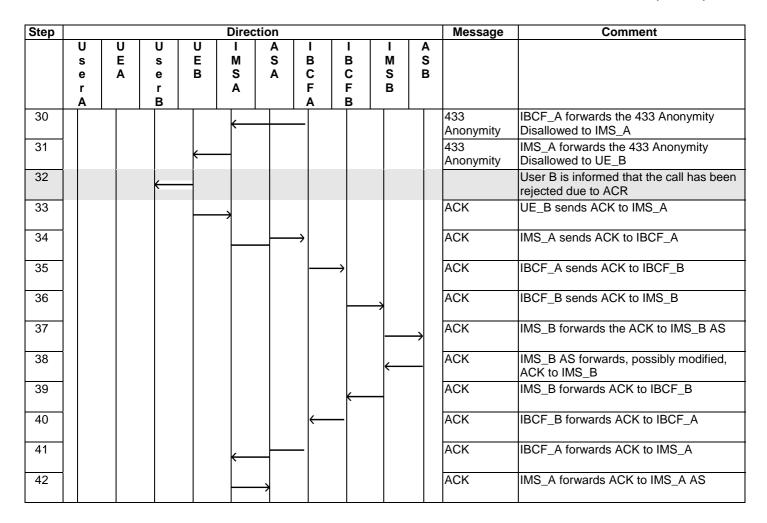
### 4.5.5.6 Supplementary Services OIR and ACR with AS in roaming

	Inte	roperability Test Description						
Identifier:	TD_IMS_SS_0006							
Summary:	IMS network supports properly application services based on the example of the OIR and ACR supplementary services							
Configuration:	CF_ROAM_AS							
SUT	IMS_A and IMS_B							
References	Test Purpose	Specification Reference						
	TP_IMS_5046_01	TS 124 229 [1], clause 5.2.6.3.3 ¶1 (1 <sup>st</sup> numbered list)						
	TP_IMS_5067_01	TS 124 229 [1], clause 5.2.7.2 ¶5						
	TP_IMS_5097_09	TS 124 229 [1], clause 5.4.3.2 ¶11						
		(items 5 and 8 in 1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_06_R							
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any userACR identity according to table 1</li> <li>UE_B is registered in IMS_B via IMS_A using userOIR identity according to table 1</li> <li>UE_A is subscribed to ACR service</li> <li>IMS_B is configured to contact AS_B (OIR)</li> <li>IMS_A is configured to OIR service</li> <li>UE_B is subscribed to OIR service</li> </ul>							
Test Sequence:	Step							
. set esquentes.		alls User A (i.e. userACR in IMS_B)						
		t user B is informed that call has been rejected due to ACR						
	2  VOIIIY UIC	a door b to informed that oall had been rejected due to here						

		Interoperability Test Description
Conformance	Check	. , .
Criteria:	1	TP_IMS_5046_01 in CFW step 6 (INVITE)
		ensure that {
		when { IMS_A receives an initial INVITE from UE_B }
		then { IMS_A sends the INVITE to IMS_B
		containing a Route_header
		not indicating the P-CSCF_SIP_URI of IMS_A and
		containing a Route_header
		indicating the "list of Service Route header URIs
		from the registration" and
		containing an additional Via_header
		containing ( the P-CSCF_via_port_number and
		(the P-CSCF-FQDN_address or
		the P-CSCF-IP_address)) of IMS_A and
		containing an additional topmost Record-Route_header
		indicating (the P-CSCF_port_number
		'where it awaits subsequent requests' from UE_A and
		(the P-CSCF-FQDN_address or
		the P-CSCF-IP_address)) of IMS_A and
		not containing P-Preferred-Identity_header and
		containing a P-Asserted-Identity_header
		containing an address of UE_B and
		containing a P-Charging-Vector_header
		containing an icid-value_parameter }
	2	TP_IMS_5067_01 in CFW step 6 (INVITE)
	_	ensure that {
		when { IMS_A receives an initial INVITE from UE_B }
		then { IMS_A sends the INVITE to IMS_B
		containing a P-Charging-Vector_header
		t
	3	TP_IMS_5097_09 in CFW step 10 (INVITE)
	3	lensure that {
		when { IMS_B receives an initial INVITE from IMS_A addressed to UE_A }
		then { IMS_B sends the initial INVITE to AS_B
		containing a Route_header
		indicating the SIP_URI of AS_B and
		containing a P-Charging-Function-Addresses_header and
		containing a P-Charging-Punction-Addresses_neader and containing a P-Charging-Vector_header
		(including a orig-ioi_parameter
		indicating a ong-ion_parameter indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter and
		including access-network-charging-info) }
		}

Step					Direc	tion		Message	Comment			
	N o o C	U E A	U s e r B	UEB	I M S A	A S A	I B C F A	I B C F B	I M S B	A S B		
1				$\rightarrow$								User B calls User A
2					$\rightarrow$						INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and
3				<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response

Step					Directi	ion					Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I B C F A	I B C F B	I M S B	A S B		
4							$\rightarrow$				INVITE	IMS_A sends INVITE to IBCF_A
5					<b></b>		_				100 Trying	IBCF_A responds with a 100 Trying provisional response
6								$\rightarrow$			INVITE	IBCF_A sends INVITE to IBCF_B
7								_			100 Trying	IBCF_B responds with a 100 Trying provisional response
8									<del>)</del>		INVITE	IBCF_B sends INVITE to IMS_B
9								<del>(</del>			100 Trying	IMS_B responds with a 100 Trying provisional response INVITE triggers the OIR IFC in IMS_B
10										$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B
11									←		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
12									<del></del>		INVITE	IMS_B AS returns modified INVITE including Privacy header (value "id" or
13										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
14								<del></del>	_		INVITE	IMS_B forwards INVITE to IBCF_B
15									>		100 Trying	IBCF_B responds with a 100 Trying provisional response
16							<b>-</b>	_			INVITE	IBCF_B forwards INVITE to IBCF_A
17								$\rightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
18					<del></del>						INVITE	IBCF_A forwards INVITE to IMS_A
19							$\rightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the ACR IFC in IMS_A
20						>					INVITE	IMS_A forwards the INVITE to IMS_A AS
21					<b>(</b>						100 Trying	AS optionally responds with a 100 Trying provisional response
22					<del></del>						433 Anonymity	IMS_A AS responds with 433 Anonymity Disallowed to IMS_A
23							$\rightarrow$				433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to IBCF_A
24								$\rightarrow$			433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IBCF_B
25									>		433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IMS_B
26										$\rightarrow$	433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IMS_B AS
27									<b></b>		433 Anonymity	IMS_B AS forwards, possibly modified, 433 Anonymity Disallowed to IMS_B
28								<b>—</b>	-		433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IBCF_B
29							<del></del>	_			433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IBCF_A



### 4.5.5.7 Supplementary Service CFU with AS

	Interoperability Te	st Description						
Identifier:	TD_IMS_SS_0007	•						
Summary:	IMS network supports properly app	lication services based on the example of the CFU						
	supplementary service							
Configuration:	CF_INT_AS							
SUT	IMS_A and IMS_B							
References	Test Purpose	Specification Reference						
	TP_IMS_5097_01	TS 124 229 [1], clause 5.4.3.2 ¶11						
		(1 <sup>st</sup> numbered list)						
	TP_IMS_5108_03	TS 124 229 [1], clause 5.4.3.3 ¶5						
		(item 4 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5115_08	TS 124 229 [1], clause 5.4.3.3 ¶89						
		(4 <sup>th</sup> numbered list)						
Use Case ref.:	UC_11_I							
Pre-test	<ul> <li>HSS of IMS_A and of IMS B</li> </ul>	is configured according to table 1						
conditions:	<ul> <li>UE_A and UE_B2 have IP b</li> </ul>	earers established to IMS_B as per clause 4.2.1						
	<ul> <li>UE_A is registered in IMS_A</li> </ul>	A using any user identity						
	UE_B2 is registered in IMS_	B using any user identity						
		act AS_B (CFU) for userCFU						
		_B and has activated CFU service						

		Interoperability Test Description
Test Sequence:	Step	
	1	User A calls User B (i.e. userCFU in IMS_B)
	2	User A may be informed of call diversion
	3	User B2 answers call
	4	Verify that user A is informed that call has been answered
	6	Verify that user B2 is informed that call is established
	7	User A ends call
	8	Verify that user B2 is informed that call has ended
	9	Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5097_01 in CFW step 6 (INVITE):
		ensure that {
		when { UE_A sends an initial INVITE to UE_B }
		then { IMS_B receives the initial INVITE
		not containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_A
		containing a P-Charging-Vector_header
		(containing an icid-value_parameter and
		containing a orig-ioi_parameter indicating IMS_A and
		not containing an access-network-charging-info_parameter and
		not containing a term-ioi_parameter) and
		containing a Record-Route_header
		indicating the originating S-CSCF_SIP_URI }
		}
	2	TP_IMS_5108_03 in CFW step 10 (INVITE)
		ensure that {
		when { IMS_B receives an initial INVITE from IMS_A addressed_to UE_B }
		then { IMS_B sends the initial INVITE to AS_B
		containing a topmost Route_header
		indicating the SIP_URI of AS_B and
		containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_B and
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter }
		}
	3	TP_IMS_5115_08 in CFW step 28 (200 OK)
		ensure that {
		when { IMS_B receives 200_response from AS_B addressed_to UE_A }
		then { IMS_B sends the 200_response to IMS_A
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		including a term-ioi_parameter
		indicating operator_identifier of IMS_BIUT_ }
		]

Step				Dir	ection					Message	Comment
		U E	U s	U E	I M	I B	I B	I M	A S		
		A	e r	B2	S A	C F	С	S B	В		
1	A		B2 _			A	В				User A calls User B
										IND CITE	UE A sends INVITE with the first SDP
2					$\rightarrow$					INVITE	offer indicating all desired media and
3		←			$\dashv$					100 Trying	IMS_A responds with a 100 Trying provisional response
4						<del>-</del>				INVITE	IMS_A forwards INVITE to IBCF_A
5					<b></b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
6							<del>)</del>			INVITE	IBCF_A forwards INVITE to IBCF_B
7						<del></del>	-			100 Trying	IBCF_B responds with a 100 Trying provisional response
8								>		INVITE	IBCF_B forwards INVITE to IMS_B
9							<b>—</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the CFU IFC in IMS_B
10									$\rightarrow$	INVITE	IMS_B forwards the INVITE to AS_B
11								<del></del>	_	100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
											AS_B applies the CDIV CFU procedure
12								<del></del>	-	181 Call is being	AS_B indicates optionally to IMS_B that call has been forwarded
13							<del></del>	-		181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
14						<b></b>	-			181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
15					$\leftarrow$	_				181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
16		<b></b>								181 Call is being	IMS_A indicates that call to UE_B has been forwarded
17	<b>—</b>									being	User A may be informed of call diversion
18								<b>-</b>		INVITE	AS_B returns modified INVITE including new request URI and history header to
19									$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
20				<b>—</b>			1	-		INVITE	IMS_B forwards the INVITE to UE_B2
21								>		100 Trying	UE_B2 optionally responds with a 100 Trying provisional response
22			<b>←</b>								User B2 is informed of incoming call of User A
23				$\rightarrow$							User B2 answers call
24								>		200 OK	UE_B2 responds to INVITE with 200 OK to indicate that the call has been
25									$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
26								<b>-</b>	+	200 OK	AS_B returns, possibly modified, 200 OK to IMS_B

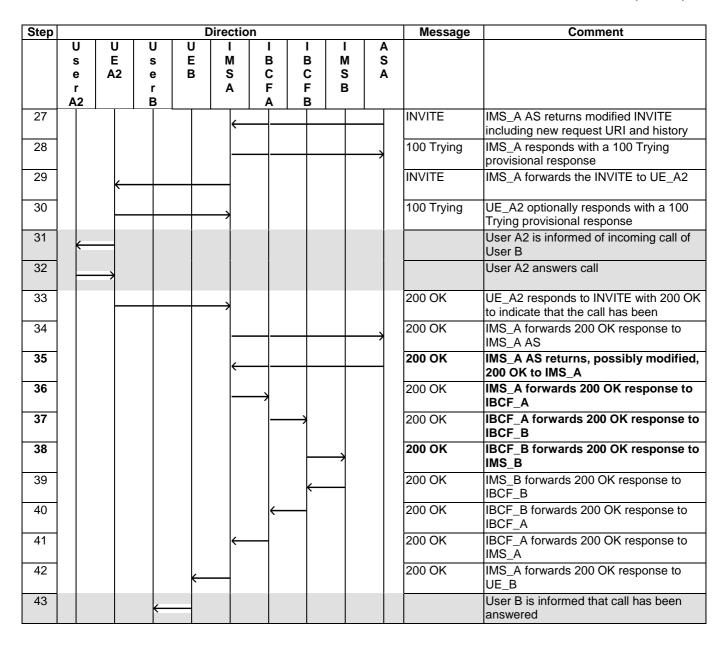
Step				D	irectio	n		Message	Comment		
	U s e r A	U E A	U s e r B2	U E B2	M S A	I B C F A	I B C F	I M S B	A S B		
27							<b>←</b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
28						$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A
29					<b>←</b>					200 OK	IBCF_A forwards 200 OK response to IMS_A
30		<b>←</b>								200 OK	IMS_A forwards 200 OK response to UE_A
31	<b>←</b>										User A is informed that call has been answered

# 4.5.5.8 Supplementary Service CFU with AS in roaming

		Interoperability Te	st Description		
Identifier:	TD_IMS_	SS_0008	•		
Summary:			lication services based on the example of the CFU		
-	suppleme	entary service	·		
Configuration:	CF_ROA	M_AS			
SUT	IMS_A ar	nd IMS_B			
References	Test Pur	pose	Specification Reference		
	TP_IMS_	5046_01	TS 124 229 [1], clause 5.2.6.3.3 ¶1 (1 <sup>st</sup> numbered list)		
	TP_IMS_	5067_01	TS 124 229 [1], clause 5.2.7.2 ¶5		
	TP_IMS	5070_01	TS 124 229 [1], clause 5.2.7.3 ¶3		
	TP_IMS_	5110_01	TS 124 229 [1], clause 5.4.3.3 ¶79 (after 6 <sup>th</sup> dashed list)		
Use Case ref.:	UC_11_F	?	Harris a same as a say		
Pre-test conditions:	• UE • UE • IN	E_A and UE_B2 have IP b E_A is registered in IMS_A E_B2 is registered in IMS_ IS_A is configured to conta	is configured according to table 1 learers established to IMS_B as per clause 4.2.1 learers established to IMS_B as per clause 4.2.1 learers established to IMS_B as per clause 4.2.1 learers established using any user identity learers established established learers established learers established established learers establis		
<b>-</b>	1 01				
Test Sequence:	Step		OFIL: 1040 A)		
	1	User B calls User A (i.e.			
	2	User B may be informed	of Call diversion		
	3	User A2 answers call	and that all has been accounted		
	4		med that call has been answered		
	6		ormed that call is established		
	7	User B ends call			
	8		ormed that call has ended		
	9	Iverity that user B is info	rmed that call has ended		

		Interoperability Test Description
0 (	0	
Conformance	Check	
Criteria:	1	TP_IMS_5046_01 in CFW step 6 (INVITE) ensure that { when { IMS_A receives an initial INVITE from UE_B } then { IMS_A sends the INVITE to IMS_B containing a Route_header not indicating the P-CSCF_SIP_URI of IMS_A and containing a Route_header indicating the "list of Service Route header URIs from the registration" and containing an additional Via_header containing ( the P-CSCF_via_port_number and
	3	TP_IMS_5067_01 in CFW step 6 (INVITE) ensure that {   when { IMS_A receives an initial INVITE from UE_B }   then { IMS_A sends the INVITE to IMS_B
	4	ensure that {    when { IMS_A receives an initial INVITE from UE_B }    then { IMS_A sends a 100_response to IMS_B    } }  TP_IMS_5110_01 in CFW step 37 (200 OK)    ensure that {    when { IMS_A receives a 200_response from AS_A addressed_to UE_B }    then { IMS_A sends the 200_response to IMS_B }

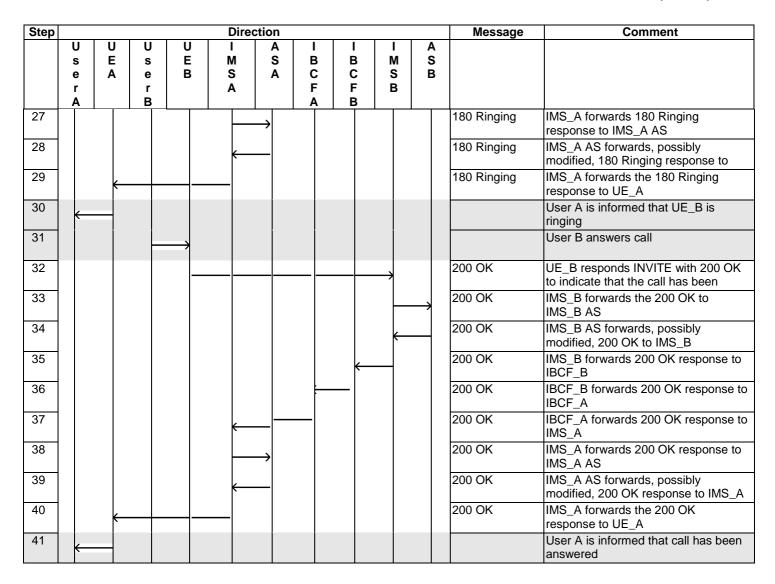
Step			Directi	on				Message	Comment
	UU	l l	UI	1	Ī	I	A		
	s E e A2	s e e	E M B S	B	B	M S	S A		
	r	r	A	F	F	В			
1	A2	B	<del> </del>	A	В				User B calls User A
2			<b></b>					INVITE	UE_B sends INVITE with the first SDP offer indicating all desired media and
3			<b></b>					100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
5			<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
6				_	$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
7				$\leftarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
8						$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
9					$\leftarrow$			100 Trying	IMS_B responds with a 100 Trying provisional response
10					$\leftarrow$			INVITE	IMS_B forwards INVITE to IBCF_B
11						$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
12				$\leftarrow$				INVITE	IBCF_B forwards INVITE to IBCF_A
13					$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
14			<b>←</b>					INVITE	IBCF_A forwards INVITE to IMS_A
15			_	$\longrightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
									INVITE triggers the CFU IFC in IMS_A
16					$\top$		$\rightarrow$	INVITE	IMS_A forwards the INVITE to IMS_A AS
17			<b>←</b>					100 Trying	IMS_A AS optionally responds with the 100 Trying to IMS_A
									IMS_A AS applies the CDIV CFU procedure
18			<b>←</b>					181 Call is being	IMS_A AS indicates optionally to IMS_A that call has been forwarded
19			-	$\longrightarrow$				181 Call is being	IMS_A indicates to IBCF_A that call has been forwarded
20					$\rightarrow$			181 Call is being	IBCF_A indicates to IBCF_B that call has been forwarded
21						$\longrightarrow$		181 Call is being	IBCF_B indicates to IMS_B that call has been forwarded
22					<b>←</b>			181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
23				$\leftarrow$				181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
24			<b>←</b>					181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
25			$\leftarrow$					181 Call is being	IMS_A indicates to UE_B that call to UE_A has been forwarded
26		<del></del>							User B may be informed of call diversion



# 4.5.5.9 Supplementary Services OIP and OIR with AS

		Interoperability Test Description
Identifier:	TD_IMS_SS	5_0009
Summary:		supports properly application services based on the example of the OIP and OIR supplementary
	services	
Configuration:	CF_INT_AS	
SUT	IMS_B	
References	Test Purpos	
	TP_IMS_50	
	TD IMO 54	(1 <sup>st</sup> numbered list)
	TP_IMS_51	08_03 TS 124 229 [1], clause 5.4.3.3 ¶5 (item 4 in 1 <sup>st</sup> numbered list)
Use Case ref.:	110 00 1	(item 4 in 1 numbered list)
Use Case rer.:	UC_09_I	
Pre-test	LICC	of IMC. A and of IMC. D is configured assembles to table 4
conditions:		of IMS_A and of IMS B is configured according to table 1
conditions.		A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1
		A is registered in IMS_A using userOIR_priv identity according to table 1
		B is registered in IMS_B using userOIP_priv identity according to table 1 A is configured to contact AS_A (OIR)
		A is subscribed to OIR service
		B is configured to contact AS_B (OIP)
	• UE_E	B is subscribed to OIP service
Test	Step	
Sequence:	1	User A calls User B (i.e. userOIP in IMS_B)
Sequence.	2	Verify that user B is informed of incoming call of User A and User A's identity is not displayed
	3	Verify that user A is informed that UE_A is ringing
	4	User B answers call
	5	Verify that user A is informed that call has been answered
	6	Verify that user B is informed that call has been answered  Verify that user B is informed that the call is established
	7	User B ends call
	8	Verify that user A is informed that call has ended
		I VEHIV Hal user A is informed mar call has ended
	9	Verify that user B is informed that call has ended
Conformance	9	
Conformance Criteria:		Verify that user B is informed that call has ended
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE):
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that {
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B }
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that {
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header
	9 Check	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and containing a Record-Route_header
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and
	9 Check 1	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } }
	9 Check	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE)
	9 Check 1	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } }  TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that {
	9 Check 1	Verify that user B is informed that call has ended  TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing an access-network-charging-info_parameter and not containing an access-network-charging-info_parameter and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B}
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing an orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a topmost Route_header
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a topmost Route_header indicating the SIP_URI of AS_B and
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing an icid-value_parameter and not containing an access-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a topmost Route_header indicating the SIP_URI of AS_B and containing a Route_header
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing a orig-ioi_parameter indicating IMS_A and not containing a naccess-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a topmost Route_header indicating the SIP_URI of AS_B and containing a Route_header indicating the S-CSCF_SIP_URI of IMS_B and
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing an icid-value_parameter and containing an icid-value_parameter and not containing a nacess-network-charging-info_parameter and not containing a term-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a Route_header indicating the SIP_URI of AS_B and containing a Route_header indicating the S-CSCF_SIP_URI of IMS_B and containing a P-Charging-Vector_header
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE     not containing a Route_header     indicating the S-CSCF_SIP_URI of IMS_A     containing an icid-value_parameter and         containing an orig-ioi_parameter indicating IMS_A and         not containing an access-network-charging-info_parameter and         not containing a necress-network-charging-info_parameter and         not containing a term-ioi_parameter) and         containing a Record-Route_header         indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that {     when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B}     then {IMS_B sends the INVITE to AS_B         containing a topmost Route_header         indicating the SIP_URI of AS_B and         containing a Route_header         indicating the S-CSCF_SIP_URI of IMS_B and         containing a P-Charging-Vector_header         including a orig-ioi_parameter
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A containing a P-Charging-Vector_header (containing an icid-value_parameter and containing an orig-ioi_parameter indicating IMS_A and not containing an access-network-charging-info_parameter and not containing a lerm-ioi_parameter) and containing a Record-Route_header indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that { when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B} then {IMS_B sends the INVITE to AS_B containing a topmost Route_header indicating the SIP_URI of AS_B and containing a Route_header indicating the S-CSCF_SIP_URI of IMS_B and containing a P-Charging-Vector_header including a orig-ioi_parameter indicating operator_identifier of IMS_A and
	9 Check 1	TP_IMS_5097_01 in CFW step 10 (INVITE): ensure that { when { UE_A sends an initial INVITE to UE_B } then { IMS_B receives the initial INVITE     not containing a Route_header     indicating the S-CSCF_SIP_URI of IMS_A     containing an icid-value_parameter and         containing an orig-ioi_parameter indicating IMS_A and         not containing an access-network-charging-info_parameter and         not containing a necress-network-charging-info_parameter and         not containing a term-ioi_parameter) and         containing a Record-Route_header         indicating the originating S-CSCF_SIP_URI } } TP_IMS_5108_03 in CFW step 14 (INVITE) ensure that {     when {IMS_B receives an initial INVITE from IMS_A addressed_to UE_B}     then {IMS_B sends the INVITE to AS_B         containing a topmost Route_header         indicating the SIP_URI of AS_B and         containing a Route_header         indicating the S-CSCF_SIP_URI of IMS_B and         containing a P-Charging-Vector_header         including a orig-ioi_parameter

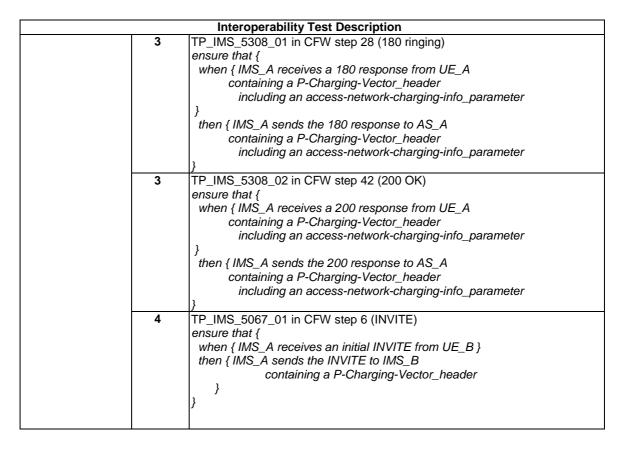
Step			Dir	ection					Message	Comment
	U U s E	U L		A S	I B	I B	I M	A S		
	e A	e E	S S	A	С	С	S	В		
	r A	r B	A		F A	F B	В			
1										User A calls User B
2			<b></b>						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media
3	<u> </u>								100 Trying	IMS_A responds with a 100 Trying provisional response
										INVITE triggers the OIR IFC in IMS_A
4			_	$\longrightarrow$					INVITE	IMS_A forwards the INVITE to IMS_A AS
5			<b>←</b>						100 Trying	IMS_A AS optionally responds with a 100 Trying provisional response
6			<b>—</b>						INVITE	IMS_A AS returns modified INVITE including Privacy header (value "id"
7			_	$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
8			_		$\rightarrow$				INVITE	IMS_A forwards the INVITE to IBCF_A
9			<b>←</b>		_				100 Trying	IBCF_A responds with a 100 Trying provisional response
10						$\rightarrow$			INVITE	IBCF_A forwards the INVITE to IBCF_B
11									100 Trying	IBCF_B responds with a 100 Trying provisional response
12							$\rightarrow$		INVITE	IBCF_B forwards the INVITE to IMS_B
13						<b></b>	-		100 Trying	IMS_B responds with a 100 Trying provisional response
										INVITE triggers the OIP IFC in IMS_B
14							-	$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
15							$\leftarrow$		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
16							$\leftarrow$		INVITE	IMS_B AS returns modified INVITE including modified From and P-
17								$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
18			<del></del>			-			INVITE	IMS_B forwards the INVITE to UE_B
19							$\rightarrow$		100 Trying	UE_B optionally responds with a 100 Trying provisional response
20		<b></b>								User B is informed of incoming call of User A, user A's identity is not
21							$\rightarrow$		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has
22								$\rightarrow$	180 Ringing	IMS_B forwards the 180 Ringing to IMS_B AS
23							$\leftarrow$		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing to IMS_B
24						$\leftarrow$	$\dashv$		180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
25						-			180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
26			<u> </u>						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A

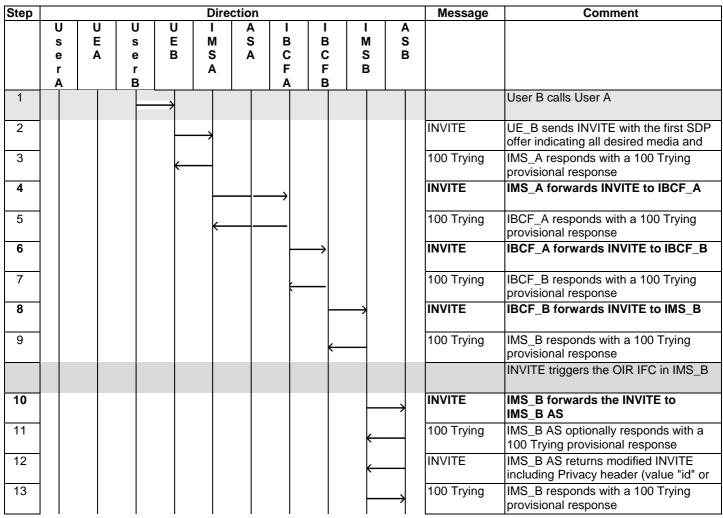


### 4.5.5.10 Supplementary Services OIP and OIR with AS in roaming

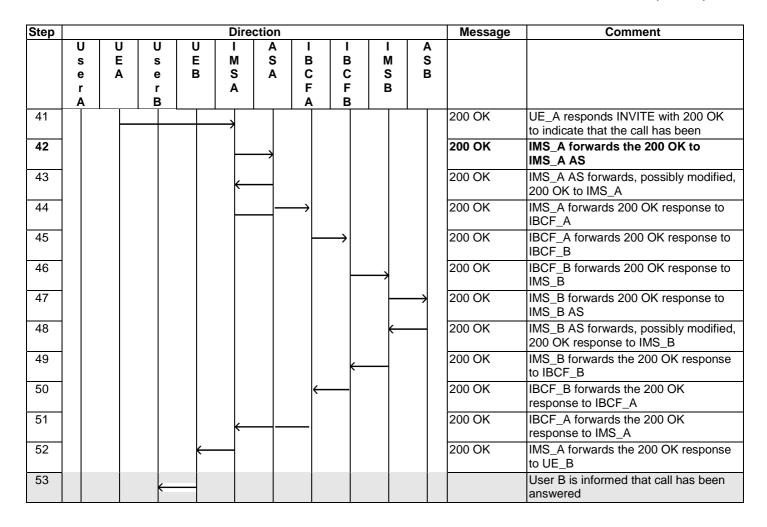
	Interoperability	Test Description						
ldentifier:	TD_IMS_SS_0010							
Summary:	IMS network supports properly a and OIR supplementary service	application services based on the example of the OIP s						
Configuration:	CF_ROAM_AS							
SUT	IMS_A and IMS_B							
References	Test Purpose	Specification Reference						
	TP_IMS_5046_01	TS 124 229 [1], clause 5.2.6.3.3 ¶1 (1 <sup>st</sup> numbered list)						
	TP_IMS_5097_09	TS 124 229 [1], clause 5.4.3.2 ¶11 (items 5 and 8 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5308_01	TS 124 229 [1], clause 5.4.4.2.2 ¶2						
	TP_IMS_5308_02	TS 124 229 [1], clause 5.4.4.2.2 ¶2						
	TP_IMS_5067_01	TS 124 229 [1], clause 5.2.7.2 ¶5						
Use Case ref.:	UC_09_R							

#### **Interoperability Test Description** Pre-test HSS of IMS A and of IMS B is configured according to table 1 conditions: UE A and UE B have IP bearers established to their respective IMS networks as per clause 4.2.1 UE\_A is registered in IMS\_A using userOIP\_priv identity according to table 1 UE\_B is registered in IMS\_B via IMS\_A using userOIR\_priv identity according to table 1 IMS\_A is configured to contact AS\_A (OIP) UE\_A is subscribed to OIP service IMS B is configured to contact AS B (OIR) UE\_B is subscribed to OIR service Step **Test Sequence:** User B calls User A (i.e. userOIP in IMS\_A) 2 Verify that user A is informed of incoming call of User B and User B's identity is not displayed 3 Verify that user B is informed that UE\_A is ringing 4 User A answers call Verify that user B is informed that call has been answered 5 Verify that user A is informed that the call is established 6 User A ends call 7 8 Verify that user B is informed that call has ended 9 Verify that user A is informed that call has ended Conformance Check Criteria: TP IMS\_5046\_01 in CFW step 6 (INVITE) ensure that { when { IMS A receives an initial INVITE from UE\_B } then { IMS\_A sends the INVITE to IMS\_B containing a Route\_header not indicating the P-CSCF\_SIP\_URI of IMS\_A and containing a Route\_header indicating the "list of Service Route header URIs from the registration" and containing an additional Via\_header containing (the P-CSCF\_via\_port\_number and (the P-CSCF-FQDN\_address or the P-CSCF-IP\_address)) of IMS\_A and containing an additional topmost Record-Route\_header indicating (the P-CSCF\_port\_number 'where it awaits subsequent requests' from UE A and (the P-CSCF-FQDN\_address or the P-CSCF-IP\_address)) of IMS\_A and not containing P-Preferred-Identity header and containing a P-Asserted-Identity\_header containing an address of UE\_B and containing a P-Charging-Vector header containing an icid-value parameter } 2 TP\_IMS\_5097\_09 in CFW step 10 (INVITE) ensure that { when { IMS\_B receives an initial INVITE from IMS\_A addressed\_to UE\_B } then { IMS\_B sends the initial INVITE to AS\_B containing a Route\_header indicating the SIP\_URI of AS\_B and containing a P-Charging-Function-Addresses\_header and containing a P-Charging-Vector\_header (including a orig-ioi\_parameter indicating operator\_identifier of IMS\_A and not including a term-ioi\_parameter and including access-network-charging-info) }





14	Step				Directio	n				Message	Comment
e A e B S A C C C S B B INVITE IMS_B forwards the INVITE to IBCF_B 100 Trying IBCF_B response with a 100 Trying provisional response INVITE IN							I B	,   I			
A B B INVITE INS_B forwards the INVITE to IBCF_B 100 Trying Provisional response INVITE INS_A 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE INS_A 100 Trying INVITE INS_A AS 100 Trying INVITE INS_A AS 100 Trying INS_A AS optionally responds with a 100 Trying provisional response INVITE INS_A INVITE INS_A AS 100 Trying INS_A AS optionally responds with a 100 Trying INS_A AS optionally responds with a 100 Trying INVITE INVITE INS_A AS 100 Trying INVITE INVITE INS_A AS 100 Trying INVITE INVI		e A	A e		S	4 C	;   C	:   5	8 B		
15   100 Trying   BGC B responds with a 100 Trying provisional response   INVITE   I					<u>^                                    </u>	_	_	_			
INVITE IBCF. A forwards the INVITE to IMS. A forwards the INVITE with a 100 Trying provisional response of INVITE in IMS. A forwards the INVITE to IMS. A 100 Trying provisional response of INVITE in IMS. A forwards the INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A forwards the INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying in IMS A A 30 optionally response with a 100 Trying in IMS. A 4 soptionally response with a 100 Trying provisional response of INVITE in IMS. A 4 soptional response of INVITE in IMS. A 4 soptional invite in INVITE in IMS. A 4 soptional invite in INVITE in IMS. A 4 soptional response of INVITE in IMS. A 4 softing in Ims. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying provisional response of INVITE in IMS. A 100 Trying in IMS.	14							<del>(</del>		INVITE	IMS_B forwards the INVITE to IBCF_B
BISCF_A responds with a 100 Trying   BISCF a responds with a 100 Trying   Discration   Discrat	15							>		100 Trying	
provisional response INVITE IMS_B forwards the INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_A 20 21 22 23 24 26 27 28 29 20 20 20 21 20 21 22 23 24 25 26 27 28 29 29 30 30 30 31 30 31 32 32 33 33 34 35 36 36 37 38 39							<del></del>				IBCF_A
19   100 Trying	17						$\longrightarrow$			100 Trying	
provisional response INVITE triggers the OIP IFC in IMS_A INVITE triggers the OIP IFC in IMS_A INVITE triggers the OIP IFC in IMS_A AS_A AS_A forwards the INVITE to IMS_A AS_A AS_A optionally responds with a 100 Trying provisional response INVITE IMS_A AS returns modified INVITE including modified From and P- 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A responds with a 100 Trying IMS_A responds of incoming call of User A is informed of incoming call of User A is informed of incoming call of User B, user B's identity is not 180 Ringing IMS_A forwards the INVITE to UE_A IMS_A AS_INVITE with 180 Ringing IMS_A forwards the 180 Ringing to IMS_A forwards the 180 Ringing to IMS_A forwards the 180 Ringing response to IBCF_B I80 Ringing IMS_B A forwards 180 Ringing response to IBCF_B I80 Ringing IMS_B A Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B A Forwards the 180 Ringing IMS_B A Forwards the 180 Ringing IMS_B A Forwards the 180 Ringing IMS_B Ringing IMS_B Forwards the 180 Ringing IMS_B Forwards the 180 Ringing IMS_B Ringin	18				<b></b>					INVITE	IMS_B forwards the INVITE to IMS_A
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21 22 23 24 25 26 27 28 29 20 20 20 21 20 21 20 21 20 21 20 21 20 21 20 21 21 22 23 24 25 26 26 27 28 29 20 20 20 20 20 20 20 20 20 20 20 20 20	20									INVITE	
100 Trying provisional response INVITE IMS_A AS returns modified INVITE ims_Lording modified INVITE ims_Lording modified From and P- 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to UE_A  100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed of incoming call of User B, user B's identity is not User B, user B's informed that User B, informed that	21				,					100 Trying	
including modified From and P- 100 Trying provisional responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to UE_A 100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed of incoming call of User B, user B's identity is not 180 Ringing UE_A responds to initial INVITE with 180 Ringing IMS_A forwards the 180 Ringing to indicate that it has 180 Ringing to IMS_A AS forwards the 180 Ringing to IMS_A AS I80 Ringing to IMS_A National INS_A I80 Ringing to IMS_A Ringing IMS_A forwards 180 Ringing response to IBCF_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards the 180 Ringing response to IMS_B I80 Ringing IMS_B Forwards the 180 Ringing response to IMS_B I80 Ringing IBCF_B Forwards the 180 Ringing response to IMS_B I80 Ringing Response to IBCF_B I80 Ringing Response to IBCF_A I80 Ringing Response to IMS_B I80 Ringing Response to IBCF_A I80 Ringing Response to IMS_B I80 Ringing Response to UE_B I80 Ringing Response to UE_B I80 Ringing Response to UE_B I80 Ringing Response to IMS_B Is informed that UE_A is ringing I80 Ringing Response to IA0 Ringing Response Response to IA0 Ringing Response	22										100 Trying provisional response
provisional response INVITE IMS_A forwards the INVITE to UE_A  100 Trying UE_A optionally responds with a 100 Trying provisional response User A is informed of incoming call of User B, user B's identity is not  180 Ringing UE_A responds to initial INVITE with 180 Ringing IMS_A forwards the 180 Ringing to IMS_A AS  180 Ringing IMS_A Forwards, possibly modified, 180 Ringing IMS_A forwards 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards 180 Ringing response to IMS_B  32  33  34  36  37  38  38  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing IBCF_B forwards 180 Ringing response to IMS_B  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B  180 Ringing IMS_B Forwards 180 Ringing response to IMS_B  180 Ringing IMS_B Forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_A forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_B is informed that UE_A is ringing in the informed that UE_A is ringing response to IMS_B											including modified From and P-
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Trying provisional response User A is informed of incoming call of User B, user B's identity is not  180 Ringing UE_A responds to initial INVITE with 180 Ringing to indicate that it has  180 Ringing IMS_A AS forwards the 180 Ringing to IMS_A AS  180 Ringing IMS_A AS forwards, possibly modified, 180 Ringing IMS_A AS forwards 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IBCF_B  180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B  180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B  180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B  180 Ringing IMS_B AS forwards the 180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IMS_B forwards the 180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing informed that UE_A is ringing											
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180 Ringing   IMS_A forwards the 180 Ringing to IMS_A AS   180 Ringing   IMS_A AS   180 Ringing to IMS_A   180 Ringing to IMS_A   180 Ringing to IMS_A   180 Ringing to IMS_A forwards 180 Ringing response to IBCF_A   180 Ringing   IBCF_A forwards 180 Ringing response to IBCF_B   180 Ringing   IBCF_B forwards 180 Ringing response to IMS_B   180 Ringing   IMS_B forwards 180 Ringing response to IMS_B   180 Ringing   IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B   180 Ringing   IMS_B forwards the 180 Ringing response to IBCF_B   180 Ringing   IMS_B forwards the 180 Ringing response to IBCF_A   180 Ringing   IBCF_B forwards the 180 Ringing response to IMS_A   180 Ringing   IBCF_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to IMS_A   180 Ringing   IMS_A forwards the 180 Ringing   IMS_A forwards   IMS_A forw	27				<del>-</del>					180 Ringing	UE_A responds to initial INVITE with
180 Ringing to IMS_A  180 Ringing to IMS_A forwards 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards 180 Ringing response to IMS_B  180 Ringing IMS_B forwards 180 Ringing response to IMS_B  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	28									180 Ringing	IMS_A forwards the 180 Ringing to
to IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards 180 Ringing response to IMS_B  180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	29				<b></b>					180 Ringing	
response to IBCF_B  180 Ringing IBCF_B forwards 180 Ringing response to IMS_B  180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	30					$\longrightarrow$				180 Ringing	
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to IMS_B AS  180 Ringing IMS_B AS forwards, possibly modified, 180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	32							<del></del>		180 Ringing	IBCF_B forwards 180 Ringing
180 Ringing response to IMS_B  180 Ringing IMS_B forwards the 180 Ringing response to IBCF_B  180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	33								$\longrightarrow$	180 Ringing	
35 36 37 38 39 40 40 40 41 40 40 40 41 41 41 41 41 41 41 41 41 41 41 41 41	34									180 Ringing	IMS_B AS forwards, possibly modified,
36 37 38 38 39 40 40 40 4180 Ringing IBCF_B forwards the 180 Ringing response to IBCF_A 180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_B  User B is informed that UE_A is ringing	35							←		180 Ringing	IMS_B forwards the 180 Ringing
37 38 38 39 40 180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A 180 Ringing IMS_A forwards the 180 Ringing response to UE_B User B is informed that UE_A is ringing	36						<del></del>			180 Ringing	IBCF_B forwards the 180 Ringing
38 39 180 Ringing IMS_A forwards the 180 Ringing response to UE_B User B is informed that UE_A is ringing	37					<del></del>				180 Ringing	IBCF_A forwards the 180 Ringing
User B is informed that UE_A is ringing	38			<del></del>						180 Ringing	IMS_A forwards the 180 Ringing
	39		←								User B is informed that UE_A is
	40	$\longmapsto$									



#### 4.5.5.11 Ad-hoc Conference Call service

Interoperability Test I	Description							
TD_IMS_CONF_0001								
IMS network handles subsequent INVITEs, UPDATEs, REFERs and NOTIFYs								
correctly during Ad-Hoc Conference ca	lls							
CF_INT_CONF_CALL								
IMS_A								
Test Purpose	Specification Reference							
TP_IMS_5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123 (9 <sup>th</sup> numbered list)							
UC_16								
<ul> <li>UE_A and UE_B have IP beare as per clause 4.2.1</li> <li>UE_A is registered in IMS_A us</li> <li>IMS_A is configured to contact and UE_B is registered in IMS_B us</li> <li>IMS_B is configured to contact and User A and B are subscribed to</li> </ul>	rs established to their respective IMS networks ing any user identity AS_A (CONF) ing any user identity AS_B (CONF) CONF service							
	IMS network handles subsequent INVI correctly during Ad-Hoc Conference call CF_INT_CONF_CALL IMS_A  Test Purpose TP_IMS_5121_02  UC_16  HSS of IMS_A and of IMS B is 6 UE_A and UE_B have IP beare							

		Interoperability Test Description							
Test Sequence:	Step								
	1	User A initiates an ad-hoc conference call with a pre-configured							
		conference-factory URI							
	2	Verify that User A is informed the Ad Hoc Conference Call is being set up							
	3	Verify that User A is informed the Ad Hoc Conference Call is established							
	4	User A invites User B to join the Conference Call.							
	5	Verify that User B is informed of incoming invitation from User A to join the							
		Conference Call							
	6	Verify that User A is informed that User B is being alerted							
	7	User B joins the Conference Call							
	8	Verify that User A is alerted when User B joins the Conference Call							
	9	User B leaves the Conference Call							
	10	Verify that User B is informed that the Conference Call has ended							
	11	Verify that User A is alerted when User B leaves the Conference Call							
Conformance	Check								
Criteria:	1	TP_IMS_5121_02 in CFW in step 34 & 44 (200 OK ):							
		ensure that {							
		when { UE_B sends a 1xx or 2xx_response to UE_A }							
		then { IMS_A receives the 1xx or 2xx_response							
		containing a P-Charging-Vector_header							
		not containing a access-network-charging-info_parameter and							
		not containing a P-Access-Network-Info_header }							
		]}							

Step					Dire	ction					Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I B C F A	I B C F B	I M S B	A S B		
1		$\rightarrow$										User A initiates an ad-hoc conference call
2				_	$\rightarrow$						INVITE	UE_A sends INVITE to IMS_A with information for all commonly supported
3		<b>←</b>									100 Trying	IMS_A responds with a 100 Trying provisional response
4	←											User A is informed the Ad Hoc Conference Call is being set up
5					_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IMS_A AS
6					<b>←</b>						100 Trying	IMS_A AS responds with a 100 Trying provisional response
7					<del>(</del>						200 OK	IMS_A AS responds with a 200 OK to IMS_A, with isfocus parameter.
8		$\leftarrow$									200 OK	IMS_A forwards the 2000K response to UE_A
9	<del></del>	_										User A is informed the Ad Hoc Conference Call is established
10					$\longrightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
11						$\rightarrow$					ACK	IMS_A forwards the ACK to IMS_A AS
12		$\rightarrow$										User A invites user B to join the ad-hoc conference call
13					$\rightarrow$						REFER	UE_A sends REFER message to IMS_A, with Refer-To : <ue_b td="" uri<=""></ue_b>
14						$\rightarrow$					REFER	IMS_A forwards the REFER to IMS_A AS
15					$\leftarrow$						202 Accepted	IMS_A AS responds with a 202 Accepted

Step					Directio	n					Message	Comment
	U s	U E		U E   1	I   A M   S		 	I B	I M	A S		
	e r	A	e I		S A	A C		C F	S B	В		
16	A		В			Δ		В			202	IMC A forwards the 202 Assented
16		←			-						202 Accepted	IMS_A forwards the 202 Accepted response to UE_A
17					←—						NOTIFY	IMS_A AS sends a NOTIFY to IMS_A to inform the conference initiator the
18		←									NOTIFY	IMS_A forwards the NOTIFY to UE_A
19					•						200 OK	UE_A responds with 200 OK to IMS_A
20					$\longrightarrow$						200 OK	IMS_A forwards the 200 OK response to IMS_A AS
21					<del></del>						INVITE	IMS_A AS sends INVITE to UE_B with conference-factory URI (received in the
22					$\longrightarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
23											INVITE	IMS_A forwards the INVITE to IBCF_A
24					←						100 Trying	IBCF_A responds with a 100 Trying provisional response
25								>			INVITE	IBCF_A forwards the INVITE to IBCF_B
26							←—				100 Trying	IBCF_B responds with a 100 Trying provisional response
27									$\rightarrow$		INVITE	IBCF_B forwards the INVITE to IMS_B
28								<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
29				<del></del>					_		INVITE	IMS_B forwards the INVITE to UE_B
30									$\rightarrow$		100 Trying	UE_B responds with a 100 Trying provisional response
31			<b></b>									User B is informed of incoming invitation from User A to join the Conference Call
32								-	$\rightarrow$		180 Ringing	UE_B sends a 180 ringing to IMS_B
33								<b>←</b>	_		180 Ringing	IMS_B forwards the 180 ringing to IBCF_B
34							<del></del>	-			180 Ringing	IBCF_B forwards the 180 ringing to IBCF_A
35					<del></del>		-				180 Ringing	IBCF_A forwards the 180 ringing to IMS_A
36					$\longrightarrow$						180 Ringing	IMS_A forwards the 180 ringing to IMS_A AS
37					←—						NOTIFY	Upon reception of 180 Ringing from UE_B, IMS_A AS sends NOTIFY with
38		<b></b>			-						NOTIFY	IMS_A forwards the NOTIFY to UE_A
39	<del></del>											User A is notified that User B is being invited to join the call
40				$\longrightarrow$							200 OK	UE_A responds with 200 OK to IMS_A for NOTIFY
41					$\longrightarrow$						200 OK	IMS_A forwards the 200 OK response to IMS_A AS
42									$\rightarrow$		200 OK	UE_B responds with 200 OK to IMS_B for INVITE
43								<b>—</b>	_		200 OK	IMS B forwards the 200 OK response to IBCF_B

Step					Direction					Message	Comment
	s I	U U E s A e	E E	E N	A S	I B C F A	I B C F B	;   S	В		
44						•				200 OK	IBCF_B forwards the 200 OK response to IBCF_A
45					<del></del>					200 OK	IBCF_A forwards the 200 OK response to IMS_A
46					$\longrightarrow$					200 OK	IMS A forwards the 200 OK response to IMS_A AS
47			$\longrightarrow$								User B joins the conference
48								$\longrightarrow$		ACK	UE_B acknowledges the 200 OK for INVITE
49								←		ACK	IMS B forwards the ACK to IBCF_B
50						•				ACK	IBCF_B forwards the ACK to IBCF_A
51					<u> </u>					ACK	IBCF_A forwards the ACK to IMS_A
52					<b>──</b>					ACK	IMS A forwards the ACK to IMS_A AS
53					<b></b>					NOTIFY	AS_A sends NOTIFY to UE_A to inform it has successfully joined the conference
54		<del></del>								NOTIFY	IMS_A forwards NOTIFY to UE_A
55	<del></del>										User A is alerted that User B has joined the conference
56				$\longrightarrow$						200 OK	UE_A sends 200 OK response for NOTIFY
57					$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IMS_A AS
58			$\longrightarrow$								User B leaves the conference
59								$\longrightarrow$		BYE	UE_B sends BYE to IMS_B to leave the conference
60								<del></del>		BYE	IMS_B forwards the BYE to IBCF_B
61						•	<u>.                                    </u>			BYE	IBCF_B forwards the BYE to IBCF_A
62					<b>←</b>					BYE	IBCF_A forwards the BYE to IMS_A
63					<del></del>					BYE	IMS_A forwards the BYE to IMS_A AS
64					<b></b>					200 OK	IMS_A AS releases resources for this conference caller and sends a 200 OK
65						$\longrightarrow$				200 OK	IMS_A forwards the 200 OK response to IBCF_A
66						-	$\longrightarrow$			200 OK	IBCF_A forwards the 200 OK response to IBCF_B
67								$\longrightarrow$		200 OK	IBCF_B forwards the 200 OK response to IMS_B
68				<del></del>						200 OK	IMS_B forwards the 200 OK response to UE_B
69			<del></del>								User B is informed that the conference has ended
70					<b></b>					NOTIFY	AS_A sends NOTIFY to IMS _A to inform UE_A that UE_B has left the
71		<del></del>								NOTIFY	IMS_A forwards NOTIFY to UE_A

Step		Direction										Message	Comment
	D w e r A	U E A	U s e r B	U E B	M S A	A S A	I B C F A	F	;	М	A S B		
72	<b>—</b>												User A is notified that user B has left the conference
73					$\longrightarrow$								UE_A sends a 200 OK response for NOTIFY
74					_	$\longrightarrow$							IMS_A forwards the 200 OK response to IMS_A AS

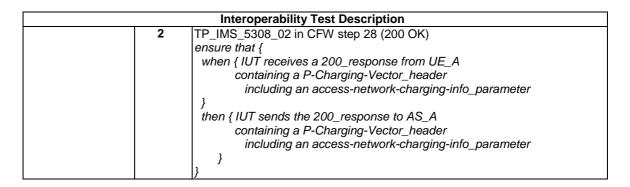
### 4.5.6 Presence

The test descriptions for the presence service are defined in TS 102 901 [17].

### 4.5.7 IPTV

# 4.5.7.1 IPTV registration and Service Attachment. Push mode

		Interoperability Test Descr	ription							
Identifier:	TD_IMS_	IPTV_0001								
Summary:	IMS netwo	ork supports properly IPTV registra	ation and service attachment in Push mode							
Configuration:	CF_IPTV									
SUT	IMS_A									
References	Test Purp		Specification Reference							
	TP_IMS_	5206_01	TS 124 229 [1], clause 5.4.1.2.2 F ¶15							
	TD IMO	5000.00	(before NOTE 3)							
U 0	TP_IMS_	0308_02	TS 124 229 [1], clause 5.4.4.2.2 ¶2							
Use Case ref.:										
Pre-test conditions:	<ul> <li>HSS of IMS_A is configured according to table 1</li> <li>UE_A has IP bearers established to its respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using userIPTV according to table 1</li> <li>IMS_A is configured to send a third party register to AS_A (SDF)</li> <li>IMS_A not configured for topology hiding</li> </ul>									
Test Sequence:  Conformance	Step 29 Check	Verify that user A receives servic	e attachment information							
Criteria:	1	TP_IMS_5206_01 in CFW step 2 ensure that {   when { IMS_A receives a protect containing an Authorizati containing a integrity processor the spending or the syes or ip-assoc-pending or ip-assoc-yes)}   then { IMS_A sends a third party containing a P-Access-containing a P-Visited-ly} }	cted REGISTER ion header rotected parameter indicating  y register to AS_A Network-Info header							



Step				Dire	ction				Message	Comment
	U s	U E	U s	U E	I M	A S	I M	A S		
	е	Α	е	В	S	Α	S	В		
	r A		r B		Α		В			
										IMS_A matches the iFC of the service profile belong to the user, and find out the AS (SDF) that user has subscribed
23						$\rightarrow$			REGISTER	IMS_A sends a REGISTER to AS_A (third party registration)
24					←				200 OK	AS_A responds with 200 OK
25					<b>←</b>				MESSAGE	AS_A sends a MESSAGE containing the service attachment information
26		$\leftarrow$							MESSAGE	IMS_A forwards the MESSAGE to UE_A
27		-			$\longrightarrow$				200 OK	UE_A responds with 200 OK
28									200 OK	IMS_A forwards the 200 OK response
						1				to AS_A
29										UE receives service attachment information

### 4.5.7.2 IPTV registration and Service Attachment. Pull mode.

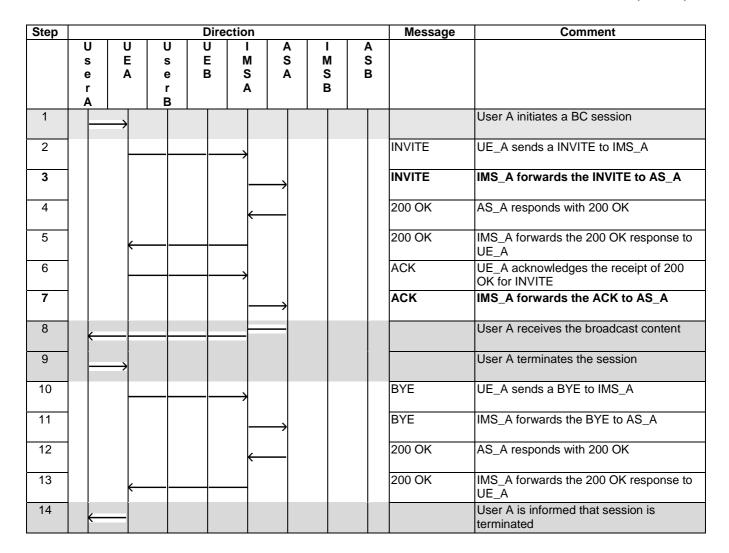
	Interoperability T	est Description								
Identifier:	TD_IMS_IPTV_0002									
Summary:	IMS network supports properly IPTV registration and service attachment in Pull mode									
Configuration:	CF_IPTV									
SUT	IMS_A									
References	Test Purpose	Specification Reference								
	TP_IMS_5097_14	TS 124 229 [1], clause 5.4.3.2 ¶11 (items 5 and 8 in 1 <sup>st</sup> numbered list)								
	TP_IMS_5308_02	TS 124 229 [1], clause 5.4.4.2.2 ¶2								
Use Case ref.:										
Pre-test conditions:	clause 4.2.1	hed to its respective IMS networks as per sing userIPTV according to table 1 pull mode service discovery								
Test Sequence:	Step	ves service attachment information								

		Interoperability Test Description					
Conformance	Check						
Criteria:	1	TP_IMS_5097_14 in CFW step 24 (SUBSCRIBE): ensure that { when { IMS_A sends the SUBSCRIBE to AS_A } then { AS_A receives the SUBSCRIBE containing a Route_header indicating the SIP_URI of AS_A containing a P-Charging-Function-Addresses_header containing a P-Charging-Vector_header (including a orig-ioi_parameter indicating IMS_A and not including a term-ioi_parameter and including access-network-charging-info)}					
	2	TP_IMS_5308_02 in CFW step 30 (200 OK) ensure that {   when { IUT receives a 200_response from UE_A					

Step					Dire	ction				Message	Comment
	U s e r A	E A		U s e r B	U E B	I M S A	A S A	M S B	A S B		
											UE retrieves the PSI/address of AS_A (SDF)
23		•				$\rightarrow$				SUBSCRIBE	UE_A sends a SUBSCRIBE for "ua-profile" event to IMS_A
24							$\rightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE to AS_A
25						$\leftarrow$				200 OK	AS_A responds with 200OK
26		•	<del></del>							200 OK	IMS_A forwards the 200 OK response to UE_A
27						$\leftarrow$				NOTIFY	AS_A sends a NOTIFY for the service attachment information to IMS_A
28		•	<del></del>							NOTIFY	IMS_A forwards the NOTIFY to UE_A
29		,				$\rightarrow$				200 OK	UE_A responds with 200 OK
30							$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A
31											UE receives service attachment information

### 4.5.7.3 BC session

		Interoperability Tes	t Description							
Identifier:	TD_IMS_IPTV_0003									
Summary:	IMS network supports properly IPTV Broadcast session									
Configuration:	CF_IPTV									
SUT	IMS_A									
References	Test Purpose Specification Reference									
	TP_IMS_5	5108_03	TS 124 229 [1], clause 5.4.3.2 ¶5							
			(item 4 in 1 <sup>st</sup> numbered list)							
	TP_IMS_5	5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119							
			(item 1 in 8 <sup>th numbered list)</sup>							
Use Case ref.:	UC_19									
Pre-test	HSS of IMS_A is configured according to table 1									
conditions:	UE_A has IP bearers established to its respective IMS networks as per									
	clause 4.2.1									
	UE_A is registered in IMS A using userIPTV according to table 1									
	UE_A has done IPTV registration and service attachment procedures using push									
	or pull mode									
	<ul><li>IMS_</li></ul>	A not configured for topolo	gy hiding							
Test Sequence:	Step									
	1	User A initiates a BC ses	sion							
	11	Verify that user A receive	s the broadcast content							
	12 User A terminates the session									
	19	Verify that user A is inform	ned that session is terminated							
Conformance	Check									
Criteria:	1	TP_IMS_5108_03 in CFV	/ step 3 (INVITE)							
		ensure that {								
			initial INVITE from IMS_A}							
		then { IUT sends the init								
		ost Route_header								
			P_URI of AS_A and							
		containing a Route								
			CSCF SIP_URI of IMS_A and							
			arging-Vector_header							
			oi narameter							
		including a orig-								
		indicating oper	ator_identifier of IMS_A and							
		indicating oper								
		indicating oper not including a te }	ractor_identifier of IMS_A and erm-ioi_parameter }							
	2	indicating open not including a to } TP_IMS_5107_02 in CFV	ractor_identifier of IMS_A and erm-ioi_parameter }							
	2	indicating open not including a to a second process of the second	vator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)							
	2	indicating open not including a to a feet to the second se	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B}							
	2	indicating open not including a to not including a to see that { when { UE_A sends ACK then { IMS_B receives not included the see that } }	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B} the ACK							
	2	indicating open not including a to not including a to a second process of the second pro	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B} the ACK Route_header							
	2	indicating open not including a to not including a to see that { when { UE_A sends ACK then { IMS_B receives not containing a indicating the see the not including the see the not indicating the see the not including the not including the not including the not including a to not include a to not including a to not include a to	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B} the ACK Route_header S-CSCF_SIP_URI of IMS_A and							
	2	indicating open not including a to not including a to see that { when { UE_A sends ACK then { IMS_B receives not containing a indicating the see the not including the see the not indicating the see the not including the not including the not including the not including a to not include a to not including a to not include a to	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B} the ACK Route_header							
	2	indicating open not including a to not including a to see that { when { UE_A sends ACK then { IMS_B receives not containing a indicating the see the not including the see the not indicating the see the not including the not including the not including the not including a to not include a to not including a to not include a to	rator_identifier of IMS_A and erm-ioi_parameter }  V step 7 (ACK)  to addressed to UE_B} the ACK Route_header S-CSCF_SIP_URI of IMS_A and							



# 4.5.7.4 CoD session. Establishing content control channel and content delivery channels using RTSP Method 1

	Interoperability 7	Test Description					
Identifier:	TD_IMS_IPTV_0004						
Summary:	Gummary: IMS network supports properly IPTV content on demand session						
Configuration:	CF_IPTV						
SUT	IMS_A						
References	Test Purpose	Specification Reference					
	TP_IMS_5108_03	TS 124 229 [1], clause 5.4.3.2 ¶5 (item 4 in 1 <sup>st</sup> numbered list)					
	TP_IMS_5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119 (item 1 in 8 <sup>th</sup> numbered list)					
Use Case ref.:	UC_20						
Pre-test conditions:	<ul> <li>HSS of IMS_A is configured according to table 1</li> <li>UE_A has IP bearers established to its respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS A using userIPTV according to table 1</li> <li>UE_A has done IPTV registration and service attachment procedures using push or pull mode</li> <li>UE_A, IMS_A and AS_A are configured to establish content control channel and content delivery channels using RTSP method 1</li> <li>IMS_A not configured for topology hiding</li> </ul>						

		Interoperability Test Description
Test Sequence:	Step	
-	1	User A initiates a CoD session (content selection)
	26	Verify that user A starts receiving the streaming content
	27	User A terminates the session
	36	Verify that user A is informed that session is terminated
Conformance	Check	
Criteria:	1	TP_IMS_5108_03 in CFW step 3 (INVITE)
		ensure that {
		when { IUT receives an initial INVITE from IMS_A}
		then { IUT sends the initial INVITE to AS_A
		containing a topmost Route_header
		indicating the SIP_URI of AS_A and
		containing a Route_header
		indicating the S-CSCF SIP_URI of IMS_A and
		containing a P-Charging-Vector_header
		including a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter }
		}
	2	TP_IMS_5107_02 in CFW step 11 (ACK)
		ensure that {
		when { UE_A sends ACK to addressed to UE_B}
		then { IMS_B receives the ACK
		not containing a Route_header
		indicating the S-CSCF_SIP_URI of IMS_A and
		not containing a P-Access-Network-Info_header
		<b> </b> }
		}

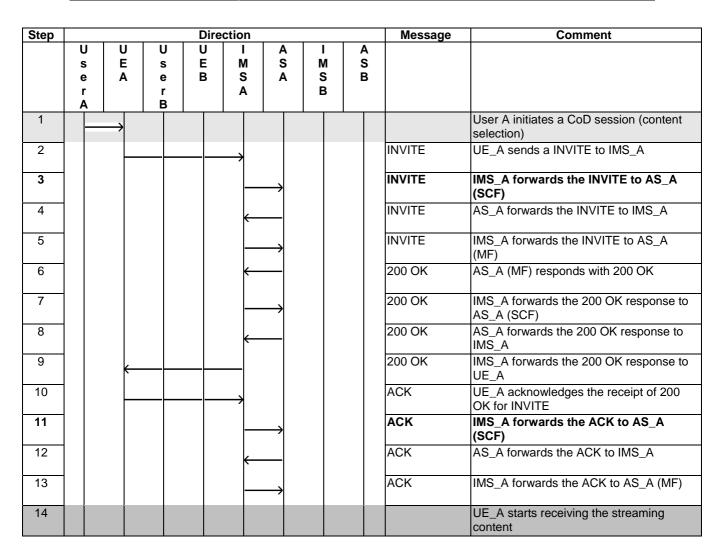
Step			Direc	tion				Message	Comment
	U s		U	M	A S	M	A S		
	e A	e e	В	S	Ā	S	В		
	r A	r B		Α		В			
1	$\longrightarrow$								User A initiates a CoD session (content selection)
2				$\rightarrow$				INVITE	UE_A sends a INVITE to IMS_A
3					$\rightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (SCF)
4				<b>←</b>				INVITE	AS_A forwards the INVITE to IMS_A
5					$\rightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (MF)
6				$\leftarrow$				200 OK	AS_A (MF) responds with 200 OK
7					$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
8				<del>(</del>	_			200 OK	AS_A forwards the 200 OK response to IMS_A
9		<u> </u>						200 OK	IMS_A forwards the 200 OK response to UE_A
10				$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
11					$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
12				<b>←</b>				ACK	AS_A forwards the ACK to IMS_A
13					$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
									UE_A sets up RTSP with AS_A (MF)
14				$\rightarrow$				INVITE	UE_A sends reINVITE message indicating media attribute "a=recvonly"
15					$\rightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A
16				<del></del>	_			INVITE	AS_A forwards the reINVITE to IMS_A
17					$\rightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A (MF)
18				$\leftarrow$	_			200 OK	AS_A (MF) responds with 200 OK
19					$\rightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
20				$\leftarrow$				200 OK	IMS_B forwards the 200 OK response to IMS_A
21		<del></del>						200 OK	IMS_A forwards the 200 OK response to UE_A
22				$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for reINVITE
23					$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
24				<b>←</b>	_			ACK	AS_A forwards the ACK to IMS_A
25					$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
26	<del></del>								User A starts receiving the streaming content
27	$\longrightarrow$								User A terminates the session

Step					Direction				Message	Comment
	U s	U E	U			A S	I M	AS		
	e r	Α	e r	E	B S A	Α	S B	В		
	Α		В							
28		-			$\longrightarrow$				BYE	UE_A sends a BYE to IMS_A
29					_	$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
30					<del>(</del>				BYE	AS_A forwards the BYE to IMS_A
31					_	$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (MF)
32					<del>(</del>				200 OK	AS_A (MF) responds with 200 OK
33					_	$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
34					<del>(</del>				200 OK	IMS_B forwards the 200 OK response to IMS_A
35		<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
36	<b>←</b>									User A is informed that session is terminated

# 4.5.7.5 CoD session. Establishing content control channel and content delivery channels using RTSP Method 2

	Interoperability 1	Test Description								
Identifier:	TD_IMS_IPTV_0005									
Summary:	IMS network supports properly IPTV content on demand session									
Configuration:	CF_IPTV									
SUT	IMS_A									
References	Test Purpose	Specification Reference								
	TP_IMS_5108_03	TS 124 229 [1], clause 5.4.3.2 ¶5								
		(item 4 in 1 <sup>st</sup> numbered list)								
	TP_IMS_5107_02	TS 124 229 [1], clause 5.4.3.2 ¶119								
		(item 1 in 8 <sup>th</sup> numbered list)								
Use Case ref.:	UC_21									
Pre-test conditions:	<ul> <li>clause 4.2.1</li> <li>UE_A is registered in IMS A</li> <li>UE_A has done IPTV registr or pull mode</li> </ul>	shed to its respective IMS networks as per using userIPTV ation and service attachment procedures using push configured to establish content control channel and th RTSP method 2								
Tost Soguence:	Ston									
Test Sequence:	1 User A initiates a CoD	session (content selection)								
		session (content selection)								
	J 32   Verilly triat user A stan	ts receiving the streaming content								

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5108_03 in CFW step 3 (INVITE) ensure that {   when { IUT receives an initial INVITE from IMS_A}   then { IUT sends the initial INVITE to AS_A       containing a topmost Route_header       indicating the SIP_URI of AS_A and       containing a Route_header       indicating the S-CSCF SIP_URI of IMS_A and       containing a P-Charging-Vector_header       including a orig-ioi_parameter       indicating operator_identifier of IMS_A and       not including a term-ioi_parameter } }
	2	TP_IMS_5107_02 in CFW step 11 (ACK) ensure that { when { UE_A sends ACK to addressed to UE_B} then { IMS_B receives the ACK not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A and not containing a P-Access-Network-Info_header } }



## 4.5.7.6 Request for Network PVR offline capture in home network

		Interoperability Test Descr	ription						
Identifier:		PTV_0006							
Summary:	IMS network supports properly N-PVR offline capture requests								
Configuration:	CF_IPTV								
SUT	IMS_A								
References	Test Purp	ose	Specification Reference						
	TP_IMS_5	5108_04	TS 124 229 [1], clause 5.4.3.3 ¶5						
			(item 4 in 1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_22								
Pre-test	• HSS	of IMS_A is configured according t	to table 1						
conditions:		has IP bearers established to its							
	claus	e 4.2.1	·						
	<ul><li>UE_A</li></ul>	is registered in IMS A using userl	PTV according to table 1						
		•	has done IPTV registration and service attachment procedures using either						
		or pull mode	3						
		A not configured for topology hidin	a						
	<u> </u>	3,							
Test Sequence:	Step								
,	1	User A requests to record a live p	ve programme that has not started yet						
	6	Verify that user A is informed that							
			5						
Conformance	Check								
Criteria:	1	TP_IMS_5108_04 in CFW step 3	(MESSAGE):						
		ensure that {	,						
		when { IMS_A receives a MESS	SAGE from UE_A }						
		then { IMS_A sends the MESSA	IGE to AS_A						
		containing a topmost Rou	ute_header						
		indicating the SIP_URI	of AS_A and						
		containing a Route_head	ler						
		indicating the S-CSCF_	_SIP_URI of IMS_A and						
		containing a P-Charging-							
		including a orig-ioi_para							
		indicating operator_ide	entifier of IMS_A and						
		not including a term-ioi	_parameter }						
		<b> </b> }							

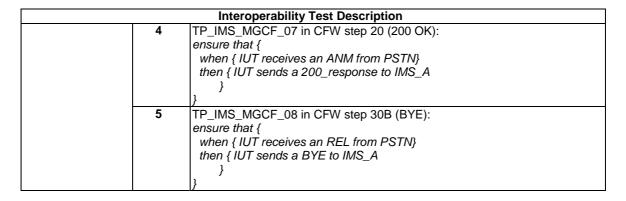
Step				Dire	ction			Message	Comment	
	D % e r A	U E A	U s e r B	U E B	M % A	A S A	I M S B	A S B		
1		$\rightarrow$								User a requests to record a live programme that has not started yet
2					$\rightarrow$				MESSAGE	UE_A sends a MESSAGE to IMS_A
3						$\rightarrow$			MESSAGE	IMS_A forwards the MESSAGE to AS_A
4					$\leftarrow$				200 OK	AS_A responds with 200 OK
5		<b>←</b>			_				200 OK	IMS_A forwards the 200 OK response to UE_A
6	<b>(</b>									User A is informed that recording has started

## 4.5.8 IMS-PSTN Interoperability

## 4.5.8.1 IMS-to-PSTN call

#### 4.5.8.1.1 Normal Call, PSTN user clears call

		Interoperability Test	Description					
Identifier:	TD_IMS_	PSTN_0001	•					
Summary:	Outgoing	call to PSTN, PSTN user cle	ears call					
Configuration:	CF_PSTN	I						
SUT	IMS_A an	nd MGCF						
References	Test Purp	oose	Specification Reference					
	TP_IMS_	MGCF_02	TS 124 229 [1], clause 5.5.3.1.2					
	TP_IMS_	MGCF_03	TS 124 229 [1], clause 5.5.3.1.2					
	TP_IMS_	MGCF_06	TS 124 229 [1], clause 5.5.3.2.2					
			TS 129 163 [18], clause 7.2.3.1.4					
	TP_IMS_	MGCF_07	TS 124 229 [1], clause 5.4.1.2.2					
			TS 129 163 [18], clause 7.2.3.1.5					
	TP_IMS_	MGCF_08	TS 124 229 [1], clause 5.5.4.1					
			TS 129 163 [18], clause 7.2.3.1.8					
Use Case ref.:	UC_20							
Pre-test	• HS	SS of IMS_A is configured a	ccording to table 1					
conditions:			ned to its IMS networks as per clause 4.2.1					
		_ _A is registered in IMS_A ເ						
		GCF within the trust domain						
		or manner and administration	·					
Test Sequence:	Step							
•	1	User A calls User B						
	2		ed of incoming call of User A					
	3	Verify that user A is inform						
	4	User B answers call	ou max o <u></u> _ no migmig					
	5		ed that call has been answered					
		6 Verify that user A and B can communicate						
	7							
	8	Verify that user B is informed that call has ended						
	9	Verify that user A is inform						
	, i	Trong that door it is in our	ou that our had one ou					
Conformance	Check							
Criteria:	1	TP_IMS_MGCF_02 in CF\	V step 5 (100 Trying):					
		ensure that {	3,5					
		when { IUT receives an ir	nitial INVITE from IAM_A}					
		then { IUT sends a 100_r						
		}						
		}						
	2	TP_IMS_MGCF_03 in CF\	V step 5 and 6 (183 Session Progress):					
		ensure that {						
			nitial INVITE from IMS_A }					
		then { IUT sends a 100_r	esponse to IMS_A and					
			response to IMS_A					
			a Dequire beeder indicating 100rd value and					
			ng Require_header indicating 100rel_value and					
		containing a P	-Charging-Vector_header					
		containing a P	-Charging-Vector_header including a term-ioi_parameter					
		containing a P	-Charging-Vector_header					
		containing a P	-Charging-Vector_header including a term-ioi_parameter					
		containing a P	-Charging-Vector_header including a term-ioi_parameter indicating the operator_identifier of IMS_A					
	3	containing a P }  TP_IMS_MGCF_06 in CFV	-Charging-Vector_header including a term-ioi_parameter indicating the operator_identifier of IMS_A					
	3	containing a P  }  TP_IMS_MGCF_06 in CFV ensure that {	-Charging-Vector_header including a term-ioi_parameter indicating the operator_identifier of IMS_A  W step 15 (180 Ringing):					
	3	containing a P }  TP_IMS_MGCF_06 in CF\ ensure that { when { IUT receives an A	Charging-Vector_header including a term-ioi_parameter indicating the operator_identifier of IMS_A  N step 15 (180 Ringing):  CM indicating subscriber_free					
	3	containing a P  }  TP_IMS_MGCF_06 in CFV ensure that {  when { IUT receives an A or receives a	CM indicating subscriber_free a CPG indicating ALERTING from PSTN }					
	3	containing a P }  TP_IMS_MGCF_06 in CF\ ensure that { when { IUT receives an A	CM indicating subscriber_free a CPG indicating ALERTING from PSTN }					
	3	containing a P  }  TP_IMS_MGCF_06 in CFV ensure that {  when { IUT receives an A or receives a	CM indicating subscriber_free a CPG indicating ALERTING from PSTN }					



Step			Dire	ection	<u> </u>		Message	Comment
	U	U	ı	M	Р	U		
	s	E A	M	G C	S	S		
	e r	A	S A	F	l N	e r		
	A		•	•	'	В		
1		$\rightarrow$						User A calls User B
2			$\rightarrow$				INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
5			$\leftarrow$	_			100 Trying	MGCF responds with a 100 Trying provisional response
6			$\leftarrow$	_			183 Session Progress	MGCF responds with 183 Session Progress response
7		$\leftarrow$					183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
8			$\rightarrow$				PRACK	UE_A sends PRACK to IMS_A
9				$\rightarrow$			PRACK	IMS_A forwards PRACK to MGCF
10			$\leftarrow$	_			200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
11		$\leftarrow$					200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
12					$\rightarrow$		IAM	MGCF sends IAM to PSTN
13						$\rightarrow$		User B is informed of incoming call of User A
14				<b>←</b>			ACM/CPG	PSTN responds with ACM/CPG
15			$\leftarrow$				180 Ringing	MGCF sends 180 Ringing response to IMS_A
16		$\leftarrow$					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
17	$\vdash$							User A is informed that UE_B is ringing
18					<b>(</b>			User B answers call
19				$\leftarrow$			ANM	PSTN sends ANM to MGCF
20			$\leftarrow$	_			200 OK	MGCF sends 200 OK response to IMS_A
21		$\leftarrow$					200 OK	IMS_A forwards 200 OK response to UE_A

Step		Direction							Message	Comment
	U s e r A	U E A		I M S A	M G C F	P S T N		U s e r B		
22	4		•							User A is informed that call has been answered
23									ACK	UE_A acknowledges the receipt of 200 OK for INVITE
24					$\rightarrow$				ACK	IMS_A forwards ACK to MGCF
25										User A and B can communicate
26B						<b></b>				User B ends call
27B					$\leftarrow$	-			REL	PSTN sends BYE to MGCF
28B						$\rightarrow$			RLC	MGCF responds RLC to PSTN
29B							$\longrightarrow$			User B is informed that call has ended
30B				$\leftarrow$	-				BYE	MGCF sends BYE to IMS_A
31B		€	•						BYE	IMS_A forwards BYE to UE_A
32B	<b>+</b>									User A is informed that call has ended
33B			>						200 OK	UE_A sends 200 OK for BYE
34B					$\rightarrow$				200 OK	IMS_A forwards 200 OK response to MGCF

## 4.5.8.1.2 Normal Call, IMS user clears call

	Interoperability Test Desc	ription							
Identifier:	TD_IMS_PSTN_0002								
Summary:	Outgoing call to PSTN, IMS user clears call								
Configuration:	CF_PSTN								
SUT	IMS_A and MGCF								
References	Test Purpose	Specification Reference							
	TP_IMS_MGCF_02	TS 124 229 [1], clause 5.5.3.1.2							
	TP_IMS_MGCF_03	TS 124 229 [1], clause 5.5.3.1.2							
	TP_IMS_MGCF_06	TS 124 229 [1], clause 5.5.3.2.2							
		TS 129 163 [18], clause 7.2.3.1.4							
	TP_IMS_MGCF_07	TS 124 229 [1], clause 5.4.1.2.2							
		TS 129 163 [18], clause 7.2.3.1.5							
	TP_IMS_MGCF_17	TS 129 163 [18], clause 7.2.3.2.13							
Use Case ref.:	UC_20								
Pre-test	<ul> <li>HSS of IMS_A is configured according</li> </ul>	to table 1							
conditions:	<ul> <li>UE_A has IP bearers established to its</li> </ul>	IMS networks as per clause 4.2.1							
	<ul> <li>UE_A is registered in IMS_A using any</li> </ul>	user identity							
	MGCF within the trust domain of IMS_A								

Toot Coguenes:	Ston	Interoperability Test Description
Test Sequence:	Step	Lleav A colle Lleav D
	1	User A calls User B
	2	Verify that user B is informed of incoming call of User A
	3	Verify that user A is informed that UE_B is ringing
	4	User B answers call
	5	Verify that user A is informed that call has been answered
	6	Verify that user A and B can communicate
	7	User A ends call
	8	Verify that user B is informed that call has ended
	9	Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_MGCF_02 in CFW step 5 (100 Trying):
		ensure that {
		when { IUT receives an initial INVITE from IAM_A}
		then { IUT sends a 100_response to IMS_A
		}
		}
	2	TP_IMS_MGCF_03 in CFW step 5 and 6 (183 Session Progress):
	_	ensure that {
		when { IUT receives an initial INVITE from IMS_A }
		then { IUT sends a 100_response to IMS_A and
		sends 183_response to IMS_A
		containing Require_header indicating 100rel_value and
		containing a P-Charging-Vector_header
		including a term-ioi_parameter
		indicating the operator_identifier of IMS_A
		}
		1
	3	TP_IMS_MGCF_06 in CFW step 15 (180 Ringing):
		ensure that {
		when { IUT receives an ACM indicating subscriber_free
		or receives at ACM indicating subscriber_free
		then { IUT sends a 180_response to IMS_A
		1
	4	TD IMC MCCE 07 in CEM stop 20 (200 OK):
	4	TP_IMS_MGCF_07 in CFW step 20 (200 OK):
		ensure that {
		when { IUT receives an ANM from PSTN}
		then { IUT sends a 200_response to IMS_A
		, <i>)</i>
		}
	5	TP_IMS_MGCF_29A in CFW step 24 (REL):
		ensure that {
		when { IUT receives a BYE from IMS_A }
		then { IUT sends an REL to PSTN
		}
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	1	l'

Step			Dire	ectio	on			Message	Comment
	Us	ΠE	I M	M		P S	U s		
	е	Ā	S	С		Т	е		
	r A		Α	F		N	r B		
1		7							User A calls User B
2			$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		$\leftarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$				INVITE	IMS_A forwards INVITE to MGCF
5			<b>←</b>					100 Trying	MGCF responds with a 100 Trying provisional response
6			<b>←</b>					183 Session Progress	MGCF responds with 183 Session Progress response
7		$\leftarrow$						183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
8			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A
9				$\rightarrow$				PRACK	IMS_A forwards PRACK to MGCF
10			<b>←</b>					200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
11		$\leftarrow$						200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
12				_		$\rightarrow$		IAM	MGCF sends IAM to PSTN
13							$\rightarrow$		User B is informed of incoming call of User A
14				+				ACM/CPG	PSTN responds with ACM/CPG
15			<b>←</b>					180 Ringing	MGCF sends 180 Ringing response to IMS_A
16		$\leftarrow$						180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
17	$\leftarrow$								User A is informed that UE_B is ringing
18						<b>—</b>	+		User B answers call
19				*		-		ANM	PSTN sends ANM to MGCF
20			<b>←</b>					200 OK	MGCF sends 200 OK response to IMS_A
21		$\leftarrow$						200 OK	IMS_A forwards 200 OK response to UE_A
22	<b>—</b>								User A is informed that call has been answered
23			$\rightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
24			_	$\rightarrow$				ACK	IMS_A forwards ACK to MGCF
25									User A and B can communicate
26A		<del>)</del>							User A ends call
27A			$\rightarrow$					BYE	UE_A sends BYE
28A			_	$\rightarrow$				BYE	IMS_A forwards BYE to MGCF

Step			Dire	ection			Message	Comment
	U s e r A	UEA	М S A	M G C F	P S T N	U s e r B		
29A					<del></del>		REL	MGCF sends REL to PSTN
30A						$\rightarrow$		User B is informed that call has ended
31A				<del>(                                    </del>			RLC	PSTN sends RLC response to MGCF
32A			←	_			200 OK	MGCF sends 200 OK response to IMS_A
33A		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
34A	$\leftarrow$							User A is informed that call has ended

## 4.5.8.1.3 Unsuccessful Call, PSTN user busy

		Interoperability Test Descr	iption				
Identifier:	TD_IMS_I	PSTN_0003					
Summary:	Outgoing call to PSTN, user B busy						
Configuration:	CF_PSTN						
SUT	IMS_A an	d MGCF					
References	Test Purp	ose	Specification Reference				
	TP_IMS_N	MGCF_02	TS 124 229 [1], clause 5.5.3.1.2				
	TP_IMS_N	MGCF_09	TS 129 163 [18], clause 7.2.3.1.8				
Use Case ref.:	UC_20						
Pre-test	• HS	S of IMS_A is configured accordin	g to table 1				
conditions:	• UE	_A has IP bearers established to it	ts IMS networks as per clause 4.2.1				
	• UE	_A is registered in IMS_A using ar	ny user identity				
	• MG	GCF within the trust domain of IMS	_A				
	• Us	er B in the PSTN is busy					
	•	,					
Test Sequence:	Step						
	1	User A calls User B					
	2	Verify that user A is informed that	User B is busy				
Conformance	Check						
Criteria:	1	TP_IMS_MGCF_02 in CFW step	6 (100 Trying):				
		ensure that {					
		when { IUT receives an initial IN					
		then { IUT sends a 100_respons	e to IMS_A				
		}					
	2	TP_IMS_MGCF_09 in CFW step	14 (486 Busy Here):				
		ensure that {					
		when { IUT receives an REL with	,				
		then { IUT sends a 486_respons	re to IMS_A				
		}					
		]}					

Step		Dir	ection			Message	Comment
	_	U I	M	PS	U		
		E M A S	G	T	s e		
	r	Α	F	N	r		
1	A				В		User B is busy
•							333. 2.10 243,
2							User A calls User B
3						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
4		<del></del>				100 Trying	IMS_A responds with a 100 Trying provisional response
5			$\longrightarrow$			INVITE	IMS_A forwards INVITE to MGCF
6		<b>←</b>				100 Trying	MGCF responds with a 100 Trying provisional response
7		<b> </b>				183 Session Progress	MGCF responds with 183 Session Progress response
8		<b></b>				183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
9						PRACK	UE_A sends PRACK to IMS_A
10		_	$\longrightarrow$			PRACK	IMS_A forwards PRACK to MGCF
11		<b> </b>				200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
12		<del></del>				200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
13				$\rightarrow$		IAM	MGCF sends IAM to PSTN
14			<b>←</b>			REL (cause #17)	PSTN responds with REL "user busy"
15				$\rightarrow$		RLC	PSTN sends RLC to MGCF
16		<b> </b>				486 Busy Here	MGCF sends 486 Busy Here response to IMS_A
17						486 Busy Here	IMS_A forwards 486 Busy Here response to UE_A
18	<b>—</b>						User A is informed that User B is busy
19		$\rightarrow$				ACK	UE_A acknowledges the receipt of 486 for INVITE
20		_	$\longrightarrow$			ACK	IMS_A forwards ACK to MGCF

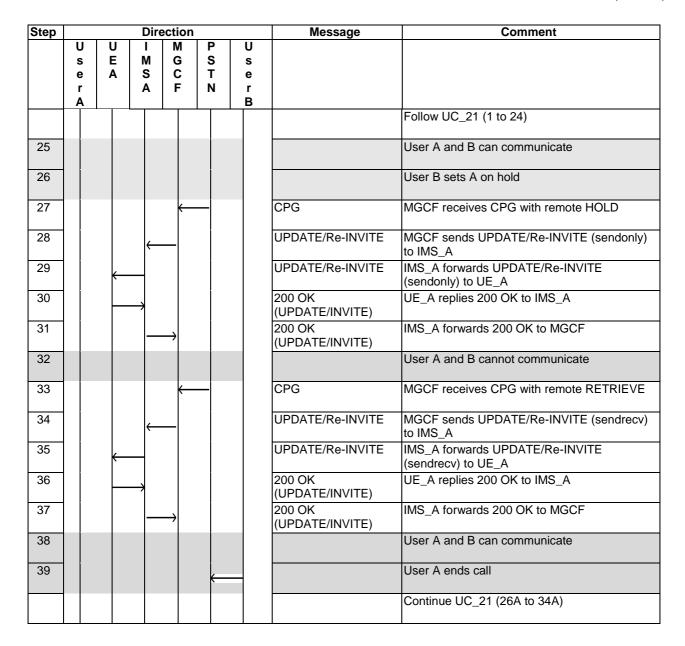
#### 4.5.8.1.4 IMS user holds/resumes call

		Interoperability Test Desc	cription				
Identifier:	TD_IMS_	PSTN_0004	•				
Summary:	Outgoing	call to PSTN, communication hol-	d by IMS user				
Configuration:	CF_PSTN						
SUT	IMS_A and MGCF						
References	Test Purp		Specification Reference				
		MGCF_11	TS 129 163 [18], clause 7.4.10.1				
		MGCF_12	TS 129 163 [18], clause 7.4.10.1				
Use Case ref.:	UC_20						
	_						
Pre-test		SS of IMS_A is configured accord					
conditions:			its IMS networks as per clause 4.2.1				
		_A is registered in IMS_A using					
		GCF within the trust domain of IM					
	• UE	_A configured to perform user in	itiated hold/resume using INVITE				
Test Sequence:	Step	11 11 11					
	1	User A calls User B					
	2	Verify that user B is informed of					
	3	Verify that user A is informed the	at UE_B is ringing				
	4	User B answers call	et cell has been appropried				
	5	Verify that user A is informed the					
	6	Verify that user A and B can cor					
	7 8	User A puts connection to B on Verify that user A and B cannot					
	9	User A resumes connection to E					
	10	Verify that user A and B can cor					
	11	User B ends call	Illituriicate				
	12	Verify that user B is informed that	at call has ended				
	13	Verify that user A is informed that					
	10	verily that user A is informed the	at call rias ended				
Conformance	Check						
Criteria:	1	TP_IMS_MGCF_11 in CFW ste	p 31 (CPG):				
	-	ensure that {	- (c. c).				
		when { IUT receives an UPDA	TE or a target_refresh INVITE				
		containing a	SDP				
			sendonly from IMS_A }				
		then { IUT sends a CPG indica	ting remote_hold to PSTN				
		}					
		} TD IMO MOOF 40: 0FM 1	07 (000)				
	2	TP_IMS_MGCF_12 in CFW ste	p 37 (CPG):				
		ensure that {   when { IUT receives an UPDA	TE or a target refresh INIVITE				
		containing a					
			sendrecv from IMS_A }				
		then { IUT sends a CPG indica					
		}	<u> </u>				
I		l)					

Step			Dire	ectio				Message	Comment
	U s e r A	U E A	I M S A	M G C F	F	5	U s e r B		
25									User A and B can communicate
26									User A sets B on hold
27			$\rightarrow$					UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendonly) to IMS_A
28				$\rightarrow$				UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendonly) to MGCF
29			$\leftarrow$		•			200 OK (UPDATE/INVITE)	MGCF replies 200 OK to IMS_A
30		<b>←</b>						200 OK (UPDATE/INVITE)	IMS_A forwards 200 OK to UE_A
31					$\longrightarrow$			CPG	MGCF sends CPG "remote HOLD"
32									User A and B cannot communicate
33			$\rightarrow$					UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendrecv) to IMS_A
34				$\rightarrow$	•			UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendrecv) to MGCF
35			$\leftarrow$	_				200 OK (UPDATE/INVITE)	MGCF replies 200 OK to IMS_A
36		<b>←</b>			•			200 OK (UPDATE/INVITE)	IMS_A forwards 200 OK to UE_A
37					$\longrightarrow$			CPG	MGCF sends CPG "remote RETRIEVE"
38									User A and B can communicate
39						<del>(                                    </del>			User B ends call
40									Continue UC_20 (26B to 34B)

#### 4.5.8.1.5 PSTN user holds/resumes call

		Interoperability Test Des	scription					
Identifier:	TD_IMS_	PSTN_005	•					
Summary:	Outgoing	call to PSTN, communication ho	old by PSTN user					
Configuration:	CF_PSTN							
SUT	IMS_A and MGCF							
References	Test Purpose Specification Reference							
		MGCF_13	TS 129 163 [18], clause 7.4.10.2					
	TP_IMS_	MGCF_14	TS 129 163 [18], clause 7.4.10.2					
Use Case ref.:	UC_20							
Pre-test	• HS	SS of IMS_A is configured accord	ding to table 1					
conditions:	• UE	_A has IP bearers established t	to its IMS networks as per clause 4.2.1					
	• UE	_A is registered in IMS_A using	any user identity					
	• M	GCF within the trust domain of IN	MS_A					
Test Sequence:	Step							
	1	User A calls User B						
	2	Verify that user B is informed of						
	3	Verify that user A is informed the	hat UE_B is ringing					
	4	User B answers call						
	5	Verify that user A is informed the	hat call has been answered					
	6	Verify that user A and B can co						
	7	User B puts connection to A or	n hold					
	8	Verify that user A and B canno	t communicate					
	9	User B resumes connection to	A					
	10	Verify that user A and B can co	ommunicate					
	11	User B ends call						
	12	Verify that user B is informed the	nat call has ended					
	13	Verify that user A is informed the	nat call has ended					
Conformance	Check							
Criteria:	1	TP_IMS_MGCF_13 in CFW ste	ep 28 (UPDATE):					
		ensure that {						
			ndicating remote_hold from PSTN }					
		then { IUT sends an UPDATE						
		containing a						
			g sendonly to IMS_A					
		}						
		} ====================================	07 (UDD 4.TE)					
	2	TP_IMS_MGCF_14 in CFW ste	ep 37 (UPDATE)::					
		ensure that {	adia atia a mana (a matria ya fuana DOTN)					
			ndicating remote_retrieve from PSTN }					
		then { IUT sends an UPDATE						
		containing a						
			g sendonly to IMS_A					
		}						
		<b>J</b>						



#### 4.5.8.2 PSTN-to-IMS call

#### 4.5.8.2.1 Normal Call, PSTN user clears call

Interoperability Test Description								
ldentifier:	TD_IMS_PSTN_0006							
Summary:	Incoming call from PSTN, PSTN	user clears call						
Configuration:	CF_PSTN							
SUT	IMS_A and MGCF							
References	Test Purpose	Specification Reference						
	TP_IMS_MGCF_01	TS 124 229 [1], clause 5.5.3.1.1						
	TP_IMS_MGCF_05	TS 124 229 [1], clause 5.5.3.2,1						
	TP_IMS_MGCF_15	TS 129 163 [18], clauses 7.2.3.2.4 and						
		7.2.3.2.6						
	TP_IMS_MGCF_16	TS 129 163 [18], clause 7.2.3.2.8						
	TP_IMS_MGCF_08	TS 124 229 [1], clause 5.5.4.1						
		TS 129 163 [18], clause 7.2.3.1.8						
Use Case ref.:	UC_21							

		Interenerability Teet Deceription					
Pre-test	LIC	Interoperability Test Description					
conditions:		SS of IMS_A is configured according to table 1  A has IP bearers established to its IMS networks as per clause 4.2.1					
conditions.		:_A has it bearers established to its livis hetworks as per clause 4.2.1 :_A is registered in IMS_A using any user identity					
		:_A is registered in IMS_A using any user identity  GCF within the trust domain of IMS_A					
	IVIV	GOF WITHIN THE TRUST COMMAIN OF INIS_A					
Test Sequence:	Step						
root ooquonooi	1	User B calls User A					
	2	Verify that user A is informed of incoming call of User B					
	3	Verify that user B is informed that UE_A is ringing					
	4	User A answers the call					
	5	Verify that user A and B can communicate					
	6	User B ends call					
	7	Verify that user B is informed that call has ended					
	8	Verify that user A is informed that call has ended					
Conformance	Check						
Criteria:	1	TP_IMS_MGCF_01 in CFW step 3 (INVITE):					
		ensure that {					
		when { IUT receives an initial IAM from PSTN }					
		then { IUT sends a INVITE to IMS_A containing a Request_URI					
		indicating Tel_URI_E.164_Number					
		or (Sip_URI_E.164_Number with user_portion_phone)					
		containing a Contact_header					
		indicating anyvalue_GRUU_format and					
		containing a Supported_header					
		including an 100rel_value and					
		containing a P-Asserted-Identity_header and					
		containing a P-Charging-Vector_header					
		indicating an icid-value_parameter and					
		containing a SDP					
		<pre>indicating codec_supported and curr_precondition }</pre>					
		}					
	2	TP_IMS_MGCF_05 in CFW step 14 (UPDATE):					
		ensure that {					
		when { IUT receives an 2000K_PRACK from IMS_A and					
		conditions_fullfilled}					
		then { IUT sends a UPDATE to IMS_A					
		}					
	-	TD IMC MCCE 45 in CEM stop 20 (ACM/CDC):					
	3	TP_IMS_MGCF_15 in CFW step 20 (ACM/CPG): ensure that {					
		when { IUT receives a 180_response from IMS_A }					
		then { IUT sends an ACM indicating subscriber_free					
		or sends a CPG indicating ALERTING to PSTN					
		}					
		}					
	4	TP_IMS_MGCF_16 in CFW step 25 (ANM):					
		ensure that {					
		when { IUT receives a 200_response from IMS_A }					
		then { IUT sends an ANM to PSTN					
	5	TP_IMS_MGCF_08 in CFW step 33B (BYE):					
	3	ensure that {					
		when { IUT receives an REL from PSTN}					
		then { IUT sends a BYE to IMS_A					
		}					
		<b> </b> }					

Step		D	irect	tion			Message	Comment
	U s	U E I	I M	M G	P S	U s		
	е	A	S	С	Т	е		
	r A	,	A	F	N	r B		
1					<u> </u>			User B calls User A
2				<b>←</b>			IAM	PSTN send IAM to MGCF
3			$\leftarrow$	_			INVITE	MGCF sends INVITE to IMS_A (SDP with precondition status, MIME subtype
4				$\rightarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
5		<del></del>	_				INVITE	IMS_A forwards INVITE to UE_A
6			>				100 Trying	UE_A optionally responds with a 100 Trying provisional response
7			*				183 Session Progress	UE_A sends 183 Session Progress response to IMS_A
8				$\rightarrow$			183 Session Progress	IMS_A forwards 183 Session Progress response to MGCF
9			<b>←</b>				PRACK	MGCF responds with PRACK to IMS_A
10		<del></del>					PRACK	IMS_A forwards PRACK to UE_A
11			<b>&gt;</b>				200 OK (PRACK)	UE_A responds with 200 OK to IMS_A
12				$\rightarrow$			200 OK (PRACK)	IMS_A forwards 200 OK to MGCF
13			<b>←</b>				UPDATE	MGCF sends UPDATE to IMS_A
14		<b></b>					UPDATE	IMS_A forwards UPDATE to UE_A
15			*				200 OK (UPDATE)	UE_A responds with 200 OK to IMS_A
16				$\rightarrow$			200 OK (UPDATE)	IMS_A forwards 200 OK to MGCF
17	$\leftarrow$							User A is informed of incoming call of User B
18		$\longmapsto$	,				180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
19				$\rightarrow$			180 Ringing	IMS_A forwards 180 Ringing response to MGCF
20					$\rightarrow$		ACM/CPG	MGCF send ACM/CPG to PSTN
21						<del>)</del>		User B is informed that UE_A is ringing
22		<b>→</b>						User A answers the call
23			>				200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
24				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF
25					$\rightarrow$		ANM	MGCF sends ANM to PSTN
26			$\leftarrow$				ACK	MGCF sends ACK to PSTN
27		<u></u>					ACK	IMS_A forwards ACK to UE_A
28	<b>←</b>							User A and B can communicate

Step		Direction						Message	Comment
	U s e r A		U E A	M S A	M G C F	P S T N	U s e r B		
29B			-			$\leftarrow$			User B ends call
30B					$\leftarrow$			REL	PSTN sends REL to MGCF
31B						$\rightarrow$		RLC	MGCF sends RLC to PSTN
32B							$\rightarrow$		User B is informed that call has ended
33B				$\leftarrow$	_			BYE	MGCF sends BYE to IMS_A
34B			<del>(</del>	-				BYE	IMS_A forwards BYE to UE_A
35B	+								User A is informed that call has ended
36B				<del>)</del>				200 OK	UE_A sends 200 OK for BYE
37B					$\rightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF

## 4.5.8.2.2 Normal Call, IMS user clears call

		Interoperability Test Desc	ription					
Identifier:	TD_IMS_PSTN_0007							
Summary:	Incoming	call from PSTN, IMS user clears of	all					
Configuration:	CF_PSTN							
SUT	IMS_A an	d MGCF						
References	Test Purp	oose	Specification Reference					
	TP_IMS_I	MGCF_01	TS 124 229 [1], clause 5.5.3.1.1					
	TP_IMS_I	MGCF_05	TS 124 229 [1], clause 5.5.3.2,1					
	TP_IMS_I	MGCF_15	TS 129 163 [18], clauses 7.2.3.2.4 and					
			7.2.3.2.6					
	TP_IMS_I	MGCF_16	TS 129 163 [18], clause 7.2.3.2.8					
	TP_IMS_I	MGCF_17	TS 129 163 [18], clause 7.2.3.2.13					
Use Case ref.:	UC_21							
Pre-test	• HS	SS of IMS_A is configured according	ng to table 1					
conditions:	• UE	_A has IP bearers established to	its IMS networks as per clause 4.2.1					
		_A is registered in IMS_A using a						
	• MC	GCF within the trust domain of IMS	S_A					
Test Sequence:	Step							
	1	User B calls User A						
	2	Verify that user A is informed of i						
	3	Verify that user B is informed that	t UE_A is ringing					
	4	User A answers the call						
	5	Verify that user A and B can communicate						
	6	User A ends call						
	7	Verify that user B is informed that						
	8	Verify that user A is informed that	t call has ended					

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_MGCF_01 in CFW step 3 (INVITE):
		ensure that {
		when { IUT receives an initial IAM from PSTN }
		then { IUT sends a INVITE to IMS_A
		containing a Request_URI
		indicating Tel_URI_E.164_Number
		or (Sip_URI_E.164_Number with user_portion_phone)
		containing a Contact_header
		indicating anyvalue_GRUU_format and
		containing a Supported_header
		including an 100rel value and
		containing a P-Asserted-Identity_header and
		containing a P-Charging-Vector_header
		indicating an icid-value_parameter and
		containing a SDP
		indicating codec_supported and curr_precondition
		}
	2	TP_IMS_MGCF_05 in CFW step 14 (UPDATE):
	_	ensure that {
		when { IUT receives an 2000K_PRACK from IMS_A and
		conditions_fullfilled}
		then { IUT sends a UPDATE to IMS_A
		then to rection a or DATE to livio_A
	3	TP_IMS_MGCF_15 in CFW step 20 (ACM/CPG):
		ensure that {
		when { IUT receives a 180_response from IMS_A }
		then { IUT sends an ACM indicating subscriber_free
		or sends a CPG indicating ALERTING to PSTN
		}
		}
	4	TP_IMS_MGCF_16 in CFW step 25 (ANM):
		ensure that {
		when { IUT receives a 200_response from IMS_A }
		then { IUT sends an ANM to PSTN
		}
		}
	5	TP_IMS_MGCF_32A in CFW step 24 (REL):
		ensure that {
		when { IUT receives a BYE from IMS_A }
		then { IUT sends an REL to PSTN
		then { for serius an NEE to PSTIV
		l)

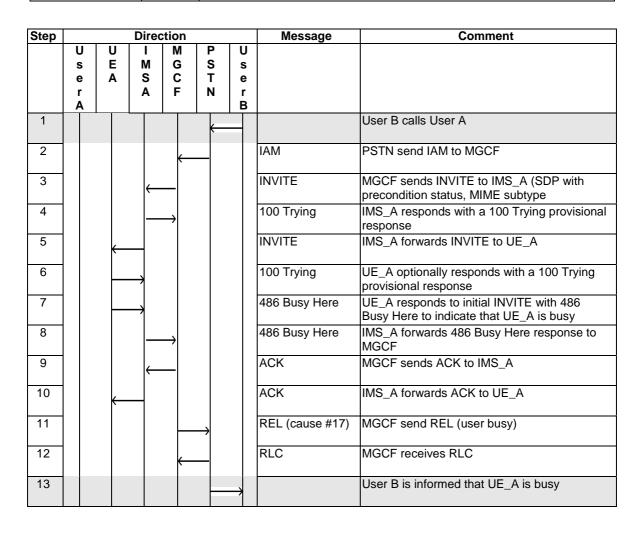
U U I M G S T E N N F N F B US S E P T N SEN S C T N SEN SEN SEN SEN SEN SEN SEN SEN SEN S	
e A S C T N F B User B calls User A  1 User B calls User A  IAM PSTN send IAM to MGCF  INVITE MGCF sends INVITE to IM with precondition status, M 100 Trying IMS_A responds with a 10 provisional response INVITE to IMS_A forwards IMS_A forwards IMS_A las Session Progress IMS_A sends 183 Session Ims_A forwards 183 Session Progress IMS_A forwards 183 Session Progress IMS_A forwards IMS_A prack IMS_A forwards Prack to IMS_A forwards Prack to IMS_A forwards 200 OK to IMS_A forwards UPDATE to IMS_A forwards UPDATE to IMS_A forwards UPDATE to IMS_A forwards 200 OK to IMS_A	
IAM PSTN send IAM to MGCF  INVITE MGCF sends INVITE to IM with precondition status, M 100 Trying IMS_A responds with a 100 provisional response INVITE to IMS_A forwards IN	
IAM	
INVITE   MGCF sends INVITE to IM with precondition status, M   100 Trying   IMS_A responds with a 100 provisional response   INVITE   IMS_A forwards INVITE to IMS_A forwards INVITE to IMS_A forwards INVITE to IMS_A forwards INVITE to IMS_A session Invisional response to IMS_A   183 Session Progress   UE_A sends 183 Session Invisional response to IMS_A   183 Session Progress   IMS_A forwards 183 Session Invisional response to IMS_A   183 Session Progress   IMS_A forwards 183 Session Invisional response to MGCF   PRACK   IMS_A forwards PRACK to IMS_A   IMS_A forwards PRACK to IMS_A forwards PRACK to IMS_A forwards 200 OK to IMS_A forwards UPDATE   IMS_A forwards UPDATE   UPDATE   IMS_A forwards UPDATE   UPDATE   IMS_A forwards 200 OK to	
with precondition status, M 100 Trying IMS_A responds with a 100 provisional response INVITE IMS_A forwards INVITE to 100 Trying UE_A optionally responds Trying provisional response 183 Session Progress UE_A sends 183 Session I response to IMS_A 183 Session Progress IMS_A forwards 183 Session I response to IMS_A 183 Session Progress IMS_A forwards 183 Session I response to MGCF PRACK MGCF responds with PRA IMS_A PRACK IMS_A forwards PRACK to 200 OK (PRACK) UE_A responds with 200 OC 11 12 13 14 15 16 17 18 180 Ringing UE_A responds to initial IN 180 Ringing to indicate tha	
provisional response INVITE IMS_A forwards INVITE to  100 Trying UE_A optionally responds Trying provisional response IRS Session Progress UE_A sends 183 Session Iresponse to IMS_A  183 Session Progress IMS_A forwards 183 Session Fresponse to MGCF PRACK MGCF responds with PRA IMS_A PRACK IMS_A forwards PRACK to  200 OK (PRACK) UE_A responds with 200 C  200 OK (PRACK) IMS_A forwards 200 OK to  UPDATE MGCF sends UPDATE to I  UPDATE IMS_A forwards UPDATE to I  UPDATE UE_A responds with 200 C  200 OK (UPDATE) UE_A responds with 200 C  USer A is informed of incor User B  180 Ringing UE_A responds to initial IN 180 Ringing to indicate tha	
100 Trying UE_A optionally responds Trying provisional response 183 Session Progress UE_A sends 183 Session I response to IMS_A 183 Session Progress IMS_A forwards PRACK IMS_A IMS_A IMS_A IMS_A IMS_A IMS_A IMS_A IMS_A forwards PRACK to 200 OK (PRACK) UE_A responds with 200 COM (PRACK) IMS_A forwards UPDATE IMS_A forwards 200 OK to 200 OK (UPDATE) IMS_A forwards 200 OK to 200 OK (UPDATE) IMS_A forwards 200 OK to USE IMS	) Trying
Trying provisional response  183 Session Progress UE_A sends 183 Session I response to IMS_A  183 Session Progress IMS_A forwards 183 Session I response to MGCF  PRACK MGCF responds with PRA IMS_A  PRACK IMS_A forwards PRACK to 200 OK (PRACK) UE_A responds with 200 OK (PRACK)  10  11  12  13  14  15  16  17  18  180 Ringing UE_A responds to initial IN 180 Ringing to indicate tha	UE_A
response to IMS_A  183 Session Progress IMS_A forwards 200 OK to 183 IMS_A forwards 200 OK	
response to MGCF PRACK MGCF responds with PRA IMS_A PRACK IMS_A forwards PRACK to  200 OK (PRACK) UE_A responds with 200 OK  10 11 12 13 14 15 16 17 18 18 Ringing UE_A responds to initial IN 180 Ringing to indicate tha	Progress
IMS_A  PRACK  IMS_A forwards PRACK to  200 OK (PRACK)  UE_A responds with 200 OK  UPDATE  UPDATE  UPDATE  IMS_A forwards 200 OK to  UPDATE  UPDATE  IMS_A forwards UPDATE  200 OK (UPDATE)  UE_A responds with 200 OK  UE_A responds with 200 OK  UPDATE  UPDATE  UPDATE  UB_A forwards 200 OK to  USer A is informed of incorruser B  180 Ringing  UE_A responds to initial IN  180 Ringing to indicate tha	
11 200 OK (PRACK) UE_A responds with 200 COM (PRACK) IMS_A forwards 200 OK to UPDATE MGCF sends UPDATE to IMS_A forwards UPDATE 15 200 OK (UPDATE) UE_A responds with 200 COM (UPDATE) USer A is informed of incorruser B 180 Ringing UE_A responds to initial IN 180 Ringing to indicate that	
12 13 14 15 16 17 18 18 18 18 200 OK (PRACK) IMS_A forwards 200 OK to UPDATE  10 11 12 13 14 15 15 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18	UE_A
13  UPDATE  UPDATE  UPDATE  IMS_A forwards UPDATE  15  200 OK (UPDATE)  USer A is informed of incorruser B  18  18  Ringing  UPDATE  UPDATE  UPDATE  USer A is informed of incorruser B  180 Ringing  UE_A responds to initial IN 180 Ringing to indicate tha	K to IMS_A
14  UPDATE  IMS_A forwards UPDATE  200 OK (UPDATE)  UE_A responds with 200 OK  10  USer A is informed of incorruser B  18 Iso Ringing  UE_A responds to initial IN  180 Ringing to indicate tha	MGCF
15  200 OK (UPDATE)  UE_A responds with 200 C  200 OK (UPDATE)  IMS_A forwards 200 OK to  User A is informed of incor User B  18 UE_A responds to initial IN 180 Ringing UE_A responds to indicate tha	MS_A
16 200 OK (UPDATE) IMS_A forwards 200 OK to  17 User A is informed of incor User B  18 UE_A responds to initial IN 180 Ringing to indicate tha	to UE_A
17 User A is informed of incor User B  18 USER A is informed of incor User B  180 Ringing UE_A responds to initial IN 180 Ringing to indicate that	OK to IMS_A
User B  18 UE_A responds to initial IN 180 Ringing to indicate that	MGCF
180 Ringing to indicate that	ning call of
$  \qquad   \qquad   \qquad   \qquad  $ to MGCF	
20 ACM/CPG MGCF send ACM/CPG to	PSTN
User B is informed that UE	_A is ringing
User A answers the call	
23 UE_A responds INVITE wiindicate that the call has be	
24 200 OK IMS_A forwards 200 OK re	
ANM MGCF sends ANM to PST	N
ACK MGCF sends ACK to PST	N
ACK IMS_A forwards ACK to UE	<b>E_A</b>
User A and B can commun	icate

Step	Direction						Message	Comment
	U s e r	U E A	I M S A	M G C F	P S T N	U s e r		
29A	A	$\rightarrow$				B		User A ends call
30A			$\rightarrow$				BYE	UE_A releases the call with BYE
31A				$\rightarrow$			BYE	IMS_A forwards BYE to MGCF
32A					$\rightarrow$		REL	MGCF sends REL to PSTN
33A				$\leftarrow$			RLC	PSTN sends response RLC to MGCF
34A						$\rightarrow$		User B is informed that call has ended
35A			←	-			200 OK	MGCF sends 200 OK response to IMS_A
36A		<b>←</b>					200 OK	IMS_A forwards the 200 OK response to UE_A
37A								User A is informed that call has ended

## 4.5.8.2.3 Unsuccessful Call, IMS user busy

Interoperability Test Description						
Identifier:	TD_IMS_PSTN_008					
Summary:	Incoming ca	all from PSTN, user A busy				
Configuration:	CF_PSTN					
SUT	IMS_A and	MGCF				
References	<b>Test Purpo</b>	se	Specification Reference			
	TP_IMS_M	GCF_01	TS 124 229 [1], clause 5.5.3.1.1			
	TP_IMS_M	GCF_10	TS 129 163 [18], clause 7.2.3.2.12			
Use Case ref.:	UC_21					
Pre-test conditions:	<ul><li>UE_A</li><li>UE_A</li><li>MGC</li></ul>	of IMS_A is configured accordin A has IP bearers established to i A is registered in IMS_A using an CF within the trust domain of IMS · A in IMS is busy	ts IMS networks as per clause 4.2.1 ny user identity			
Test Sequence:	Step					
rost ocquerice.		Jser B calls User A				
		/erify that user B is informed that	UF A is busy			
	_ v	only mat door b to informed that	. 02_/(10 000)			

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_MGCF_01 in CFW step 3 (INVITE):
		ensure that {
		when { IUT receives an initial IAM from PSTN }
		then { IUT sends a INVITE to IMS_A
		containing a Request_URI
		indicating Tel_URI_E.164_Number or (Sip_URI_E.164_Number with user_portion_phone)
		containing a Contact_header
		indicating anyvalue_GRUU_format and
		containing a Supported_header
		including an 100rel_value and
		containing a P-Asserted-Identity_header and
		containing a P-Charging-Vector_header
		indicating an icid-value_parameter and
		containing a SDP
		indicating codec_supported and curr_precondition
		}
		}
	2	TP_IMS_MGCF_10 in CFW step 11 (REL):
		ensure that {
		when { IUT receives a 486_response from IMS_A}
		then { IUT sends a REL with (cause17 or cause34) to PSTN
		}
		}



## 4.5.8.2.4 IMS user holds/resumes call

	Interoperability Test Description					
Identifier:	TD_IMS_PSTN_0009					
Summary:	Incoming call from PSTN, communication hold by IMS user					
Configuration:	CF_PSTN					
SUT	IMS_A and MGCF					
References	Test Pur	oose	Specification Reference			
	TP_IMS_	MGCF_11	TS 129 163 [18], clause 7.4.10.1			
	TP_IMS_	MGCF_12	TS 129 163 [18], clause 7.4.10.1			
Use Case ref.:	UC_21					
Pre-test	• HS	SS of IMS_A is configured according	ng to table 1			
conditions:			ts IMS networks as per clause 4.2.1			
		A is registered in IMS_A using a				
		GCF within the trust domain of IMS				
	• UE	_A configured to perform user init	iated hold/resume using INVITE			
			<u>.</u>			
Test Sequence:	Step					
-	1	User B calls User A				
	2	Verify that user A is informed of incoming call of User B				
	3	Verify that uUser B is informed that UE_A is ringing				
	4	User A answers the call				
	5	Verify that user A and B can communicate				
	6	User A puts connection to B on hold				
	7	Verify that user A and B cannot communicate				
	8	Iser A resumes connection to B				
	9		at user A and B can communicate			
	10	User A ends call				
	11	Verify that user B is informed that	t call has ended			
	12	Verify that user A is informed that				
Conformance	Check					
Criteria:	1	TP_IMS_MGCF_11 in CFW step	34 (CPG):			
		ensure that {				
		when { IUT receives an UPDAT				
		containing a S				
			sendonly from IMS_A }			
		then { IUT sends a CPG indicati	ng remote_hold to PSTN			
		}				
		}	12 (070)			
	2	TP_IMS_MGCF_12 in CFW step	40 (CPG):			
		ensure that {	F (			
		when { IUT receives an UPDAT	⊏ or a target_retresn INVITE			
		containing a S				
		then { IUT sends a CPG indicating s	rendrecv from IMS_A }			
		theri { for serius a CFG indicati	ng remote_retrieve to F311V			
		1				
		l f				

Step	Direction						Message	Comment
	U	U	ı	M	Р	U		
	s	Е	M	G	S	s		
	е	Α	S	С	Т	е		
	r		Α	F	N	r		
	A			<u> </u>		В		[-    C 04 (4.407)
00								Follow UC_21 (1 to 27)
28								User A and B can communicate
29								User A sets B on hold
30			$\rightarrow$				UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendonly)
								to IMS_A
31				$\rightarrow$			UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE
								(sendonly) to MGCF
32			$\leftarrow$	-			200 OK	MGCF replies 200 OK to IMS_A
33		$\leftarrow$					200 OK	IMS_A forwards 200 OK to UE_A
34					$\rightarrow$		CPG	MGCF sends CPG with remote HOLD
35								User A and B cannot communicate
36							UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendrecv)
			1					to IMS_A
37							UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE
								(sendrecv) to MGCF
38			$\leftarrow$				200 OK	MGCF replies 200 OK to IMS_A
39		$\leftarrow$			Î		200 OK	IMS_A forwards 200 OK to UE_A
40					$\rightarrow$		CPG	MGCF sends CPG with remote RETRIEVE
41								User A and B can communicate
42					$\leftarrow$			User A ends call
43								Continue UC_21 (29A to 37A)

#### 4.5.8.2.5 PSTN user holds/resumes call

	Intero	perability Test Description				
Identifier:	TD_IMS_PSTN_0010					
Summary:	Incoming call from PS	N, communication hold by PSTN user				
Configuration:	CF_PSTN					
SUT	IMS_A and MGCF					
References	Test Purpose	Specification Reference				
	TP_IMS_MGCF_13	TS 129 163 [18], clause 7.4.10.2				
	TP_IMS_MGCF_14	TS 129 163 [18], clause 7.4.10.2				
Use Case ref.:	UC_21					
Pre-test	<ul> <li>HSS of IMS_A</li> </ul>	s configured according to table 1				
conditions:	<ul> <li>UE_A has IP be</li> </ul>	earers established to its IMS networks as per clause 4.2.1				
	<ul> <li>UE_A is registe</li> </ul>	red in IMS_A using any user identity				
	<ul> <li>MGCF within th</li> </ul>	e trust domain of IMS_A				
Test Sequence:	Step					
rest ocquerice.	Step					
rest ocquence.	1 User B calls	User A				
rest ocquence.	1 User B calls 2 Verify that u	ser A is informed of incoming call of User B				
rest ocquence.	1 User B calls 2 Verify that u					
rest ocquence.	1 User B calls 2 Verify that u 3 Verify that u	ser A is informed of incoming call of User B				
rest ocquence.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing				
rest ocquence.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing vers the call ser A and B can communicate connection to A on hold				
rest ocquence.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing vers the call ser A and B can communicate				
rest ocquence.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts 7 Verify that u 8 User B resu	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing vers the call ser A and B can communicate connection to A on hold				
rest ocquemoc.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts 7 Verify that u 8 User B resu 9 Verify that u	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing wers the call ser A and B can communicate connection to A on hold ser A and B cannot communicate mes connection to A ser A and B can communicate				
rest ocquemoc.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts 7 Verify that u 8 User B resu 9 Verify that u 10 User A ends	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing wers the call ser A and B can communicate connection to A on hold ser A and B cannot communicate mes connection to A ser A and B can communicate ser A and B can communicate				
rest ocquemoc.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts 7 Verify that u 8 User B resu 9 Verify that u 10 User A ends 11 Verify that u	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing wers the call ser A and B can communicate connection to A on hold ser A and B cannot communicate mes connection to A ser A and B can communicate ser A and B can communicate ser A and B can communicate ser B is informed that call has ended				
rest dequence.	1 User B calls 2 Verify that u 3 Verify that u 4 User A answ 5 Verify that u 6 User B puts 7 Verify that u 8 User B resu 9 Verify that u 10 User A ends 11 Verify that u	ser A is informed of incoming call of User B ser B is informed that UE_A is ringing wers the call ser A and B can communicate connection to A on hold ser A and B cannot communicate mes connection to A ser A and B can communicate ser A and B can communicate				

	Interoperability Test Description						
Conformance	Check						
Criteria:	1	TP_IMS_MGCF_13 in CFW step 30 (UPDATE): ensure that {   when { IUT receives a CPG indicating remote_hold from PSTN }   then { IUT sends an UPDATE or a target_refresh INVITE					
	2	TP_IMS_MGCF_14 step 36 (CPG): ensure that {   when { IUT receives a CPG indicating remote_retrieve from PSTN }   then { IUT sends an UPDATE or a target_refresh INVITE					

Step			Dire	ection	1		Message	Comment
	U s e r A	U E A	M S A	M G C F	P S T N	U s e r B		
								Follow UC_21 (1 to 27)
28								User A and B can communicate
29								User B sets A on hold
30				<b>←</b>			CPG	MGCF receives CPG " remote HOLD"
31			$\leftarrow$				UPDATE/Re-INVITE	MGCF sends UPDATE/Re-INVITE (sendonly) to IMS_A
32		$\leftarrow$					UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendonly) to UE_A
33			$\rightarrow$				200 OK	UE_A replies 200 OK to IMS_A
34				$\rightarrow$			200 OK	IMS_A forwards 200 OK to MGCF
35								User A and B cannot communicate
36				<b>←</b>			CPG	MGCF receives CPG "remote RETRIEVE"
37			$\leftarrow$				UPDATE/Re-INVITE	MGCF sends UPDATE/Re-INVITE (sendrecv) to IMS_A
38		$\leftarrow$					UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendrecv) to UE_A
39			$\rightarrow$		·		200 OK	UE_A replies 200 OK to IMS_A
40				$\rightarrow$			200 OK	IMS_A forwards 200 OK to MGCF
41								User A and B can communicate
42					€			User A ends call
								Continue UC_21 (30A to 37A)

## History

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