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

#### Reference

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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)".

### Introduction

The IP Multimedia core network Subsystem (IMS) is a key component in the ETSI NGN architecture. Each IMS consists of multiple functional entities and interfaces. The goal of this work is to provide the interoperability tests for standardized network to network interfaces (NNI) of the IMS core network that are based on SIP messages.

Test purposes defined in the present document have been developed based on the requirements stated in the 3GPP IMS Release 9 specification.

### 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.

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### 2.1 Normative references

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

[1]	ETSI TS 124 229 (V9.5.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 9.5.0 Release 9)".
[2]	ETSI TS 186 011-1 (V4.1.1): "IMS Network Testing (INT); IMS NNI Interoperability Test Specifications; Part 1: Test Purposes for IMS NNI Interoperability".
[2]	ETICLES 100 251 NA 4 1 5 Ft ct 1 1 C TE ct (ATEC) 1 c 1 P ct 1 TE ct (ATEC)

- [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 9)".
- [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 9.5.0 Release 9)".
- [17] ETSI TS 102 901: "IMS Network Testing (INT); IMS NNI Interoperability Test Specifications; IMS NNI interoperability test descriptions for RCS".
- [18] ETSI TS 129 163 (V9.4.0): "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 9.4.0 Release 9)".

#### 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 7)".
- [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)".

[i.3] ETSI TR 184 008: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Infrastructure ENUM Options for a TISPAN IPX".
 [i.4] IETF RFC 3761: "The E.164 to Uniform Resource Identifiers (URI); Dynamic Delegation Discovery System (DDDS) Application (ENUM)".
 [i.5] GSMA PRD IR.67: "DNS/ENUM Guidelines for Service Providers & GRX/IPX Providers" ver.5.1.
 [i.6] IETF RFC 3403: "Dynamic Delegation Discovery System (DDDS), Part Three: The Domain

### 3 Abbreviations

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

Name System (DNS) Database".

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

GSM Global System for Mobile Communications

GSMA GSM Association 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 Message Transfer Part
NAPTR Naming Authority Pointer
NNI Network-to-Network Interface

N-PVR Network based Personal Video Recording

NS Name Server

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
PoI Point of Interconnection

PSTN Public Switched Telephone Network

SA Security Association S-CSCF Serving CSCF

SCTP Stream Control Transmission Protocol

SDP Session Description Protocol SIP Session Initiation Protocol SGF Signalling Gateway Function

SUT System Under Test

TCP Transmission Control Protocol

TD Test Description

TISPAN Telecommunications and Internet converged Services and Protocols for Advanced Networking

TN Telephone Number 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 eXtensible 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] but do not exclude the use of IPv6 in the case that all involved IMS nodes support this version of the IP protocol.

### 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	Managa	Comment	
Step	UE IMS Wessage		Message	Comment	
1				The UE establishes an IP bearer as required by its	
				specific access network (optional).	
2	$\leftarrow \rightarrow$			P-CSCF address discovery using DHCP	
				procedures for IPv4 (optional).	
3	$\rightarrow$		REGISTER	The UE sends initial registration for IMS services.	
4	+		200 OK	The IMS responds with 200 OK.	
5	→ S		SUBSCRIBE	The UE subscribes to its registration event	7, 1
				package.	ţe.
6	← 200 OK or 202 Accepted		200 OK or 202 Accepted	The IMS responds with 200 OK or 202 Accepted.	Unprotected
7	← NOTIFY		NOTIFY	The IMS sends initial NOTIFY for registration event	100
				package, containing full registration state	Ju
				information for the registered public user identity in	
				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 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).	
3	$\rightarrow$	REGISTER	The UE sends initial registration for IMS services.	-
4	<b>←</b>	401 Unauthorized	The IMS responds with a valid Digest AKA authentication challenge and a list of integrity and encryption algorithms supported by the network as defined in the IMS AKA procedure of TS 133 203 [7].	Unprotected
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	<b>→</b>	REGISTER	The UE sends another REGISTER with authentication credentials over IPSEC security association SA1.	by SA1
7	+	200 OK	The IMS responds with 200 OK over the same IPSEC security association SA1.	Protected by SA1
8	<b>→</b>	SUBSCRIBE	The UE subscribes to its registration event package over the IPSEC security association SA2.	Protect ed by
9	<b>←</b>	200 OK or 202 Accepted	The IMS responds with 200 OK or 202 Accepted over the IPSEC security association SA2.	Pro

Step	Direction	Message	Comment	
Step	UE IMS	Wiessage	Comment	
10	<b>←</b>		The IMS sends initial NOTIFY for registration event package, containing full registration state information for the registered public user identity in the XML body, over the IPSEC security association SA2.	
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).	
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.	tec
7	$\rightarrow$	SUBSCRIBE	The UE subscribes to its registration event package.	S.C
8	← 200 OK or 202 Accepted		The IMS responds with 200 OK or 202 Accepted.	Ju
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.

#### 4.2.5 Number Resolution

"ENUM (RFC 3761 [i.4]) is a capability that transforms E.164 numbers into domain names and then uses the DNS (Domain Name System) to discover NAPTR records that specify the services available for a specific domain name." (TS 184 008 [i.3]).

The test infrastructure focuses on the use of Infrastructure ENUM to map a telephone number into a SIP URI that could identify a specific point of interconnection (PoI) to that communication provider's network that could enable the originating party to establish communication with the associated terminating party either directly or through an IPX.

The Infrastructure ENUM platform has a tiered structure and provides authoritative, service specific information to the quering party. A combination of Tier 0, Tier 1 and Tier 2 registries enables global discovery of ENUM data.

When returning the SIP URI of an PoI the ENUM solution acts a hosted T2 ENUM registry for the number range holder. When returning a NS record the ENUM solution acts as either a Tier 0 or Tier 1 registry.

#### 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.

Table 1: HSS sample user profiles

Private Identity	Public Identity 1 (SIP URI)	Public Identity 2 (Tel URI)	Default Public Identity	Filter criteria
userGEN_priv	userGEN	na	1	na
userSIP_priv	userSIP	e.g. tel:+330123402	1	na
userTEL_priv	userTEL	e.g. tel:+330123403	2	na
userNOAS_priv	userNOAS	na	1	contact AS on terminating INVITE SESSION_TERMINATED
userHOLD_priv	userHOLD	na	1	contact HOLD AS
userOIP_priv	userOIP	na	1	contact OIP AS
userOIR_priv	userOIR	na	1	contact OIR AS
userACR_priv	userACR	na	1	contact ACR AS
userCFU_priv	userCFU	na	1	contact CFU AS
userIPTV_priv	userIPTV	na	1	Contact IPTV AS

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

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: 293410100367663@ims.041mnc.293.mcc.3gppnetwork.org.

#### 4.3.1.6 MRFC

#### 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 H.248 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 Media Gateway across an H.248 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 codecs 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 Stream Control Transmission Protocol (SCTP) into Message Transfer Part (MTP) protocol), to pass ISDN User Part (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.

#### 4.3.3.2 ENUM

When testing a combination of local and external registries can be used to simulate all functions of the Tier 0, Tier 1 and Tier 2 registries operation plus all national and international interconnect scenarios. It is assumed that each IMS core may access a local ENUM solution and an external ENUM solution with query capabilities or a combination of local and external solutions to allow retrieval of ENUM data.

#### 4.3.3.2.1 Local ENUM Solution

Each IMS may access a local ENUM solution with query capabilities which allows retrieval of authoritative stored ENUM data (usually Tier 2 data) or authoritative cached ENUM data (any Tier).

#### 4.3.3.2.2 Common ENUM Solution

An external ENUM registry is provided by the GSMA PRD IR.67 [i.5] to simulate a Tier 0 global root, national Tier 1 registries and off board Tier 2 registries. Depending on the scenario in simulation the registry allows to resolve a TN either directly with the SIP URI of the appropriate interconnection point or indirectly with a NS record of the destination operator. The NS record can then be used by the local ENUM solution to obtain a SIP URI. The test participants select the required features in order to implement particular simulation scenarios.

For the test participants the registry offers:

- an interface to manage user accounts;
- a provisioning interface for entering relevant information (E.164 number, SIP URI or NS record etc.) into the database; and
- a query interface accepting NAPTR queries and responding with NAPTR responses. As an example, the ENUM service should have an entry to map E.164 number (e.g. +33633348273) to the SIP URI of userSIP. Alternatively the response can also contain a NS record.

#### 4.3.3.2.3 Node Configuration

The common ENUM solution should be configured to support a proper resolution of E.164 TNs into SIP URIs as defined in GSMA PRD IR.67 [i.5], clause 5.44 with reference to RFC 3761 [i.4] and RFC 3403 [i.6].

### 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 **IMS A IMSB** FNUM HSS HSS DB Gm Мх c Mx P-CSCF S-CSCF **IBCF A** PCO РΟ РΟ РО I-CSCF

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, a common interconnect ENUM DB and local ENUM is involved, IBCF is involved but no topology hiding performed.

Test configuration for:

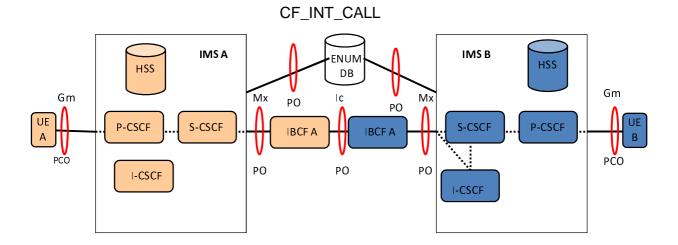
Registration requests and responses from UE B

Example:

REGISTER prior to IMS VoIP voice call from UE\_B

Figure 1: CF\_ROAM\_REG

#### Interworking Call



#### Precondition:

Different network operators performing origination and termination, both Ues or only UE\_A in home networks (INT), both Ues registered, no AS, a common interconnect ENUM DB and local ENUM is 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 initiall requests and responses from UE\_A (when UE\_B is nor registered)

#### Example:

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

Figure 2: CF\_INT\_CALL

#### Roaming Call

#### CF\_ROAM\_CALL IMS A IMS B Gm ENUM UE HSS DΒ Мx Мx PCO P-CSCF S-CSCF S-CSCF P-CSCF Gm PΟ РΟ PΟ **I-CSCF** I-CSCF

#### 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, a common interconnect ENUM DB and local ENUM is involved, IBCF is involved, topology hiding may apply.

#### Test configuration for:

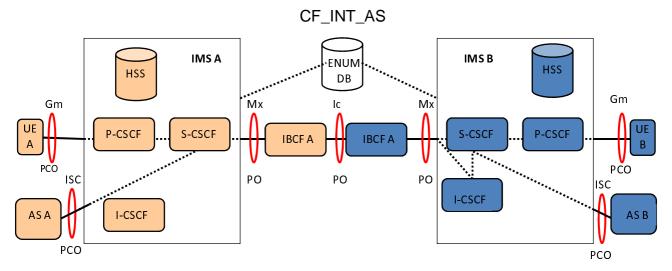
Requests and responses between UE\_B and UE\_A in call (CALL) and messaging scenarios

#### Example:

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

Figure 3: CF\_ROAM\_CALL

### Interworking Application Server



#### 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), a common interconnect ENUM DB and local ENUM is involved, IBCF is involved, topology hiding may apply.

#### Test configuration for:

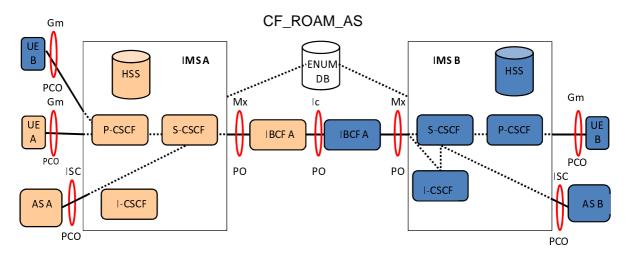
Requests and responses between ASes and UEs

#### 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

### Roaming Application Server



#### Precondition:

Different network operators performing origination and termination, UE\_B roaming (ROAM) via IMS\_A, UE\_A in home network, both Ues are registered, AS for UE\_A and UE\_B may be involved (AS), a common interconnect ENUM DB and local ENUM is involved, IBCF is involved, topology hiding may apply.

#### Test configuration for:

Requests and responses between AS\_B and UEs

#### Example:

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

Figure 5: CF\_ROAM\_AS

### Interworking Conference Server

#### CF\_INT\_CONF\_AS IMS A **IMSB** ENUM HSS HSS DB Gm Gm **I-CSCF** S-CSCF P-CSCF Mw PCO PCO S-CSCF ISC I-CSCF PΟ Conf **MRFP MRFC** AS A **MRFP** Mb

#### Precondition:

PCO

Different network operators performing origination and termination, both Ues or only UE\_A in home networks (INT), both UEs registered, CONF AS is involved in IMS\_A, a common interconnect ENUM DB and local ENUM is involved, IMS\_A and IMS\_B both include MRFC and MRFP

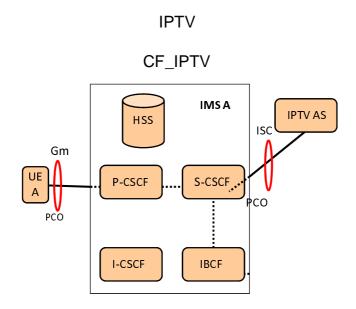
Test configuration for:

Requests and responses between UE\_A and UE\_B in an Ad-hoc Conference call (CONF\_CALL)

Example:

Initial INVITE 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 involved

Test configuration for:

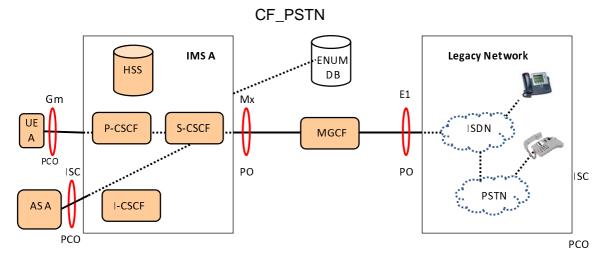
Requests and responses between UE\_A and IPTV AS

Example:

Initial INVITE from UE\_A to initiate an IPTV Broadcast session

Figure 7: CF\_IPTV

#### **PSTN** Interworking



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), a common interconnect ENUM DB and local ENUM is involved, IBCF is involved, topology hiding may apply.

Test configuration for:

Requests and responses between ASes and UEs

Example:

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

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 46

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

The expected call flow sequence is:

Step			Dir	ection			Message	Comment
	U	U	I	I	I	I		
	s	E	M	В	В	M		
	e r	В	S	C F	C F	S		
	В		^	A	В			
1		$\rightarrow$						User B triggers registration to IMS B
2		_	$\rightarrow$				REGISTER	UE_B sends a REGISTER to IMS_A
3			-	$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF_A
4					$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF_B
5						$\longrightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS_B
6					←		401 Unauthorized	IMS_B responds with 401 Unauthorized to IBCF_B
7				←			401 Unauthorized	IBCF_B forwards the 401 Unauthorized to IBCF_A
8			+				401 Unauthorized	IBCF_A forwards the 401 Unauthorized to IMS_A
9		$\leftarrow$					401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
10							REGISTER	UE_B sends the same REGISTER containing
							DECICTED	authentication challenge response to IMS_A
11				$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF A
12 13					_		REGISTER REGISTER	IBCF_A forwards the REGISTER to IBCF B IBCF_B forwards the REGISTER to IMS B
14					_		200 OK	IMS_B responds with 200 OK
15							200 OK	IBCF_B forwards the 200 OK response to
				$\leftarrow$				IBCF_A
16			<b>+</b>				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					←		200 OK or 202 Accepted	IMS_B responds with a 200 OK or 202 Accepted
22							200 OK	IBCF_B forwards 200 OK or 202 Accepted to
				$\leftarrow$			or 202 Accepted	IBCF_A
23			<del>(</del>				200 OK or 202 Accepted	IBCF_A forwards 200 OK or 202 Accepted to IMS_A
24					$\leftarrow$		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status
25				<u></u>			NOTIFY	IBCF_B forwards NOTIFY to IBCF_A
26			+				NOTIFY	IBCF_A forwards NOTIFY to IMS_A
27			F	$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
28					$\rightarrow$		200 OK	IBCF_A forwards 200 OK response to IBCF_B
39						$\longrightarrow$	200 OK	IBCF_B forwards 200 OK response to IMS_B
30		_	$\longrightarrow$				SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event 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						$\longrightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE request to IMS_B
34					$\leftarrow$		200 OK or 202 Accepted	IMS_B responds with 200 OK or 202 Accepted
35				<b>(</b>			200 OK or 202 Accepted	IBCF_B forwards the 200 OK or 202 Accepted response to IBCF_A
36			<b>+</b>				200 OK or 202 Accepted	IBCF_A forwards the 200 OK or 202 Accepted response to IMS_A
37							200 OK or	IMS_A forwards the 200 OK or 202 Accepted
		$\leftarrow$					202 Accepted	response to 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		
38					←		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE B's registration status
39				$\leftarrow$			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
40			←				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
41		$\leftarrow$	$\leftarrow$				NOTIFY	IMS_A forwards the NOTIFY to UE_B
42		<del>`</del>					200 OK	UE_B responds to the NOTIFY with a 200 OK
43		<b>├</b> ── <b>├</b>					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						$\longrightarrow$	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).

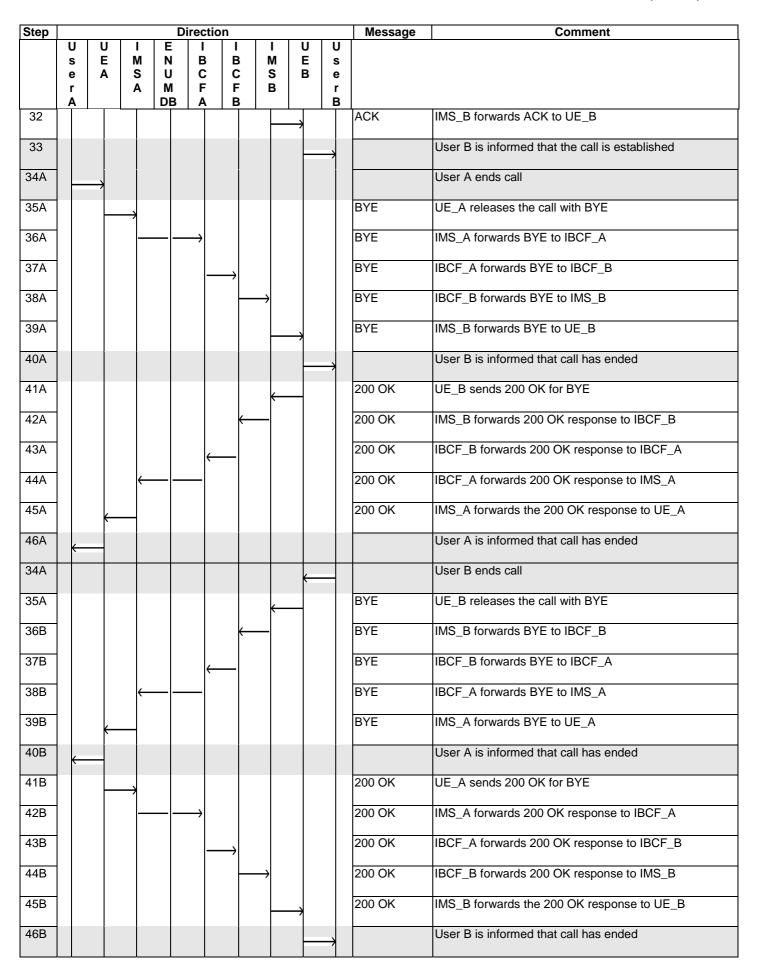
### 4.4.2.1.2 UC\_02\_I: SIP Call Flow "Normal Call" with CF\_INT\_CALL

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 14
3	User A is informed that UE_B is ringing	Step 20
4	User B answers call	Step 21
5	User A is informed that call has been answered	Step 27
6	User B is informed that the call is established	Step 33
7A	User A ends call	Step 34A
7B	User B ends call	Step 34B
8A	User B is informed that call has ended	Step 40A
8B	User A is informed that call has ended	Step 40B
9A	User A is informed that call has ended	Step 46A
9B	User B is informed that call has ended	Step 46B

Step				D	irectio	n				Message	Comment
	C	U	ı	Ε	I	ı	ı	U	U		
	s	Ę	M	N	В	В	M	E	s		
	е	Α	S	U	C	C	S	В	е		
	r A		Α	M DB	F	В	В		r B		
1				100	1	1					User A calls User B
		$\rightarrow$									User A cans User D
2										INVITE	UE_A sends INVITE with the first SDP offer indicating
			1								all desired medias and codecs that UE_A supports
3										100 Trying	IMS_A responds with a 100 Trying provisional
											response

Step				Direc	tion					Message	Comment
	U s	U E I	I E		2	I 3	I M	πС	U s		
	e	Α :	s U	C	;   (	2	S	В	e		
	r A	4	A M DE			F 3	В		r B		
4			$ \longrightarrow $						Ī	ENUM	IMS A sends query to ENUM DB
5			<del></del>							ENUM	ENUM DB sends response to IMS A
6				$\longrightarrow$						INVITE	IMS_A forwards INVITE to IBCF_A
7			<u> </u>							100 Trying	IBCF_A responds with a 100 Trying provisional response
8					$\longrightarrow$	,				INVITE	IBCF_A forwards INVITE to IBCF_B
9					←—	-				100 Trying	IBCF_B responds with a 100 Trying provisional response
10							>			INVITE	IBCF_B forwards INVITE to IMS_B
11						<b>-</b>	-			100 Trying	IMS_B responds with a 100 Trying provisional response
12								$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
13							$\leftarrow$			100 Trying	UE_B optionally responds with a 100 Trying provisional response
14									$\rightarrow$		User B is informed of incoming call of User A
15							$\leftarrow$			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16						$\leftarrow$	-			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
17					<del></del>	-				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
18			<del></del>							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
19		<b></b>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
20	<b>←</b>										User A is informed that UE_B is ringing
21								<b>—</b>			User B answers call
22							$\leftarrow$			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
23						<b>—</b>	-			200 OK	IMS_B forwards 200 OK response to IBCF_B
24					<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
25			<del>  </del>							200 OK	IBCF_A forwards 200 OK response to IMS_A
26		<del></del>								200 OK	IMS_A forwards 200 OK response to UE_A
27	<b>-</b>										User A is informed that call has been answered
28										ACK	UE_A acknowledges the receipt of 200 OK for INVITE
29				$\longrightarrow$						ACK	IMS_A forwards ACK to IBCF_A
30					$\longrightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
31						-	<del>)</del>			ACK	IBCF_B forwards ACK to IMS_B



### 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				Di	rectio	n				Message	Comment
	ū	U	I	E	- n	I	I	U E	U		
	s e	E A	M S	N	B	B	M S	В	s e		
	r		Α	M	F	F	В		r		
1	A 	$\rightarrow$		DB	A	В			В		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				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$							ENUM	ENUM DB sends response to IMS A
6					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>	_				100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11						$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
12						$\leftarrow$	_			INVITE	IMS_B forwards INVITE to IBCF_B
13							$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
14					$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
15						$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
16			$\leftarrow$		_					INVITE	IBCF_A forwards INVITE to IMS_A
17					$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
18								$\rightarrow$		INVITE	IMS_A forwards INVITE to UE_B
19			<b>←</b>					+		100 Trying	UE_B optionally responds with a 100 Trying provisional response
20									$\rightarrow$		User B is informed of incoming call of User A
21			$\leftarrow$					$\dashv$		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
22					$\rightarrow$					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
23						$\rightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
24						-	$\rightarrow$			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
25						<b>←</b>	$\dashv$			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
26					$\leftarrow$	-				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A

1	Step					Direc	ction					Message	Comment
Part							I B	I B	I M				
Name		е		S	U	(	C	С	S		е		
MINS A   180 Ringing   MINS A   180 Ringing response to   UE_A   User A is informed that UE_A is ringing   User B answers call   USER A   User A is informed that UE_A is ringing   User B answers call   USER B responds INVITE with 200 OK to indicate that the call has been answered   200 OK   MINS_A forwards 200 OK response to IBCF_A   200 OK   MINS_A forwards 200 OK response to IBCF_B   200 OK   MINS_B forwards 200 OK response to IBCF_B   200 OK   MINS_B forwards 200 OK response to IBCF_B   200 OK   MINS_B forwards 200 OK response to IBCF_B   200 OK   MINS_A forwards 200 OK response to IBCF_B   200 OK   MINS_A forwards 200 OK response to IBCF_A   200 OK   MINS_A forwards 200 OK response to IBCF_B   200 OK   MINS_A forwards 200 OK response to IBCF_A   200 OK   MINS_A forwards 200 OK response to IBCF_A   200 OK   MINS_A forwards 200 OK response to IBCF_A   200 OK   MINS_A forwards ACK to IBCF_B   ACK   MINS_B forwards ACK to IBCF_B   ACK   MINS_B forwards ACK to IBCF_B   ACK   MINS_B forwards ACK to IBCF_B   ACK   MINS_A forwards ACK to IBCF_B		-							В	<u>.</u>			
UE_A   User A is informed that UE_A is ringing	27			•	<u> </u>							180 Ringing	
User B answers call	28			(								180 Ringing	
200 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered 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_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 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 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	29	ŧ											User A is informed that UE_A is ringing
that the call has been answered 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_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 UB_A 200 OK IBCF_A forwards 200 OK response to UB_A 200 OK IBCF_A forwards 200 OK response to UB_A 200 OK IBCF_A forwards 200 OK response to UB_A 200 OK IBCF_B forwards 200 OK response to UB_A 200 OK IBCF_B forwards 200 OK response to UB_A 200 OK IBCF_B forwards 200 OK response to IBCF_B ACK IBCF_B forwards 200 OK response to IBCF_B BYE IBCF_B forwards 200 OK response to IBCF_B B	30									<b>←</b>			User B answers call
32   33   34   35   36   37   38   36   36   37   38   39   39   39   39   39   30   39   30   39   30   30	31				<u>.                                    </u>			_	+	Ŧ		200 OK	
200 OK   IBCF_B forwards 200 OK response to IMS_B	32					<del></del>	,					200 OK	
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 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 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 200 OK response to UE_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 IBCF_A forwards 200 OK response to IBCF_A 38 49 40 41 42 42 43 44 45 46 46 47 48 48 49 49 49 49 49 49 49 49 49 40 40 41 41 42 42 43 44 45 46 46 47 48 48 49 49 49 49 49 49 40 40 40 41 41 42 42 40 41 42 42 43 44 45 46 46 47 48 48 49 49 49 49 40 40 40 40 41 41 42 42 40 40 40 40 40 40 40 40 40 40 40 40 40	33							<b>→</b>				200 OK	IBCF_A 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 IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to UE_A  User A is presented that call in process  ACK UE_A acknowledges the receipt of 200 OK for INVITE ACK IMS_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B  IBCF_B forwards ACK to IBCF_A BCK IMS_A forwards ACK to IBCF_B BCK IMS_A forwards ACK to IBCF_B BCK IMS_A forwards ACK to UE_B BCK IMS_A forwards ACK to UE_B BCK IMS_A forwards ACK to IBCF_A BCK IMS_A forwards ACK to UE_B BCK IMS_A forwards ACK to IBCF_A BCK IMS_A forwards ACK to IBCF_B BCF_B forwards ACK to IBCF_B	34								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
200 OK IBCF_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to UE_A 200 OK IMS_A forwards 200 OK response to UE_A  User A is presented that call in process  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_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  BCK IBCF_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_A  BCK IBCF_A forwards ACK to IBCF_A  BCK IBCF_A forwards ACK to IBCF_A  BCK IBCF_A forwards BCK to IBCF_A  BCK IBCF_B forwards BCK to IBCF_A  BCK IBCF_B forwards BCK to IBCF_B  BCK IBCF_B forwards BCK to IBCF_B FORWARDS  BCK IBCF_B forwards BC	35							<u></u>	4			200 OK	IMS_B forwards 200 OK response to IBCF_B
200 OK IMS_A forwards 200 OK response to UE_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is presented that call in process  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 IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_A  BCF_B forwards ACK to UE_B  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  BYE IBCF_B forwards BYE to IBCF_B	36						<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
User A is presented that call in process  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 IBCF_A  ACK IBCF_B forwards ACK to IBCF_A  BCK IBCF_A forwards ACK to IBCF_A  BCK IBCF_A forwards ACK to IBCF_A  BCK IBCF_A forwards BCF to IBCF_A  BYE IBCF_A forwards BYE to IBCF_A  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IBCF_B	37											200 OK	IBCF_A forwards 200 OK response to IMS_A
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 IBCF_B  ACK IBCF_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 IBCF_A  ACK IBCF_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to UE_B  User B is informed that the call is in progress  User A ends call  BYE UE_A releases the call with BYE  BYE IBCF_A forwards BYE to IBCF_A  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IBCF_B	38			<del>(                                    </del>								200 OK	IMS_A forwards 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 IBCF_B   ACK   IBCF_B forwards ACK to IBCF_B   ACK   IBCF_B forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IMS_A   ACK   IBCF_A forwards ACK to IMS_A   ACK   IMS_A forwards ACK to UE_B   User B is informed that the call is in progress   User A ends call   BYE   UE_A releases the call with BYE   BYE   IBCF_A forwards BYE to IBCF_B   BYE   IBCF_A forwards BYE to IBCF_B   BYE   IBCF_B forwards BYE to IMS_B   BYE   IBCF_B forwards BYE to IMS_B	39	+											User A is presented that call in process
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 IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_A  ACK IBCF_B forwards ACK to IBCF_A  BYE 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  BYE IBCF_B forwards BYE to IBCF_B	40			$\longrightarrow$								ACK	
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_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_B  User B is informed that the call is in progress  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  BYE IBCF_B forwards BYE to IBCF_B	41			•		$\longrightarrow$	,					ACK	IMS_A forwards ACK to IBCF_A
44 45 46 47 48 49A 50A 50A 51A 52A 53A  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 UE_B User B is informed that the call is in progress User A ends call BYE UE_A releases the call with BYE BYE IBCF_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B	42							$\rightarrow$				ACK	IBCF_A 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 UE_B  User B is informed that the call is in progress  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  BYE IBCF_B forwards BYE to IMS_B	43								$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
46 47 48 48 49A 50A 51A 52A 53A  ACK IBCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to UE_B User B is informed that the call is in progress User A ends call BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_A BYE IBCF_B forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B	44							<b>—</b>	4			ACK	IMS_B forwards ACK to IBCF_B
ACK IMS_A forwards ACK to UE_B  User B is informed that the call is in progress  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  BYE IBCF_B forwards BYE to IMS_B	45						<del></del>					ACK	IBCF_B forwards ACK to IBCF_A
48 49A 50A 51A 52A 53A User B is informed that the call is in progress User A ends call BYE UE_A releases the call with BYE BYE IMS_A forwards BYE to IBCF_A BYE IBCF_B forwards BYE to IMS_B	46											ACK	IBCF_A forwards ACK to IMS_A
49A  50A  51A  52A  53A  User A ends call  User A ends call  UE_A releases the call with BYE  BYE  IMS_A forwards BYE to IBCF_A  BYE  IBCF_A forwards BYE to IBCF_B  BYE  IBCF_B forwards BYE to IMS_B	47									<del>)</del>		ACK	IMS_A forwards ACK to UE_B
50A  51A  52A  53A  BYE  UE_A releases the call with BYE  BYE  IMS_A forwards BYE to IBCF_A  BYE  IBCF_A forwards BYE to IBCF_B  BYE  IBCF_B forwards BYE to IMS_B	48										$\rightarrow$		User B is informed that the call is in progress
51A  52A  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IMS_B	49A		$\longrightarrow$										User A ends call
52A  BYE IBCF_A forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IMS_B	50A											BYE	UE_A releases the call with BYE
53A BYE IBCF_B forwards BYE to IMS_B	51A					$\longrightarrow$	,					BYE	IMS_A forwards BYE to IBCF_A
	52A							$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
54A BYE IMS_B forwards BYE to IBCF_B	53A								$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
	54A							<b>—</b>	4			BYE	IMS_B forwards BYE to IBCF_B

Step					Dir	ectio	า				Message	Comment
	U s	U			E N	I B	I B	I M	U E	U s		
	e r	Ā		s l	Ŭ M	C F	C F	S	В	е		
	À		Ľ		B	A	В			r B		
55A						$\leftarrow$	_				BYE	IBCF_B forwards BYE to IBCF_A
56A				←—							BYE	IBCF_A forwards BYE to IMS_A
57A					-				$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
58A										$\rightarrow$		User B is informed that call has ended
59A				$\leftarrow$					-		200 OK	UE_B sends 200 OK for BYE
60A					-	→					200 OK	IMS_A forwards 200 OK response to IBCF_A
61A							$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
62A								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
63A							<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
64A						$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
65A				←—		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
66A		+									200 OK	IMS_A forwards the 200 OK response to UE_A
67A	<b>←</b>											User A is informed that call has ended
49B		$\rightarrow$										User A ends call
50B		-	$\longrightarrow$								BYE	UE_A releases the call with BYE
51B					-	$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
52B							$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
53B								$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
54B							<b>—</b>				BYE	IMS_B forwards BYE to IBCF_B
55B						$\leftarrow$	_				BYE	IBCF_B forwards BYE to IBCF_A
56B				$\leftarrow$	-	_					BYE	IBCF_A forwards BYE to IMS_A
57B					-	_			$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
58B										$\rightarrow$		User B is informed that call has ended
59B				$\leftarrow$							200 OK	UE_B sends 200 OK for BYE
60B					-	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
61B							$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
62B								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
63B							$\leftarrow$	_			200 OK	IMS_B forwards 200 OK response to IBCF_B

Step				Di	rectio	n				Message	Comment
	C	C		Е	ı	-	ı	C	U		
	s	Е	M	N	В	В	M	Ε	S		
	е	Α	S	U	С	С	S	В	е		
	r		Α	М	F	F	В		r		
	Α			DB	Α	В			В		
64B					$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
65B			$\leftarrow$		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
66B		←	4							200 OK	IMS_A forwards the 200 OK response to UE_A
67B	<b>—</b>										User A is informed that call has ended

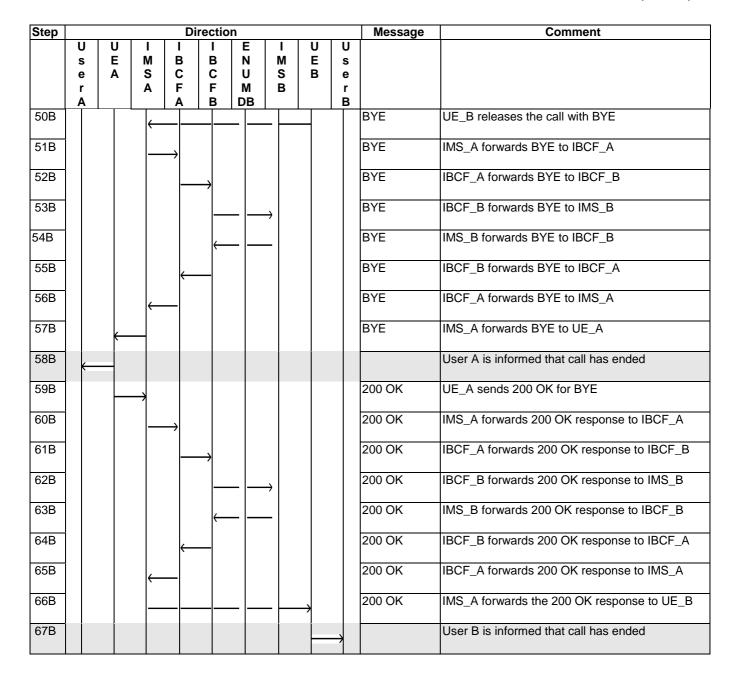
The test sequence and expected call flow sequence when user B calls user A in a roaming scenario is:

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 20
3	User B is informed that UE_A is ringing	Step 29
4	User A answers call	Step 30
5	User B is informed that call has been answered	Step 39
6	User A is informed that the call is established	Step 48
7A	User A ends call	Step 49A
7B	User B ends call	Step 49B
8A	User B is informed that call has ended	Step 58A
8B	User A is informed that call has ended	Step 58B
9A	User A is informed that call has ended	Step 67A
9B	User B is informed that call has ended	Step 67B

Step				Di	rectio	n				Message	Comment
	U s e r A	U E A	I M S A	I B C F A	I B C F B	E N U M DB	I M S B	U E B	U s e r B		
1								<u></u>			User B calls User A
2			←			_ _	_			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				$\leftarrow$						100 Trying	IBCF_B responds with a 100 Trying provisional response
8					<b>←</b>	_	-			INVITE	IBCF_B forwards INVITE to IMS_B
9						_	$\rightarrow$			100 Trying	IMS_B responds with a 100 Trying provisional response
10						$\leftarrow$	-			ENUM	IMS B sends query to ENUM DB
11							$\rightarrow$			ENUM	ENUM DB sends response to IMS B
12					<b>←</b>	_	-			INVITE	IMS_B forwards INVITE to IBCF_B

Step					Di	irect						Message	Comment
	U s	L		I M	I B	l B		1	I M	U E	U		
	е	7		S	С	С	U	J	S	В	е		
	r A			Α	F A	F B	D	/I B	В		r B		
13			L									100 Trying	IBCF_B responds with a 100 Trying provisional response
14					$\leftarrow$							INVITE	IBCF_B forwards INVITE to IBCF_A
15						$\rightarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
16				$\leftarrow$	_							INVITE	IBCF_A forwards INVITE to IMS_A
17					$\rightarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
18			<del></del>									INVITE	IMS_A forwards INVITE to UE_A
19				<del>)</del>								100 Trying	UE_A optionally responds with a 100 Trying provisional response
20	$\leftarrow$												User A is informed of incoming call of User B
21				>								180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started alerting
22					$\rightarrow$							180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
23						$\rightarrow$						180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
24						-		$\longrightarrow$				180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
25						+						180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
26					$\leftarrow$							180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
27				<b>←</b>	_							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
28					_					<del>)</del>		180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
29										F	$\rightarrow$		User B is informed that UE_A is ringing
30	H	$\longrightarrow$											User A answers call
31				<b>→</b>								200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
32					$\rightarrow$							200 OK	IMS_A forwards 200 OK response to IBCF_A
33						$\rightarrow$						200 OK	IBCF_A forwards 200 OK response to IBCF_B
34						-		$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
35						+						200 OK	IMS_B forwards 200 OK response to IBCF_B
36					$\leftarrow$							200 OK	IBCF_B forwards 200 OK response to IBCF_A
37				<b>←</b>	_							200 OK	IBCF_A forwards 200 OK response to IMS_A
38					_ _					<del>)</del>		200 OK	IMS_A forwards 200 OK response to UE_B
39										H	$\rightarrow$		User B is presented that call in process
40				<b>←</b>								ACK	UE_B acknowledges the receipt of 200 OK for INVITE

Step			_	Dir	ectio		•			Message	Comment
		U E	I M	I B	I B	EN	I M	U E	U s		
	е	Ā	S	С	С	U	S	В	е		
	r A			F A	F B	M DB	В		r B		
41			<del></del>	•						ACK	IMS_A forwards ACK to IBCF_A
42					$\rightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
43						_	$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
44					$\leftarrow$	_	_			ACK	IMS_B forwards ACK to IBCF_B
45				$\leftarrow$						ACK	IBCF_B forwards ACK to IBCF_A
46			<del></del>	-						ACK	IBCF_A forwards ACK to IMS_A
47		<b>—</b>	-							ACK	IMS_A forwards ACK to UE_A
48	<b>—</b>										User A is informed that the call is in progress
49A		>									User A ends call
50A			*							BYE	UE_A releases the call with BYE
51A				<b>&gt;</b>						BYE	IMS_A forwards BYE to IBCF_A
52A					$\rightarrow$					BYE	IBCF_A forwards BYE to IBCF_B
53A						_	$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
54A					$\leftarrow$	_	_			BYE	IMS_B forwards BYE to IBCF_B
55A				$\leftarrow$						BYE	IBCF_B forwards BYE to IBCF_A
56A			<del></del>	-						BYE	IBCF_A forwards BYE to IMS_A
57A						_	_	$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
58A								$\vdash$	$\rightarrow$		User B is informed that call has ended
59A			<del></del>				_			200 OK	UE_B sends 200 OK for BYE
60A				•						200 OK	IMS_A forwards 200 OK response to IBCF_A
61A					$\rightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
62A						_	$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
63A					$\leftarrow$	_	_			200 OK	IMS_B forwards 200 OK response to IBCF_B
64A				<del></del>						200 OK	IBCF_B forwards 200 OK response to IBCF_A
65A			<del></del>	-						200 OK	IBCF_A forwards 200 OK response to IMS_A
66A		<b>—</b>	-							200 OK	IMS_A forwards the 200 OK response to UE_A
67A	<b>—</b>										User A is informed that call has ended
49B								(			User B ends call



### 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

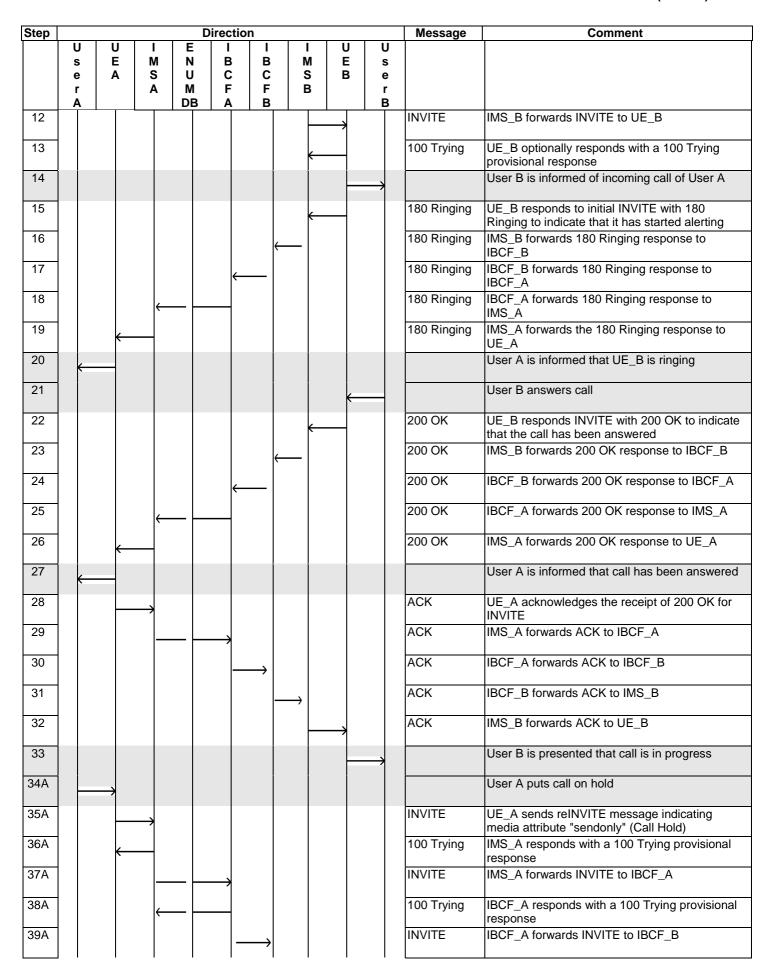
The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

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	14	20
3	User A is informed that UE_B is ringing	20	29
4	User B answers call	21	30
5	User A is informed that call has been answered	23	39
6	User B is presented that call is established	33	48
7A	User A puts call on hold	34A	49A
7B	User B puts call on hold	34B	49B
8A	User B is informed that call on hold	51A	66A
8B	User A is informed that call on hold	51B	66B
9A	User A resumes call	57A	84A
9B	User B resumes call	57B	84B
10A	User B is informed that call is resumed	68A	101A
10B	User A is informed that call is resumed	68B	101B
11A	User A is informed that call is resumed	74A	110A
11B	User B is informed that call is resumed	74B	110B
12	User A ends call	75	111
13	User B is informed that call has ended	81	119
14	User A is informed that call has ended	87	129

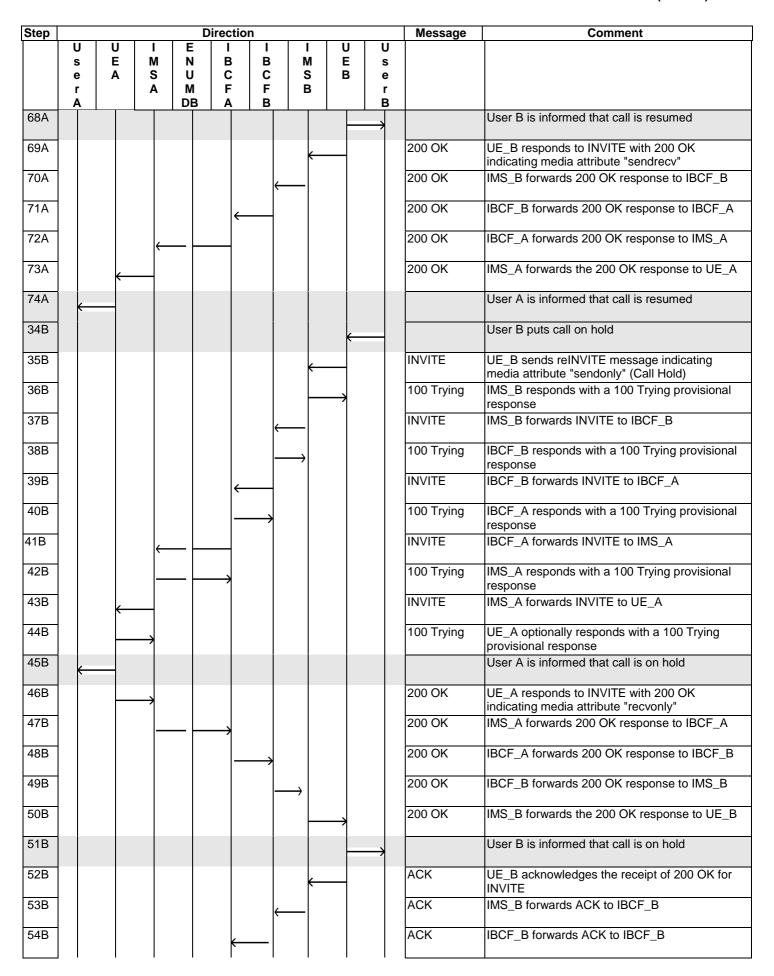
# 4.4.3.1.2 UC\_03\_I: SIP Call Flow "call hold and resume" using reINVITE with CF\_INT\_CALL

The expected call flow sequence is:

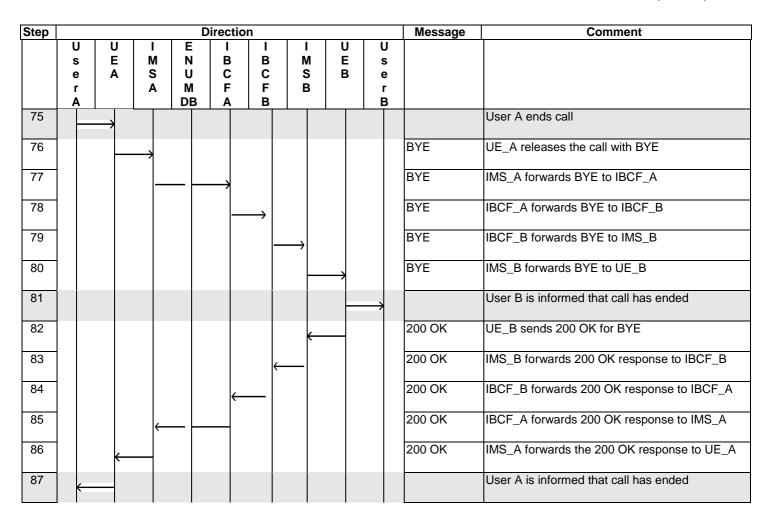
Step	p Direction										Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	I M S B	U E B	U s e r B	Message	
1		<b>—</b>									User A calls User B
2			$\rightarrow$							INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that
3		<b>←</b>								100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



Step				D	irectio	n				Message	Comment
	U s	U E	I M	E N	I B	I B	I M	U			
	е	Ā	S	Ü	C	C	S	В	е		
	r A		^	DB	A	В			r B		
40A					←					100 Trying	IBCF_A responds with a 100 Trying provisional response
41A						-	$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
42A						•	<del></del>			100 Trying	IMS_B responds with a 100 Trying provisional response
43A								$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
44A							<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
45A								-	<b></b>		User B is informed that call is on hold
46A							_			200 OK	UE_B responds to INVITE with 200 OK
47A										200 OK	indicating media attribute "recvonly"  IMS_B forwards 200 OK response to IBCF_B
48A										200 OK	IBCF_B forwards 200 OK response to IBCF_A
49A										200 OK	IBCF_A forwards 200 OK response to IMS_A
50A										200 OK	IMS_A forwards the 200 OK response to UE_A
51A											User A is informed that call is on hold
52A										ACK	UE_A acknowledges the receipt of 200 OK for
53A										ACK	INVITE IMS_A forwards ACK to IBCF_A
54A										ACK	IBCF_A forwards ACK to IBCF_B
55A										ACK	IBCF_B forwards ACK to IMS_B
56A										ACK	IMS_B forwards ACK to UE_B
57A											User A resumes call
58A										INVITE	UE_A sends reINVITE message indicating
59A										100 Trying	media attribute "sendrecv" (Call Resume)  IMS_A responds with a 100 Trying provisional
		<b>←</b>									response
60A			_		$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
61A			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
62A					_	$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
63A					←					100 Trying	IBCF_A responds with a 100 Trying provisional response
64A						-	$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
65A						•	<u>.                                    </u>			100 Trying	IMS_B responds with a 100 Trying provisional response
66A								$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
67A							<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response



Step					Directio	on				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	- BCFA	- B C F B	В 0 ⊠ −	UEB	U s e r B		
55B			$\leftarrow$							ACK	IBCF_B forwards ACK to IMS_A
56B		<del></del>								ACK	IMS_A forwards ACK to UE_A
57B								<b>←</b>			User B resumes call
58B							<b>←</b>	_		INVITE	UE_B sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
59B								$\longrightarrow$		100 Trying	IMS_B responds with a 100 Trying provisionalresponse
60B						•	<u> </u>			INVITE	IMS_B forwards INVITE to IBCF_B
61B						-	<b></b>			100 Trying	IBCF_B responds with a 100 Trying provisional response
62B					<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
63B					_	$\longrightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
64B			$\leftarrow$	_						INVITE	IBCF_A forwards INVITE to IMS_A
65B					$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
66B		<del></del>	_							INVITE	IMS_A forwards INVITE to UE_A
67B			$\rightarrow$							100 Trying	UE_A optionally responds with a 100 Trying provisional response
68B	<b>←</b>										User A is informed that call is resumed
69B			$\rightarrow$							200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"
70B				_	$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
71B					_	$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
72B						_	$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
73B								$\longrightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
74B									$\rightarrow$		User B is informed that call is resumed



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

Step				Di	irectio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	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
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$							ENUM	ENUM DB sends response to IMS A
6					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$		_					100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response

Step					Dire	ectio	n				Message	Comment
	U s	UE			Z II	I B	I B	I M	πС	Us		
	e	Ā		s l	J	С	С	S	В	e		
	r A		-		M B	F A	F B	В		r B		
10						Î	<u> </u>	$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11							$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
12							$\leftarrow$				INVITE	IMS_B forwards INVITE to IBCF_B
13								$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
14						$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
15							$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
16				<del></del>		_					INVITE	IBCF_A forwards INVITE to IMS_A
17					_	→					100 Trying	IMS_A responds with a 100 Trying provisional response
18					_				$\rightarrow$		INVITE	IMS_A forwards INVITE to UE_B
19				<del></del>							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
21				$\leftarrow$							180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
22						→					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
23							$\rightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
24								$\rightarrow$			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
25							$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
26						$\leftarrow$					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
27				$\leftarrow$		_					180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
28		+									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
29	<b>(</b>											User A is informed that UE_B is ringing
30									(			User B answers call
31				<del></del>							200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
32						→					200 OK	IMS_A forwards 200 OK response to IBCF_A
33						F	$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
34								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
35							$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
36						$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
37				$\leftarrow$		-					200 OK	IBCF_A forwards 200 OK response to IMS_A

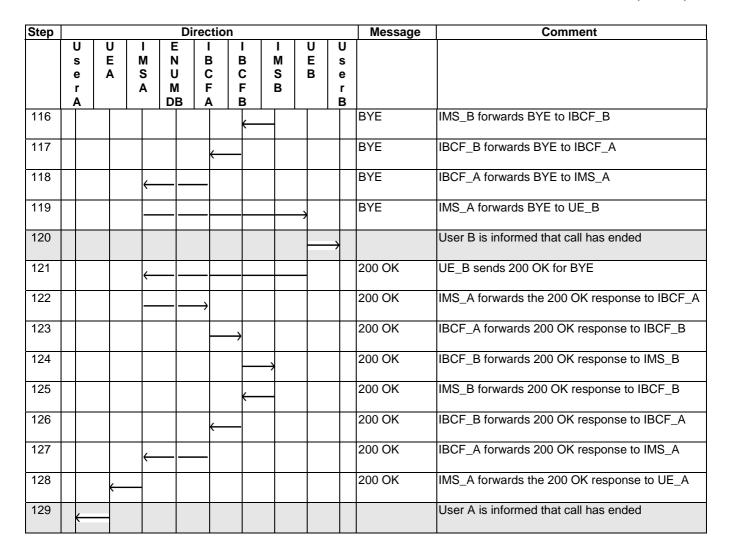
Step					Dire	ction						Message	Comment
	U s	U E	I M	E		I 3	I B	I M	U		J s		
	е	Ā	S	U	(	3	С	S	В	6	е		
	r A		Α	DI		F A	F B	В		E	r 3		
38		<b>←</b>										200 OK	IMS_A forwards 200 OK response to UE_A
39	<b>(</b>												User A is informed that call has been answered
40			$\rightarrow$									ACK	UE_A acknowledges the receipt of 200 OK for INVITE
41			-		$\longrightarrow$							ACK	IMS_A forwards ACK to IBCF_A
42							$\rightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
43								$\rightarrow$				ACK	IBCF_B forwards ACK to IMS_B
44							$\leftarrow$					ACK	IMS_B forwards ACK to IBCF_B
45						$\leftarrow$						ACK	IBCF_B forwards ACK to IBCF_A
46			+									ACK	IBCF_A forwards ACK to IMS_A
47			_						$\rightarrow$			ACK	IMS_A forwards ACK to UE_B
48										$\longrightarrow$			User B is presented that call is in progress
49A		$\rightarrow$											User A puts call on hold
50A		_	-									INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
51A		<b>←</b>										100 Trying	IMS_A responds with a 100 Trying provisional response
52A			_		$\longrightarrow$							INVITE	IMS_A forwards INVITE to IBCF_A
53A			+									100 Trying	IBCF_A responds with a 100 Trying provisional response
54A							$\rightarrow$					INVITE	IBCF_A forwards INVITE to IBCF_B
55A						<del></del>	_					100 Trying	IBCF_B responds with a 100 Trying provisional response
56A								$\rightarrow$				INVITE	IBCF_B forwards INVITE to IMS_B
57A							$\leftarrow$					100 Trying	IMS_B responds with a 100 Trying provisional response
58A							$\leftarrow$					INVITE	IMS_B forwards INVITE to IBCF_B
59A							-	$\rightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
60A						$\leftarrow$	_					INVITE	IBCF_B forwards INVITE to IBCF_A
61A							$\rightarrow$					100 Trying	IBCF_A responds with a 100 Trying provisional response
62A			+									INVITE	IBCF_A forwards INVITE to IMS_A
63A			-		$\longrightarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
64A			-				-		$\rightarrow$			INVITE	IMS_A forwards INVITE to UE_B
65A			+									100 Trying	UE_B optionally responds with a 100 Trying provisional response

S   E   M N B B B M S B B W S B B E F R	
e A S U C C C S B B e F B U User B is informed that call is on hold indicating attribute "reconsty" inactive 200 OK IMS_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK	
A DB A B B B User B is informed that call is on hold indicating attribute "recvonly" inactive 200 OK IMS_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK IB	
200 OK UE_B responds to INVITE with 200 C indicating attribute "recvonly" inactive 200 OK IMS_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IMS_A forwards 200 OK response to 200 OK IMS_A forwards 200 OK response to 200 OK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B I	
indicating attribute "recvonly" inactive 200 OK IMS_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IMS_A forwards 200 OK response to 200 OK IMS_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK resp	
200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_B forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IBCF_A forwards 200 OK response to 200 OK IMS_A forwards 200 OK response to ACK UE_A acknowledges the receipt of 20 INVITE ACK IBCF_A forwards ACK to IBCF_A ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_B USer A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B IBCF_B forwards ACK to I	
70A 71A 71A 72A 73A 73A 74A 75A 76A 77A 78A 78A 78A 78A 78A 78A 78A 78A 78	IBCF_A
71A 72A 73A 74A 75A 76A 77A 78A 78A 78A 78A 78A 78A 78A 78A 78	o IBCF_B
72A 73A 74A 75A 76A 76A 77A 78A 78A 78A 78A 78A 78A 78A 78A 78	o IMS_B
73A  74A  75A  75A  76A  77A  78A  78A  78A  78A  78A  78	IBCF_B
75A 76A 77A 77A 77A 77A 78A 79A 80A 81A 82A 83A 84A 85A	o IBCF_A
75A 76A 77A 77A 78A 78A 78A 78A 78A 78A 78A 78	o IMS_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 IBCF_B   ACK   IBCF_B forwards ACK to IBCF_B   ACK   IBCF_B forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IMS_A   ACK   IBCF_A forwards ACK to IMS_A   ACK   IBCF_A forwards ACK to UE_B   ACK   IBCF_A forwards ACK   ACK   IBCF_A forwards ACK   ACK   IBCF_A forwards ACK   ACK   ACK   IBCF_A forwards ACK	UE_A
ACK IMS_A forwards ACK to IBCF_B  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 IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_A  IMS_A forwards ACK to IBCF_B  IMS_A forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  IBCF_A forwards ACK to IBCF_B  IBCF_B forwar	00 OK for
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 IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_B  User A is informed that call is on hold  User A resumes call  INVITE UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resu	
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_B  B3A  User A is informed that call is on hold  User A resumes call  INVITE UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resu	
80A  81A  82A  83A  84A  Wiser A resumes call  INVITE  UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resumes)	
81A  82A  83A  84A  85A  INVITE  IBCF_A forwards ACK to IMS_A  ACK  IMS_A forwards ACK to UE_B  User A is informed that call is on hold  User A resumes call  INVITE  UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resumes)	
82A  83A  User A is informed that call is on hold  User A resumes call  INVITE  UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resumes)	
83A  User A is informed that call is on hold  User A resumes call  INVITE  UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resumes)	
84A User A resumes call  INVITE UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resumes)	
85A INVITE UE_A sends reINVITE message indice media attribute "sendrecv" (Call Resu	I
media attribute "sendrecv" (Call Resu	
	•
87A INVITE IMS_A forwards INVITE to IBCF_A	
88A 100 Trying IBCF_A responds with a 100 Trying response	provisional
89A INVITE IBCF_A forwards INVITE to IBCF_B	
90A 100 Trying IBCF_B responds with a 100 Trying response	provisional
91A INVITE IBCF_B forwards INVITE to IMS_B	
92A 100 Trying IMS_B responds with a 100 Trying presponse	ovisional
93A INVITE IMS_B forwards INVITE to IBCF_B	

Step					Dii	rectio	n				Message	Comment
	U s	U E			E N	I B	I B	I M	U	U		
	e	A		S	U	С	С	S	В	e		
	r A		4		M OB	F A	F B	В		r B		
94A				-		Î	-	$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
95A						<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
96A							$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
97A				$\longleftarrow$	-						INVITE	IBCF_A forwards INVITE to IMS_A
98A					-	$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
99A					-				$\rightarrow$		INVITE	IMS_A forwards INVITE to UE_B
100 A				<del></del>	-						100 Trying	UE_B optionally responds with a 100 Trying provisional response
101 A										$\rightarrow$		User B is informed that call is resumed
102 A				$\longleftarrow$	-	_	-				200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"
103 A					-	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
104 A							$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
105 A								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
106 A							<del>(</del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
107 A						<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
108 A				<del></del>	-	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
109 A		<b>←</b>									200 OK	IMS_A forwards the 200 OK response to UE_A
110 A	←	-										User B is informed that call has ended
49B									<b>←</b>			User B puts call on hold
50B				$\leftarrow$							INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
51B					-				$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
52B					-	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
53B				<del></del>	-	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
54B							$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
55B						<del>(</del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
56B								$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
57B							$\leftarrow$	$\dashv$			100 Trying	IMS_B responds with a 100 Trying provisional response
58B							<b></b>	$\blacksquare$			INVITE	IMS_B forwards INVITE to IBCF_B
59B								$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response

Step				D	irect	ion				Message	Comment
	U s	U E	I M	E N	I B	I B	I M	UE	Us		
	е	Ā	S	U	С	С	S	В	е		
	r A		A	M DB	F	F B	В		r B		
60B					+					INVITE	IBCF_B forwards INVITE to IBCF_A
61B					-	$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
62B			$\leftarrow$	_ -						INVITE	IBCF_A forwards INVITE to IMS_A
63B					$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
64B		$\leftarrow$								INVITE	IMS_A forwards INVITE to UE_A
65B			$\rightarrow$							100 Trying	UE_A optionally responds with a 100 Trying provisional response
66B	<b>K</b>										User A is informed that call is on hold
67B		H	$\rightarrow$							200 OK	UE_A responds to INVITE with 200 OK indicating attribute "recvonly" inactive
68B				_ -	$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
69B					-	$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
70B						-	$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
71B						ŧ				200 OK	IMS_B forwards 200 OK response to IBCF_B
72B					+					200 OK	IBCF_B forwards 200 OK response to IBCF_A
73B			<b>←</b>							200 OK	IBCF_A forwards 200 OK response to IMS_A
74B					_			$\rightarrow$		200 OK	IMS_A forwards 200 OK response to UE_B
75B			$\leftarrow$		_					ACK	UE_B acknowledges the receipt of 200 OK for INVITE
76B					$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
77B						$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
78B						-	$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
79B						ŧ				ACK	IMS_B forwards ACK to IBCF_B
80B					+					ACK	IBCF_B forwards ACK to IBCF_A
81B										ACK	IBCF_A forwards ACK to IMS_A
82B		$\leftarrow$								ACK	IMS_A forwards ACK to UE_A
83B	<b>—</b>										User A is informed that call is on hold
84B								<b>←</b>			User B resumes call
85B			$\leftarrow$							INVITE	UE_B sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
86B								$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
87B			_		$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A

Step						recti	on				Message	Comment
	U s	L			E N	I B	l B	I M	U	U		
	е	Ā	. :	S	U	С	С	S	В	е		
	r A		4		M OB	F	F B	В		r B		
88B				<del></del>							100 Trying	IBCF_A responds with a 100 Trying provisional response
89B							$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
90B						<del>(</del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
91B								$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
92B							←				100 Trying	IMS_B responds with a 100 Trying provisional response
93B							<b>←</b>				INVITE	IMS_B forwards INVITE to IBCF_B
94B							-	$\longrightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
95B						<b>←</b>					INVITE	IBCF_B forwards INVITE to IBCF_A
96B							$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
97B				$\leftarrow$	-						INVITE	IBCF_A forwards INVITE to IMS_A
98B					_	$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
99B			<del>(                                    </del>								INVITE	IMS_A forwards INVITE to UE_A
100 B				•							100 Trying	UE_A optionally responds with a 100 Trying provisional response
101 B	<b></b>											User A is informed that call is resumed
102 B			>								200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"
103 B					-	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
104 B							$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
105 B								$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
106 B							<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
107 B						<del>(</del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
108 B					$\leftarrow$	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
109 B					-	_			$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
110 B									$\vdash$	$\rightarrow$		User B is informed that call is resumed
111		$\rightarrow$										User A ends call
112			;								BYE	UE_A releases the call with BYE
113					-	$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
114							$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
115											BYE	IBCF_B forwards BYE to IMS_B



#### 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	14	20
3	User A is informed that UE_B is ringing	20	29
4	User B answers call	21	30
5	User A is informed that call has been answered	27	39
6	User B is informed that call is established	29	48
7A	User A puts call on hold	34A	49A
7B	User B puts call on hold	34B	49B
8A	User B is informed that call on hold	40A	58A
8B	User A is informed that call on hold	40B	58B
9A	User A resumes call	52A	68A
9B	User B resumes call	52B	68B
10A	User B is informed that call is resumed	58A	77A
10B	User A is informed that call is resumed	58B	77B
11A	User A is informed that call is resumed	64A	86A
11	User A is informed that call is resumed	64B	86B
12	User A ends call	65	87
13	User B is informed that call has ended	71	96
14	User A is informed that call has ended	77	105

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

Step				Direc	tion					Message	Comment
		U I E M	E N	I B	I B	I		J E	U		
		A S		C				В	s e		
	r A	Α	M DB	F	F		3		r B		
1		*	DE								User A calls User B
2		$\longrightarrow$								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		_	$\longrightarrow$							ENUM	IMS A sends query to ENUM DB
5		•	<u>-</u>							ENUM	ENUM DB sends response to IMS A
6		_		$\longrightarrow$						INVITE	IMS_A forwards INVITE to IBCF_A
7		•	<del></del>							100 Trying	IBCF_A responds with a 100 Trying provisional response
8					$\longrightarrow$					INVITE	IBCF_A forwards INVITE to IBCF_B
9					<del></del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10						$\longrightarrow$				INVITE	IBCF_B forwards INVITE to IMS_B
11						<del></del>				100 Trying	IMS_B responds with a 100 Trying provisional response
12						-	<del></del>			INVITE	IMS_B forwards INVITE to UE_B
13							<del></del>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
14									$\rightarrow$		User B is informed of incoming call of User A
15							<del></del>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16						$\longleftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
17					<del></del>					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
18		•	<del></del>							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
19		<b></b>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
20	<del>(</del>										User A is informed that UE_B is ringing
21								<del></del>			User B answers call
22							<del></del>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
23						$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
24					$\longleftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
25		•	<del></del>							200 OK	IBCF_A forwards 200 OK response to IMS_A
	1	ı l	1	ı	ı	ı I		1	1		

Step		•			Direc	ction					Message	Comment
	U s	.   1	J I		N E			/	U E	U s		
	e r		A S		/ F	·   F	·   E		В	e r B		
26	A	1			<u> </u>					Ī	200 OK	IMS_A forwards 200 OK response to UE_A
27		<del>(</del>										User A is informed that call has been answered
28			$\longrightarrow$								ACK	UE_A acknowledges the receipt of 200 OK for INVITE
29						•					ACK	IMS_A forwards ACK to IBCF_A
30						$\longrightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
31							$\longrightarrow$				ACK	IBCF_B forwards ACK to IMS_B
32									>		ACK	IMS_B forwards ACK to UE_B
33										$\rightarrow$		User B is presented that call is in progress
34A	-	;										User A puts call on hold
35A			$\longrightarrow$								UPDATE	UE_A sends reUPDATE message indicating media attribute "sendonly" (Call Hold)
36A											UPDATE	IMS_A forwards UPDATE to IBCF_A
37A						$\longrightarrow$					UPDATE	IBCF_A forwards UPDATE to IBCF_B
38A							$\longrightarrow$				UPDATE	IBCF_B forwards UPDATE to IMS_B
39A									>		UPDATE	IMS_B forwards UPDATE to UE_B
40A										$\rightarrow$		User B is informed that call is on hold
41A								←	-		200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "recvonly"
42A							<del></del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
43A						<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
44A				←							200 OK	IBCF_A forwards 200 OK response to IMS_A
45A			<del></del>								200 OK	IMS_A forwards the 200 OK response to UE_A
46A	-											User A resumes call
47A			$\longrightarrow$								UPDATE	UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
48A					<del></del>						UPDATE	IMS_A forwards UPDATE to IBCF_A
49A						$\longrightarrow$					UPDATE	IBCF_A forwards UPDATE to IBCF_B
50A							$\longrightarrow$				UPDATE	IBCF_B forwards UPDATE to IMS_B
51A									>		UPDATE	IMS_B forwards UPDATE to UE_B
52A										$\rightarrow$		User B is informed that call is resumed
53A								<b>&lt;</b>			200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "sendrecv"

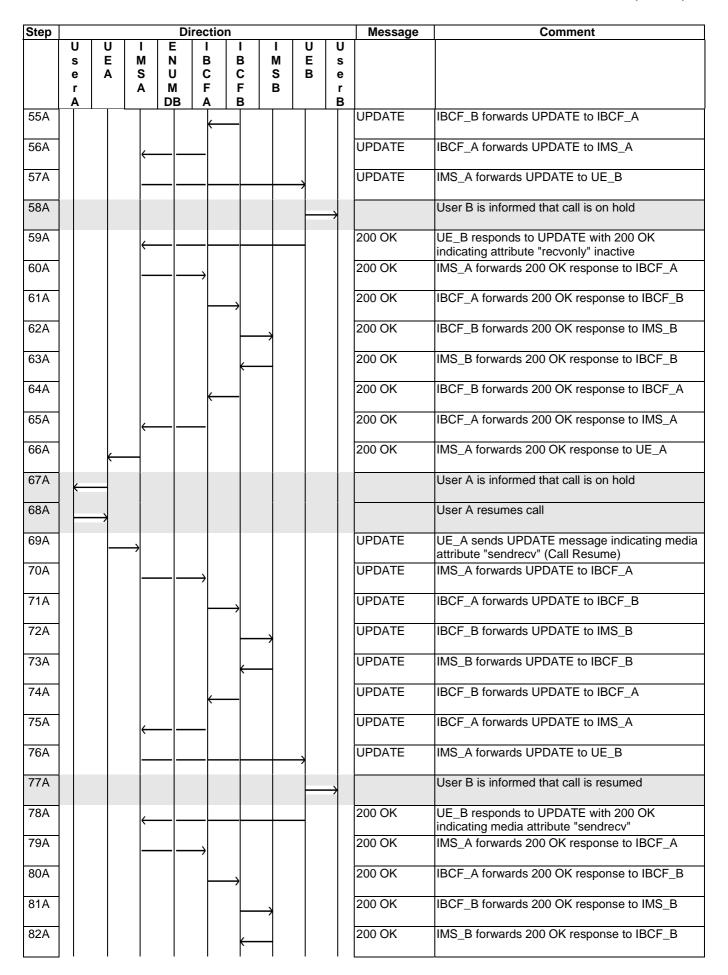
S	Step					Direc	tion					Message	Comment
A M B F F F B B F F B B P F B B P F B B P F B B P P B B P P B B P P B B P P B P P B P P B P P B P P P P P P P P P P P P P P P P P P P P		_				І В			I ∕I				
200 OK			4		_				-	В			
200 OK BCF_B forwards 200 OK response to IBCF_A 200 OK BCF_A forwards 200 OK response to IBCF_A 200 OK BCF_A forwards 200 OK response to IBCF_A 200 OK BCF_A forwards 200 OK response to UE_A 200 OK BCF_A forwards 200 OK response to UE_A 34B 34B 35B 36B 37B 36B 37B 38B 39B 40B 40B 41B 42B 42B 43B 44B 45B 46B 47B 48B 49B 50B 50B 51B 50B 51B 52B 53B 54B 56B 57B 57B 57B 57B 57B 57B 57B 57B 57B 57	54A	Α			DI	ВА	В	3   	 		В	200 OK	IMS_B forwards 200 OK response to IBCE_B
200 OK BCF_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  User A is informed that call is resumed  UPDATE UE B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  UPDATE IMS_B forwards UPDATE to IBCF_B  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards 200 OK response to IMS_B  200 OK IMS_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 UE_B  WEST_A forwards 200 OK response to UE_B  ACK UE_B acknowledges the receipt of 200 OK for UPDATE  ACK UE_B acknowledges the receipt of 200 OK for UPDATE  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B for								$\longleftarrow$					·
200 OK IMS_A forwards the 200 OK response to UE_A  34B  34B  35B  36B  37B  38B  38B  39B  40B  40B  41B  42B  43B  44B  44B  45B  46B  47B  46B  47B  46B  47B  46B  47B  46B  47B  47	55A						<del></del>					200 OK	
User A is informed that call is resumed  User B puts call on hold  UPDATE UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  UPDATE IMS_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  User A is informed that call is on hold  USER A forwards 200 OK response to IBCF_B  200 OK IBCF_A forwards 200 OK response to IBCF_B  200 OK IMS_A forwards 200 OK response to UE_B  48B  48B  48B  49B  50B  50B  51B  52B  UPDATE IMS_A forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IBCF_A  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_B forwards ACK to IBCF_B  IUPDATE IMS_B forwards ACK to IBCF_B  IUPDATE IMS_B forwards ACK to IBCF_B  IUPDATE IMS_B forwards ACK to IBCF_B	56A				←							200 OK	IBCF_A forwards 200 OK response to IMS_A
User B puts call on hold  UPDATE UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold) UPDATE IMS_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  UPDATE IMS_A forwards 200 OK response to IBCF_B  UPDATE IMS_A forwards 200 OK response to IBCF_B  200 OK IMS_A forwards 200 OK response to IBCF_B  200 OK IMS_B forwards 200 OK response to UE_B  USer B is informed that call is on hold  ACK UE_B acknowledges the receipt of 200 OK for UPDATE  ACK IMS_B forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  ACK IMS_B forwards ACK to IBCF_A  ACK IMS_A forwards ACK to UE_A  USer B resumes call  UPDATE IMS_B forwards ACK to UE_A  ISS_B orwards UPDATE to IBCF_B	57A			<del></del>								200 OK	IMS_A forwards the 200 OK response to UE_A
JPDATE UE B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  JPDATE IIMS, B forwards UPDATE to IBCF_B  JPDATE IBCF_B forwards UPDATE to IBCF_A  JPDATE IBCF_B forwards UPDATE to IBCF_A  JPDATE IBCF_A forwards UPDATE to IMS_A  JPDATE IMS_A forwards UPDATE to UE_A  JUPDATE IMS_A forwards 200 OK response to IBCF_A  JUPDATE IMS_A forwards 200 OK response to IBCF_B  JUPDATE IMS_B forwards 200 OK response to IBCF_B  JUPDATE IMS_B forwards 200 OK response to UE_B  JUPDATE IMS_B forwards ACK to IBCF_B	58A	•											User A is informed that call is resumed
media attribute "sendonly" (Call Hold)  JUPDATE  IIMS_B forwards UPDATE to IBCF_B  JUPDATE  IIMS_B forwards UPDATE to IBCF_A  JUPDATE  IIBCF_B forwards UPDATE to IBCF_A  JUPDATE  IIBCF_A forwards UPDATE to IBCF_A  JUPDATE  IIMS_A forwards UPDATE to UE_A  JUPDATE	34B									<b>—</b>			User B puts call on hold
UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  User A is informed that call is on hold  User A is informed that call is on hold  User A is informed that call is on hold  USER A is informed that call is on hold  USER A is informed that call is on hold  USER A is informed that call is on hold  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 UE_B  USER B is informed that call is on hold  ACK USER B informed that call is on hold  ACK USER B forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to USER  ACK IMS_A forwards ACK to USER  USER B resumes call  USER B resumes call  UPDATE USER B sends UPDATE message indicating media attribute "sendrecy" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	35B								<del></del>	-		UPDATE	
UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  200 OK UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  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 UE_B  46B  47B  48B  49B  50B  51B  52B  53B  54B	36B							<del></del>				UPDATE	IMS_B forwards UPDATE to IBCF_B
UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  User A is informed that call is on hold  200 OK UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  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 UE_B  46B  47B  48B  49B  50B  51B  52B  UPDATE  UE_B sends UPDATE message indicating media attribute "sendreov" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	37B						<del></del>	-				UPDATE	IBCF_B forwards UPDATE to IBCF_A
40B 41B 42B 42B 42B 42B 42B 43B 44B 46B 46B 46B 46B 47B 46B 47B 48B 49B 50B 51B 52B 53B 62B 53B 62B 62B 62B 62B 62B 62B 62B 62B 62B 62	38B				←							UPDATE	IBCF_A forwards UPDATE to IMS_A
42B 42B 42B 42B 43B 44B 44B 45B 46B 46B 47B 48B 49B 50B 51B 51B 52B 53B 54B	39B			<del></del>								UPDATE	IMS_A forwards UPDATE to UE_A
indicating media attribute "recvonly"  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 IMS_B  200 OK IMS_B forwards the 200 OK response to UE_B  46B  47B  48B  49B  49B  50B  51B  52B  User B is informed that call is on hold  ACK UE_B acknowledges the receipt of 200 OK for UPDATE  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 IMS_A forwards ACK to UE_A  USer B resumes call  UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	40B	•											User A is informed that call is on hold
42B 43B 44B 44B 44B 45B 45B 46B 47B 48B 49B 50B 50B 51B 53B 53B	41B			<b></b>								200 OK	
44B 45B 46B 46B 46B 47B 48B 49B 50B 51B 52B 53B 54B	42B					<del></del>						200 OK	-
45B  46B  47B  48B  48B  49B  50B  51B  52B  45B  46B  47B  48B  49B  52B  49B  52B  49B  52B  49B  53B  49B  54B	43B						<del></del>					200 OK	IBCF_A forwards 200 OK response to IBCF_B
46B  47B  48B  49B  50B  51B  52B  User B is informed that call is on hold  ACK  UE_B acknowledges the receipt of 200 OK for UPDATE  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 UE_A  User B resumes call  UPDATE  UPDATE  UPDATE  UPDATE  UPDATE  UPDATE  UPDATE  UNS_B forwards UPDATE to IBCF_B	44B							$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
47B 48B 49B 50B 51B 52B 53B 54B 54B	45B									$\rightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
48B  49B  49B  50B  51B  52B  UPDATE  ACK IMS_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  User B resumes call  UPDATE	46B										$\rightarrow$		User B is informed that call is on hold
49B  50B  ACK IBCF_B forwards ACK to IBCF_A  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  User B resumes call  UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	47B								<b></b>			ACK	
50B  ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_A  User B resumes call  UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	48B							←—				ACK	IMS_B forwards ACK to IBCF_B
51B  ACK IMS_A forwards ACK to UE_A  User B resumes call  UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	49B						<del></del>					ACK	IBCF_B forwards ACK to IBCF_A
52B  User B resumes call  UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  UPDATE IMS_B forwards UPDATE to IBCF_B	50B				←							ACK	IBCF_A forwards ACK to IMS_A
53B UPDATE UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume) UPDATE IMS_B forwards UPDATE to IBCF_B	51B			<del></del>								ACK	IMS_A forwards ACK to UE_A
54B   media attribute "sendrecv" (Call Resume)  UPDATE   IMS_B forwards UPDATE to IBCF_B	52B									<b>←</b>			User B resumes call
54B UPDATE IMS_B forwards UPDATE to IBCF_B	53B								<del></del>			UPDATE	
55B UPDATE IBCF_B forwards UPDATE to IBCF_A	54B							<del></del>				UPDATE	
	55B						←—					UPDATE	IBCF_B forwards UPDATE to IBCF_A

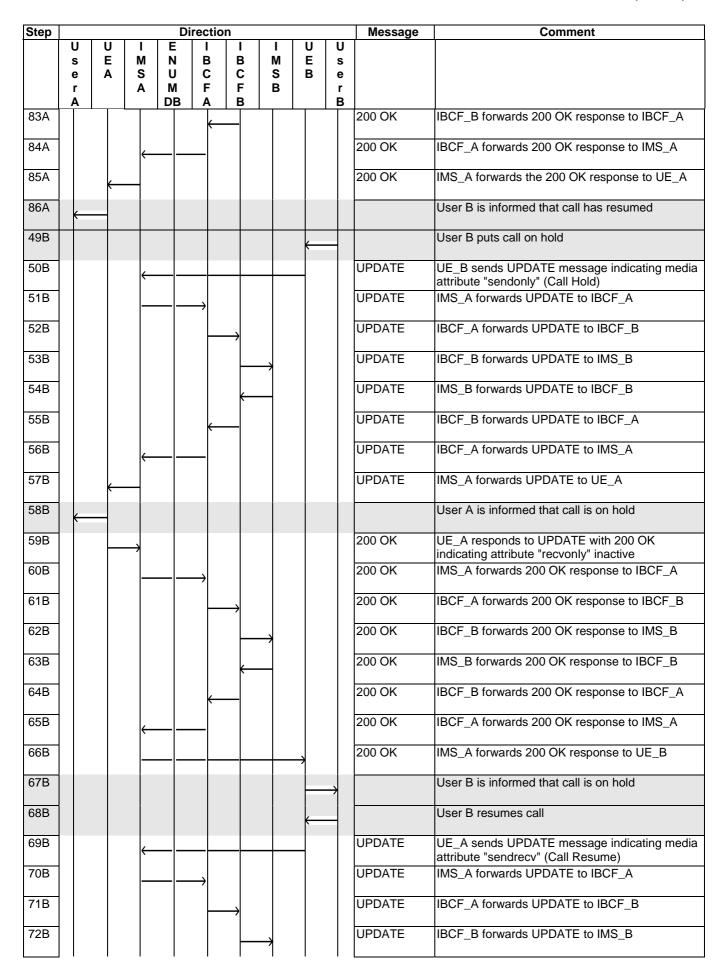
Step				[	Direction	on				Message	Comment
- '	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	M S B	U E B	U s e r B		
56B			$\leftarrow$							UPDATE	IBCF_A forwards UPDATE to IMS_A
57B		<b>-</b>								UPDATE	IMS_A forwards UPDATE to UE_A
58B	<b>(</b>										User A is informed that call is resumed
59B			<del>)</del>							200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
60B				_  -	$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
61B					_					200 OK	IBCF_A forwards 200 OK response to IBCF_B
62B						_	$\longrightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
63B								<b>→</b>		200 OK	IMS_B forwards the 200 OK response to UE_B
64B									<b>→</b>		User B is informed that call is resumed
65		$\rightarrow$									User A ends call
66			<b>→</b>							BYE	UE_A releases the call with BYE
67				_	<b>→</b>					BYE	IMS_A forwards BYE to IBCF_A
68					_	$\longrightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
69						-	$\longrightarrow$			BYE	IBCF_B forwards BYE to IMS_B
70								$\longrightarrow$		BYE	IMS_B forwards BYE to UE_B
71									$\longrightarrow$		User B is informed that call has ended
72							<b>(</b>			200 OK	UE_B sends 200 OK for BYE
73						€				200 OK	IMS_B forwards 200 OK response to IBCF_B
74					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
75			$\leftarrow$	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
76		<b>-</b>								200 OK	IMS_A forwards the 200 OK response to UE_A
77	<b>←</b>										User A is informed that call has ended

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

Step					Dire	ction					Message	Comment
	U s	UE	M	Z B		I 3	I B	I M	ЯC	U s		
	e	Ā	S	U	J	C	С	S	В	e		
	r A		A	N Di		F A	F B	В		r B		
1	È	$\rightarrow$										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			_	$\longrightarrow$							ENUM	IMS A sends query to ENUM DB
5			<b>←</b>								ENUM	ENUM DB sends response to IMS A
6					>						INVITE	IMS_A forwards INVITE to IBCF_A
7			<b>←</b>								100 Trying	IBCF_A responds with a 100 Trying provisional response
8							>				INVITE	IBCF_A forwards INVITE to IBCF_B
9						<del></del>	-				100 Trying	IBCF_B responds with a 100 Trying provisional response
10								<del>)</del>			INVITE	IBCF_B forwards INVITE to IMS_B
11							<del></del>				100 Trying	IMS_B responds with a 100 Trying provisional response
12							$\leftarrow$				INVITE	IMS_B forwards INVITE to IBCF_B
13								<del>)</del>			100 Trying	IBCF_B responds with a 100 Trying provisional response
14						$\leftarrow$	-				INVITE	IBCF_B forwards INVITE to IBCF_A
15							>				100 Trying	IBCF_A responds with a 100 Trying provisional response
16			<b>←</b>								INVITE	IBCF_A forwards INVITE to IMS_A
17					<del></del>						100 Trying	IMS_A responds with a 100 Trying provisional response
18									<del>-</del>		INVITE	IMS_A forwards INVITE to UE_B
19			<del>(</del>								100 Trying	UE_B optionally responds with a 100 Trying provisional response
20										$\rightarrow$		User B is informed of incoming call of User A
21			<del>(</del>								180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
22					$\stackrel{-}{\longrightarrow}$						180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
23							>				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
24								<del>-</del>			180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
25							$\leftarrow$				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
26						$\longleftarrow$					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A

Step				Di	recti	ion					Message	Comment
	U	πС	M	E N	I B	I B	I M	Ĺ		U		
	s e	A	S	Ü	С	C	S		3	s e		
	r A		Α	M DB	F A	F B	В			r B		
27			<b>←</b>								180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
28		<b>—</b>									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
29	<b>(</b>											User A is informed that UE_B is ringing
30								•				User B answers call
31			$\leftarrow$								200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
32					$\rightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
33						$\longrightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
34							$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
35						+					200 OK	IMS_B forwards 200 OK response to IBCF_B
36					+						200 OK	IBCF_B forwards 200 OK response to IBCF_A
37			<b>←</b>		_						200 OK	IBCF_A forwards 200 OK response to IMS_A
38		<b>←</b>									200 OK	IMS_A forwards 200 OK response to UE_A
39	<b>—</b>											User A is informed that call has been answered
40			$\rightarrow$								ACK	UE_A acknowledges the receipt of 200 OK for INVITE
41					$\rightarrow$						ACK	IMS_A forwards ACK to IBCF_A
42						$\longrightarrow$					ACK	IBCF_A forwards ACK to IBCF_B
43							$\rightarrow$				ACK	IBCF_B forwards ACK to IMS_B
44						+					ACK	IMS_B forwards ACK to IBCF_B
45					+						ACK	IBCF_B forwards ACK to IBCF_A
46			<b>←</b>								ACK	IBCF_A forwards ACK to IMS_A
47					_			$\rightarrow$			ACK	IMS_A forwards ACK to UE_B
48										<del>)</del>		User B is presented that call is in progress
49A		$\rightarrow$										User A puts call on hold
50A			-;								UPDATE	UE_A sends UPDATE message indicating media attribute "sendonly" (Call Hold)
51A				_ _	$\rightarrow$						UPDATE	IMS_A forwards UPDATE to IBCF_A
52A					-	$\longrightarrow$					UPDATE	IBCF_A forwards UPDATE to IBCF_B
53A						-	$\longrightarrow$				UPDATE	IBCF_B forwards UPDATE to IMS_B
54A						<b>(</b>	-				UPDATE	IMS_B forwards UPDATE to IBCF_B





Step						ectio	า				Message	Comment
	U s	U		I E		I B	I B	I M	U E	U		
	е	Ā	;	sΙ	J	C F	C F	S	В	е		
	r A		Ľ	A N D		A	В	В		r B		
73B							$\leftarrow$				UPDATE	IMS_B forwards UPDATE to IBCF_B
74B						$\leftarrow$					UPDATE	IBCF_B forwards UPDATE to IBCF_A
75B				<del></del>		_					UPDATE	IBCF_A forwards UPDATE to IMS_A
76B		<b>K</b>									UPDATE	IMS_A forwards UPDATE to UE_A
77B	<b>—</b>											User A is informed that call is resumed
78B		-	$\longrightarrow$								200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
79B						→					200 OK	IMS_A forwards 200 OK response to IBCF_A
80B							$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
81B								$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
82B							$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
83B						$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
84B				<del></del>		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
85B						_			$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
86B												User B is informed that call is resumed
87		$\rightarrow$										User A ends call
88		-	$\longrightarrow$								BYE	UE_A releases the call with BYE
89						<b>→</b>					BYE	IMS_A forwards BYE to IBCF_A
90							$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
91								$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
92							<b>—</b>				BYE	IMS_B forwards BYE to IBCF_B
93						$\leftarrow$					BYE	IBCF_B forwards BYE to IBCF_A
94				<del></del>							BYE	IBCF_A forwards BYE to IMS_A
95						_			$\rightarrow$		BYE	IMS_A forwards BYE to UE_B
96										$\rightarrow$		User B is informed that call has ended
97				<del></del>		-					200 OK	UE_B sends 200 OK for BYE
98						<b>→</b>					200 OK	IMS_A forwards the 200 OK response to IBCF_A
99						$\vdash$	$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
100								<del> </del>			200 OK	IBCF_B forwards 200 OK response to IMS_B

Step				D	irect	ion				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	I B C F A	I B C F B	M S B	U E B	U s e r B		
101						<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
102					<b>+</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
103			$\leftarrow$							200 OK	IBCF_A forwards 200 OK response to IMS_A
104		←								200 OK	IMS_A forwards the 200 OK response to UE_A
105	<b>—</b>										User A is informed that call has ended

## 4.4.4 IMS message exchange between UEs in different networks

#### 4.4.4.1 Description

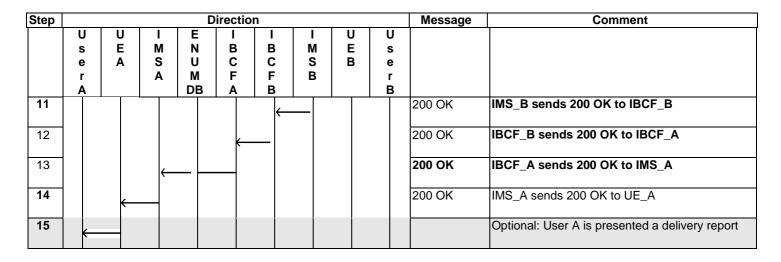
The UE\_A sends a MESSAGE to UE\_B located in a different network.

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 9	Step 12
3	Optional: User A is presented a delivery report	Step 15	Step 21

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

Step					Directio	on			Message	Comment	
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	- M & B	ВШС	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				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
4			<b>←</b>	_						ENUM	ENUM DB sends response 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								$\rightarrow$		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



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

										T	
Step										Message	Comment
	U s	U E	M	E N	B	В	I M	U	U		
	e	A	S	Ü	C	C	S	В	e		
	r	- 1	Ā	M	F	F	В		r		
	Α			DB	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				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
4			$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
5					<b>→</b>					MESSAGE	IMS_A sends MESSAGE to IBCF_A
6						<b>→</b>				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
7							$\rightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
8						$\leftarrow$	_			MESSAGE	IMS_B sends MESSAGE to IBCF_B
9					←					MESSAGE	IBCF_B sends MESSAGE to IBCF_A
10			$\leftarrow$							MESSAGE	IBCF_A sends MESSAGE to IMS_A
11						-		$\longrightarrow$		MESSAGE	IMS_A sends MESSAGE to UE_B
12									$\rightarrow$		User B is informed about the instant message
13			$\leftarrow$	_			-			200 OK	UE_B sends 200 OK to IMS_A
14				_	$\longrightarrow$					200 OK	IMS_A sends 200 OK to IBCF_A
15						$\rightarrow$				200 OK	IBCF_A sends 200 OK to IBCF_B
16							$\longrightarrow$			200 OK	IBCF_B sends 200 OK to IMS_B
17						$\leftarrow$	_			200 OK	IMS_B sends 200 OK to IBCF_B

Step					Directio	n				Message	Comment
	U	U	I	Е	ı	ı	ı	U	U		
	S	Е	M	N	В	В	M	E	S		
	е	Α	S	U	C	C	S	В	е		
	r		Α	M	F	F	В		r		
	Ą	1		DB	I A	В	<u> </u>		В		
18					<b>←</b>					200 OK	IBCF_B sends 200 OK to IBCF_A
19			$\leftarrow$							200 OK	IBCF_A sends 200 OK to IMS_A
20		<b>←</b>								200 OK	IMS_A sends 200 OK to UE_A
21	<b>—</b>										Optional: User A is presented a delivery report

# 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 25

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	Step34

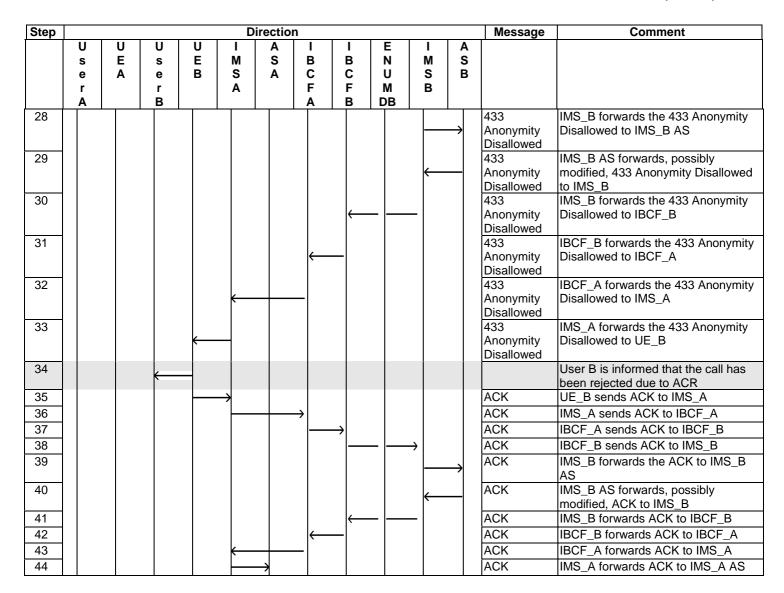
#### 4.4.5.2 UC\_06\_I: SIP message flow for SS ACR with CF\_INT\_AS

Step					Di	rection					Message	Comment	
	D w e r A	U E A	U s e r B	U E B	- M & A	В В м с и п	A 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
3		<b>←</b>										100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5					$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
													INVITE triggers the OIR IFC in IMS_A

Step					Direc	tion					Message	Comment
	U	Ū	U	Ū			A	I .	I	I A		
	s e	E A	s e	E B		N U				M S S B		
	r	^	r			М				В		
	Α		В		_   [	В		A	В		ļ	
6					-	<del></del>					INVITE	IMS_A forwards the INVITE to IMS_A AS
7					<del></del>						100 Trying	IMS_A AS optionally responds with a 100 Trying provisional response
8					←—						INVITE	IMS_A AS returns modified INVITE including Privacy header (value "id"
9						>					100 Trying	IMS_A responds with a 100 Trying provisional response
10							$\longrightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
11					<del></del>						100 Trying	IBCF_A responds with a 100 Trying provisional response
12								$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
13								<del></del>			100 Trying	IBCF_B responds with a 100 Trying provisional response
14									<del></del>		INVITE	IBCF_B forwards INVITE to IMS_B
15									<del></del>		100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the ACR IFC in IMS_B
16										<b>→</b>	INVITE	IMS_B forwards the INVITE to IMS_B AS
17										<b></b>	100 Trying	AS optionally responds with a 100 Trying provisional response
18										<del></del>	433 Anonymity	IMS_B AS responds with 433 Anonymity Disallowed to IMS_B
19									<del></del>		433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IBCF_B
20								<del></del>			433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IBCF_A
21					<del></del>						433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IMS_A
22						<del></del>					433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to IMS_A
23					<del></del>						433 Anonymity	IMS_A AS forwards, possibly modified, 433 Anonymity
24		<b></b>									433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to UE_A
25	<b>—</b>										, dionymity	User A is informed that the call has been rejected due to ACR
26					>						ACK	UE_A sends ACK to IMS_A
27											ACK	IMS_A forwards the ACK to IMS_A AS
28					<del></del>						ACK	IMS_A AS forwards, possibly modified, ACK to IMS_A
29											ACK	IMS_A forwards ACK to IBCF_A
30								$\longrightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
31									<del></del>		ACK	IBCF_B forwards ACK to IMS_B
32										<b></b>	ACK	IMS_B forwards ACK to IMS_B AS
							<u> </u>	<u> </u>			ļ	

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

Step					Di	rection							Message	Comment
	U	U	U	U	I	Α	I	I	Ε	I		Α		
	S	E	S	E	M	S	В	В	N	N		S		
	e r	Α	e r	В	S	Α	C F	C F	U M	S		В		
	Ä		В		^		A	В	DB		'			
1				$\rightarrow$										User B calls User A
2													INVITE	UE_B sends INVITE with the first
					$\rightarrow$									SDP offer indicating all desired
														media and codecs that UE_B supports
3													100 Trying	IMS_A responds with a 100 Trying
														provisional response
4						+ - :	•						INVITE	IMS_A sends INVITE to IBCF_A
5					$\leftarrow$		-						100 Trying	IBCF_A responds with a 100 Trying provisional response
6								<del>&gt;</del>					INVITE	IBCF_A sends INVITE to IBCF_B
7							<b></b>						100 Trying	IBCF_B responds with a 100 Trying provisional response
8									_	$\rightarrow$			INVITE	IBCF_B sends INVITE to IMS_B
9								$\leftarrow$	_	-			100 Trying	IMS_B responds with a 100 Trying provisional response
10									$\leftarrow$	_			ENUM	IMS B sends query to ENUM DB
11										$\rightarrow$			ENUM	ENUM DB sends response to IMS B
														INVITE triggers the OIR IFC in IMS_B
12										_		>	INVITE	IMS_B forwards the INVITE to IMS_B AS
13										<del>&lt;</del>		-	100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
14													INVITE	IMS_B AS returns modified INVITE
										<del>&lt;</del>		-		including Privacy header (value "id" or "header") to IMS_B
15										_		≯	100 Trying	IMS_B responds with a 100 Trying provisional response
16								$\leftarrow$	_				INVITE	IMS_B forwards INVITE to IBCF_B
17									_	$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
18							$\leftarrow$	-					INVITE	IBCF_B forwards INVITE to IBCF_A
19								>					100 Trying	IBCF_A responds with a 100 Trying provisional response
20					←								INVITE	IBCF_A forwards INVITE to IMS_A
21						<del>  ;</del>	•						100 Trying	IMS_A responds with a 100 Trying provisional response
														INVITE triggers the ACR IFC in IMS_A
22						<del>-</del>							INVITE	IMS_A forwards the INVITE to IMS_A AS
23					<del></del>								100 Trying	AS optionally responds with a 100 Trying provisional response
24													433	IMS_A AS responds with 433
					$\leftarrow$								Anonymity Disallowed	Anonymity Disallowed to IMS_A
25							<b>&gt;</b>						433 Anonymity Disallowed	IMS_A forwards the 433 Anonymity Disallowed to IBCF_A
26								>					433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IBCF_B
27									_	$\rightarrow$			Disallowed 433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IMS_B
													Disallowed	_



## 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 11	Step 19

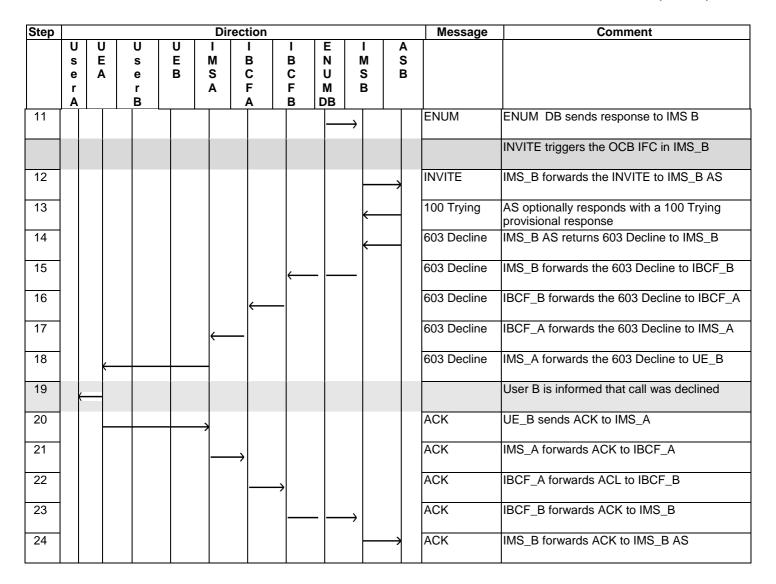
## 4.4.6.2 UC\_07\_I: SIP message flow for SS OCB with CF\_INT\_AS

The expected call flow sequence is:

Step					Dir	ection					Message	Comment
	U	ū	U	Ū	I	Ī	Ī	E	l Na	A		
	s e	E A	s e	E B	M S	B C	B	N U	M S	S		
	r	^	r		A	F	F	М	B			
	À		В			A	В	DB	_			
1				$\rightarrow$								User B calls User A
2											INVITE	UE_B sends INVITE with the first SDP offer
							_   _		<b>→</b>			indicating all desired media and codecs that UE_B supports
3				<b>←</b>		_	_	_	_		100 Trying	IMS_B responds with a 100 Trying provisional response
4								$\leftarrow$	-		ENUM	IMS B sends query to ENUM DB
5									→		ENUM	ENUM DB sends response to IMS B
												INVITE triggers the OCB IFC in IMS_B
6										$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
7									<b>←</b>	_	100 Trying	AS optionally responds with a 100 Trying provisional response
8									<b>—</b>		603	IMS_B AS returns 603 Decline to IMS_B
											Decline	IMC D forwards the CO2 Desline to LIE D
9				$\leftarrow$	_		- -	_	-		603 Decline	IMS_B forwards the 603 Decline to UE_B
11			<b>—</b>								Decime	User B is informed that call was declined
12			•			_			<b>→</b>		ACK	UE_B sends ACK to IMS_B
13											ACK	IMS_B forwards ACK to IMS_B AS
										1		

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

Step						Dii	ection					Messag	e Comment
	U s e r A	U E A	1	J s e r 3	U E B	I M S A	I B C F A	I B C F B	E N U M DB	M S B	A S B		
1					<b>&gt;</b>								User B calls User A
2						$\rightarrow$						INVITE	UE_B 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
5						$\leftarrow$	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
6								$\rightarrow$				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								$\leftarrow$	_	-		100 Trying	IMS_B responds with a 100 Trying provisional response
10									$\leftarrow$			ENUM	IMS B sends query to ENUM DB



## 4.4.7 Supplementary Service Originating Identification Presentation (OIP)

#### 4.4.7.1 Description

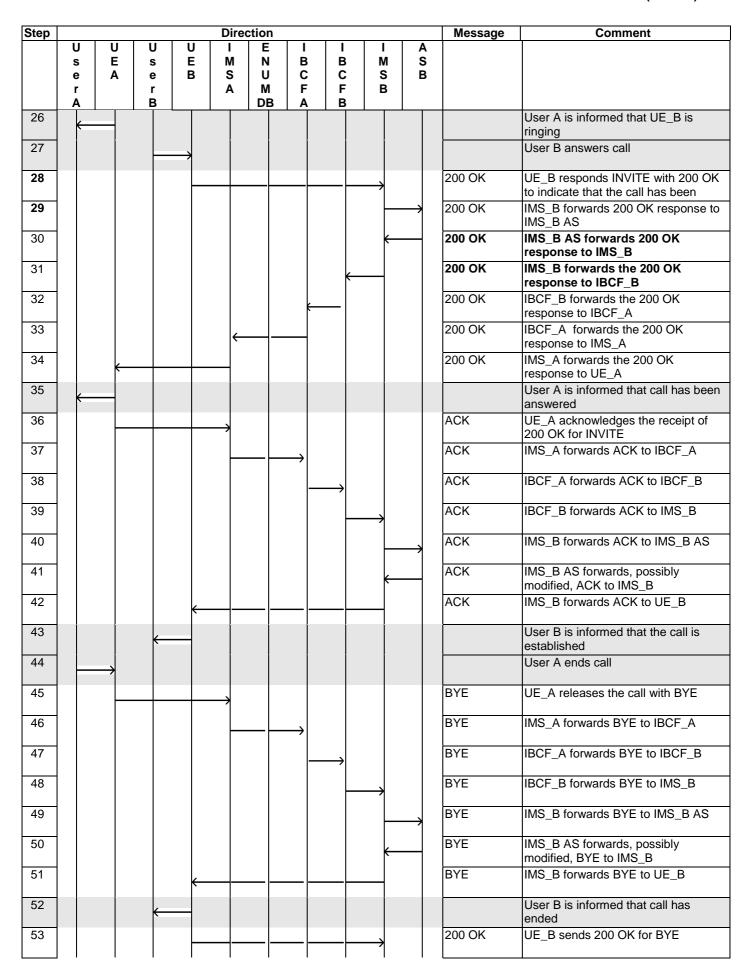
UE\_A places an IMS VoIP call to UE\_B. UE\_B is subscribed to OIP service. The call flow path and node configuration for this use case corresponds to CF\_INT\_AS when UE\_B is in home network and to CF\_ROAM\_AS when UE\_B is roaming in IMS\_A.

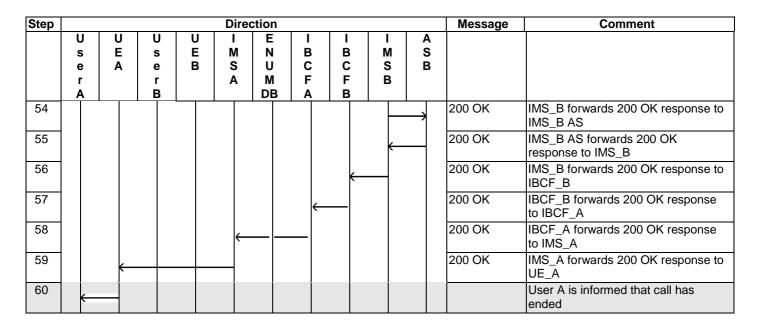
The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering):

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	Step 18	Step 24
	displayed		
3	User A is informed that UE_B is ringing	Step 26	Step 35
4	User B answers call	Step 27	Step 36
5	User A is informed that call has been answered	Step 35	Step 47
6	User B is informed that the call is established	Step 43	Step 58
7	User A ends call	Step 44	Step 59
8	User B is informed that call has ended	Step 52	Step 70
9	User A is informed that call has ended	Step 60	Step 81

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

3    SDP offer indicating all desired   100 Trying   IMS_A response with a 100 Trying   ENUM   IMS_A sends query to ENUM DB   ENUM   ENUM DB sends response to IMS   ENUM   ENUM DB sends response to IMS   INVITE   IMS_A forwards INVITE to IBCF_J   100 Trying   IBCF_A responds with a 100 Trying provisional response   INVITE   IMS_A forwards INVITE to IBCF_B   100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying   IMS_B response   INVITE to UE_B   IMS_B responds with a 100 Trying   IMS_B responds with a 100 Try	Step					Directio	n					Message	Comment
e A e B S U C C S B B  INVITE UE.A sends INVITE with the first SDP offer indicating all desired 100 Trying IMS. A responds with a 100 Trying provisional response INVITE IMS. A forwards INVITE to IBCF. INVITE IBCF. A responds with a 100 Trying IBCF. A responds with a 100 Trying 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 IMS. B responds with a 100 Trying provisional response INVITE IMS. B A specifically response with a 100 Trying IMS. B responds with a 100 Trying IMS. B		_	-	-				,   [		l M			
T R B A MB F F B B User A calls User B  INVITE UE A sends INVITE with the first SDP offer indicating all desired 100 Trying IMS. A responds with a 100 Trying provisional response ENUM IMS A sends query to ENUM DB ENUM ENUM DB sends response to IMS INVITE IMS. A forwards INVITE to IBCF_J 100 Trying IBCF_A forwards INVITE to IBCF_J 100 Trying IBCF_B forwards INVITE to IBCF_J 100 Trying provisional response INVITE INSET BECF_B 100 Trying IMS_B forwards INVITE to IMS_I 100 Trying provisional response INVITE INSET_BECF_B 100 Trying provisional response INVITE INSET_BECF_B 100 Trying IMS_B forwards INVITE to IMS_I 100 Trying IMS_B forwards InvITE INSET_BECF_B 100 Trying INSET_BECF_B INVITE INSET_BECF_B				_									
User A calls User B   INVITE   UE. A sends INVITE with the first SDP offer indicating all desired   100 Trying   IMS. A responds with a 100 Trying provisional response   ENUM   IMS A sends upery to ENUM DB   ENUM   ENUM DB sends response to IMS   IMS A sends upery to ENUM DB   ENUM   ENUM DB sends response to IMS   IMS A sends upery to ENUM DB   ENUM   ENUM DB sends response to IMS   IMS A sends upery to ENUM DB   ENUM   ENUM DB sends response to IMS   IMS A sends upery to ENUM DB   ENUM   ENUM DB sends response to IMS   IMS A forwards INVITE to IBCF_A   Improvisional response   INVITE   IMS_A forwards INVITE to IBCF_B   Improvisional response   INVITE   IMS_B Fersponds with a 100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B AS   Improvisional response   INVITE   Imscending   Imscend		r		r		A N	/ F	:   F	=	-			
3    SDP offer indicating all desired   100 Trying   IMS. A response with a 100 Trying provisional response   ENUM   IMS A sends query to ENUM DB   ENUM   E	1		→ 	   		D	B   A	\	<u> </u>				User A calls User B
100 Trying	2					<b>→</b>						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired
ENUM ENUM DB sends response to IMS  INVITE IMS_A forwards INVITE to IBCF_/  100 Trying ISCF_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 forwards INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE INVITE triggers the OIP IFC in IMS_B AS  100 Trying AS optionally responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_B AS  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_B  100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards to initial INVITE with a 100 Trying IMS_B forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing response to IMS_B AS  180 Ringing IMS_B A forwards the 180 Ringing	3		<b></b>									100 Trying	IMS_A responds with a 100 Trying
INVITE   IMS_A forwards INVITE to IBCF_/   100 Trying   IBCF_A responds with a 100   Trying provisional response   INVITE   IBCF_B forwards INVITE to IBCF_B   100 Trying   IBCF_B forwards INVITE to IBCF_B   100 Trying   IBCF_B forwards INVITE to IMS_B   INVITE   IBCF_B forwards INVITE to IMS_I   INVITE triggers the OIP IFC in IMS_B forwards the INVITE to IMS_B   INVITE triggers the OIP IFC in IMS_B forwards the INVITE to IMS_B   INVITE to IMS_B forwards the INVITE to IMS_B   Invite Imvite Imvite Imvite Imvite Imvite Imvite Imv	4					$\longrightarrow$						ENUM	
Too Trying   IBCF_A responds with a 100   Trying provisional response   INVITE   IBCF_B responds with a 100   IRCF_B responds with	5					<del></del>						ENUM	ENUM DB sends response to IMS
Trying provisional response   INVITE   IBCF_B responds with a 100   IRVITE   IBCF_B forwards INVITE to IMS_B   IRVITE to IMS_B   IRVITE triggers the OIP IFC in IMS_B AS   IRVITE triggers the OIP IFC in IMS_B AS   IRVITE triggers the OIP IFC in IMS_B AS   IRVITE   IMS_B AS   IRVITE to IMS_B A	6						$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
BBCF_B	7					<del></del>						100 Trying	Trying provisional response
Trying provisional response INVITE IBCF_B forwards INVITE to IMS_II  100 Trying IMS_B responds with a 100 Trying provisional response INVITE triggers the OIP IFC in IMS_B  112 12 13 14 15 15 16 17 18 18 10 Trying AS optionally responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to UE_IMS_B forwards I80 Ringing IMS_B forwards I80 Ringing response to IMS_B AS (and It) is displayed IRS_B RAS forwards I80 Ringing IMS_B AS forwards I80 Ringing response to IMS_B I80 Ringing IMS_B AS forwards I80 Ringing response to IMS_B I80 Ringing IMS_B forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_B forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_B forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_B forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_B forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing response to IBCF_B I80 Ringing IBCF_A forwards the 180 Ringing IBCF_B forwards the I80 Ringing IBCF_B forwards the I80 Ringing response to IBCF_B I80 Ringing IBCF_B forwards the I80 Ringing IBCF_B forwards the I80 Ringing Response to IBCF_B I80 Ringing IBCF_B forwards the I80 Ringing I	8							$\longrightarrow$	,			INVITE	
11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9							<del></del>	-			100 Trying	Trying provisional response
provisional response INVITE triggers the OIP IFC in IMS_B INVITE IMS_B forwards the INVITE to IMS_B AS  100 Trying IMS_B AS 100 Trying provisional response INVITE IMS_B AS returns, possibly modifie INVITE to IMS_B B SE returns, possibly modifie INVITE to IMS_B AS INVITE IMS_B responds with a 100 Trying IMS_B responds to intical INVITE to UE_IMS_B IMS_B Responds to IMS_B IMS_B Responds to IMS_B Responds to IMS_B Response to IMS_A	10									$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
INVITE   IMS_B AS   100 Trying   AS optionally responds with a 100 Trying provisional response   INVITE to IMS_B AS   100 Trying   AS optionally responds with a 100 Trying provisional response   INVITE   IMS_B AS returns, possibly modifie   INVITE to IMS_B   AS returns, possibly modifie   INVITE to IMS_B   100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards the INVITE to UE_I   100 Trying   UE_B optionally responds with a 10 Trying provisional response   User A, User A's identity is displayed   USer A, User A's identity is displayed   180 Ringing   UE_B responds to initial INVITE with 180 Ringing to indicate that it has 180 Ringing   IMS_B AS forwards 180 Ringing response to IMS_B AS   180 Ringing   IMS_B AS forwards 180 Ringing   IMS_B AS 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   180 Ringing   IMS_A forwards the 180 Ringing   180 Ringing   IMS_A forwards the 180 Ringing	11								<b>—</b>			100 Trying	provisional response
IMS_B AS   100 Trying   AS optionally responds with a 100 Trying provisional response   INVITE   IMS_B AS returns, possibly modifie   INVITE to IMS_B   100 Trying   IMS_B responds with a 100 Trying   IMS_B responds with a 100 Trying   IMS_B forwards the INVITE to UE_I   100 Trying   UE_B optionally responds with a 10 Trying provisional response   INVITE   IMS_B forwards the INVITE to UE_I   100 Trying   UE_B optionally responds with a 10 Trying provisional response   User B is informed of incoming call   User A, User A's identity is displaye   180 Ringing   UE_B responds to initial INVITE with   180 Ringing   IMS_B forwards 180 Ringing   IMS_B forwards 180 Ringing   IMS_B forwards 180 Ringing   IMS_B forwards the 180 Ringing   IMS_A forwards   IMS_A forwards   IMS_A forwards   IM													IMS_B
Trying provisional response INVITE IMS_B AS returns, possibly modifie INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the INVITE to UE_  100 Trying UE_B optionally responds with a 10 Trying provisional response User B is informed of incoming call User A, User A's identity is displaye  19  180 Ringing UE_B responds to initial INVITE wit 180 Ringing to indicate that it has 180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS  180 Ringing IMS_B forwards the 180 Ringing response to IMS_B AS I80 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_A forwards the 180 Ringing response to IBCF_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	12										$\rightarrow$		IMS_B AS
INVITE to IMS_B  100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards the INVITE to UE_  100 Trying UE_B optionally responds with a 100 Trying provisional response  18  19  18  19  18  19  180 Ringing UE_B responds to initial INVITE with 180 Ringing to indicate that it has 180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS forwards 180 Ringing response to IMS_B AS forwards 180 Ringing response to IMS_B 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_B Ringing response to IMS_B Ringing response to IMS_B Ringing response to IMS_A forwards the 180 Ringing Ring	13									$\leftarrow$		_	Trying provisional response
provisional response  INVITE IMS_B forwards the INVITE to UE_  INVITE IMS_B optionally responds with a 10 Trying provisional response User B is informed of incoming call User A, User A's identity is displaye  IBO Ringing UE_B responds to initial INVITE wit 180 Ringing to indicate that it has  IRO Ringing IMS_B forwards 180 Ringing response to IMS_B AS  IRO Ringing IMS_B AS forwards 180 Ringing response to IMS_B  IRO Ringing IMS_B forwards the 180 Ringing response to IBCF_B  IRO Ringing IBCF_B forwards the 180 Ringing response to IBCF_A  IRO Ringing IBCF_A forwards the 180 Ringing response to IMS_A  IRO Ringing IMS_A forwards the 180 Ringing response to IMS_A  IRO Ringing IMS_A forwards the 180 Ringing response to IMS_A	14									$\leftarrow$			
17											$\rightarrow$	_	provisional response
Trying provisional response  User B is informed of incoming call User A, User A's identity is displaye  180 Ringing UE_B responds to initial INVITE wit 180 Ringing to indicate that it has  180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS  180 Ringing IMS_B AS forwards 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 IMS_A forwards the 180 Ringing response to IMS_A					<del></del>	<u> </u>							
User A, User A's identity is displaye  180 Ringing UE_B responds to initial INVITE wit 180 Ringing to indicate that it has  180 Ringing IMS_B forwards 180 Ringing response to IMS_B AS  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_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 IBCF_A forwards the 180 Ringing response to IMS_A										$\rightarrow$		100 Trying	Trying provisional response
20 21 22 22 23 24 25 26 27 28 29 20 20 20 20 21 20 20 21 20 21 22 22 23 24 25 26 27 28 29 20 20 20 20 20 20 21 20 20 20 21 20 20 21 20 20 21 20 20 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20				<del></del>									User A, User A's identity is displayed
response to IMS_B AS  180 Ringing IMS_B AS forwards 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										$\rightarrow$			180 Ringing to indicate that it has
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											$\rightarrow$		response to IMS_B AS
response to IBCF_B  180 Ringing	21									$\leftarrow$			response to IMS_B
response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing	22								<b>—</b>				response to IBCF_B
response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing								<del></del>	-				response to IBCF_A
						<del></del>							response to IMS_A
L I I I I I I I I I I I I I I I I I I I	25		<b></b>									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A



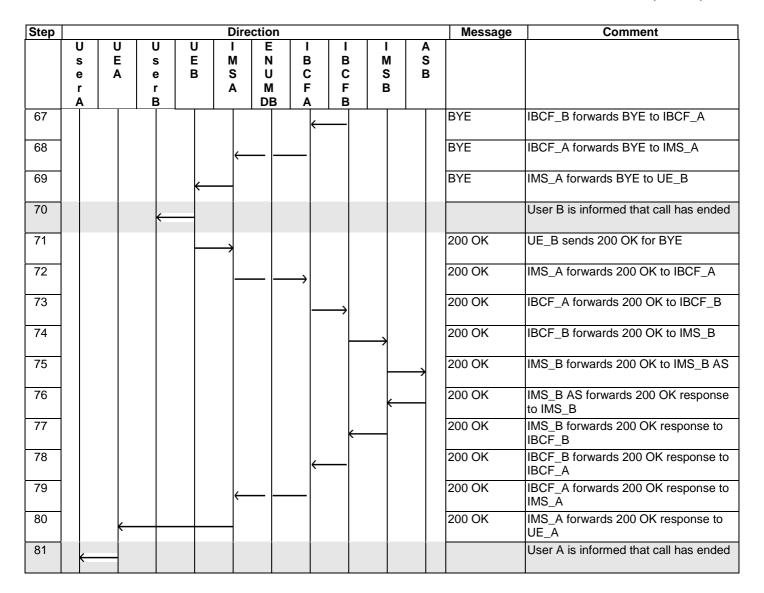


### 4.4.7.3 UC\_08\_R: SIP message flow for SS OIP with CF\_ROAM\_AS

0					Б.							1 84	
Step		111	-	 	Dire	ection	<u> </u>	<del></del>			Α	Message	Comment
	U s	U	L	U E	M	N	B		I B	M	A S		
	e	A	6	В	S	Ü			C	S	В		
	r	^	ľ		Ā	М	F		F	В			
	À		Ė		••	DB	-		В	_			
1		$\rightarrow$											User A calls User B
2		-			<b>-</b>							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						$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5					←							ENUM	ENUM DB sends response to IMS A
6							$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7					<b>←</b>	-						100 Trying	IBCF_A responds with a 100 Trying provisional response
8									$\rightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
9								$\leftarrow$	_			100 Trying	IBCF_B responds with a 100 Trying provisional response
10										$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
11									<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
													INVITE triggers the OIP IFC in IMS_B
12											$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
13										<b>←</b>		100 Trying	AS optionally responds with a 100 Trying provisional response

Step					Di	rectio	n					Message	Comment
	U s	U	U	U	I M	l E			I B	I M	A		
	е	Ā	е	В	S	U		;	С	S	В		
	r A		r B		Α	M DE			F B	В			
14							1			<b>←</b>		INVITE	IMS_B AS returns, possibly modified, INVITE to IMS_B
15											$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
16									$\leftarrow$			INVITE	IMS_B forwards the INVITE to IBCF_B
17										$\rightarrow$		100 Trying	IBCF_B 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					←							INVITE	IBCF_A forwards the INVITE to IMS_A
21					-		$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
22				<del>(</del>								INVITE	IMS_A forwards the INVITE to UE_B
23					<b>→</b>							100 Trying	UE_B optionally responds with a 100 Trying provisional response
24			<b>←</b>										User B is informed of incoming call of User A, User A's identity is displayed
25					$\longrightarrow$							180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
26					_		$\longrightarrow$					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
27									<del>&gt;</del>			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
28										$\rightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
29											$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
30										<b>←</b>		180 Ringing	IMS_B AS forwards 180 Ringing response to IMS_B
31									<b>←</b>			180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
32								←—	_			180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
33					+							180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
34		<b>K</b>										180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
35	<b>—</b>												User A is informed that UE_B is ringing
36				$\longrightarrow$									User B answers call
37					$\longrightarrow$							200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
38					-		$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
39								-	>			200 OK	IBCF_A forwards 200 OK response to IBCF_B

40 41 42 43 44 44 45 46 47 47 48 48 49 50 51 51 52 53 53 54 54 55 66 67 67 68 68 68 68 68 68 68 68 68 68 68 68 68	Step					Dire	ection	1					Message	Comment
40 41 42 43 44 45 46 47 48 48 49 49 49 40 40 41 41 42 43 44 45 46 46 47 48 48 49 49 49 49 49 40 40 40 41 41 42 48 49 49 49 40 40 40 40 40 40 41 41 42 43 44 45 46 46 47 48 48 49 49 49 40 40 40 40 40 40 40 40 40 40 40 41 41 42 43 44 45 46 46 47 48 48 49 49 49 40 40 40 40 40 40 40 40 40 40 40 40 40					E	I M	N	В		В		S		
40   41   42   43   44   45   44   46   46   47   47   47   47   47		-	Α	_	В							В		
200 OK   IMS_B AS   200 OK response to IMS_A   20	40	A		В			DB	5   A		В	$\rightarrow$		200 OK	
42   42   43   44   45   46   47   48   46   47   48   49   49   49   49   49   49   49	41											$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to
44	42										<b>—</b>		200 OK	IMS_B AS forwards 200 OK
200 OK   IBCF_B forwards the 180 Ringing response to IBCF_A   200 OK   IBCF_B forwards the 180 Ringing response to IBCF_A   200 OK   IBCF_A forwards the 180 Ringing response to IMS_A   200 OK   IBCF_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 UE_A   IMS_A forwards the 200 OK response to UE_A   IMS_A forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IBCF_A   ACK   IBCF_B forwards ACK to IBCF_B   ACK   IBCF_B forwards ACK to IMS_B   ACK   IBCF_B forwards ACK to IMS_B   ACK   IBCF_B forwards ACK to IBCF_B   ACK   IBCF_B forwards BYE to IBCF_B   ACK   IBCF_B forwards BYE to IBCF_B   BYE   IBCF_B forwards BYE to IBCF_B   BYE   IBCF_B forwards BYE to IBCF_B   BYE   IMS_B forwards BYE to IMS_B AS forwards BYE to IMS_B AS forwards possibly modified, BYE to IMS_B BYE   IMS_B forwards BYE to IMS_B BYE   I	43									<b>—</b>	_		200 OK	
response to IMS_A 200 OK IMS_A forwards the 200 OK response to IMS_A 48 49 49 50 51 52 53 54 55 56 67 57 58 69 60 61 61 62 63 64 65 65	44								<del></del>	_			200 OK	IBCF_B forwards the 180 Ringing
to UE. A User A is informed that call has been answered  ACK UE. A acknowledges the receipt of 2U. E. Acknowledges the subject of 2U. E. Acknowledges the subject of 2U. E. Acknowledges the receipt of 2U. E. Acknowledges the receipt of 2U. E. Ack	45					$\leftarrow$							200 OK	IBCF_A forwards the 180 Ringing
48 49 40 50 51 51 52 53 54 55 66 67 60 61 61 62 63 64 65 65 66 67 68 68 68 68 68 68 68 68 68 68 68 68 68	46		<b>←</b>										200 OK	
200 OK for INVITE ACK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_A 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_B ACK IBCF_A forwards ACK to IBCF_B BCF_B forwards BCF_B IMS_B ACS forwards BCF_B BCF_B forwards BCF_B IMS_B ACS forwards BCF_B BCF_B forwards BCF_B IMS_B ACS forwards BCF_B IMS_B ACS forwards BCF_B IMS_B ACS forwards BCF_B IMS_B ACS forwards, possibly modified, BCF_B IMS_B	47	<b>—</b>												
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 IMS_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_A forwards ACK to IBCF_B  BCF_A forwards ACK to IMS_A ACK IMS_A forwards ACK to IBCF_B BCF_B forwards ACK to IBCF_B BCF_B forwards ACK to IBCF_B BCF_B forwards BCF_B forwards BCF_B BCF_B forwards BCF_B forward	48					$\longrightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
ACK IBCF_B forwards ACK to IMS_B ACK IMS_B AS forwards, possibly modified, ACK to IMS_B AS ACK IMS_B Sorwards, ACK to IMS_B ACK IMS_B forwards, ACK to IMS_B ACK IMS_B forwards, ACK to IBCF_B ACK IBCF_B forwards, ACK to IBCF_A BCK IBCF_B forwards, ACK to IBCF_A BCK IBCF_B forwards, BCK to IBCF_B BCF_B forwards, BCK to IB	49					_		$\longrightarrow$					ACK	
52 53 54 55 55 56 57 58 60 61 62 63 64 65	50									→			ACK	IBCF_A forwards ACK to IBCF_B
ACK IMS_B AS forwards, possibly modified, 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 IMS_A BCK IMS_A forwards ACK to IBCF_A BCK IMS_A forwards ACK to IBCF_A BCK IBCF_A forwards BCK to IMS_A BCK IBCF_A forwards BCK to IBCF_A BCK IBCF_A forwards BCK to IBCF_B BCK IBCF_B forwards BCK to IBCF_B BCK IBCF_B forwards BCK to IBCF_B BCK IBCF_B forwards BCK to IBCF_B forwards BCK t	51										$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
modified, 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 IMS_A ACK IMS_A forwards ACK to IMS_A BCF_B forwards ACK to IMS_A ACK IMS_A forwards ACK to IMS_A BCF_B forwards ACK to IMS_A BCF_B forwards BCF_B BYE IMS_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	52											$\rightarrow$	ACK	IMS_B forwards ACK to IMS_B AS
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 UE_B  User B is informed that the call is established User A ends call  BYE UE_A releases the call with BYE BYE IBCF_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	53										<b>—</b>		ACK	
ACK IBCF_A forwards ACK to IMS_A  ACK IMS_A forwards ACK to UE_B  User B is informed that the call is established  User A ends call  User A ends call  BYE UE_A releases the call with BYE  BYE IBCF_A forwards BYE to IBCF_A  BYE IBCF_B forwards BYE to IMS_B  BYE IMS_B forwards BYE to IMS_B  BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	54									<b>—</b>			ACK	
ACK IMS_A forwards ACK to UE_B    Separate	55								<del></del>	_			ACK	IBCF_B forwards ACK to IBCF_A
58 59 60 61 62 63 64 65 User B is informed that the 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  BYE IMS_B forwards BYE to IMS_B  BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	56					<b>←</b>							ACK	IBCF_A forwards ACK to IMS_A
established  User A ends call  BYE  UE_A releases the call with BYE  BYE  BYE  BYE  BYE  BYE  BYE  BYE	57				<b>←</b>								ACK	IMS_A forwards ACK to UE_B
59  60  61  62  63  64  65  User A ends call  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  BYE  IMS_B forwards BYE to IMS_B  BYE  IMS_B AS forwards, possibly modified, BYE to IMS_B	58			<b>←</b>										
61 62 63 64 65 BYE IMS_A forwards BYE to IBCF_A BYE IBCF_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B AS BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	59		$\rightarrow$											
62 63 64 65 BYE IBCF_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B AS BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	60					$\rightarrow$							BYE	UE_A releases the call with BYE
63 64 65 BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to IMS_B AS BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	61					_		$\longrightarrow$					BYE	IMS_A forwards BYE to IBCF_A
64  BYE IMS_B forwards BYE to IMS_B AS  BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	62									<del>&gt;</del>			BYE	IBCF_A forwards BYE to IBCF_B
BYE IMS_B AS forwards, possibly modified, BYE to IMS_B	63										$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B
modified, BYE to IMS_B	64											$\rightarrow$	BYE	IMS_B forwards BYE to IMS_B AS
	65										<b>←</b>		BYE	
	66									<b>—</b>			BYE	



## 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.

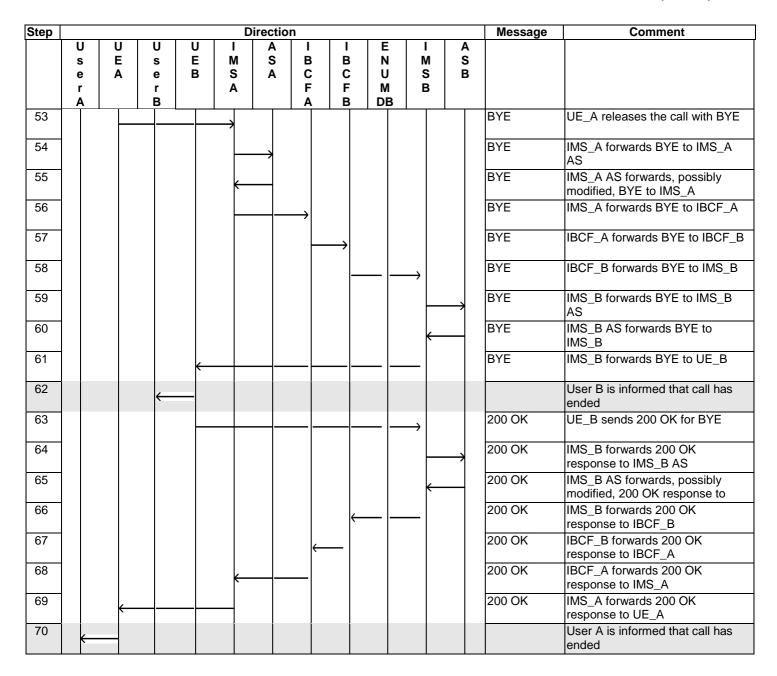
The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering):

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 22	Step 28
	is not displayed		
3	User B is informed that UE_A is ringing	Step 32	Step 41
4	User A answers call	Step 33	Step 42
5	User B is informed that call has been answered	Step 43	Step 55
6	User A is informed that the call is established	Step 51	Step 66
7	User A ends call	Step 52	Step 67
8	User B is informed that call has ended	Step 62	Step 80
9	User A is informed that call has ended	Step 70	Step 91

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

Step						Direc	ction						Message	Comment
	U	Ų		U s	U E		A I		I B	E N	I M	A S		
	s e	7		e			A		C	Ü	S	В		
	r			r B		Α	F		F B	M DB	В			
1	A			<u> </u>	<del>)</del>		<i>F</i>		<b>D</b>	DB				User B calls User A
2										_	$\rightarrow$		INVITE	UE_B sends INVITE with the first SDP offer indicating all desired
3					←				_	_			100 Trying	IMS_B responds with a 100 Trying provisional response
4										<b>←</b>			ENUM	IMS B sends query to ENUM DB
5											$\rightarrow$		ENUM	ENUM DB sends response to IMS B
														INVITE triggers the OIR IFC in IMS_B
6												$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
7											<del>(</del>		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional
8											<del>&lt;</del>		INVITE	IMS_B AS returns modified INVITE including Privacy header
9													100 Trying	IMS_B responds with a 100 Trying provisional response
10									$\leftarrow$	_  -	_		INVITE	IMS_B forwards the INVITE to IBCF_B
11										_	$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
12								-	-				INVITE	IBCF_B forwards the INVITE to IBCF_A
13									>				100 Trying	IBCF_A responds with a 100 Trying provisional response
14						<b></b>	_						INVITE	IBCF_A forwards the INVITE to IMS_A
15							$\longrightarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
														INVITE triggers the OIP IFC in IMS_A
16						<del></del>							INVITE	IMS_A forwards the INVITE to IMS_A AS
17						<del></del>							100 Trying	IMS_A AS optionally responds with a 100 Trying provisional
18						<del></del>							INVITE	IMS_A AS returns modified INVITE including modified From
19													100 Trying	IMS_A responds with a 100 Trying provisional response
20			<del>(</del>	-		-							INVITE	IMS_A forwards the INVITE to UE_A
21						>							100 Trying	UE_A optionally responds with a 100 Trying provisional response
22	+													User A is informed of incoming call of User B, user B's identity is
23						>							180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it
24													180 Ringing	IMS_A forwards the 180 Ringing to IMS_A AS

Step					D	irectio	on						Message	Comment
		U E	U s	U E	I M	A S	I B		I 3	E N	I M	A S		
		A	e	В	S	A	C			Ü	S	В		
	r A		r B		Α		F		F	M DB	В			
25			Б		<u> </u>			_   [		DB.			180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing to IMS_A
26							$\longrightarrow$						180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
27							•		•				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
28										_	$\rightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
29												$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
30											<del>(</del>		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing response
31				$\leftarrow$						-	-		180 Ringing	IMS_B forwards the 180 Ringing response to UE_B
32			<del></del>	_										User B is informed that UE_A is ringing
33		<del>)</del>												User A answers call
34				_	$\rightarrow$								200 OK	UE_A responds INVITE with 200 OK to indicate that the call has
35						$\rightarrow$							200 OK	IMS_A forwards the 200 OK to IMS_A AS
36					$\leftarrow$								200 OK	IMS_A AS forwards, possibly modified, 200 OK to IMS_A
37							$\longrightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
38							•		•				200 OK	IBCF_A forwards 200 OK response to IBCF_B
39										_	$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
40												$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
41											<b>←</b>		200 OK	IMS_B AS forwards, possibly modified, 200 OK response to
42				$\leftarrow$					-	-	-		200 OK	IMS_B forwards the 200 OK response to UE_B
43			<del></del>											User B is informed that call has been answered
44										-	$\rightarrow$		ACK	UE_B acknowledges the receipt of 200 OK for INVITE
45												$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS
46											<b>←</b>		ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
47									$\leftarrow$	-	-		ACK	IMS_B forwards ACK to IBCF_B
48								<del></del>					ACK	IBCF_B forwards ACK to IBCF_A
49					<b>—</b>								ACK	IBCF_A forwards ACK to IMS_A
50		<del></del>											ACK	IMS_A forwards ACK to UE_A
51	<b>(</b>													User A is informed that the call is established
52		>												User A ends call



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

Step					D	irectio	n					Message	Comment
	U	U	U	U	ı	Α	ı	ı	E	I	Α		
	S	E	S	E	M	S	В	В	N	M	S		
	е	Α	е	В	S	Α	C	C	U	S	В		
	r		r B		Α		F	B	M DB	В			
4	Α		P				Α	<u> </u>	ם עו				Llear D. colle Llear A
i i				$\rightarrow$									User B calls User A
2												INVITE	UE_B sends INVITE with the
													first SDP offer indicating all
					1								desired media and codecs that
													UE_B supports
3				,								100 Trying	IMS_A responds with a 100
													Trying provisional response
4												INVITE	IMS_A forwards INVITE to
													IBCF_A

Step						Direct	ion				_		Message	Comment
	U	J	U	ū	I	A			_ L	E		A		
	s e	<u> </u>	s e	E B	M S	S			B C	N U	M	S B		
	r	-	r	_	Ā		F		F	M	В			
	Α		В	-			Α		В	DB				
5					←								100 Trying	IBCF_A responds with a 100 Trying provisional response
6													INVITE	IBCF_A forwards INVITE to
							•		$\rightarrow$					IBCF_B
7									_				100 Trying	IBCF_B responds with a 100
8													INVITE	Trying provisional response IBCF_B forwards INVITE to
0											$\rightarrow$		INVITE	IMS_B
9									_				100 Trying	IMS_B responds with a 100
														Trying provisional response
10										<b>←</b>			ENUM	IMS B sends query to ENUM DB
11										_	$\rightarrow$		ENUM	ENUM DB sends response to IMS B
														INVITE triggers the OIR IFC in
40													INVITE	IMS_B
12												$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
13													100 Trying	IMS_B AS optionally responds
											←		, ,	with a 100 Trying provisional
													INDUTE	response
14											_		INVITE	IMS_B AS returns modified INVITE including Privacy header
											(			(value "id" or "header") to IMS_B
15													100 Trying	IMS_B responds with a 100
10												1	INDUTE	Trying provisional response
16									$\leftarrow$				INVITE	IMS_B forwards the INVITE to IBCF_B
17													100 Trying	IBCF_B responds with a 100
											7			Trying provisional response
18									_				INVITE	IBCF_B forwards the INVITE to IBCF_A
19									_				100 Trying	IBCF_A responds with a 100
													INDUTE	Trying provisional response
20					←								INVITE	IMS_B forwards the INVITE to IMS_A
21													100 Trying	IMS_A responds with a 100
							,							Trying provisional response
														INVITE triggers the OIP IFC in IMS_A
22													INVITE	IMS_A forwards the INVITE to
						$\longrightarrow$								IMS_A AS
23													100 Trying	IMS A AS optionally responds
														with a 100 Trying provisional response
24													INVITE	IMS_A AS returns modified
					←									INVITE including modified From
														and P-Asserted headers to
25													100 Trying	IMS_A responds with a 100
						$\longrightarrow$								Trying provisional response
26		<del></del>											INVITE	IMS_A forwards the INVITE to UE_A
27						$\longrightarrow$							100 Trying	UE_A optionally responds with a
28														100 Trying provisional response User A is informed of incoming
	←													call of User B, user B's identity
														is not displayed
29													180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that
														it has started alerting
	•	•	•	•	•		į	•	•	,			1	

Step			 			ction						Message	Comment
	U s	U		U   E   1		-	I B	I B	E N	I M	A		
	e	Ā		в	S   A	A (	C	С	U	S	В		
	r A		r B	'	4		F A	F B	M DB	В			
30	Î					\		Ť				180 Ringing	IMS_A forwards the 180 Ringing to IMS_A AS
31					<del>(</del>							180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing to IMS_A
32						<del> </del>	•					180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
33								$\rightarrow$				180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
34									_	$\longrightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
35											$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
36										+		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing response to IMS_B
37								←	_			180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
38							$\leftarrow$					180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
39						<del></del>	-					180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
40				<del></del>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
41			<del></del>										User B is informed that UE_A is ringing
42		$\longrightarrow$											User A answers call
43		-		<u> </u>								200 OK	UE_A responds INVITE with 200 OK to indicate that the call
44						•						200 OK	has been answered IMS_A forwards the 200 OK to IMS_A AS
45					<b>.</b>							200 OK	IMS_A AS forwards, possibly modified, 200 OK to IMS_A
46						<del> </del>	•					200 OK	IMS_A forwards 200 OK response to IBCF_A
47								$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
48									_	$\longrightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
49										-	$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
50										<del>(</del>		200 OK	IMS_B AS forwards, possibly modified, 200 OK response to
51								←	_			200 OK	IMS_B IMS_B forwards the 200 OK
52							$\leftarrow$	_				200 OK	response to IBCF_B IBCF_B forwards the 200 OK response to IBCF_A
53					<b>(</b>		_					200 OK	IBCF_A forwards the 200 OK response to IMS_A
54				<del></del>								200 OK	IMS_A forwards the 200 OK response to UE_B
55			<b>-</b>										User B is informed that call has been answered
56												ACK	UE_B acknowledges the receipt of 200 OK for INVITE
57						<del> </del> ;	•					ACK	IMS_A forwards ACK to IBCF_A

Step						Dire	ction						Message	Comment
	U			U	U			I	I	Е	I	Α		
	s			s	E			3	В	N	M	S		
	е	A	4	е	В	-		2	Č	U	S	В		
	r A			r B		Α		F	F B	M DB	В			
58	7						<del>, '</del>	1	1	DB	1		ACK	IBCF_A forwards ACK to
00									$\rightarrow$				/ Corc	IBCF_B
59										_  _	$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
60													ACK	IMS_B forwards ACK to IMS_B
														AS
61											<b>←</b>		ACK	IMS_B AS forwards, possibly modified, ACK to IMS_B
62									$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
63								$\leftarrow$	_				ACK	IBCF_B forwards ACK to IBCF_A
64						<b></b>							ACK	IBCF_A forwards ACK to IMS_A
65			<del></del>										ACK	IMS_A forwards ACK to UE_A
66	,													User A is informed that the call
	•													is established
67	-	$\longrightarrow$												User A ends call
68						<del>&gt;</del>							BYE	UE_A releases the call with BYE
69							•						BYE	IMS_A forwards BYE to IMS_A AS
70						<b></b>							BYE	IMS_A AS forwards, possibly
71													BYE	modified, BYE to IMS_A IMS_A forwards BYE to IBCF_A
72							] /						BYE	IBCF_A forwards BYE to
12									$\rightarrow$				BIL	IBCF_B
73										_	$\longrightarrow$		BYE	IBCF_B forwards BYE to IMS_B
74													BYE	IMS_B forwards BYE to IMS_B
														AS
75											<b>←</b>		BYE	IMS_B AS forwards BYE to IMS_B
76									$\leftarrow$				BYE	IMS_B forwards BYE to IBCF_B
77									_				BYE	IBCF_B forwards BYE to IBCF_A
78													BYE	IBCF_A forwards BYE to IMS_A
79					<b></b>	_ `							BYE	IMS_A forwards BYE to UE_B
80					_									User B is informed that call has
														ended
81						<del>)</del>							200 OK	UE_B sends 200 OK for BYE
82							$\longrightarrow$	,					200 OK	IMS_A forwards 200 OK response to IBCF_A
83									_				200 OK	IBCF_A forwards 200 OK
														response to IBCF_B
84										_	$\longrightarrow$		200 OK	IBCF_B forwards 200 OK
85													200 OK	response to IMS_B IMS_B forwards 200 OK
												1		response to IMS_B AS
86											<b>←</b>		200 OK	IMS_B AS forwards, possibly modified, 200 OK response to
67													000 014	IMS_B
87									$\leftarrow$	<u> </u>	—		200 OK	IMS_B forwards 200 OK response to IBCF_B
88								$\leftarrow$	-				200 OK	IBCF_B forwards 200 OK response to IBCF_A
89													200 OK	IBCF_A forwards 200 OK
														response to IMS_A
90			<del>(                                    </del>			-							200 OK	IMS_A forwards 200 OK response to UE_A
91		,												User A is informed that call has
	)													ended

# 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	14	20
3	User A is informed that UE_B is ringing	20	29
4	User B answers call	21	30
5	User A is informed that call has been answered	27	39
6	User B is informed that call is established	33	48
7	User B puts call on hold	34	49
8	User A is informed that call on hold with AS	49	70
	tone		
9	User B is informed that call on hold	57	81
10	User B resumes call	65	92
11	User B is informed that call is resumed	87	123
12	User A is informed that call is resumed	95	134
13	User A ends call	96	135
14	User B is informed that call has ended	102	144
15	User A is informed that call has ended	108	153

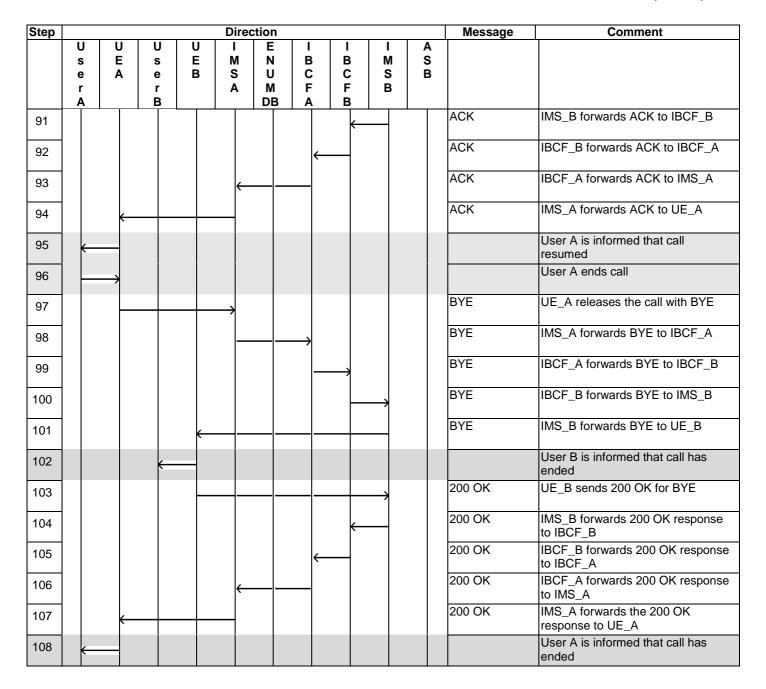
# 4.4.9.1.1 UC\_10\_I: SIP Call Flow "call hold and resume with AS tone" using reINVITE with CF\_INT\_AS

Step					Direc	ction					Message	Comment
•	U s e r A	U E A	U s e r B	U E B	I M S A	E N U M DB	I B C F A	I B C F B	M S B	A S B		
1		<b>—</b>										User A calls User B
2					<b>-&gt;</b>						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that UE_A supports
3		<b>←</b>									100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$					ENUM	IMS A sends query to ENUM DB
5					$\leftarrow$	_					ENUM	ENUM DB sends response to IMS A
6							$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
7					$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
8								$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
9							$\leftarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
10									$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B

Step					D	irection						Message	Comment
	U s e r A	E	E	J   U s   E e   E r   B	E   N	S U	C F	:   (	I B C F B	I M S B	A S B		
11		•			•		•	•	$\leftarrow$			100 Trying	IMS_B responds with a 100 Trying provisional response
12					<del>(</del>							INVITE	IMS_B forwards INVITE to UE_B
13										$\rightarrow$		100 Trying	UE_B optionally responds with a 100 Trying provisional response
14				<b>—</b>									User B is informed of incoming call of User A
15										$\rightarrow$		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16									$\leftarrow$			180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
17								<del></del>				180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
18						<del></del>						180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
19			←									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
20	K												User A is informed that UE_B is ringing
21				$\longrightarrow$									User B answers call
22										$\rightarrow$		200 OK	UE_B responds to INVITE with 200 OK to indicate that the call has been answered
23									$\leftarrow$			200 OK	IMS_B forwards 200 OK response to IBCF_B
24								←	-			200 OK	IBCF_B forwards 200 OK response to IBCF_A
25						<del></del>						200 OK	IBCF_A forwards 200 OK response to IMS_A
26			<del>(</del>									200 OK	IMS_A forwards the 200 OK response to UE_A
27	•												User A is informed that call has been answered
28					$\longrightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
29							$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
30									<del>)</del>			ACK	IBCF_A forwards ACK to IBCF_B
31										$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
32					<del></del>				$\perp$			ACK	IMS_B forwards ACK to UE_B
33				<b>—</b>									User B is informed that call is established
34													User B puts call on hold
35										$\rightarrow$		INVITE	UE_B sends reINVITE message indicating media attribute "sendonly" (Call Hold)
36					<del></del>				+			100 Trying	IMS_B responds with a 100 Trying provisional response

		_				Direc							Message	Comment
	U s e r A	E	:   s	s e r	U E B	M S A	E N U M DB	B C F A	,	I B C F B	I M S B	A S B		
37			I									$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
38											<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
39											$\leftarrow$		INVITE	AS_B sends reINVITE to IMS_B
40												$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
41										$\leftarrow$			INVITE	IMS_B forwards reINVITE to IBCF_B
42											$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
43									$\leftarrow$	+			INVITE	IBCF_B forwards reINVITE to IBCF_A
44										$\rightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
45						←							INVITE	IBCF_A forwards reINVITE to IMS_A
46								$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
47			<del></del>										INVITE	IMS_A forwards reINVITE to UE_A
48						$\rightarrow$							100 Trying	UE_A optionally responds with a 100 Trying provisional response
49	←													User A is informed that call is on hold with AS tone
50						<b>→</b>							200 OK	UE_A responds to reINVITE with 200 OK indicating media attribute "recvonly"
51								$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
52										<del>)</del>			200 OK	IBCF_A forwards 200 OK response to IBCF_B
53											$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
54												$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
55											$\leftarrow$		200 OK	AS_B forwards 200 OK response to IMS_B
56					<del></del>								200 OK	IMS_B forward the 200 OK to UE_B
57				<del></del>										User B is informed that the call is on hold
58											$\rightarrow$		ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
59												$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
60											←		ACK	AS_B forwards ACK to IMS_B
61										$\leftarrow$			ACK	IMS_B forwards ACK to IBCF_B
62									$\leftarrow$	4			ACK	IBCF_B forwards ACK to IBCF_A
63						$\leftarrow$							ACK	IBCF_A forwards ACK to IMS_A

Step					D	irectio	n					Message	Comment
	U s	_			U E I	I E		3   I	В	M –	A S		
	e r	. 4	A (		В	S L	JC	; (	C F	S B	В		
	Ā			В		, D			В			101/	1000 07 1 0007 115 0
64			←									ACK	IMS_A forwards ACK to UE_A
65				<b></b>									User B resumes call
66										$\rightarrow$		INVITE	UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)
67					<del></del>							100 Trying	IMS_B responds with a 100 Trying provisional response
68											$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
69										$\leftarrow$		100 Trying	AS_B optionally responds with a 100 Trying provisional response
70										$\leftarrow$	_	INVITE	AS_B forwards INVITE to IMS_B
71											$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
72									<b></b>			INVITE	IMS_B sends reINVITE to IBCF_B
73										$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
74								$\leftarrow$				INVITE	IBCF_B sends reINVITE to IBCF_A
75									<del>)</del>			100 Trying	IBCF_A responds with a 100 Trying provisional response
76						<del></del>						INVITE	IBCF_A sends reINVITE to IMS_A
77							<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional response
78			←—									INVITE	IMS_A forwards reINVITE to UE_A
79					;							100 Trying	UE_A optionally responds with a 100 Trying provisional response
80					;							200 OK	UE_A sends the 200 OK indicating media attribute "sendrecv" to IMS_A
81							$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
82									>			200 OK	IBCF_A forwards 200 OK response to IBCF_B
83										$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
84											$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
85										$\leftarrow$		200 OK	AS_B forwards the 200 OK for INVITE
86					<del></del>					$\dashv$		200 OK	IMS_B forwards 200 OK to UE_B
87				<b>—</b>									User B is informed that call is resumed
88										$\rightarrow$		ACK	UE_B sends ACK to IMS_B
89											$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
90										$\leftarrow$		ACK	AS_B forwards ACK to IMS_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					Dire	ction					Message	Comment
	N e r ∢	U E A	UserB	U E B	I M S A	E N U M DB	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
3		$\leftarrow$									100 Trying	IMS_A responds with a 100 Trying provisional response

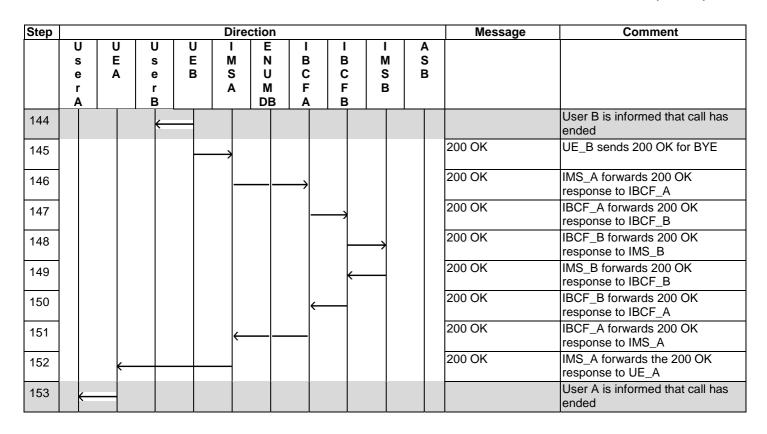
Step					Direc						Message	Comment
	U s	U E	U s	U E	I M	E N	I B	I B	I M	A S		
	е	Ā	е	В	S	U	С	С	S B	В		
	r A		r B		Α	M DB	F A	F B	В			
4						$\rightarrow$					ENUM	IMS A sends query to ENUM DB
5					$\leftarrow$	_					ENUM	ENUM DB sends response to IMS A
6							$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
7					$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
8							-				INVITE	IBCF_A forwards INVITE to IBCF_B
9							<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
10									$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
11								*			100 Trying	IMS_B responds with a 100 Trying provisional response
12								<b>+</b>			INVITE	IMS_B forwards INVITE to IBCF_B
13									$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
14							←				INVITE	IBCF_B forwards INVITE to IBCF_A
15							_	$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
16					$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
17							$\longrightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
18				←							INVITE	IMS_A forwards 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
21					$\rightarrow$						180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that
22							$\rightarrow$				180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
23							-	$\longrightarrow$			180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
24									$\rightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
25								€			180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
26							<b>←</b>				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
27					$\leftarrow$						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
28		<b></b>									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
29	<b>—</b>											User A is informed that UE_B is ringing
30				$\rightarrow$								User B answers call
31					$\rightarrow$						200 OK	UE_B responds to INVITE with 200 OK to indicate that the call

Step					Dir	rection	1					Message	Comment
	U s	U E	U s	υE	I M		l B		I B	I M	A S		
	e r	A	e r	В	S	U M	C F		C F	S B	В		
32	A		B		-	DB	- A →		В			200 OK	IMS_A forwards 200 OK response to IBCF_A
33									<b>→</b>			200 OK	IBCF_A forwards 200 OK response to IBCF_B
34										$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
35									$\leftarrow$			200 OK	IMS_B forwards 200 OK response to IBCF_B
36								<del></del>	_			200 OK	IBCF_B forwards 200 OK response to IBCF_A
37					€	-						200 OK	IBCF_A forwards 200 OK response to IMS_A
38		←										200 OK	IMS_A forwards the 200 OK response to UE_A
39	<b>←</b>												User A is informed that call has been answered
40					$\rightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
41					-		$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
42									<del>-</del>			ACK	IBCF_A forwards ACK to IBCF_B
43										$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
44									<b>←</b>			ACK	IMS_B forwards ACK to IBCF_B
45								<del></del>	_			ACK	IBCF_B forwards ACK to IBCF_A
46					<del>&lt;</del>							ACK	IBCF_A forwards ACK to IMS_A
47				<b>(</b>								ACK	IMS_A forwards ACK to UE_B
48			<b>←</b>										User B is informed that call is established
49				$\rightarrow$									User B puts call on hold
50					$\rightarrow$							INVITE	UE_B sends reINVITE message indicating media attribute
51				<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
52					-		$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
53					€	-						100 Trying	IBCF_A responds with a 100 Trying provisional response
54									$\rightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
55								<del></del>	_			100 Trying	IBCF_B responds with a 100 Trying provisional response
56										$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
57									$\leftarrow$	$\dashv$		100 Trying	IMS_B responds with a 100 Trying provisional response
58											$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
59										<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response

Step					D	irectio	n					Message	Comment
	U s	U E	U s	U	I N	ı E		,	I B	I M	A S		
	е	Ā	е	В	S	S U	) C	;   (	С	S	В		
	r A		r B		Α	\ DE			F B	В			
60							•	,		$\leftarrow$		INVITE	AS_B sends reINVITE to IMS_B
61											$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
62									$\leftarrow$			INVITE	IMS_B forwards reINVITE to IBCF_B
63										$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
64								<del></del>	-			INVITE	IBCF_B forwards reINVITE to IBCF_A
65									<del>)</del>			100 Trying	IBCF_A responds with a 100 Trying provisional response
66						$\leftarrow$						INVITE	IBCF_A forwards reINVITE to IMS_A
67							$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
68		<b>—</b>										INVITE	IMS_A forwards reINVITE to UE_A
69					$\longrightarrow$							100 Trying	UE_A optionally responds with a 100 Trying provisional response
70	<b>—</b>												User A is informed that call is on hold with AS tone
71					$\longrightarrow$							200 OK	UE_A responds to reINVITE with 200 OK indicating media
72							$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
73									<del>)</del>			200 OK	IBCF_A forwards 200 OK response to IBCF_B
74										$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
75											$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
76										<b>←</b>		200 OK	AS_B forwards 200 OK response to IMS_B
77									$\leftarrow$			200 OK	IMS_B forwards 200 OK response to IBCF_B
78								<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
79						<del></del>						200 OK	IBCF_A forwards 200 OK response to IMS_A
80				+								200 OK	IMS_A forward the 200 OK to UE_B
81			<del>-</del>										User B is informed that the call is on hold
82												ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
83							$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
84									<del>)</del>			ACK	IBCF_A forwards ACK to IBCF_B
85										$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
86											$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
87										<del>(</del>		ACK	AS_B forwards ACK to IMS_B

Step					Dire	ction					Message	Comment
	U s	υш	U	U E	I M	E N	l B	l B	I M	A S		
	е	A	е	В	S	U M	C	C	S	В		
	r A		r B		A	DB	A	В	В			
88								<b>←</b>			ACK	IMS_B forwards ACK to IBCF_B
89							<b>←</b>				ACK	IBCF_B forwards ACK to IBCF_A
90					$\leftarrow$						ACK	IBCF_A forwards ACK to IMS_A
91		$\leftarrow$									ACK	IMS_A forwards ACK to UE_A
92				$\rightarrow$								User B resumes call
93					$\rightarrow$						INVITE	UE_B sends second reINVITE message indicating media
94				<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
95							$\longrightarrow$				INVITE	IMS_A sends reINVITE to IBCF_A
96					$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
97							_	$\longrightarrow$			INVITE	IBCF_A sends reINVITE to IBCF_B
98							<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
99								_	<del></del>		INVITE	IBCF_B sends reINVITE to IMS_B
100								<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
101										$\longrightarrow$	INVITE	IMS_B sends reINVITE to AS_B
102									<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
103									<b>←</b>	$\blacksquare$	INVITE	AS_B forwards INVITE to IMS_B
104										$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
105								<b>←</b>			INVITE	IMS_B sends reINVITE to IBCF_B
106									$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
107							<b>←</b>				INVITE	IBCF_B sends reINVITE to IBCF_A
108							_	$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
109					$\leftarrow$						INVITE	IBCF_A sends reINVITE to IMS_A
110							$\longrightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
111		<b>←</b>									INVITE	IMS_A forwards reINVITE to UE_A
112					$\longrightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
113					$\rightarrow$						200 OK	UE_A sends the 200 OK indicating media attribute
114							$\longrightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
115							_	<b></b>			200 OK	IBCF_A forwards 200 OK response to IBCF_B

Step					Dir	ectio						Message	Comment
	U s e r	U E A	U s e r	U E B	M S A	N U M	E C	3   1 3   (	I B C F	I M S B	A S B		
116	A		B 			DE	3   A	\	B	$\rightarrow$		200 OK	IBCF_B forwards 200 OK
117											$\rightarrow$	200 OK	response to IMS_B IMS_B forwards 200 OK response to AS_B
118										<b>←</b>		200 OK	AS_B forwards the 200 OK for INVITE
119									<b>—</b>			200 OK	IMS_B forwards 200 OK to IBCF_B
120								<del></del>				200 OK	IBCF_B forwards 200 OK to IBCF_A
121					<del>(</del>							200 OK	IBCF_A forwards 200 OK to IMS_A
122				<b>←</b>								200 OK	IMS_A forwards 200 OK to UE_B
123			<b>←</b>										User B is informed that call is resumed
124					->							ACK	UE_B sends ACK to IMS_A
125					_		$\longrightarrow$	•				ACK	IMS_A forwards ACK to IBCF_A
126									<del>)</del>			ACK	IBCF_A forwards ACK to IBCF_B
127										$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
128											$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
129										$\leftarrow$		ACK	AS_B forwards ACK to IMS_B
130									<b>—</b>			ACK	IMS_B forwards ACK to IBCF_B
131								<del></del>				ACK	IBCF_B forwards ACK to IBCF_A
132					<del>(</del>							ACK	IBCF_A forwards ACK to IMS_A
133		<b>←</b>										ACK	IMS_A forwards ACK to UE_A
134	$\vdash$												User A is informed that call resumed
135		$\rightarrow$											User A ends call
136					$\longrightarrow$							BYE	UE_A releases the call with BYE
137					_		<b></b>					BYE	IMS_A forwards BYE to IBCF_A
138									<del>)</del>			BYE	IBCF_A forwards BYE to IBCF_B
139										$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B
140									$\leftarrow$	$\dashv$		BYE	IMS_B forwards BYE to IBCF_B
141								<del></del>	$\frac{1}{2}$			BYE	IBCF_B forwards BYE to IBCF_A
142					←							BYE	IBCF_A forwards BYE to IMS_A
143				←								BYE	IMS_A forwards BYE to UE_B



# 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	19	19
3	User B2 is informed of incoming call of User A	24	30
4	User B2 answers call	25	31
5	User A is informed that call has been answered	33	42
6	User B2 is informed that call is established	41	53
7	User A ends call	42	54
8	User B2 is informed that call has ended	48	62
9	User A is informed that call has ended	54	72

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

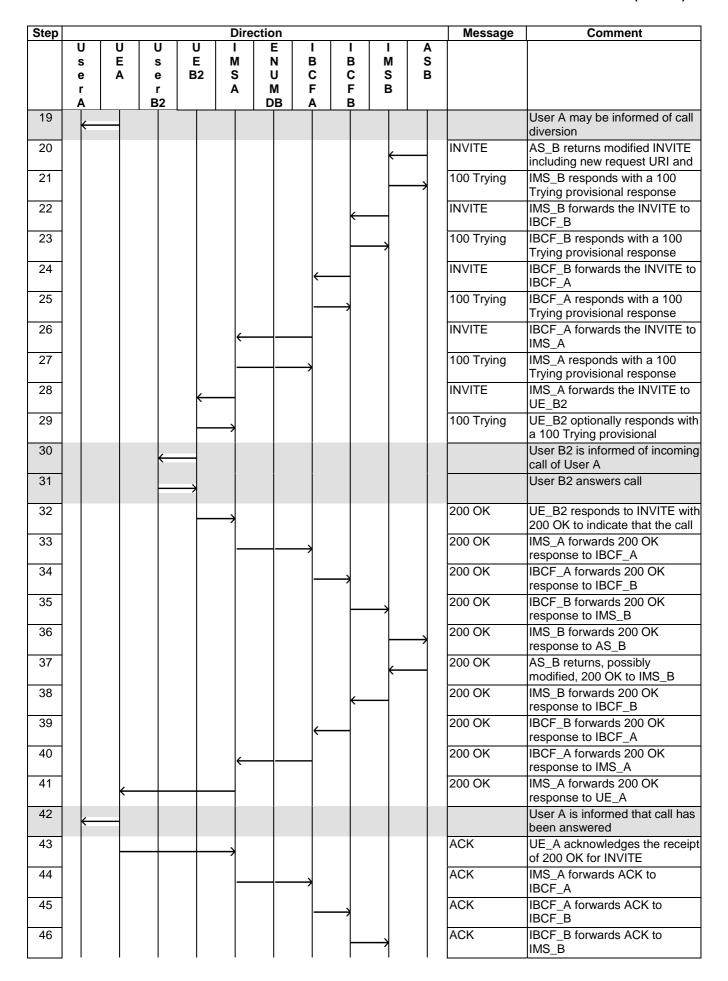
Step			Dir	ection				Message	Comment
	U U s E	U s	U I E M	E N	I B	I B I	I A VI S		
	e A	e	B2 S A	Ü	C	C	S B		
	Å	B2	^	DB	Ā	В			
1	$\longrightarrow$								User A calls User B
2			<b> </b>					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired
3			_	<b>→</b>				ENUM	IMS A sends query to ENUM DB
4			←					ENUM	ENUM DB sends response to IMS A
5	<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
6			-		$\rightarrow$			INVITE	IMS_A forwards INVITE to IBCF_A
7			←					100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$		INVITE	IBCF_A forwards INVITE to IBCF_B
9					←			100 Trying	IBCF_B responds with a 100 Trying provisional response
10						:		INVITE	IBCF_B forwards INVITE to IMS_B
11						←		100 Trying	IMS_B responds with a 100 Trying provisional response
									INVITE triggers the CFU IFC in IMS_B
12								INVITE	IMS_B forwards the INVITE to AS_B
13							<del></del>	100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
									AS_B applies the CDIV CFU procedure
14							<del></del>	181 Call is being	AS_B indicates optionally to IMS_B that call has been
15						<del></del>		181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
16					←			181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
17			←		$\dashv$			181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
18	<b>├</b>							181 Call is being	IMS_A indicates that call to UE_B has been forwarded
19	<del></del>								User A may be informed of call diversion
20							<del></del>	INVITE	AS_B returns modified INVITE including new request URI and
21								100 Trying	IMS_B responds with a 100 Trying provisional response
22			<del>-</del>	-				INVITE	IMS_B forwards the INVITE to UE_B2
23								100 Trying	UE_B2 optionally responds with a 100 Trying provisional response
24		<del>(</del>	-						User B2 is informed of incoming call of User A

Step					Directio	on					Message	Comment
		J L E s				E N	I B	I B	I M	A S		
	e /	A e	В		S   1	Ŭ M	C F	C F	S B	В		
	r A	l r				)B	Ā	B	ь			
25			$\longrightarrow$									User B2 answers call
26									$\rightarrow$		200 OK	UE_B2 responds to INVITE with 200 OK to indicate that the call
27										$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
28									<del>(                                    </del>		200 OK	AS_B returns, possibly modified, 200 OK to IMS_B
29								<del>(                                    </del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
30							$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A
31					<del></del>						200 OK	IBCF_A forwards 200 OK response to IMS_A
32		<del>(</del>									200 OK	IMS_A forwards 200 OK response to UE_A
33	<del></del>											User A is informed that call has been answered
34				$\longrightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
35							<del>)</del>				ACK	IMS_A forwards ACK to IBCF_A
36								$\rightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
37									$\rightarrow$		ACK	IBCF_B forwards ACK to IMS_B
38										$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
39									<b>←</b>		ACK	AS_B returns, possibly modified, ACK to IMS_B
40				<del></del>							ACK	IMS_B forwards ACK to UE_B2
41			<del></del>									User B2 is informed that call is established
42	<b>├</b>											User A ends call
43				$\longrightarrow$							BYE	UE_A releases the call with BYE
44							<del>)</del>				BYE	IMS_A forwards BYE to IBCF_A
45								$\rightarrow$			BYE	IBCF_A forwards BYE to IBCF_B
46									$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B
47				<del></del>							BYE	IMS_B forwards BYE to UE_B
48			<del>-</del>								BYE	User B is informed that call has ended
49									$\rightarrow$		200 OK	UE_B sends 200 OK for BYE
50								<b>←</b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
51							$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A
52					<del></del>	-					200 OK	IBCF_A forwards 200 OK response to IMS_A

Step					Dire	ection					Message	Comment
	U s e r	U E A	U s e r B2	U E B2	I M S A	E N U M DB	I B C F	I B C F B	I M S B	A S B		
53		<b>←</b>	, BZ				A				200 OK	IMS_A forwards 200 OK response to UE_A
54	<b>←</b>											User A is informed that call has ended

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

Step					Dire	ction					Message	Comment
<b>F</b>	U s e r A	U E A	U s e r B2	U E B2	I M S A	E N U M DB	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
3		<b>←</b>									100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$					ENUM	IMS A sends query to ENUM DB
4					$\leftarrow$						ENUM	ENUM DB sends response to IMS A
6							$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
7					$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
8							_	$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
9							<b>←</b>				100 Trying	IBCF_B responds with a 100 Trying provisional response
10									>		INVITE	IBCF_B forwards INVITE to IMS_B
11								€			100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the CFU IFC in IMS_B
12										$\rightarrow$	INVITE	IMS_B forwards the INVITE to AS_B
13									$\leftarrow$		100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
												AS_B applies the CDIV CFU procedure
14									$\leftarrow$		181 Call is being	AS_B indicates optionally to IMS_B that call has been
15								€	-		181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
16							$\leftarrow$				181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
17					$\leftarrow$						181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
18		<b>←</b>									181 Call is being	IMS_A indicates that call to UE_B has been forwarded



Step					Directio	n					Message	Comment
					<b>vi</b> i		I B	I B	I M	A S		
	e r		e E r	l l	_		C F	C F	S B	В		
47	A		32					В			1014	1140 P. (
47										$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
48									$\leftarrow$		ACK	AS_B returns, possibly modified, ACK to IMS_B
49								$\leftarrow$			ACK	IMS_B forwards ACK to IBCF_B
50							<del></del>				ACK	IBCF_B forwards ACK to IBCF_A
51					<del></del>		1				ACK	IBCF_A forwards ACK to IMS_A
52				<del></del>							ACK	IMS_A forwards ACK to UE_B2
53			<del></del>									User B2 is informed that call is established
54		*										User A ends call
55											BYE	UE_A releases the call with BYE
56											BYE	IMS_A forwards BYE to IBCF_A
57								<del>)</del>			BYE	IBCF_A forwards BYE to IBCF_B
58									$\rightarrow$		BYE	IBCF_B forwards BYE to IMS_B
59								<del></del>			BYE	IMS_B forwards BYE to IBCF_B
60							<b></b>				BYE	IBCF_B forwards BYE to IBCF_A
61					<del></del>		-				BYE	IBCF_A forwards BYE to IMS_A
62				<del></del>							BYE	IMS_A forwards BYE to UE_B
63			<del></del>								BYE	User B is informed that call has ended
64				$\longrightarrow$							200 OK	UE_B sends 200 OK for BYE
65											200 OK	IMS_A forwards 200 OK response to IBCF_A
66								>			200 OK	IBCF_A forwards 200 OK response to IBCF_B
67									$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
68								<b>-</b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
69							<del></del>	-			200 OK	IBCF_B forwards 200 OK response to IBCF_A
70					<del></del>		-				200 OK	IBCF_A forwards 200 OK response to IMS_A
71		<del>(</del>									200 OK	IMS_A forwards 200 OK response to UE_A
72	<b>←</b>											User A is informed that call has ended

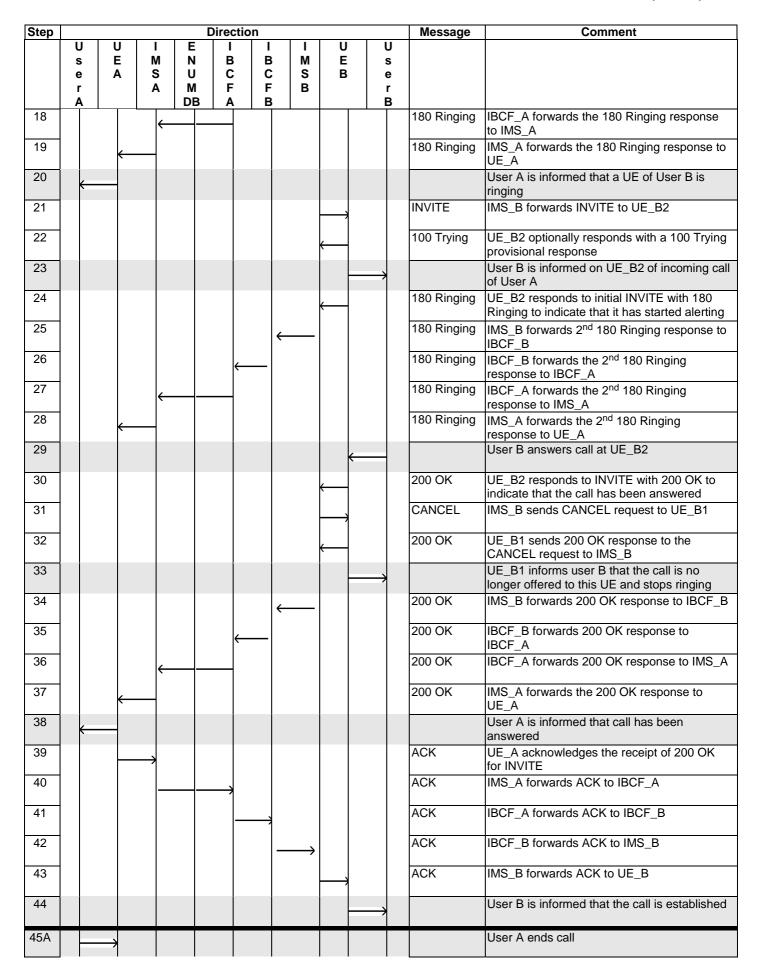
# 4.4.10.1.3 UC\_12: SIP Call Flow "Normal Call" with 2 UEs registered to same public identity

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 14
3	User B is informed of incoming call of User A on UE_B2	Step 23
4	User A is informed that a UE of User B is ringing	Step 20
5	User B answers call on UE_B2	Step 29
6	User B is informed at UE_B1 that the call is no longer offered	Step 33
7	User A is informed that call has been answered	Step 38
8	User B is informed that the call is established	Step 44
9A	User A ends call	Step 45A
9B	User B ends call	Step 45B
10A	User B is informed that call has ended	Step 51A
10B	User A is informed that call has ended	Step 51B
11A	User A is informed that call has ended	Step 57A
11B	User B is informed that call has ended	Step 57B

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

Step					Directi	ion				Message	Comment
	U	Ū	I M	E	I	l i	I	υ	U		
	s e	E	S	N U	B	B		E B	s e		
	r		Ä	м	F	F	В	"	r		
	Α			DB	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
3		←								100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5			←							ENUM	ENUM DB sends response to IMS A
6					$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			<b>←</b>							100 Trying	IBCF_A responds with a 100 Trying provisional response
8					_	$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11							←			100 Trying	IMS_B responds with a 100 Trying provisional response
12								<b></b>		INVITE	IMS_B forwards INVITE to UE_B1
13								$\longleftarrow$		100 Trying	UE_B1 optionally responds with a 100 Trying provisional response
14									$\rightarrow$		User B is informed on UE_B1 of incoming call of User A
15										180 Ringing	UE_B1 responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16							←			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
17					<del>(</del>					180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A



Step						irect	ion					Message	Comment
	U s	U			E N	I B	I	I M	U		U s		
	е	A		3	U M	C F	C F	S	В		е		
	r A				)B	A	В				r B		
46A		-	$\longrightarrow$									BYE	UE_A releases the call with BYE
47A						$\rightarrow$						BYE	IMS_A forwards BYE to IBCF_A
48A						_						BYE	IBCF_A forwards BYE to IBCF_B
49A								$\longrightarrow$				BYE	IBCF_B forwards BYE to IMS_B
50A									;	*		BYE	IMS_B forwards BYE to UE_B
51A											>		User B is informed that call has ended
52A									<del></del>			200 OK	UE_B sends 200 OK for BYE
53A								<del></del>				200 OK	IMS_B forwards 200 OK response to IBCF_B
54A						+						200 OK	IBCF_B forwards 200 OK response to IBCF_A
55A				<del></del>	-							200 OK	IBCF_A forwards 200 OK response to IMS_A
56A		•	<del></del>									200 OK	IMS_A forwards the 200 OK response to UE_A
57A	<b>←</b>												User A is informed that call has ended
45B										<del>(</del>			User B ends call
46B									<del></del>			BYE	UE_B releases the call with BYE
47B								<del></del>				BYE	IMS_B forwards BYE to IBCF_B
48B						+						BYE	IBCF_B forwards BYE to IBCF_A
49B				<del></del>								BYE	IBCF_A forwards BYE to IMS_A
50B		•	<del>(</del>									BYE	IMS_A forwards BYE to UE_A
51B	<b>←</b>												User A is informed that call has ended
52B			<del></del>									200 OK	UE_A sends 200 OK for BYE
53B						$\rightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
54B						-						200 OK	IBCF_A forwards 200 OK response to IBCF_B
55B								$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
56B									<u> </u>	,		200 OK	IMS_B forwards the 200 OK response to UE_B
57B											<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	14
3	User A is informed that UE_B is ringing	20
4	User B answers call	21
5	User A is informed that call has been answered	27
6	User B is presented that call is established	33
7A	User A adds a new media stream	34A
7B	User B adds a new media stream	34B
8A	User B may be informed to accept/reject new media stream	45A
8B	User A may be informed to accept/reject new media stream	45B
9A	User A may be informed that UE_B is alerting User B	51A
9B	User B may be informed that UE_A is alerting User A	51B
10A	If informed, User B accepts the new media stream	52A
10B	If informed, User A accepts the new media stream	52B
11A	User A is informed that new media stream has been accepted	58A
11B	User B is informed that new media stream has been accepted	58B
12	User A ends call	64
13	User B is informed that call has ended	70
14	User A is informed that call has ended	76

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).

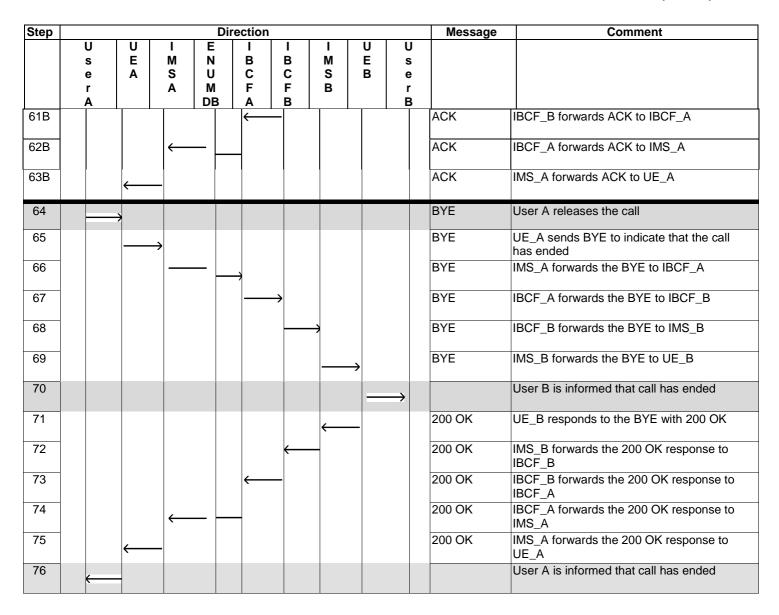
#### 4.4.11.1.1 UC\_13: SIP Call Flow "Addition of media stream using reINVITE"

Step				Dii	rection					Message	Comment
	U s e r	U E A	I M S A	E N U M DB	I B C F	I B C F B	M S B	U E B	U s e r B		
1	A —	*		J DB	A						User A calls User B
2			$\rightarrow$							INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs
3		←	_							100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$	-						ENUM	ENUM DB sends response to IMS A
6					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$		_					100 Trying	IBCF_A responds with a 100 Trying provisional response

B B B B B B B B B B B B B B B B B B B	Step				Dire	ction					Message	Comment
Report of the control		_	_			I B	I B	I M		_		
A DB A B NVITE BCF_A forwards INVITE to IBCF_B  100 Trying IBCF_B responds with a 100 Trying provisional response of INVITE to IMS_B  100 Trying IBCF_B responds with a 100 Trying provisional response of INVITE to IMS_B  100 Trying IBCF_B forwards INVITE to IMS_B  100 Trying IBCF_B forwards INVITE to UE_B  100 Trying IBCF_B forwards with a 100 Trying provisional response of INVITE INVI		-	Α						_			
100 Trying BCF. B responds with a 100 Trying provisional response Provis	8	Α		D	В	Α .	В	1		В 	INVITE	IBCE A forwards INVITE to IBCE B
NVITE   BCF_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   INVITE   IMS_B splinnally response with a 100 Trying provisional response   INVITE   IMS_B forwards INVITE to UE_B   Invited   Invited   Invited   Imstitute	9					←	_					provisional response
provisional response   INVITE   IMS_B forwards INVITE to UE_B	10							>			INVITE	IBCF_B forwards INVITE to IMS_B
12   INVITE   IMS_B forwards INVITE to UE_B   100 Trying   UE_B optionally responds with a 100 Trying provisional response   115   UE_B responds to initial INVITE with 180   Ringing Indicate that it has started   180 Ringing   IBCF_B forwards 180 Ringing response to IBCF_B   180 Ringing   IBCF_B forwards 180 Ringing response to IBCF_A 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 IBCF_A forwards 200 OK response to IBCF_B forwards ACK to IBCF_B forwards ACK to IBCF_B ACK	11						<b></b>				100 Trying	
provisional response    A	12										INVITE	l'
14   15   16   16   16   17   18   18   18   18   18   18   18	13							·			100 Trying	
15 16 16 17 17 18 18 19 18 19 18 19 18 19 18 19 18 19 18 19 18 19 19 19 19 19 19 19 19 19 19 19 19 19	14											User B is informed of incoming call of User
180 Ringing IMS_B forwards 180 Ringing response to IBCF_B IBCF_B Invards 180 Ringing response to IBCF_B IBC	15										180 Ringing	UE_B responds to initial INVITE with 180
IBCF_B   IBOR inging   IBCF_A   IBOR inging response to   IBCF_A   IBOR inging   IBOR inging   IBCF_A   IBOR inging   IBOR inging   IBCF_A   IBOR inging	16										180 Ringing	
18   BCF_A   180 Ringing   BCF_A   180 Ringing   IMS_A   180 Ringi							<del></del>	-				IBCF_B
19						<del>(</del>	-					IBCF_A
to UE_A User A is informed that UE_B is ringing User B answers call  200 OK UE_B responds 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_B 200 OK IBCF_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 UE_A 200 OK IMS_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 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 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 200 OK response to UE_A 200 OK IMS_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IMS_B forwards ACK to UE_B 31 32 33 User A adds a new media stream INVITE UE_A sends reINVITE message with new	18			←—	_						180 Ringing	
User B answers call	19		←—								180 Ringing	to UE_A
22 20 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been answered 200 OK indicate that the call has been a	20	<b>←</b>										User A is informed that UE_B is ringing
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 IBCF_A  200 OK IMS_A forwards 200 OK response to IMS_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 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 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 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 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A  200 OK IMS_B forwards 200 OK response to UE_A	21								←			User B answers call
BCF_B	22							<b></b>	-		200 OK	
IBCF_A	23						<b></b>	_			200 OK	
IMS_A	24					←	_				200 OK	
26 27 28 29 30 31 32 33 34A 35A 36 200 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 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 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_B 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 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 200 OK response to UE_A  200 OK IMS_A forwards 200 OK response to UE_A  200 OK  100	25			<del></del>							200 OK	
28 29 30 31 32 33 34 34 35A 36 37 38 38 39 30 30 30 30 30 30 31 32 32 33 34 35 35 36 36 37 38 38 38 38 38 38 38 38 38 38 38 38 38	26		←—								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  33  User B is informed that the call is established  User A adds a new media stream  INVITE UE_A sends reINVITE message with new	27	<del></del>										
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_A forwards ACK to IBCF_B  ACK IBCF_B 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 IBCF_A forwards ACK to IBCF_B  IMS_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IMS_B  IMS_A forwards ACK to IBCF_B  ACK IBCF_A forwards ACK to IMS_B	28		$\longrightarrow$								ACK	
31 32 33 34A 35A 31 31 32 33 34 35A 35A ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to UE_B  User B is informed that the call is established  User A adds a new media stream  INVITE UE_A sends reINVITE message with new	29				$\longrightarrow$						ACK	
32  ACK IMS_B forwards ACK to UE_B  User B is informed that the call is established  User A adds a new media stream  INVITE UE_A sends reINVITE message with new	30					;					ACK	IBCF_A forwards ACK to IBCF_B
33 User B is informed that the call is established  34A User A adds a new media stream  INVITE UE_A sends reINVITE message with new	31							<b>)</b>			ACK	IBCF_B forwards ACK to IMS_B
34A User A adds a new media stream  INVITE UE_A sends reINVITE message with new	32							<b></b> ;	•		ACK	IMS_B forwards ACK to UE_B
34A User A adds a new media stream  INVITE UE_A sends reINVITE message with new	33								$\longrightarrow$			
	34A		>									User A adds a new media stream
	35A										INVITE	UE_A sends reINVITE message with new media stream in SDP

S	Step				Dire	ection					Message	Comment
e r A A DB F F B B B B F F B B B B F F B B B B			_	I M		l B	l B	I M	_	_		
A					U	С	С					
100 Trying   IMS_A responds with a 100 Trying provisional response   INVITE   IMS_A forwards INVITE to IBCF_A								В				
INVITE   MS_A torwards INVITE to IBCF_A	36A		<del></del>	_							100 Trying	
provisional response INVITE IBCF_A forwards INVITE to IBCF_B 100 Trying   IBCF_A forwards INVITE to IBCF_B 100 Trying   IBCF_B forwards INVITE to IMS_B 1100 Trying   IBCF_B forwards INVITE to IMS_B 1100 Trying   IBCF_B forwards INVITE to IMS_B 1100 Trying   IMS_B responds with a 100 Trying   1100 Trying   IMS_B forwards INVITE to UE_B 1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying   1100 Trying   UE_B optionally responds with a 100 Trying with a 100	37A				-	<del> </del>					INVITE	i.
40A 41A 42A 43A 44A 44A 45A 46A 46A 46A 47A 48A 48A 48A 48A 48A 48A 48A 48A 48A 48	38A			<del></del>	-						100 Trying	
41A 42A 43A 44A 44A 45A 46A 46A 46A 47A 46A 47A 48A 48A 48A 48A 48A 48A 48A 48A 48A 48	39A						>				INVITE	IBCF_A forwards INVITE to IBCF_B
INVITE   IBCF_B forwards INVITE to IMS_B	40A					<b></b>					100 Trying	
43A 44A 44A 44A 44A 45A 46A 46A 46A 47A 46A 47A 48A 49A 50A 50A 51A 52A 53A 54A 55A 55A 56A 57A 57A 58A 60A 61A	41A							<del> </del>			INVITE	i-
44A 45A 45A 45A 45A 46A 47A 48A 48A 48A 49A 50A 50A 51A 52A 53A 55A 55A 55A 55A 55A 55A 55A 55A 55	42A						<del></del>				100 Trying	
45A 46A 47A 48A 48A 49A 50A 50A 51A 52A 53A 54A 55A 55A 56A 57A 58A 66A 61A	43A										INVITE	IMS_B forwards INVITE to UE_B
accept/reject new media stream (optional)  46A 47A 48A 48A 49A 50A 51A 52A 53A 55A 55A 55A 55A 56A 57A 58A 59A 60A 61A	44A							<b></b>			100 Trying	
Ringing  180 Ringi	45A								_	$\rightarrow$		
IBCF_B	46A							<b>←</b>			180 Ringing	
BBCF_A	47A						<del></del>	-			180 Ringing	
IMS_A   180 Ringing   IMS_A forwards the 180 Ringing response to UE_A   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   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   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 ACK to IBCF_A   ACK   IMS_A forwards ACK to IBCF_A   ACK   IMS_A forwards ACK to IBCF_B   ACK   IMS_A forwards ACK to IBCF_B   ACK   IBCF_A forwards ACK to IBCF_B   ACK   IBCF_	48A					←	-				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 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 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 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 ACK to IBCF_A  ACK IMS_A forwards ACK to IBCF_B	49A			←	-	-					180 Ringing	
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 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_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 UE_A  4 CK UE_A acknowledges the receipt of 200 OK for INVITE  4 ACK IMS_A forwards ACK to IBCF_A  ACK IMS_A forwards ACK to IBCF_B	50A		<del></del>	_							180 Ringing	
Stream   200 OK   UE_B responds with 200 OK to reINVITE   200 OK   UE_B responds with 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   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   UE_A acknowledges the receipt of 200 OK   IMS_A forwards ACK to IBCF_A   ACK   IMS_A forwards ACK to IBCF_A   ACK   IBCF_A forwards ACK to IBCF_B   ACK   IBCF_B   AC	51A	<del></del>										
55A 55A 55A 56A 56A 57A 58A 59A 60A 61A  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 asknowledges the receipt of 200 OK for INVITE ACK IMS_A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B	52A								$\leftarrow$	_		
BCF_B   200 OK   BCF_B   forwards 200 OK response to   BCF_A   200 OK	53A							←			200 OK	UE_B responds with 200 OK to reINVITE
IBCF_A   200 OK   IBCF_A forwards 200 OK response to   IMS_A   200 OK   IMS_A forwards the 200 OK response to   IMS_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   IMS_A forwards ACK to IBCF_A   ACK   IMS_A forwards ACK to IBCF_B   ACK   IBCF_A forwards ACK to IBCF_B   ACK   ACK   IBCF_B   ACK   ACK   IBCF_B   ACK	54A						<del></del>	-			200 OK	
57A  57A  200 OK IMS_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	55A					<b>←</b>	-				200 OK	
58A  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	56A			←	-	-					200 OK	IMS_A
59A  60A  61A  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	57A		<del></del>	_							200 OK	
59A  60A  61A  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	58A	←										
60A  61A  ACK  IMS_A forwards ACK to IBCF_A  ACK  IBCF_A forwards ACK to IBCF_B	59A			>							ACK	UE_A acknowledges the receipt of 200 OK
	60A				-	<del> </del>					ACK	
62A   ACK   IBCF_B forwards ACK to IMS_B	61A						>				ACK	IBCF_A forwards ACK to IBCF_B
	62A							*			ACK	IBCF_B forwards ACK to IMS_B

Step				Dii	ection					Message	Comment
	U s	U E	I M	E N	I B	I B	I M	U U E s			
	e r	Α	S A	U M	C F	C F	S B	B e			
63A	A			DB	A	В	$\longrightarrow$	В		ACK	IMS_B forwards ACK to UE_B
34B								<b>←</b>			User B adds a new media stream
35B							<del></del>			INVITE	UE_B sends reINVITE message with new media stream in SDP
36B							<b>│</b> >		Ī	100 Trying	IMS_B responds with a 100 Trying provisional response
37B						←—			-	INVITE	IMS_B forwards INVITE to IBCF_B
38B						$\longrightarrow$			Ē	100 Trying	IBCF_B responds with a 100 Trying provisional response
39B					<b>←</b>	-			-	INVITE	IBCF_B forwards INVITE to IBCF_A
40B										100 Trying	IBCF_A responds with a 100 Trying provisional response
41B			<b>←</b>	_					}	INVITE	IBCF_A forwards INVITE to IMS_A
42B				_	$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
43B		<b></b>	_						Ì	INVITE	IMS_A forwards INVITE to UE_A
44B			•						Ē	100 Trying	UE_A optionally responds with a 100 Trying provisional response
45B	<b>—</b>										Verify that User A is informed to accept/reject new media stream (optional)
46B			•							180 Ringing	UE_A responds to reINVITE with 180 Ringing
47B				_	$\rightarrow$				1	180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
48B					<u> </u>				-	180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
49B						$\longrightarrow$				180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
50B							$\longrightarrow$		-	180 Ringing	IMS_B forwards the 180 Ringing response to UE_B
51B								<b>─</b>			Verify that User B is informed that UE_A is alerting User A (optional)
52B									Ī		If informed, User A accepts the new media stream
53B			•							200 OK	UE_A responds with 200 OK to reINVITE
54B				_	$\Rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
55B					;					200 OK	IBCF_A forwards 200 OK response to IBCF_B
56B						$\longrightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
57B							$\longrightarrow$			200 OK	IMS_B forwards the 200 OK response to UE_B
58B								$\longrightarrow$			User B is informed that new media stream has been accepted
59B							<del></del>			ACK	UE_B acknowledges the receipt of 200 OK for INVITE
60B						<del></del>				ACK	IMS_B forwards ACK to IBCF_B



### 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.

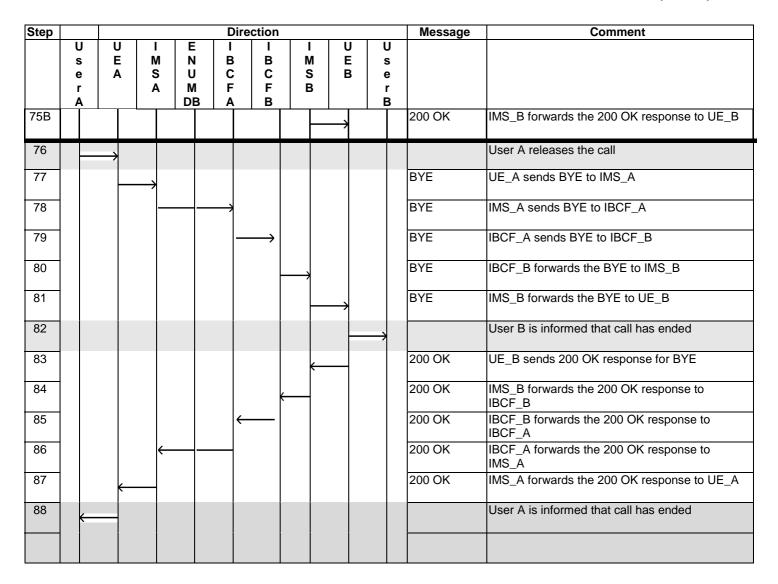
The test sequence and expected call flow sequence for multimedia session handling (when remote user interaction shall be avoided) can be illustrated when removing a media stream from a multimedia session with multiple streams (e.g. remove the chat/text stream from an IMS VoIP + chat multi-stream session):

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	64A	64A
2B	User B removes one of the media streams	64B	64B
3A	User B is informed that the media stream has been removed	70A	75A
3B	User A is informed that the media stream has been removed	70B	75B
4	User A releases the call	76	86
5	User B is informed that call has ended	82	92
6	User A is informed that call has ended	88	98

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					0	irection					Message	Comment
	U s e r A	U E A	N S	<b>ι</b> ι	I B I C I F	C	M S B	E	J E B	U s e r B		
1	Ê	$\rightarrow$										User A initiates a multimedia session with at least two streams with User B
64A		$\rightarrow$										User A removes one of the media streams
65A		-	$\longrightarrow$								UPDATE	UE_A sends UPDATE to IMS_A
66A					$\longrightarrow$						UPDATE	IMS_A forwards the UPDATE to IBCF_A
67A						$\longrightarrow$					UPDATE	IBCF_A forwards the UPDATE to IBCF_B
68A							$\longrightarrow$				UPDATE	IBCF_B forwards the UPDATE to IMS_B
69A								<del></del>			UPDATE	IMS_B forwards the UPDATE to UE_B
70A										$\rightarrow$		User B is informed that the media stream has been removed
71A							*				200 OK	UE_B responds with 200 OK to UPDATE
72A							$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
73A						←					200 OK	IBCF_B forwards 200 OK response to IBCF_A
74A				<del></del>							200 OK	IBCF_A forwards 200 OK response to IMS_A
75A		•	•								200 OK	IMS_A forwards the 200 OK response to UE_A
64B									$\leftarrow$			User B removes one of the media streams
65B							*				UPDATE	UE_B sends UPDATE to IMS_B
66B							$\longleftarrow$				UPDATE	IMS_B forwards the UPDATE to IBCF_B
67B						<del></del>					UPDATE	IBCF_B forwards the UPDATE to IBCF_A
68B					$\leftarrow$						UPDATE	IBCF_A forwards the UPDATE to IMS_A
69B		€	,								UPDATE	IMS_A forwards the UPDATE to UE_A
70B	<b>←</b>											User A is informed that the media stream has been removed
71B		-	$\longrightarrow$								200 OK	UE_A responds with 200 OK to UPDATE
72B					$\longrightarrow$						200 OK	IMS_A forwards the 200 OK response to IBCF_A
73B						$\longrightarrow$					200 OK	IBCF_A forwards the 200 OK response to IBCF_B
74B							$\longrightarrow$				200 OK	IBCF_B forwards the 200 OK response to IMS_B



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

Step					Dire	ction				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	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 initiates a multimedia session with at least two streams with User B
64A		$\rightarrow$									User A removes one of the media streams
65A		_	$\longrightarrow$							INVITE	UE_A sends reINVITE to IMS_A
66A		_								100 Trying	IMS_A responds with a 100 Trying provisional response
67A			-		$\longrightarrow$					INVITE	IMS_A forwards the reINVITE to IBCF_A
68A			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
69A					-	$\longrightarrow$				INVITE	IBCF_A forwards the reINVITE to IBCF_B
70A					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
71A						-	$\longrightarrow$			INVITE	IBCF_B forwards the reINVITE to IMS_B
72A						<del>(</del>				100 Trying	IMS_B responds with a 100 Trying provisional response

Step					Dire	ection				Message	Comment
	U	U	I	Е	T	I	I	U	U	9-	
	S	E	M	N	В	В	M	E	S		
	e r	Α	S	U M	C	C F	S B	В	e r		
	A		^	DB	A	В			В		
73A							<u> </u>	$\rightarrow$		INVITE	IMS_B forwards the reINVITE to UE_B
74A							<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying
75.0							`				provisional response
75A									$\rightarrow$		User B is informed that the media stream has been removed
76A							←			200 OK	UE_B responds with 200 OK to reINVITE
77A							,			200 OK	IMS_B forwards the 200 OK response to
							`				IBCF_B
78A					<b>←</b>					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
79A			<b>←</b>							200 OK	IBCF_A forwards the 200 OK response to
. 07 1			`								IMS_A
80A		$\leftarrow$								200 OK	IMS_A forwards the 200 OK response to UE_A
81A		igsqcup	$\longrightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for
82A										ACK	reINVITE IMS_A forwards the ACK to IBCF_A
83A										ACK	IBCF_A forwards the ACK to IBCF_B
84A										ACK	IBCF_B forwards the ACK to IMS_B
85A							<u> </u>	$\rightarrow$		ACK	IMS_B forwards the ACK to UE_B
64B								<b>←</b>			User B removes one of the media streams
65B							←	`		INVITE	UE_B sends reINVITE to IMS_B
66B										100 Trying	IMS_B responds with a 100 Trying provisional
											response
67B							$\leftarrow$			INVITE	IMS_B forwards the reINVITE to IBCF_B
68B							<del></del>			100 Trying	IBCF_B responds with a 100 Trying provisional response
69B					- ←					INVITE	IBCF_B forwards the reINVITE to IBCF_A
70B										100 Trying	IBCF_A responds with a 100 Trying provisional
										, ,	response
71B			$\leftarrow$							INVITE	IBCF_A forwards the reINVITE to IMS_A
72B					$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional
73B		_								INVITE	response IMS_A forwards the reINVITE to UE_A
74B		Ì								100 Trying	UE_A optionally responds with a 100 Trying
			$\rightarrow$							, ,	provisional response
75B	$\leftarrow$										User A is informed that the media stream has
76B										200 OK	been removed UE_A responds with 200 OK to reINVITE
77B										200 OK 200 OK	IMS_A forwards the 200 OK response to
					1						IBCF_A
78B					[-	$\longrightarrow$				200 OK	IBCF_A forwards the 200 OK response to
700										200 OK	IBCF_B
79B							$\longrightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B
80B							<u> </u>	$\rightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
81B										ACK	UE_B acknowledges the receipt of 200 OK for
										1015	reINVITE
82B										ACK	IMS_B forwards ACK to IBCF_B
83B					←					ACK	IBCF_B forwards ACK to IBCF_A
84B 85B										ACK ACK	IIBCF_A forwards ACK to IMS_A IMS_A forwards ACK to UE_A
$\vdash$										ACK	
86		$\rightarrow$								BYE	User A releases the call UE_A sends BYE to IMS_A
87 88										BYE	IMS_A forwards BYE to IBCF_A
89										BYE	IBCF_A forwards BYE to IBCF_B
90						7				BYE	IBCF_B forwards BYE to IMS_B
91								$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
	I	I	I	I	ļ		ı	-1	J		

Step			Direction									Message	Comment
	U s e r A	E		I M S A	E N U M DB	I B C F A	I B C F B	M S B	;	U E B	U s e r B		
92							•			-	$\rightarrow$		User B is informed that call has ended
93								•	(	-		200 OK	UE_B sends 200 OK for BYE
94							•	(				200 OK	IMS_B forwards the 200 OK response to IBCF_B
95							←					200 OK	IBCF_B forwards the 200 OK response to IBCF_A
96				$\leftarrow$								200 OK	IBCF_A forwards the 200 OK response to IMS_A
97			$\leftarrow$	-								200 OK	IMS_A forwards the 200 OK response to UE_A
98	+												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 33
	the Conference Call	
6	User A is notified that User B is being invited to join the call	Step 41
7	User B joins the conference	Step 48
8	User A is notified that User B has joined the conference	Step 57
9	User B leaves the conference	Step 60
10	User B is informed that the conference has ended	Step 71
11	User A is notified that user B has left the conference	Step 74

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					Direc							Message	Comment
	U s	U E	U s	UE	I M	E N	A S	I B	l B	I M	A		
	e	A	e	В	S	Ü	A	C	C	S	В		
	r		r			M		F	F	В			
1	A		В			DB		A	В				User A initiates an ad-hoc
													conference call
2					$\rightarrow$							INVITE	UE_A sends INVITE to IMS_A with information for all commonly
3		$\leftarrow$										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						-						100 Trying	IMS_A AS responds with a 100 Trying provisional response
7						-	4					200 OK	IMS_A AS responds with a 200 OK to IMS_A, with isfocus parameter.
8		<b></b>			-							200 OK	IMS_A forwards the 200OK response to UE_A
9	←												User A is informed the Ad Hoc Conference Call is established
10				_	<del>)</del>							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				_	<del>)</del>							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
16		←			_							202 Accepted	IMS_A forwards the 202 Accepted response to UE_A
17					$\leftarrow$	-	_					NOTIFY	IMS_A AS sends a NOTIFY to IMS_A to inform the conference
18		←			-							NOTIFY	IMS_A forwards the NOTIFY to UE_A
19					<del>-</del>							200 OK	UE_A responds with 200 OK to IMS_A
20						-	$\rightarrow$					200 OK	IMS_A forwards the 200 OK response to IMS_A AS
21					$\leftarrow$	-	-					INVITE	IMS_A AS sends INVITE to UE_B with conference-factory URI
22						-	$\rightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
23						<del>)</del>						ENUM	IMSA sends query to ENUM DB
24					$\leftarrow$	-						ENUM	ENUM DB sends response to IMS A
25						-	-	$\longrightarrow$				INVITE	IMS_A forwards the INVITE to IBCF_A
26					<del></del>	-	$\dashv$					100 Trying	IBCF_A responds with a 100 Trying provisional response

Step					Dire	ction						Message	Comment
	U	U	U s	E	I M	E N	AS	I	В	I M	AS		
	е	Ā	е	В	S	U	A	С	С	S	В		
	r A		r B		Α	M DB		F	F B	В			
27								ı	$\longrightarrow$			INVITE	IBCF_A forwards the INVITE to IBCF_B
28									$\leftarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
29										<b>→</b>		INVITE	IBCF_B forwards the INVITE to IMS_B
30									<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
31				$\leftarrow$		_						INVITE	IMS_B forwards the INVITE to UE_B
32						_				<b>→</b>		100 Trying	UE_B responds with a 100 Trying provisional response
33			<b>←</b>										User B is informed of incoming invitation from User A to join the
34						_				<b>→</b>		180 Ringing	UE_B sends a 180 ringing to IMS_B
35									<b>←</b>			180 Ringing	IMS_B forwards the 180 ringing to IBCF_B
36									<del></del>			180 Ringing	IBCF_B forwards the 180 ringing to IBCF_A
37					$\leftarrow$	_						180 Ringing	IBCF_A forwards the 180 ringing to IMS_A
38						_	$\rightarrow$					180 Ringing	IMS_A forwards the 180 ringing to IMS_A AS
39					$\leftarrow$	_						NOTIFY	Upon reception of 180 Ringing from UE_B, IMS_A AS sends
40		$\leftarrow$										NOTIFY	IMS_A forwards the NOTIFY to UE_A
41	<b>←</b>												User A is notified that User B is being invited to join the call
42					$\rightarrow$							200 OK	UE_A responds with 200 OK to IMS_A for NOTIFY
43						_	$\rightarrow$					200 OK	IMS_A forwards the 200 OK response to IMS_A AS
44						- -				$\longrightarrow$		200 OK	UE_B responds with 200 OK to IMS_B for INVITE
45									<b>←</b>			200 OK	IMS B forwards the 200 OK response to IBCF_B
46												200 OK	IBCF_B forwards the 200 OK response to IBCF_A
47					$\leftarrow$	- -						200 OK	IBCF_A forwards the 200 OK response to IMS_A
48						_	$\rightarrow$					200 OK	IMS A forwards the 200 OK response to IMS_A AS
49				$\rightarrow$									User B joins the conference
50												ACK	UE_B acknowledges the 200 OK for INVITE
51									<b> </b>			ACK	IMS B forwards the ACK to IBCF_B
52												ACK	IBCF_B forwards the ACK to IBCF_A
53					$\leftarrow$	_						ACK	IBCF_A forwards the ACK to IMS_A
54						- -	$\rightarrow$					ACK	IMS A forwards the ACK to IMS_A AS

Step					Dire	ction							Message	Comment
	U	Ū	U	Ū	I	E	Α		Ī		I	A		
	s e	E A	s e	E B	M S	N U	S	B	B		M S	S		
	r	^	r		Ă	M		F	F	:	В	-		
55	Α		В			DB		Α	В	} <u> </u>		<u> </u>	NOTIFY	AS_A sends NOTIFY to UE_A to
33					$\leftarrow$	_								inform it has successfully joined
56		<b></b>											NOTIFY	IMS_A forwards NOTIFY to UE_A
57	<b>←</b>													User A is alerted that User B has joined the conference
58					$\rightarrow$								200 OK	UE_A sends 200 OK response for NOTIFY
59						_	$\rightarrow$						200 OK	IMS_A forwards the 200 OK response to IMS_A AS
60				$\rightarrow$										User B leaves the conference
61						_	_				$\rightarrow$		BYE	UE_B sends BYE to IMS_B to leave the conference
62										<del></del>			BYE	IMS_B forwards the BYE to IBCF_B
63									<del></del>				BYE	IBCF_B forwards the BYE to IBCF_A
64					$\leftarrow$	_							BYE	IBCF_A forwards the BYE to IMS_A
65						_	$\rightarrow$						BYE	IMS_A forwards the BYE to IMS_A AS
66					$\leftarrow$	_							200 OK	IMS_A AS releases resources for this conference caller and sends a
67						_	-	$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
68									>				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
69											$\rightarrow$		200 OK	IBCF_B forwards the 200 OK response to IMS_B
70				$\leftarrow$	-		-						200 OK	IMS_B forwards the 200 OK response to UE_B
71			<del></del>											User B is informed that the conference has ended
72					$\leftarrow$	_	-						NOTIFY	AS_A sends NOTIFY to IMS _A to inform UE_A that UE_B has left
73		<del></del>											NOTIFY	IMS_A forwards NOTIFY to UE_A
74	←													User A is notified that user B has left the conference
75					$\rightarrow$								200 OK	UE_A sends a 200 OK response for NOTIFY
76						_	$\rightarrow$						200 OK	IMS_A forwards the 200 OK response to IMS_A AS

# 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

Step				Dire	ction			Message	Comment	
	U s e r A	U E A	U s e r B	UEB	M S A	A S A	В % М —	A S B		
1		$\rightarrow$								User A initiates a BC session
2					$\rightarrow$				INVITE	UE_A sends INVITE to IMS_A
3						$\rightarrow$			INVITE	IMS_A forwards the INVITE to AS_A
4					<del>(                                    </del>				200 OK	AS_A responds with 200 OK
5		<b>-</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
6					$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
7						$\rightarrow$			ACK	IMS_A forwards the ACK to AS_A
8	<b>←</b>									User A receives the broadcast content
9		$\rightarrow$								User A terminates the session
10					$\rightarrow$				BYE	UE_A sends BYE to IMS_A
11						$\rightarrow$			BYE	IMS_A forwards the BYE to AS_A
12					<b>←</b>				200 OK	AS_A responds with 200 OK
13		<b>(</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
14	<b>(</b>									User A is informed that session is terminated

#### 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. TS 183 063 [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 RTSP Method 1	CF_IPTV 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)

The expected call flow sequence is:

Step				Dire	ction				Message	Comment
CLOP	U	U	U	U	1	Α	1	Α	mossage	Common
	s	Ē	s	Ē	М	S	M	S		
	е	Α	е	В	S	Α	S	В		
	r		r		Α		В			
	Α		В							
1		$\rightarrow$								User A initiates a CoD session (content selection)
2					$\longrightarrow$				INVITE	UE_A sends a INVITE to IMS_A
3						$\rightarrow$			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					<b>←</b>				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					$\rightarrow$				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						$\longrightarrow$			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						$\longrightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A (SCF)

Step				Dire	ction				Message	Comment
-	U	Ū	U	Ū	l P4	A	l Na	A	_	
	s e	E A	s e	E B	M S	S	M S	S B		
	r		r	_	Ā		В			
16	A	1	В			<u> </u>			INVITE	AS_A forwards the reINVITE to IMS_A
16					$\leftarrow$				IIIVIIE	AS_A forwards the relivitie to livis_A
17						$\longrightarrow$			INVITE	IMS_A forwards the reINVITE to AS_A (MF)
18					$\leftarrow$				200 OK	AS_A (MF) responds with 200 OK
19						$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to AS_A (SCF)
20					<del>(</del>				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						$\longrightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
24					<b>←</b>				ACK	AS_A forwards the ACK to IMS_A
25						$\longrightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
26	<b>←</b>									User A starts receiving the streaming content
27		$\rightarrow$								User A terminates the session
28					$\rightarrow$				BYE	UE_A sends a BYE to IMS_A
29						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
30					<b>←</b>				BYE	AS_A forwards the BYE to IMS_A
31						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (MF)
32					<b>←</b>				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					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IMS_A
35		<del>(</del>							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
- 1	U	U	U	U	I	Α	I	Α		
	s	E	s	E	M	S	M	S		
	е	Α	е	В	S	Α	S	В		
	r		r		Α		В			
	A		В							
1		$\longrightarrow$								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					$\leftarrow$				INVITE	AS_A forwards the INVITE to IMS_A
5						$\longrightarrow$			INVITE	IMS_A forwards the INVITE to AS_A (MF)
6					<u> </u>				200 OK	AS_A (MF) responds with 200 OK
7					`				200 OK	IMS_A forwards the 200 OK response to
						$\rightarrow$				AS_A (SCF)
8					$\leftarrow$				200 OK	AS_A forwards the 200 OK response to IMS_A
9									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						$\longrightarrow$			ACK	IMS_A forwards the ACK to AS_A (SCF)
12					$\leftarrow$				ACK	AS_A forwards the ACK to IMS_A
13						$\longrightarrow$			ACK	IMS_A forwards the ACK to AS_A (MF)
14										UE_A starts receiving the streaming content
15		$\longrightarrow$								User A terminates the session
16					$\rightarrow$				BYE	UE_A sends a BYE to IMS_A
17						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
18	1				$\leftarrow$				BYE	AS_A forwards the BYE to IMS_A
19	1					$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (MF)
20	1				$\leftarrow$				200 OK	AS_A (MF) responds with 200 OK
21									200 OK	IMS_A forwards the 200 OK response to
										AS_A (SCF)
22					←				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				Dire	ction					Message	Comment
	U	U	U	U	ı	Α	I	Α	١		
	S	E	s	E	М	S	M	S	;		
	е	Α	е	В	S	Α	S	В	3		
	r		r		Α		В				
	Α		В								
1											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.

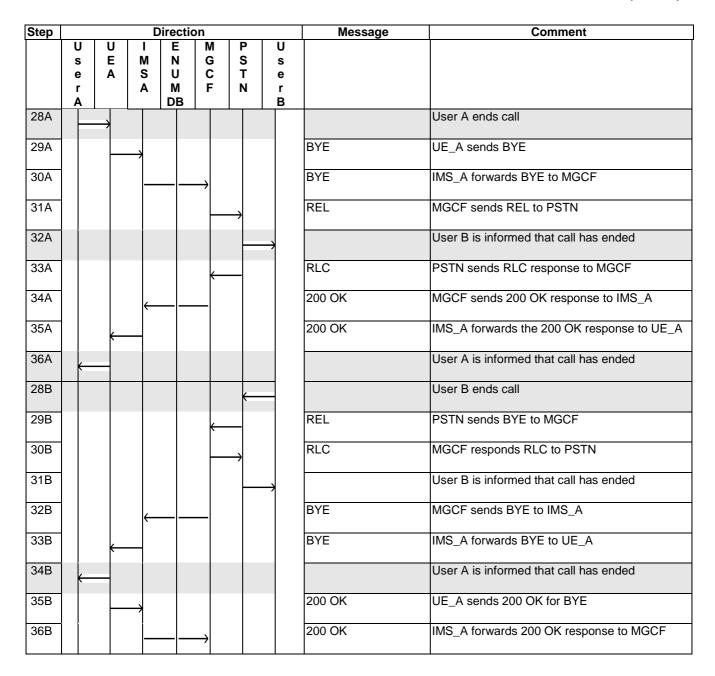
#### 4.4.16.1.2 UC\_23: IMS-to-PSTN call

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 15
3	User A is informed that UE_B is ringing	Step 19
4	User B answers call	Step 20
5	User A is informed that call has been answered	Step 24
6	User A and B can communicate	Step 27
7	User A ends call	Step 28A
8	User B is informed that call has ended	Step 32A
9	User A is informed that call has ended	Step 36A
10	User B ends call	Step 28B
11	User B is informed that call has ended	Step 31B
12	User A is informed that call has ended	Step 34B

The expected call flow sequence is:

FINAL PRICE TO STATE THE PRICE TO STATE THE PRICE TO STATE TO STATE TO STATE TO STATE THE PRICE	Step		[	Directio	on			Message	Comment
e A A M DB F N F N F B User A calls User B    INVITE   UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that 100 Trying IMS_A responds with a 100 Trying provisional response in IMS_A sends query to ENUM DB ENUM ENUM DB sends response to IMS_A INVITE   IMS_A forwards INVITE to MGCF 100 Trying megonse to IMS_A INVITE   IMS_A forwards INVITE to MGCF 100 Trying megonse with a 100 Trying provisional response in IMS_A Invited Ims_A							_		
A DB B B User A calls User B  INVITE UE A sends INVITE with the first SDP offer indicating all desired medias and codocs that 100 Trying IIMS_A responds with a 100 Trying provisione response ENUM IIMS A sends query to ENUM DB  ENUM ENUM DB sends response to IMS A INVITE to MGCF 100 Trying MGCF responds with a 100 Trying provisional response IIMS_A responds with a 100 Trying provisional response IIMS_A INVITE IIMS_A forwards INVITE to MGCF 100 Trying MGCF responds with 183 Session Progress response 183 Session MGCF responds with 183 Session Progress response 183 Session IIMS_Invited 183 Session Progress response 183 Session Progress response 183 Session Progress response 184 IIMS_A forwards PRACK to IMS_A PRACK UE_A sends PRACK to IMS_A PRACK UE_A sends PRACK to MGCF 200 OK (PRACK) IIMS_A forwards PRACK to MGCF 200 OK (PRACK) IIMS_A forwards 200 OK response to UE_A IAM MGCF sends 180 Ringing call of User A ACM/CPG PSTN responds with ACM/CPG 180 Ringing MGCF sends 180 Ringing response to UE_A IAM MGCF sends 180 Ringing response to UE_A IAM PSTN User B is informed that UE_B is ringing User A is informed that UE_B is ringing User A is informed that UE_B is ringing User A is informed that call has been answer ACK UE_A acknowledges the receipt of 200 OK IAMS_A forwards 200 OK response to UE_A IAM PSTN Sends ANM to MGCF INS_A IAMS_A forwards 200 OK response to UE_A IAMS_A forwards 200 OK response to IMS_A IAMS_A forwards ACK to MGCF									
User A calls User B  INVITE  UE A sends INVITE with the first SDP offer indicating all desired medias and codes that 100 Trying milks. A response with a 100 Trying provisions response  ENUM IMS A sends query to ENUM DB  ENUM ENUM DB sends response to IMS A  INVITE  IMS_A forwards INVITE to MGCF  TO INVITE  IMS_A forwards INVITE to MGCF  100 Trying MGCF responds with 100 Trying provisions response  IMS Orwards with a 100 Trying provisions response  IMS Orwards with 183 Session Progress Progress response  IMS_A forwards PRACK to IMS_A  PRACK  IMS_A forwards PRACK to IMS_A  PRACK  IMS_A forwards PRACK to MGCF  200 OK (PRACK) IMS_A forwards 200 OK response to IMS_A  200 OK (PRACK) IMS_A forwards 200 OK response to IMS_A  ACM/CPG  PSTN responds with ACM/CPG  IMS_A forwards the 180 Ringing response to IMS_A  ACM/CPG  IMS_A forwards the 180 Ringing response to IMS_A  User B is informed that UE_B is ringing  User B answers call  ANM  PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  User A is informed that UE_B is ringing  User B answers call  ANM  PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 O		I - I	Α		F	N			
indicating all desired medias and codes that 100 Trying IMS. A responds with a 100 Trying provisions response ENUM IMS A sends query to ENUM DB ENUM ENUM DB sends response to IMS. A  INVITE IMS_A forwards INVITE to MGCF 100 Trying MGCF responds with a 100 Trying provisions response 183 Session MGCF responds with 183 Session Progress response 183 Session IMS_forwards 183 Session Progress response to UE_A PRACK UE_A sends PRACK to IMS_A PRACK UE_A sends PRACK to IMS_A PRACK IMS_A forwards PRACK to MGCF 200 OK (PRACK) IMS_A forwards PRACK to MGCF 200 OK (PRACK) IMS_A forwards PRACK to MGCF 17  18  16  17  18  18  ACM/CPG PSTN responds with ACM/CPG 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 ANM PSTN sends ANM to MGCF 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 180 Ringing response to UE_A USer A is informed that UE_B is ringing User B answers call ANM PSTN sends ANM to MGCF 200 OK IMS_A forwards 200 OK response to UE_A USer A is informed that Call has been answer ACK UE_A acknowledges the receipt of 200 OK forwards ACK to MGCF IMS_A forwards ACK to MGCF	1	A		] DB			В		User A calls User B
indicating all desired medias and codes that 100 Trying IMS. A responds with a 100 Trying provisions response ENUM IMS A sends query to ENUM DB ENUM ENUM DB sends response to IMS. A  INVITE IMS_A forwards INVITE to MGCF 100 Trying MGCF responds with a 100 Trying provisions response 183 Session MGCF responds with 183 Session Progress response 183 Session IMS_forwards 183 Session Progress response to UE_A PRACK UE_A sends PRACK to IMS_A PRACK UE_A sends PRACK to IMS_A PRACK IMS_A forwards PRACK to MGCF 200 OK (PRACK) IMS_A forwards PRACK to MGCF 200 OK (PRACK) IMS_A forwards PRACK to MGCF 17  18  16  17  18  18  ACM/CPG PSTN responds with ACM/CPG 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 ANM PSTN sends ANM to MGCF 200 OK IMS_A forwards 200 OK response to IMS_A 200 OK IMS_A forwards the 180 Ringing response to UE_A USer A is informed that UE_B is ringing User B answers call ANM PSTN sends ANM to MGCF 200 OK IMS_A forwards 200 OK response to UE_A USer A is informed that Call has been answer ACK UE_A acknowledges the receipt of 200 OK forwards ACK to MGCF IMS_A forwards ACK to MGCF									
100 Trying IMS_A responds with a 100 Trying provisions response ENUM IMS A sends query to ENUM DB ENUM ENUM DB sends response to IMS A INVITE IMS_A forwards INVITE to MGCF 100 Trying MGCF responds with a 100 Trying provisions response 183 Session MGCF responds with 183 Session Progress response 183 Session IMS_forwards 183 Session Progress response to UE_A 101 112 123 134 145 155 166 177 188 180 Ringing MGCF sends 1AM to PSTN User B is informed of incoming call of User A ACM/CPG PSTN responds with ACM/CPG 180 Ringing MGCF sends 180 Ringing response to UE_A USer A is informed that UE_B is ringing 180 Ringing IMS_A forwards the 180 Ringing response to UE_A USer A is informed that UE_B is ringing 180 Ringing USer B answers call ANM PSTN sends ANM to MGCF 200 OK MGCF sends 200 OK response to IMS_A 200 OK MGCF sends 200 OK response to IMS_A USer A is informed that UE_B is ringing  USer B answers call ANM PSTN sends ANM to MGCF 200 OK MGCF sends 200 OK response to UE_A USer A is informed that Call has been answer ACK UE_A informed that Call has been answer	2		$\longrightarrow$					INVITE	
ENUM IMS A sends query to ENUM DB ENUM ENUM DB sends response to IMS A INVITE IMS_A forwards INVITE to MGCF 100 Trying MGCF responds with a 100 Trying provisiona response 183 Session MGCF responds with 183 Session Progress response 183 Session IMS_forwards 183 Session Progress response 180 Session IMS_forwards 183 Session Progress response 181 Session IMS_A forwards 183 Session Progress response 182 DO OK (PRACK) IMS_A forwards PRACK to IMS_A 184 PRACK IMS_A forwards PRACK to IMS_A 185 PRACK IMS_A forwards 200 OK response to UE_A 186 IMS_A forwards 200 OK response to UE_A 187 IMS_A forwards 200 OK response to UE_A 188 Ringing IMS_A forwards the 180 Ringing response to UE_A 189 IMS_A forwards the 180 Ringing response to UE_A 190 USer A is informed that UE_B is ringing 190 USer B answers call 190 ANM PSTN sends ANM to MGCF 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 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 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 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 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 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 200 OK formards 200 OK form	3		<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional
INVITE IMS_A forwards INVITE to MGCF  100 Trying MGCF responds with a 100 Trying provisional response  183 Session MGCF responds with 183 Session Progress response response  183 Session IMS_forwards 183 Session Progress response to UE_A  PRACK UE_A sends PRACK to IMS_A  PRACK IMS_A forwards PRACK to MGCF  200 OK (PRACK) IMS_A forwards PRACK to MGCF  200 OK (PRACK) IMS_A forwards 200 OK response to UE_A  IAM MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACM/CPG PSTN responds with ACM/CPG  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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 200 OK response to UE_A  User A is informed that call has been answer  ACK USEA acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	4			$\rightarrow$				ENUM	
100 Trying	5		←	_				ENUM	ENUM DB sends response to IMS A
response  183 Session MGCF responds with 183 Session Progress response  183 Session IMS forwards 183 Session Progress response to UE_A  PRACK UE_A sends PRACK to IMS_A  PRACK IMS_A forwards PRACK to MGCF  200 OK (PRACK) IMS_A forwards 200 OK response to UE_A  IAM MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACM/CPG PSTN responds with ACM/CPG  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  ANM PSTN sends ANM to MGCF  200 OK IMS_A forwards 200 OK response to IMS_A  User A is informed that UE_B is ringing  User B answers call  ANM PSTN sends ANM to MGCF  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that UE_B is ringing  User B informed that UE_B is ringing	6				$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
Progress response 183 Session Progress response 184 Session Progress response 185 Session Progress response 186 Session Progress response 186 Session Progress response 187 Session Progress response 188 Session Progress response 198 Response 198 Session Progress response 198 PRACK UE_A sends PRACK to IMS_A forwards 180 Ringress response to UE_A Session Progress response 198 Session Progress response 198 Respon	7		←					100 Trying	MGCF responds with a 100 Trying provisional response
Progress to UE_A PRACK UE_A sends PRACK to IMS_A PRACK IMS_A forwards PRACK to MGCF  200 OK (PRACK) MGCF responds with 200 OK response to IMS_A 200 OK (PRACK) IMS_A forwards 200 OK response to UE_A IAM MGCF sends IAM to PSTN  User B is informed of incoming call of User A ACM/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 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 ANM PSTN sends ANM to MGCF 200 OK MGCF sends 200 OK response to IMS_A 200 OK MGCF sends 200 OK response to IMS_A 200 OK MGCF sends 200 OK response to UE_A User A is informed that call has been answer. ACK UE_A acknowledges the receipt of 200 OK for INVITE ACK IMS_A forwards ACK to MGCF	8							Progress	response
PRACK  IMS_A forwards PRACK to MGCF  200 OK (PRACK)  MGCF responds with 200 OK response to IMS_A  200 OK (PRACK)  IMS_A forwards 200 OK response to UE_A  IAM  MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACM/CPG  PSTN responds with ACM/CPG  180 Ringing  MGCF sends 180 Ringing response to IMS_A  180 Ringing  MGCF sends 180 Ringing response to IMS_A  User A is informed that UE_B is ringing  User B answers call  ANM  PSTN sends ANM to MGCF  200 OK  MGCF sends 200 OK response to IMS_A  200 OK  MGCF sends 200 OK response to IMS_A  200 OK  USer A is informed that call has been answere  ACK  USer A is informed that call has been answere  ACK  USE_A acknowledges the receipt of 200 OK for INVITE  ACK  IMS_A forwards ACK to MGCF	9		<del></del>					Progress	
12 13 14 15 16 17 18 18 19 20 OK (PRACK)  MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACM/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 180 Ringing response to IMS_A  180 Ringing IMS_A forwards the 180 Ringing response to UE_A  User B answers call  ANM PSTN sends ANM to MGCF  20 OK MGCF sends 200 OK response to IMS_A  200 OK MGCF sends 180 Ringing response to IMS_A  User A is informed that UE_B is ringing  20 User B answers call  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to UE_A  User A is informed that call has been answer.  ACK USer A is informed that call has been answer.  ACK USer A is informed that call has been answer.  ACK USE A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	10		$\longrightarrow$					PRACK	UE_A sends PRACK to IMS_A
13 14 15 16 17 18 18 19 20 OK (PRACK) IMS_A forwards 200 OK response to UE_A IAM MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACW/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answern  ACK USER Acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	11				$\rightarrow$			PRACK	IMS_A forwards PRACK to MGCF
14 15 16 17 18 18 19 20 20 21 21 22 23 24 25 26  IAM MGCF sends IAM to PSTN  User B is informed of incoming call of User A  ACM/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 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  20 21 22 23 24 26  User B answers call  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  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 MGCF	12		<b>←</b>					200 OK (PRACK)	
User B is informed of incoming call of User A  ACM/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answers  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	13		<del></del>					200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
ACM/CPG PSTN responds with ACM/CPG  180 Ringing MGCF sends 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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answer.  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	14					$\rightarrow$		IAM	MGCF sends IAM to PSTN
180 Ringing MGCF sends 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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  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 MGCF	15						$\rightarrow$		User B is informed of incoming call of User 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  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answerd  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	16				$\leftarrow$			ACM/CPG	PSTN responds with ACM/CPG
UE_A  User A is informed that UE_B is ringing  User B answers call  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  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 MGCF	17		←		_			180 Ringing	MGCF sends 180 Ringing response to IMS_A
20 User B answers call  ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answere  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	18		<del></del>					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
ANM PSTN sends ANM to MGCF  200 OK MGCF sends 200 OK response to IMS_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answere  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	19	<b>—</b>							
22 200 OK MGCF sends 200 OK response to IMS_A 200 OK IMS_A forwards 200 OK response to UE_A 21 User A is informed that call has been answerd 22 ACK UE_A acknowledges the receipt of 200 OK for INVITE 26 ACK IMS_A forwards ACK to MGCF	20					<b>(</b>			User B answers call
23  24  User A is informed that call has been answered ACK  UE_A acknowledges the receipt of 200 OK for INVITE  ACK  IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answered acknowledges the receipt of 200 OK for INVITE  ACK  IMS_A forwards ACK to MGCF	21				<b>(</b>			ANM	PSTN sends ANM to MGCF
24 User A is informed that call has been answere  ACK UE_A acknowledges the receipt of 200 OK for INVITE  ACK IMS_A forwards ACK to MGCF	22							200 OK	MGCF sends 200 OK response to IMS_A
25 ACK UE_A acknowledges the receipt of 200 OK for INVITE ACK IMS_A forwards ACK to MGCF	23							200 OK	IMS_A forwards 200 OK response to UE_A
26 INVITE ACK IMS_A forwards ACK to MGCF	24	<b>—</b>							User A is informed that call has been answered
26 ACK IMS_A forwards ACK to MGCF	25		<b></b>					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
	26				$\rightarrow$			ACK	
User A and B can communicate	27								User A and B can communicate



#### 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\_24: 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			Dir	ectio	n		Message	Comment
	U	Ū	1	M	P	U		
	s e	E A	M S	G C	S	s e		
	r	^	A	F	N	r		
	A		**	-		В		
1					<del>-</del>			User B calls User A
2				<b>←</b>	_		IAM	PSTN send IAM to MGCF
3			<b>←</b>				INVITE	MGCF sends INVITE to IMS_A (SDP with precondition status, MIME subtype "telephone-event" clause 6.4.1)
4			_	$\rightarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
5		<b>←</b>	$\dashv$				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		←					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
14		<del>(</del>	_				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

Step		Dir	ection			Message	Comment
	U U s E	I M	M G	P S	U s		
	e A	S	C F	T N	е		
	r A	A	F	N	r 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				<del>)</del>		ACM/CPG	MGCF send ACM/CPG to PSTN
21				$\longmapsto$			User B is informed that UE_A is ringing
22							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				<del>)</del>		ANM	MGCF sends ANM to PSTN
26		$\leftarrow$				ACK	MGCF sends ACK to PSTN
27	<b>├</b>					ACK	IMS_A forwards ACK to UE_A
28							User A and B can communicate
29A							User A ends call
30A		$\rightarrow$				BYE	UE_A releases the call with BYE
31A			$\rightarrow$			BYE	IMS_A forwards BYE to MGCF
32A				<del>)</del>		REL	MGCF sends REL to PSTN
33A			<del>(                                    </del>	_		RLC	PSTN sends response RLC to MGCF
34A				$\longrightarrow$			User B is informed that call has ended
35A		$\leftarrow$				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
29B				<b>(</b>			User B ends call
30B			<del></del>			REL	PSTN sends REL to MGCF
31B				<del>)</del>		RLC	MGCF sends RLC to PSTN
32B				$\longrightarrow$			User B is informed that call has ended
33B		←	_			BYE	MGCF sends BYE to IMS_A
34B	$  \  $					BYE	IMS_A forwards BYE to UE_A
35B							User A is informed that call has ended

Step			Dir	ection	1		Message	Comment
	C	U	ı	М	Р	U		
	S	Ε	M	G	S	S		
	е	Α	S	С	Т	е		
	r		Α	F	N	r		
	Α					В		
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.

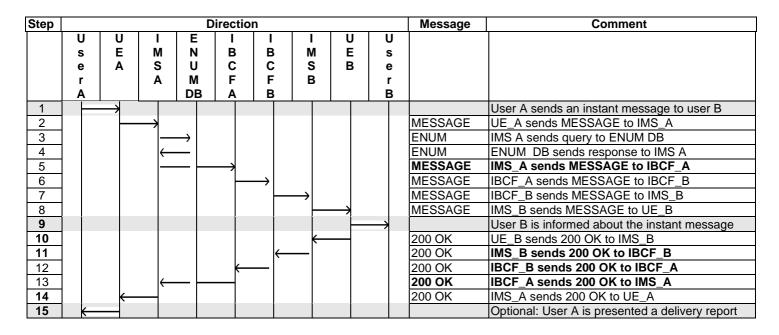
Note that the expected test sequence may only show the Call Flow that affects the test.

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

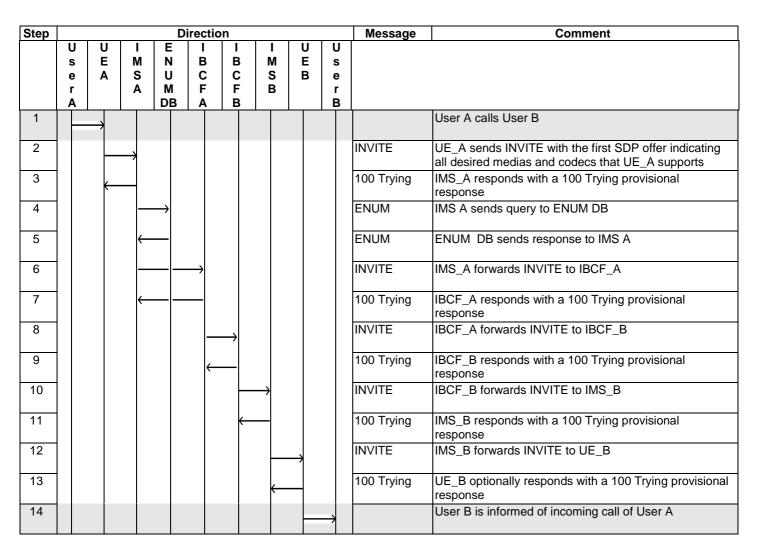
		Interoperability Test Descr	ription					
Identifier:	TD_IMS_N	MESS_0001						
Summary:	IMS network shall support SIP messages greater than 1 500 bytes							
Configuration:	CF_INT_CALL							
SUT:	IMS_B							
References:	<b>Test Purp</b>	ose	Specification Reference					
	TP_IMS_4	1002_1	TS 124 229 [1], clause 4.2A ¶1					
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>MESS</li></ul>	ause 4.2.1  and IMS_A configured to use TC  is registered in IMS_A using any is registered user of IMS_B using	lished to their respective IMS networks as  P for transport user identity					
Test Sequence:	Step							
rest sequence.	1	User A sends message to User B	with at least 1 500 characters					
	2	Verify that user B receives message						
Conformance	Check							
Criteria:	1	TP_IMS_4002_01 in CFW step 6	(MESSAGE)					
	-	ensure that {	(					
		when { UE_A sends a MESSAG	E to UE_B					
		containing a Message_B	ody greater than 1 300 bytes }					
		then { IMS_B receives the MES.						
		containing the Message_ }	Body greater than 1 300 bytes }					



#### 4.5.1.2 ENUM Query - Functionality test

	Interoperability Tes	t Description					
Identifier:	TD_IMS_ENUM_0001						
Summary:	ENUM query should result in return of	of NAPTR with correct SIP URI					
Configuration:	CF_INT_CALL						
SUT:	ENUM _A and ENUM_DB						
References:	Test Purpose	Specification Reference					
	TP_IMSENUM_01	TS 124 229 [1], clause 5.4.3.2 ¶11 (item 10 in 1 <sup>st</sup> numbered list)					
Use Case ref.:	UC_2_I						
Pre-test conditions:	<ul> <li>ENUM DB is configured with dat</li> <li>IMS A (and B) are configured to</li> <li>HSS of IMS_A and of IMS B is c</li> <li>UE_A has IP bearer established</li> <li>UE_A is registered in IMS_A usi</li> </ul>	support ENUM configured according to table 1 to its respective IMS networks as per clause 4.2.1					
Test Sequence:	Step						
Tost ocquence.	1 User A calls User B telUR	1					
	2 Verify that user B is inform	ned of incoming call of User A					

	Interoperability Test Description						
Conformance	Check						
Criteria:	1	TP_IMS_ENUM_01 in CFW step 5 (NAPTR Response):					
		ensure that {					
		when { UE_A sends an initial INVITE for UE_B to IMS_A					
		containing a Request_URI					
		indicating a Tel_URI					
		and IMS_A sends a NAPTR_Query to ENUM_DB					
		containing the TN derived_from the Tel_URI_E.164_Number					
		}					
		then { ENUM_DB sends a NAPTR_Response to IMS_A					
		containing a NAPTR_Resource_Record					
		containing the TTL of the NAPTR_record					
		containing the service_type					
		indicating E2U+sip					
		containing the_regular_expression					
		indicating !^(.*)\$!					
		containing the SIP_URI of UE_B					
		indicating backreference (\1) for the user part					
		indicating domain name for the host part					
		containing SIP_URI_parameters 'if applicable' }					
		}}					



## 4.5.2 Registration and De-registration

## 4.5.2.1 First time registration in a visited IMS network

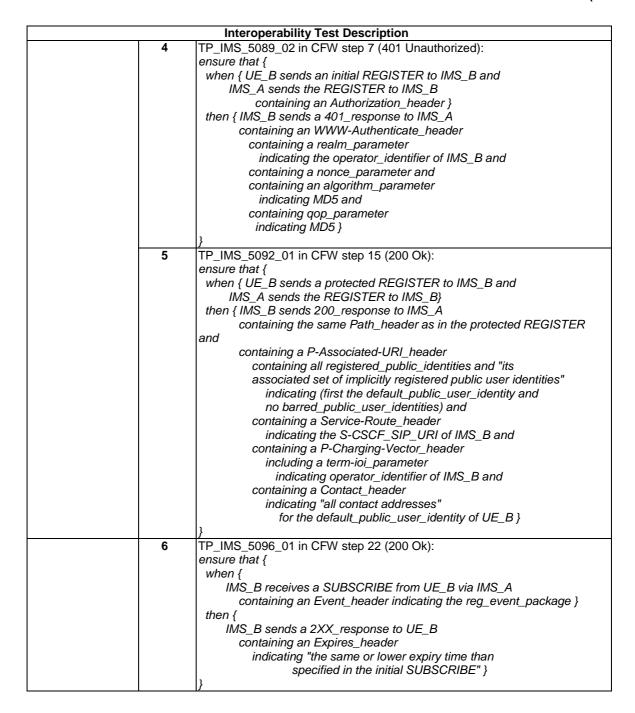
		ty Test Description						
Identifier:	TD_IMS_REG_0001_AKA							
Summary:	First time registration in a visited IMS network							
Configuration:	CF_ROAM_REG							
SUT:	IMS_A and IMS_B							
References:	Test Purpose	Specification Reference						
	TP_IMS_5011_01	TS_124 229 [1], clauses 5.2.2.1 ¶16						
		(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	<ul> <li>HSS of IMS_B is configur</li> </ul>							
conditions:	<ul> <li>UE_B IP bearers establish</li> </ul>	hed to IMS_A as per clause 4.2.1						
	<ul> <li>UE_B not registered in IM</li> </ul>							
	<ul> <li>IMS_A within the trust dor</li> </ul>	main of IMS_B						
	<ul> <li>UE_B is configured to use</li> </ul>	e AKA authentication						
Test Sequence:	Step							
	<ol> <li>User B registers in</li> </ol>	IMS B using any valid user identity						
	2 Verify that UE_B sh	nows successful registration						
Conformance	Check							
Criteria:	1 TP_IMS_5011_01 i	n CFW step 4 (REGISTER):						
	ensure that {							
	when { UE_B send	ds an unprotected REGISTER to IMS_A						
	when { UE_B send containing a	a Security-Client_header }						
	when { UE_B sendents of them { IMS_A sendents	a Security-Client_header } ds the REGISTER to IMS_B						
	when { UE_B sendents of them { IMS_A sendents of them { IMS_A sendents of them containing }	a Security-Client_header } ds the REGISTER to IMS_B a Path_header						
	when { UE_B send containing a then { IMS_A send containing containin	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and						
	when { UE_B sendents containing a containing a containing containi	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header						
	when { UE_B send containing a then { IMS_A send containing containing containing containin	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and						
	when { UE_B sendent containing a then { IMS_A sendent containing containing containing containing containing containing containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header						
	when { UE_B sendent containing a containing a containing containing containing containing containing containing containing containing containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and						
	when { UE_B sendent containing a then { IMS_A sendent containing c	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and						
	when { UE_B sendentaining a containing a then { IMS_A sendentaining containing containing containing containing containing containing containing not containing not containing containing containing containing containing not containing not containing not containing containing not containing not containing not containing not containing not containing containi	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and						
	when { UE_B sendentaining a containing a containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header						
	when { UE_B sendentaining a containing a containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter						
	when { UE_B sententaining a then { IMS_A sententaining containing indicat	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter ing no						
	when { UE_B sendentaining a then { IMS_A sendentaining containing indicate not containing containin	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter ing no iing a Security-Verify_header and						
	when { UE_B sendentaining a then { IMS_A sendentaining containing indicated not containing not containing cont	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter ing no iing a Security-Verify_header and iing a Security-Client_header and						
	when { UE_B sententaining a then { IMS_A sententaining containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter ing no iing a Security-Verify_header and iing a Security-Client_header a P-Visited-Network-ID_header						
	when { UE_B sententaining a then { IMS_A sententaining containing	a Security-Client_header } ds the REGISTER to IMS_B a Path_header g P-CSCF_SIP_URI of IMS_A and a Require_header g a path_option_tag and a P-Charging-Vector_header ng an icid-value_parameter and ng an orig-ioi_parameter and aining a term-ioi_parameter and a Authorization_header ng an integrity-protected_parameter ing no iing a Security-Verify_header and iing a Security-Client_header						

	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
	<b>y</b> ,
	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" }
	}

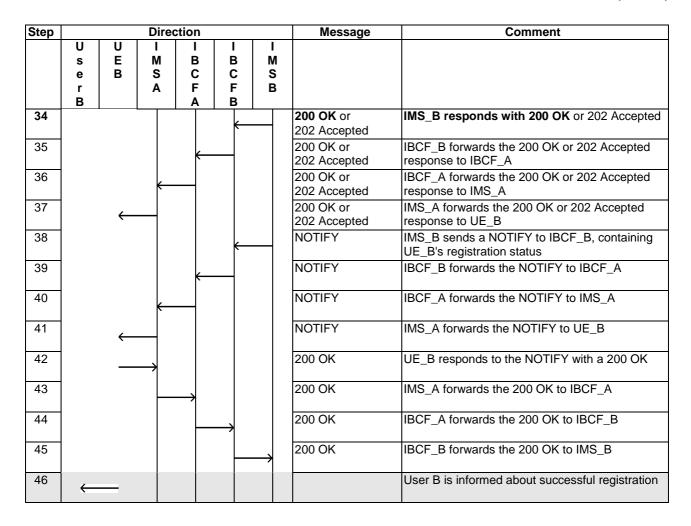
	Interoperability T	est Description						
Identifier:	TD_IMS_REG_0001_MD5							
Summary:	First time registration in a visited IMS network							
Configuration:	CF_ROAM_REG							
SUT:	IMS_A and IMS_B							
References:	Test Purpose	Specification Reference						
	TP_IMS_5011_03	TS 124 229 [1], clauses 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	<ul> <li>HSS of IMS_B is configured a</li> </ul>	according to table 1						
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_E</li> </ul>							
	IMS_A within the trust domain							
	<ul> <li>UE_B is configured to use MI</li> </ul>	D5 digest authentication						
	= 5							
Test Sequence:	Step							
•		B using any valid user identity						
		s successful registration						

Conformance	Chask	Interoperability Test Description
Conformance Criteria:	Check	TD IMC 5044 00 in CDM stee 4 /DECICTED):
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 Dr. CSCF_SIP_URI of IMS_A and
		containing a Require_header
		containing a require_needs.
		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 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 ip-assoc-yes and containing a P-Visited-Network-ID_header
		indicating "the visited network at the home network" }
		Indicating the visited network at the nome 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 }
1	1	lı .



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				$\longrightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF_A
4					$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF_B
5						$\longrightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS_B

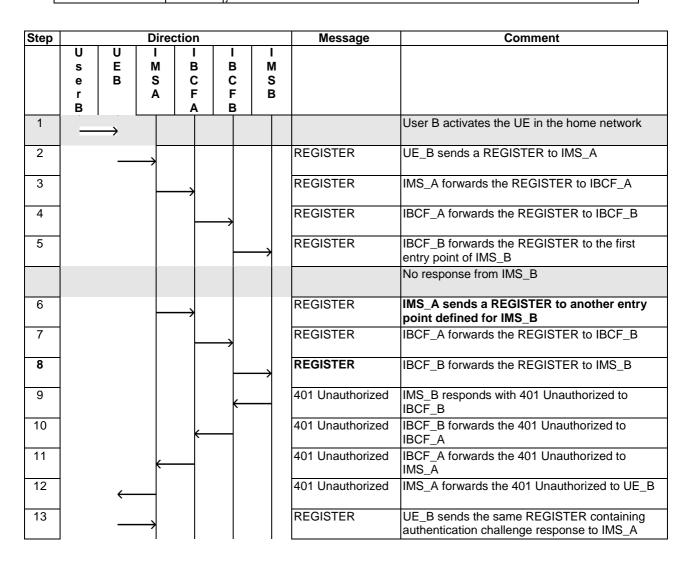
Step			Dire	ction			Message	Comment
	U s	U E	I M	I B	I B	I M		
	е	В	S	С	С	S		
	r B		Α	F A	F B	В		
6					<b>←</b>		401 Unauthorized	IMS_B responds with 401 Unauthorized to IBCF_B
7				$\leftarrow$			401 Unauthorized	IBCF_B forwards the 401 Unauthorized to IBCF_A
8			<b>←</b>				401 Unauthorized	IBCF_A forwards the 401 Unauthorized to IMS_A
9		$\leftarrow$					401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
10			$\rightarrow$				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					$\rightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
13						$\rightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS B
14					<b>—</b>		200 OK	IMS_B responds with 200 OK
15				<b>—</b>			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
16			$\leftarrow$				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					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE to IBCF_B
20						$\rightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
21					$\leftarrow$		200 OK or 202 Accepted	IMS_B responds with a 200 OK or 202 Accepted
22				$\leftarrow$			200 OK or 202 Accepted	IBCF_B forwards 200 OK or 202 Accepted to IBCF_A
23			$\leftarrow$				200 OK or 202 Accepted	IBCF_A forwards 200 OK or 202 Accepted to IMS_A
24					<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status
25				$\leftarrow$			NOTIFY	IBCF_B forwards NOTIFY to IBCF_A
26			<b>←</b>				NOTIFY	IBCF_A forwards NOTIFY to IMS_A
27				$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
28					$\rightarrow$		200 OK	IBCF_A forwards 200 OK response to IBCF_B
39						$\rightarrow$	200 OK	IBCF_B forwards 200 OK response to IMS_B
30			$\longrightarrow$				SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event package) to IMS_A
31				$\longrightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IBCF_A
32					$\rightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE request to IBCF_B
33						$\longrightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE request to IMS_B



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

		Interoperability Test Desc	cription				
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 poin	t does not answer, without topology hiding.				
Configuration:	CF_ROAN	//_REG					
SUT:	IMS_A						
References:	Test Purp	ose	Specification Reference				
	TP_IMS_5	5203_01	TS 124 229 [1], clause 5.2.2.1 ¶33				
			(item 6 in 2 <sup>nd</sup> numbered list)				
	TP_IMS_5	5092_01	TS 124 229 [1], clause 5.4.1.2.2F ¶1				
Use Case ref.:	UC_01_R						
Pre-test	<ul> <li>HSS of</li> </ul>	of IMS_B is configured according	to table 1				
conditions:	<ul> <li>UE_B</li> </ul>	IP bearers established to IMS_A	A as per clause 4.2.1				
	IMS_A configured with multiple entry points for IMS_B						
	<ul> <li>IMS /</li> </ul>	A not configured for topology hidi	ng				
			S_A pointing to a non-existing component in				
	IMS_I		-				
Test Sequence:	Step						
	1	User B registers in IMS B using	any user identity				
	2	Verify that UE_B shows success	sful 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

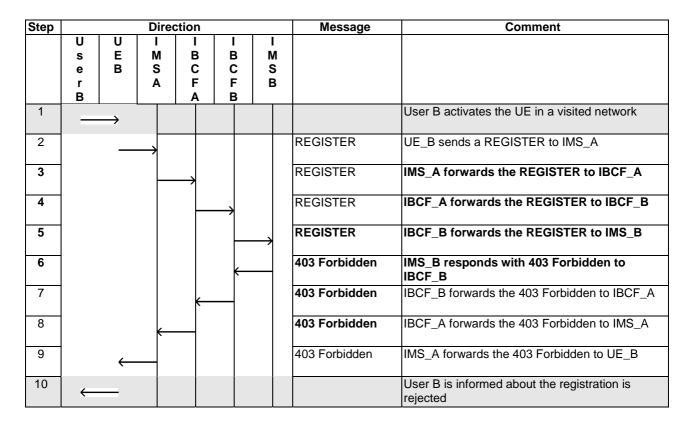


14	U s e	U					Message	Comment
14	_	E	М	I B	ΙВ	I		
4.4	_	В	S	С	С	S		
4.4	r B		Α	F A	F B	В		
14		_		$\rightarrow$			REGISTER	IMS_A forwards the REGISTER to IBCF A
15					$\rightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
16						$\rightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS B
17					<b>←</b>		200 OK	IMS_B responds with 200 OK
18				<b>←</b>			200 OK	IBCF_B forwards the 200 OK response to IBCF_A
19			<b>←</b>				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				$\rightarrow$			SUBSCRIBE	IMS_A sends a SUBSCRIBE to IBCF_A
22					$\longrightarrow$		SUBSCRIBE	IBCF_A forwards the SUBSCRIBE to IBCF_B
23						$\rightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
24					<b>←</b>		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			$\leftarrow$				200 OK or 202 Accepted	IBCF_A forwards 200 OK or 202 Accepted to IMS_A
27					<b>←</b>		NOTIFY	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				$\rightarrow$			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			<u> </u>	$\rightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IBCF_A
35					$\longrightarrow$		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				<b>←</b>			200 OK or 202 Accepted	IBCF_B forwards the 200 OK or 202 Accepted response to IBCF_A
39			<b>—</b>				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					<b>—</b>		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status

Step			Dire	ction			Message	Comment
	C	U	ı	ı	I	ı		
	s	E	M	В	В	M		
	е	В	S	C	C	S		
	r B		Α	F	F B	В		
42	Б			<del> </del>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
43			<b>←</b>				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					$\longrightarrow$		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

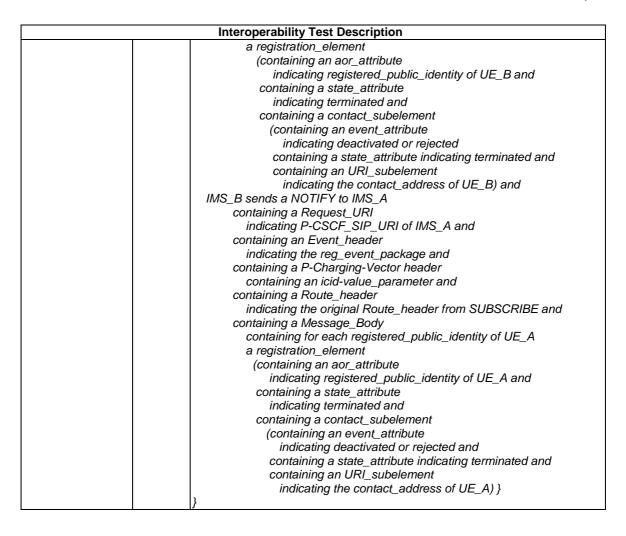
# 4.5.2.3 403 response to REGISTER from an un-trusted domain without topology hiding

		Interoperability Test Descr	iption						
Identifier:	TD_IMS_F	REG_0003							
Summary:	IMS network sends 403 response when attempting registration from a different trust domain without topology hiding								
Configuration:	CF_ROAM	1_REG							
SUT:	IMS_B								
References:	Test Purp		Specification Reference						
	TP_IMS_5	129_01	TS 124 229 [1], clause 5.3.1.2 ¶1						
Use Case ref.:	UC_01_R								
Pre-test conditions:	<ul><li>UE_B</li><li>IMS_E</li></ul>	of IMS_B is configured according to IP bearers established to IMS_A and configured for topology hidin and IMS_B are in different trust of the state of the sta	as per clause 4.2.1 g						
Test Sequence:	Step								
rest Sequence.	1	User B registers in IMS B using a	ny user identity						
	2	Verify that UE_B shows unsucces							
Conformance	Check								
Criteria:	1	TP_IMS_5129_01 in CFW step 7 ensure that {  when { UE_B sends a valid initia  and IMS_B receives the RE  then { IMS_B sends a 403_resp }	al REGISTER to IMS_A GISTER from IMS_A}						



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

		Interoperability Test Descr	ription						
Identifier:	TD_IMS_F	REG_0005							
Summary:	IMS netwo	ork can initiate user de-registration	, e.g., when a user runs out of credit						
Configuration:	CF_ROAM_REG								
SUT:	IMS_B								
References:	Test Purp	ose	Specification Reference						
	TP_IMS_5	5093_01	TS 124 229 [1], clause 5.4.1.5 ¶6						
			(1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_01_R								
Pre-test	<ul> <li>HSS</li> </ul>	of IMS_B is configured according to	to table 1						
conditions:	<ul> <li>UE_B</li> </ul>	IP bearers established to IMS_A	as per clause 4.2.1						
	<ul> <li>UE_B</li> </ul>	registered in IMS_B via IMS_A us	sing any user identity						
	<ul> <li>IMS_/</li> </ul>	A within the trust domain of IMS_E	3						
Test Sequence:	Step								
	1	IMS_B is triggered manually to de	e-register user B						
	2	Verify that UE_B shows successf	ful de-registration						
Conformance	Check								
Criteria:	1	TP_IMS_5093_01 in CFW step 4	·8 and 56						
		ensure that {							
		. =	ork_originated_deregistration_event }						
		then {							
		IMS_B sends a NOTIFY to IMS	- <u>-</u>						
		containing a Request_UR	RI						
		indicating UE_B and							
		containing an Event_head							
		indicating the reg_ever	=1 0						
		containing a P-Charging-							
		containing an icid-value							
		containing a Route_head							
			Route_header from SUBSCRIBE and						
		containing a Message_Bo	oay nistered_public_identity of UE_B						
		Containing for each reg	istered_public_identity of OE_D						

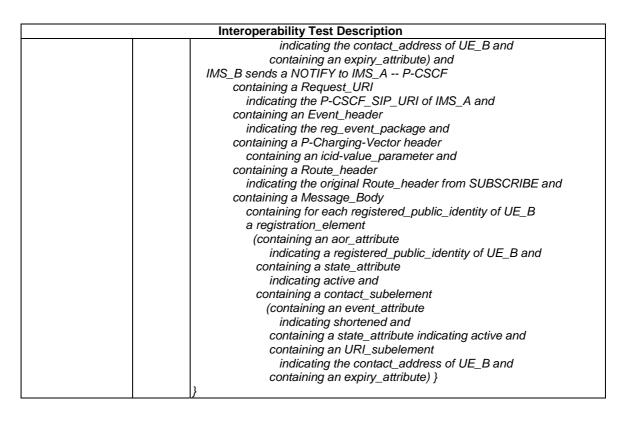


Step			Dire	ction			Message	Comment
	S & G	UEB	I M S	ВС	I B C	I M S		
	r	ь	A	F	F	В		
	В			A	В	_		
								IMS_B is triggered to de-register user B
47					<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's de-registration
48				<b>←</b>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
49			$\leftarrow$				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				$\longrightarrow$			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				<b>←</b>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A

Step			Direc	ction			Message	Comment
	D w e r B	U E B	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				$\longrightarrow$			200 OK	IMS_A responds to the NOTIFY with a 200 OK
59					$\longrightarrow$		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	<del>(</del>	_						User B is informed about de-registration

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

	Interoperability Test Description								
Identifier:	TD_IMS_REG_0006								
Summary:	IMS network can initiate user re-authentication								
Configuration:	CF_ROAM_REG								
SUT:	IMS_B								
References:		cation Reference							
	TP_IMS_5094_01 TS 124 229 [1], clause 5.4.1.6 ¶2								
Use Case ref.:	UC_01_R	L 4/							
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>UE_B registered in IMS_B using any user identity</li> <li>IMS_A within the trust domain of IMS_B</li> <li>Event received in S-CSCF of IMS_B to re-authenticate UE_B</li> </ul>								
Test Sequence:	Step								
rest sequence.	1 IMS_B network is triggered to re-authentic	cata usor B							
	2 Verify that UE_B shows successful registi								
	2   Verily that OE_B shows successful registi	alion							
Conformance	Check								
Criteria:	1 TP_IMS_5094_01 in CFW steps 48 and 5	56							
	ensure that {     when { IMS_B receives a network_origing then {         IMS_B sends a NOTIFY to UE_B containing a Request_URI indicating UE_B and containing an Event_header indicating the reg_event_packade containing a P-Charging-Vector header indicating an icid-value_parame containing a Route_header indicating the original Route_header indicating a Message_Body containing a Message_Body containing for each registered_indicating a registered_indicating a registered_public containing a state_attribute indicating a contact_subelem (containing an event_attribute indicating shortened and containing a state_attribute	ge and eader eter and eader from SUBSCRIBE and public_identity of UE_B elic_identity of UE_B and enent							



Step			Direc	ction			Message	Comment
	D w e r B	U E B	I M S A	I B C F A	- BCFB	I M S B		
								IMS_B is triggered to re-authenticate user B
47					<del>(</del>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's re-authentication
48				←			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				$\rightarrow$			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

Step			Dir	ection			Message	Comment
	U	U E	I M	I B	I B	I M		
	s e	В	S	C	C	S		
	r B		Α	F	F B	В		
54	<b>.</b>				<u> </u>	$\rightarrow$	200 OK	IBCF_B forwards the 200 OK response to IMS_B
55					$\leftarrow$		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing IMS_A's re-authentication
56				<b>←</b>			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
57			<del>(</del>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
58				<b>→</b>			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 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					$\longrightarrow$		REGISTER	IBCF_A forwards the REGISTER to IBCF B
64						$\rightarrow$	REGISTER	IBCF_B forwards the REGISTER to IMS B
65					$\leftarrow$		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						$\rightarrow$	SUBSCRIBE	IBCF_B forwards the SUBSCRIBE to IMS_B
72					$\leftarrow$		200 OK or 202 Accepted	IMS_B responds with a 200 OK or 202 Accepted
73				<b>←</b>	_		200 OK or 202 Accepted	IBCF_B forwards 200 OK or 202 Accepted to IBCF_A
74			<del>(</del>				200 OK or 202 Accepted	IBCF_A forwards 200 OK or 202 Accepted to IMS_A
75					$\leftarrow$		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's registration status
76				<del></del>	$\blacksquare$		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					$\longrightarrow$		200 OK	IBCF_A forwards 200 OK response to IBCF_B
80						$\rightarrow$	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

Step			Dire	ction			Message	Comment
	D w e r B	U E B	I M S A	I B C F A	- BCFB	I M S B		
82				<b>→</b>			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					<b>←</b>		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					<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IBCF_B, containing UE_B's registration status
90				$\leftarrow$			NOTIFY	IBCF_B forwards the NOTIFY to IBCF_A
91			<del>(                                    </del>				NOTIFY	IBCF_A forwards the NOTIFY to IMS_A
92		$\leftarrow$					NOTIFY	IMS_A forwards the NOTIFY to UE_B
93			$\rightarrow$				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						$\rightarrow$	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

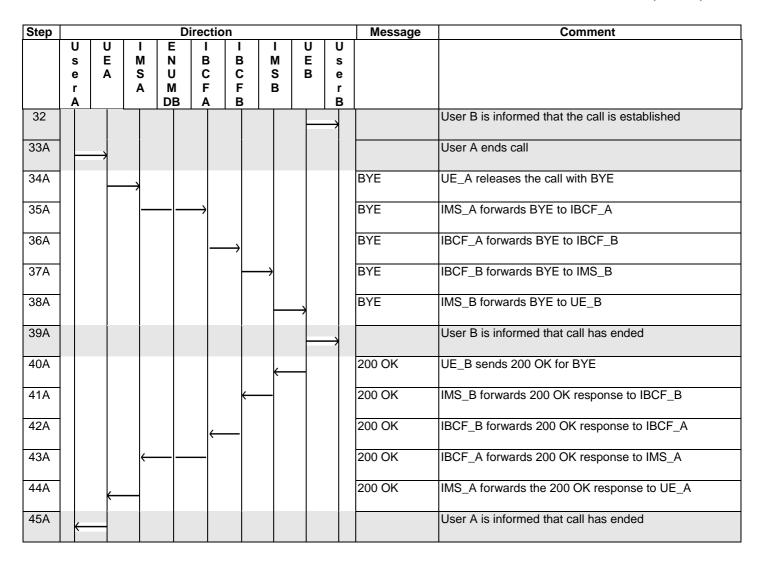
		Interoperability Te	est Description						
Identifier:	TD_IMS	CALL_0001							
Summary:			nent of dialogs for users with default SIP URIs and						
		el URI E.164 numbers	ŭ						
Configuration:	CF_INT_0								
SUT:	IMS_A ar	nd IMS_B							
References:	Test Pur	oose	Specification Reference						
	TP_IMS_	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 in 1 <sup>st</sup> numbered list)						
	TP_IMS_	5097_04	(item 9 in 1 <sup>st</sup> numbered list) 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						
			(item 1 in 8 <sup>th</sup> numbered list)						
	TP_IMS_	5107_01	TS 124 229 [1], clause 5.4.3.2 ¶119						
	TD 1140	5445.04	(item 1 in 8 <sup>th</sup> numbered list)						
	TP_IMS_	5115_01	TS 124 229 [1], clause 5.4.3.3 ¶91						
	TD IMC	E11E 02	(item 2 in 4 <sup>th</sup> numbered list) TS 124 229 [1], clause 5.4.3.3 ¶92						
	TP_IMS_	(item 3 in 4 <sup>th</sup> numbered list)							
	TP_IMS_	TS 124 229 [1], clause 5.4.3.3 ¶91							
	II _IIVIO_	3113_02	(item 2 in 4 <sup>th</sup> numbered list)						
	TP_IMS_	5115 04	TS 124 229 [1], clause 5.4.3.3 ¶92						
		0110 <u>_</u> 01	(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 11)						
	TP_IMS_	5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62						
			(after note 11)						
Use Case ref.:	UC_02_I								
Pre-test			configured according to table 1						
conditions:			ers established to their respective IMS networks as						
		lause 4.2.1							
			s userSIP_priv according to table 1						
			s userSIP_priv according to table 1						
		A within the trust domain							
			th an ENUM entry for the Tel URI E.164 Number of						
	users	SIP of IMS_B							
Test Sequence:	Ston								
rest sequence.	Step 1	Hear A calls usor R's To	I_URI (i.e. userSIP in IMS_B)						
	2		rmed of incoming call of User A						
	3		rmed that UE_B is ringing						
	4	User B answers the call	miod that OL_D to finging						
	5		rmed that call has been answered						
	6		rmed that the call is established						
	7	User A ends the call	THOSE THAT THE COMMISSION						
	8		rmed that call has ended						
	9		rmed that call has ended						
L		,	and the second control of the second control						

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5097_01 in CFW step 8 (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 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 8 (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	TP_IMS_5097_04 in CFW step 8 (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 NAPTR_Query to ENUM_DBDB
		containing the Tel_URI_E.164_Number }
		when { IMS_A receives NAPTR_Response from ENUM_DB
		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 29 (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 }
	5	TP_IMS_5107_01 in CFW step 36A (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 }
		}

	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 16 (180 Ringing):
•	ensure that {
	when { UE_B sends a 1xx_response to UE_A
	) (HO A : 11 4
	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 23 (2xx):
	ensure that {
	when { UE_B sends a 2xx_response to UE_A
	when to C_D serius a 2xx_response to OL_A
	than (IMC A received the 2004 recommend from IMC D
	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}
	}
10	TP_IMS_5131_01 in CFW step 16 (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 }
	not containing a r-onarging-runction-Addresses_neader }
	TD IMO 5404 00 in OFIN star 00 (0 )
11	' ' '
	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 }
	}
	IJ

Step	Direction									Message	Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	I M S B	UEB	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		<b>—</b>	$\blacksquare$							100 Trying	IMS_A responds with a 100 Trying provisional response

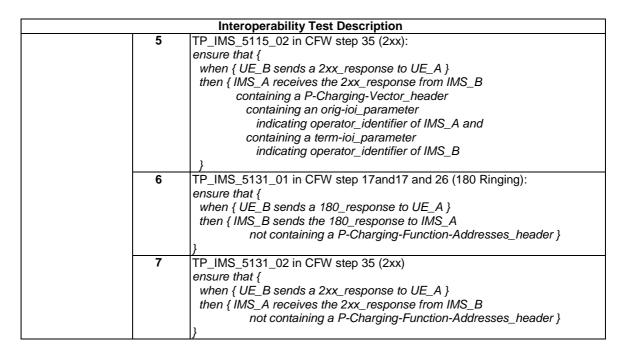
Step			Dire	ction				Message	Comment
	U U s E	I M	_	I B E	I 3	I U M E	U		
	e A	S	U	C		S B	e		
	r A	A			= 3	В	r B		
4			$\rightarrow$					ENUM	IMS A sends query to ENUM DB
5		<del></del>	_					ENUM	ENUM DB sends response to IMS A
6			_					INVITE	IMS_A forwards INVITE to IBCF_A
7		<b>←</b>		_				100 Trying	IBCF_A responds with a 100 Trying provisional response
8				$\longrightarrow$	,			INVITE	IBCF_A forwards INVITE to IBCF_B
9				<del></del>				100 Trying	IBCF_B responds with a 100 Trying provisional response
10					<del>                                     </del>			INVITE	IBCF_B forwards INVITE to IMS_B
11					$\leftarrow$	-		100 Trying	IMS_B responds with a 100 Trying provisional response
12						$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
13							$\rightarrow$		User B is informed of incoming call of User A
14						<del></del>		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
15					$\leftarrow$	-		180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
16				<del></del>				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
17		$\leftarrow$		-				180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
18	<del> </del>							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
19	<b>—</b>								User A is informed that UE_B is ringing
20						<b>←</b>			User B answers call
21						<del></del>		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
22					<del></del>	-		200 OK	IMS_B forwards 200 OK response to IBCF_B
23				<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
24		$\leftarrow$		-				200 OK	IBCF_A forwards 200 OK response to IMS_A
25								200 OK	IMS_A forwards 200 OK response to UE_A
26									User A is informed that call has been answered
27		$\rightarrow$						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
28			-					ACK	IMS_A forwards ACK to IBCF_A
29				$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
30								ACK	IBCF_B forwards ACK to IMS_B
31						$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
	1 1	I	I	1	I	1	ı		

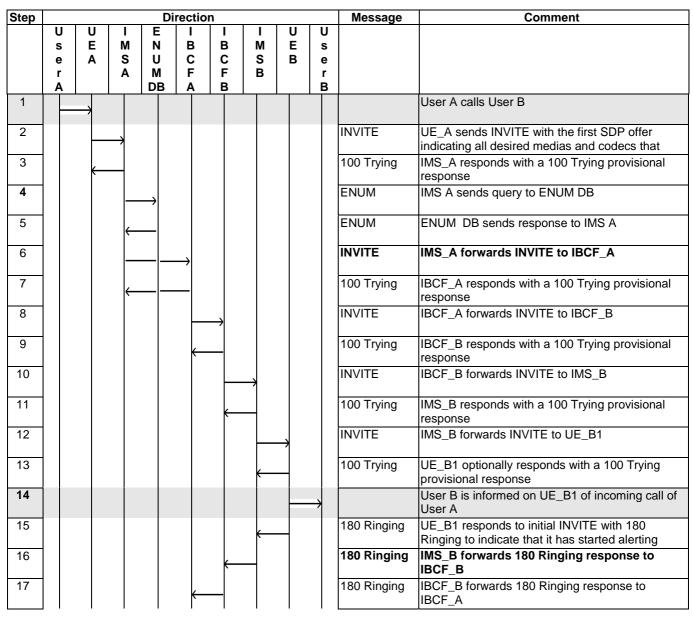


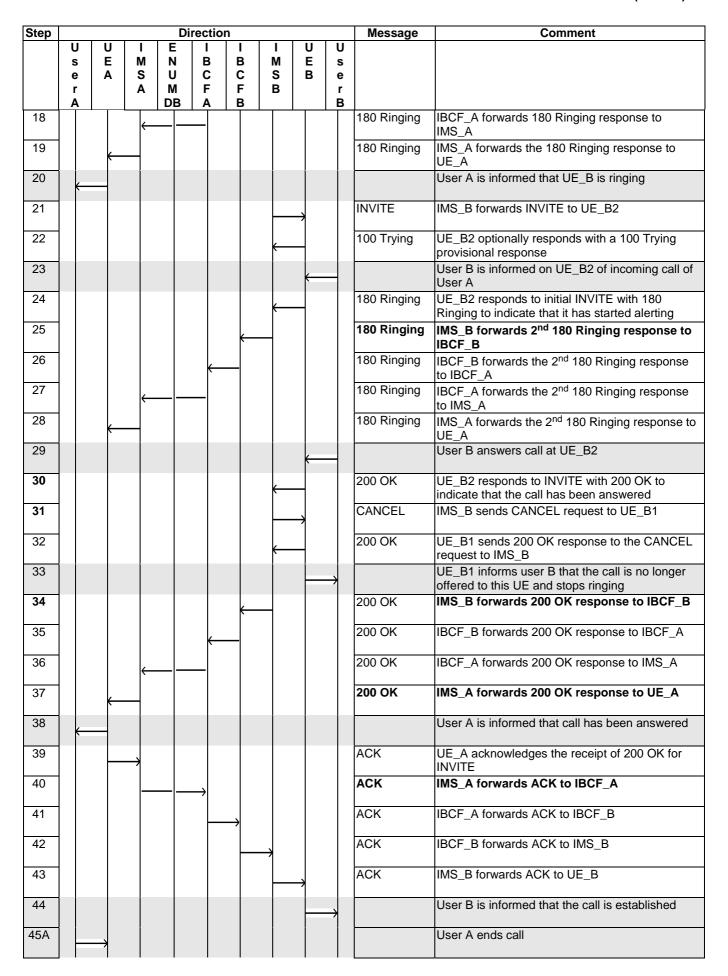
#### 4.5.3.1.1.2 Default SIP URI

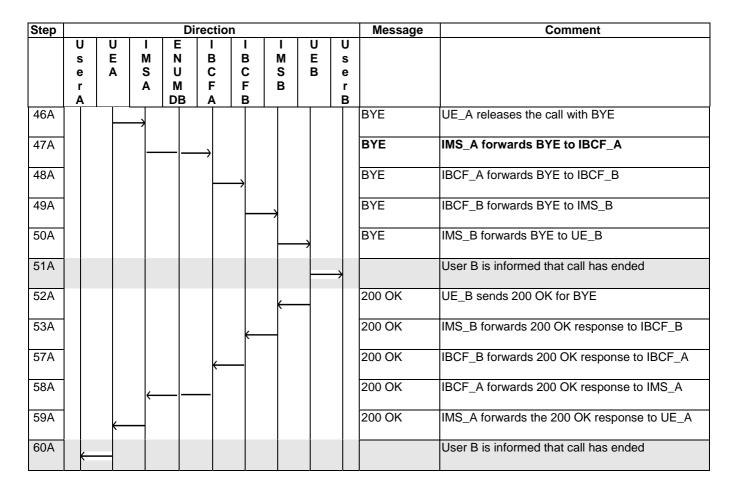
	Interoperability	Test Description					
ldentifier:	TD_IMS_CALL_0001F						
Summary:	IMS network can handle establishment of a call when the call is being offered to						
Configuration:	multiple terminals  CF INT CALL						
SUT:	IMS_A and IMS_B						
References:	Test Purpose	Specification Reference					
	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 11)					
	TP_IMS_5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62 (after note 11)					
Use Case ref.:	UC_12	·					

		Interoperability Test Description							
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 bearers established to their respective IMS networks</li> </ul>								
Conditions.	_	— · · · · · · · · · · · · · · · · · · ·							
	per clause 4.2.1  • UE A is registered in IMS A as userSIP priv according to table 1								
		UE_A is registered in IMS_A as userSIP_priv according to table 1 UE_B is registered in IMS_B via UE_B1 and UE_B2 as userSIP according to							
	table								
	• IIVIO_	A WIGHIT THE TRUST CONTAIN OF TWO_D							
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							
	4	Verify that user A is informed that a UE of User B is ringing							
	5	User B answers call on UE_B2							
	6	Verify that user B is informed at UE_B1 that the call is no longer offered							
	7	Verify that user A is informed that call has been answered							
	8	Verify that user B 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							
Conformance	Check	TD 1140 5007 041 0714 1 0 0111							
Criteria:	1	TP_IMS_5097_01 in CFW step 8 (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 a r - Gharging-vector_header (containing an icid-value_parameter and							
		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_5107_02 in CFW step 41 (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 }							
	3	TP_IMS_5107_01 in CFW step 48A (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 17 and 26 (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							
1		}							









#### 4.5.3.1.1.3 Default Tel URI

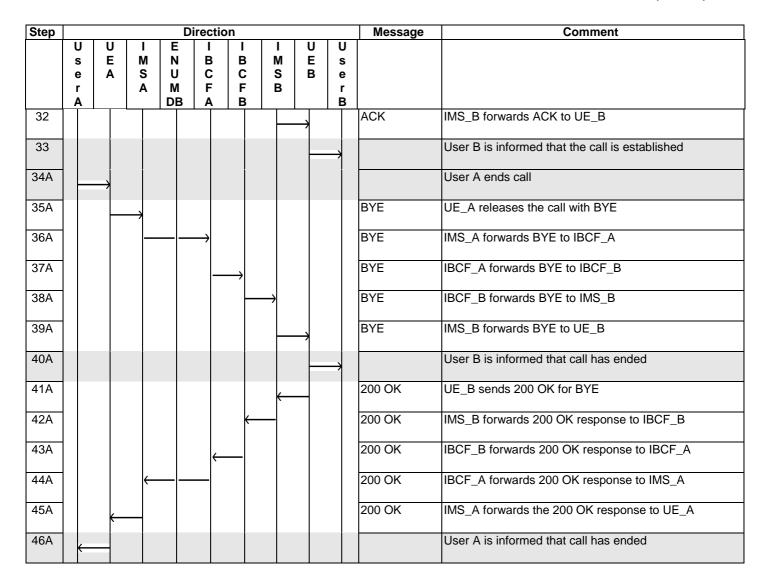
	Interoperability	Test Description					
Identifier:	TD_IMSCALL_0002						
Summary:	IMS network can handle establishment of dialogs for users with default TEL URIs						
Configuration:	CF_INT_CALL						
SUT:	IMS_A and IMS_B						
References:	Test Purpose	Specification Reference					
	TP_IMS_5097_01	TS 124 229 [1], clause 5.4.3.2 ¶11 (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 11)					
	TP_IMS_5131_02	TS 124 229 [1], clause 5.3.2.1 ¶62 (after note 11)					
Use Case ref.:	UC_02_I	, ,					

		Interoperability Test Description								
Pre-test	• HSS	of IMS_A and of IMS B is configured according to table 1								
conditions:		and UE_B have IP bearers established to their respective IMS networks as								
		ause 4.2.1								
		s registered in IMS_A using userTEL_priv according to table 1								
		B is registered in IMS_B using userTEL_priv according to table 1								
		_A within the trust domain of IMS_B								
		- William the treet demand of the								
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	Jser 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	TD 1140 5007 04 : OFIA ( ) 0 (INI) (ITE)								
Criteria:	1	TP_IMS_5097_01 in CFW step 8 (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 }								
		}  TD_IMC_5007_00 in CDM step 0 (INIVITE)								
	2	TP_IMS_5097_02 in CFW step 8 (INVITE)								
		ensure that { when { UE_A sends an initial INVITE to UE_B								
		When { OL_A serius arr initial invitte 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 30 (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 o-odor_on_ontollivio_A }								
	4	TP_IMS_5107_01 in CFW step 37A (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>I</i> ′								

		Interoperability Test Description							
Т	5	TP_IMS_5115_01 in CFW step 17 (180 Ringing):							
	J	lensure that {							
		ı Y							
		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							
-	6	TP_IMS_5115_03 in CFW step 17 (180 Ringing):							
	· ·	ensure that {							
		when { UE_B sends a 1xx_response to UE_A							
		When { OL_B series a fixx_response to OL_M							
		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 24 (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							
-		TD 100 5445 041 OFM + 04/0							
	8	TP_IMS_5115_04 in CFW step 24 (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 17 (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 24 (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 }							
		}							
		D .							

Step				D	irectio	n				Message	Comment
	N e r ∢	U E A	I M S A	E N U M DB	I B C F A	I B C F B	- М S B	ВШС	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		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response

Step				Direc	ction					Message	Comment
		U E I	I E			I B	I M	U	U s		
	e	A :	S U			C	S	В	е		
	r A		A M			F B	В		r B		
4			$\stackrel{\cdot}{\longrightarrow}$	•			,			ENUM	IMS A sends query to ENUM DB
5			$\longleftarrow$							ENUM	ENUM DB sends response to IMSA
6				$\longrightarrow$						INVITE	IMS_A forwards INVITE to IBCF_A
7			$\longleftarrow$		,					100 Trying	IBCF_A responds with a 100 Trying provisional response
8						,				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<del></del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							>			INVITE	IBCF_B forwards INVITE to IMS_B
11						<b>-</b>	-			100 Trying	IMS_B responds with a 100 Trying provisional response
12								<b>→</b>		INVITE	IMS_B forwards INVITE to UE_B
13							<del></del>	-		100 Trying	UE_B optionally responds with a 100 Trying provisional response
14									$\rightarrow$		User B is informed of incoming call of User A
15							<b></b>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16						<del></del>	-			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
17					<del></del>	_				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
18			<del></del>							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
19		<del></del>								180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
20	<del></del>	_									User A is informed that UE_B is ringing
21								<b>—</b>	-		User B answers call
22							<del></del>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
23						<b></b>	-			200 OK	IMS_B forwards 200 OK response to IBCF_B
24					<del></del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
25			<del></del>							200 OK	IBCF_A forwards 200 OK response to IMS_A
26		<del></del>								200 OK	IMS_A forwards 200 OK response to UE_A
27	<del></del>										User A is informed that call has been answered
28										ACK	UE_A acknowledges the receipt of 200 OK for INVITE
29				$\longrightarrow$						ACK	IMS_A forwards ACK to IBCF_A
30						,				ACK	IBCF_A forwards ACK to IBCF_B
31							>			ACK	IBCF_B forwards ACK to IMS_B
	I	1	ı İ		I	1	I	I	1		ļ



#### 4.5.3.1.1.4 Rejection of call from barred user

Identifier:		iiitti opti abii	ity Test Description								
	TD_IMS_0	CALL_0003	•								
Summary:	IMS network does not establish call to barred user										
Configuration:	CF_INT_C	T_CALL									
SUT:	IMS_B										
References:	Test Purp	ose	Specification Reference								
	TP_IMS_5	5108_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	User A calls user E	User A calls user B using barred user identity								
ı	Verify that user A is informed that call cannot be established										

	Interoperability Test Description									
Conformance	Check									
Criteria:	1	TP_IMS_5108_05 in CFW step 13 (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 }								
		}								

Step	Di	rection		Message	Comment
	UUIE		ח ח		
	S E M N e A S U	B B M C C S	E s B e		
	r A M	F F B	r		
4	A     DB	A   B	<u>  B</u>		Harri A celle Harri D
1	$\Rightarrow$				User A calls User B
2	<del></del>			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	$ \hspace{.05cm} \hspace{.05cm} \longrightarrow $			ENUM	IMS A sends query to ENUM DB
5	←			ENUM	ENUM DB sends response to IMS A
6		$\rightarrow$		INVITE	IMS_A forwards INVITE to IBCF_A
7	<del>  </del>	_		100 Trying	IBCF_A responds with a 100 Trying provisional response
8		$\longrightarrow$		INVITE	IBCF_A forwards INVITE to IBCF_B
9		<del></del>		100 Trying	IBCF_B responds with a 100 Trying provisional response
10		$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
11		<del></del>		100 Trying	IMS_B responds with a 100 Trying provisional response
12		<del></del>		404 Not Found	IMS_B responds to the INVITE with 404 Not Found
13		<del></del>		404 Not Found	IBCF_B forwards 404 Not Found response to IBCF_A
14	←  -	_		404 Not Found	IBCF_A forwards 404 Not Found response to IMS_A
15				404 Not Found	IMS_A forwards 404 Not Found response to UE_A
16					User A is informed that call has failed
17				ACK	UE_A acknowledges the response
18		$\longrightarrow$		ACK	IMS_A forwards ACK to IBCF_A
19		$\longrightarrow$		ACK	IBCF_A forwards ACK to IBCF_B
20				ACK	IBCF_B forwards ACK to IMS_B

## 4.5.3.1.1.5 Rejection of call to non-existing user

		Interoperability Test De	scription										
Identifier:	TD_IMS_0	CALL_0004											
Summary:	IMS netwo	ork rejects call to non existing u	ser										
Configuration:	CF_INT_C	CALL											
SUT:	IMS_B												
References:	Test Purp	ose	Specification Reference										
	TP_IMS_5	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	User A calls user B indicating Verify that user A is informed to	a non existing identity within IMS_B domain hat call cannot be established										
Conformance	Check												
Criteria:	1	IMS_A sends the INVITE	INVITE st_URI xisting_user in IMS_B and										

Step				Di	rection	•				Message	Comment
осер	U	U	П	E	I	<u>.</u>	1 1	U	U	Wessage	Comment
	s	Ē	м	N	В	В	М	Ē	s		
	e	Ā	S	Ü	C	C	S	В	e		
	r		Α	M	F	F	В		r		
	Α			DB	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
3		<b>←</b>								100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
6					$\longrightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11						$\leftarrow$				100 Trying	IMS_B responds with a 100 Trying provisional response
12						$\leftarrow$				404 Not Found	IMS_B responds to the INVITE with 404 Not Found
13					$\leftarrow$					404 Not Found	IBCF_B forwards 404 Not Found response to IBCF_A

Step				Dii	rection	)				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	M S B	UEB	U s e r B		
14			$\leftarrow$	_	_					404 Not Found	IBCF_A forwards 404 Not Found response to IMS_A
15		<b>—</b>								404 Not Found	IMS_A forwards 404 Not Found response to UE_A
16	<b>←</b>										User A is informed that call has failed
17			$\rightarrow$							ACK	UE_A acknowledges the response
18				_	$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
19						$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
20							$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B

# 4.5.3.1.1.6 Rejection of call to unavailable user

	Interoperability Te	st Description										
Identifier:	TD_IMS_CALL_0005											
Summary:	IMS network does not establish a ca	all for unavailable user										
Configuration:	CF_INT_CALL											
SUT:	IMS_B											
References:	Test Purpose	Specification Reference										
	TP_IMS_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:  Test Sequence:	HSS of IMS_A and IMS_B is configured according to table 1     UE_A has IP bearers established to their respective IMS networks as per clause 4.2.1     UE_A is registered in IMS_A using any user identity     UE_B is not registered in IMS_B    Step											
Conformance Criteria:	Check  1 TP_IMS_5133_01 in CFW step 13 (4xx): ensure that { when { UE_A sends INVITE to UE_B } then { IMS_B sends a 4xx_response to IMS_A } }											

Step				Di	rectio	n				Message	Comment
	N e r A	U E A	I M S A	E N U M DB	I B C F A	I B C F B	I M S B	UEB	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		←	$\dashv$							100 Trying	IMS_A responds with a 100 Trying provisional response

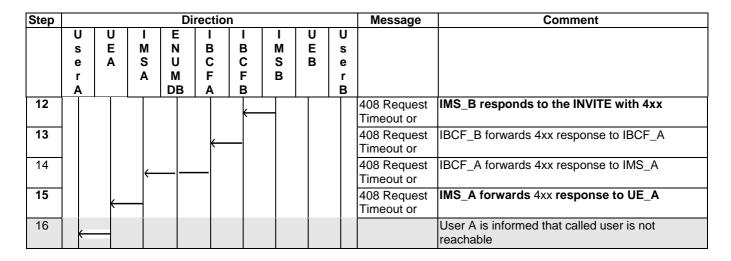
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Step					ectio	n				Message	Comment
	U	ū	I	E	Ī	1	I NA	Ū	U		
	s e	E A	M S	N U	B C	B	M S	E B	s e		
	r	^	Ā	М	F	F	В		r		
	Α			DB	Α	В			В		
4				→						ENUM	IMSA sends query to ENUM DB
5			$\leftarrow$	-						ENUM	ENUM DB sends response to IMS A
6				_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$	-	_					100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11						<b>—</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
12						<b>←</b>				4xx	IMS_B responds to the INVITE with 4xx
13					←					4xx	IBCF_B forwards 4xx response to IBCF_A
14			$\leftarrow$		_					4xx	IBCF_A forwards 4xx response to IMS_A
15		<b>—</b>	_							4xx	IMS_A forwards 4xx response to UE_A
16	<b>←</b>										User A is informed that call has failed
17			$\rightarrow$							ACK	UE_A acknowledges the response
18			-	_	$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
19						$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
20							<b>→</b>			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 Descri	iption
Identifier:	TD_IMS_CALL_0006	•
Summary:	IMS network can handle initial reque unregistered filter criterion	est to non-registered user with terminating
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>per clause 4.2.1</li> <li>UE_A has no filter criteria define</li> <li>IMS_B has terminating unregist</li> </ul>	ers established to their respective IMS networks as ed in HSS sered criterion set for UE_B on INVITE indicating an and forward the INVITE to AS_B _B _B r identity
Test Sequence:	Step 1 User A calls user B (i.e. u 2 Verify that user A is inform	serNOAS in IMS_B) med that call cannot be established
Pass Criteria:	ensure that { when { UE_A sends INV then { IMS_B receives ti	

Step				Di	rectio	1				Message	Comment
	D w e r A	UEA	M S A	E N U M DB	I B C F A	I B C F B	- М ⊗ В	U E B	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				$\rightarrow$						ENUM	IMSA sends query to ENUM DB
5			$\leftarrow$							ENUM	ENUM DB sends response to IMS A
6					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7				$\leftarrow$						100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11						$\leftarrow$	$\dashv$			100 Trying	IMS_B responds with a 100 Trying provisional response

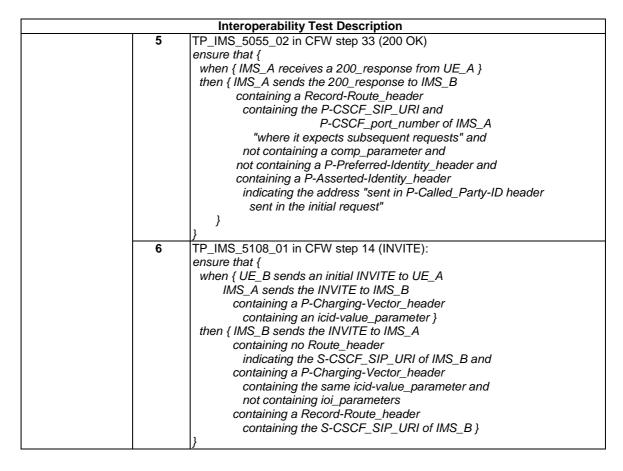


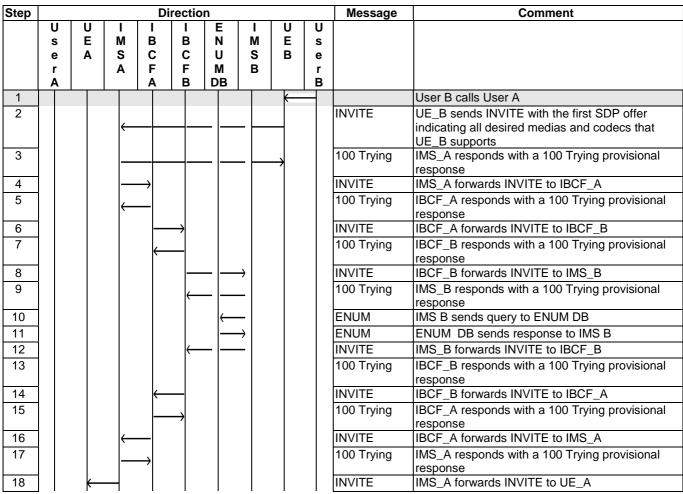
## 4.5.3.1.2 Dialogue Procedures with Roaming

#### 4.5.3.1.2.1 Normal call

		Interoperability Test Description			
Identifier:	TD_IMS_	_CALL_0007			
Summary:	IMS netv	work handles normal call while UE_B is roaming without topology hiding			
	correctly				
Configuration:	CF_ROA	AM_CALL			
SUT:	IMS_A				
References:	Test Pur				
	TP_IMS_	_5046_01 TS 124 229 [1], clause 5.2.6.3.3 ¶1 (1st numbered list)			
	TP_IMS_	_5070_01 TS 124 229 [1], clause 5.2.7.3 ¶3			
	TP_IMS_	_5301_01 TS 124 229 [1], clause 5.4.3.3 ¶126 (10 <sup>th</sup> numbered list)	;		
	TP_IMS_	_5055_01 TS 124 229 [1], clause 5.2.6.4.4 ¶1 (1 <sup>st</sup> numbered list)			
	TP_IMS_	_5055_02 TS 124 229 [1], clause 5.2.6.4.4 ¶1 (1st numbered list			
	TP_IMS_	_5108_01 TS 124 229 [1], clause 5.4.3.3 ¶5 (1 <sup>st</sup> numbered list)			
Use Case ref.:	UC_02_I	R			
Pre-test conditions:	<ul><li>UE_</li><li>UE_</li><li>IMS_</li></ul>	S of IMS_A and of IMS B is configured according to table 1 _A and UE_B have IP bearers established to IMS_A as per clause 4.2.1 _A is registered in IMS_A using any user identity _B is registered in IMS_B via IMS_A using any user identity _A within the trust domain of IMS_B ervice-Route header list exists for UE_B in P-CSCF			
Toot Comunication	Cton				
Test Sequence:	Step	User B calls User A			
	2	Verify that user A is informed of incoming call of User B	d of incoming call of Hoor D		
	3				
	4	Verify that user B is informed that UE_A is ringing 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 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 15 (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 52A (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 23 (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 P-Preferred-Identity_header and
		containing a P-Asserted-Identity_header indicating the public identity "sent in P-Called_Party-ID header
		sent in the initial request" }
		<u>[}</u>



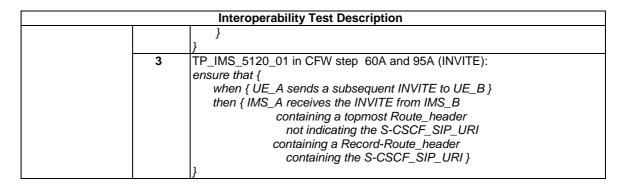


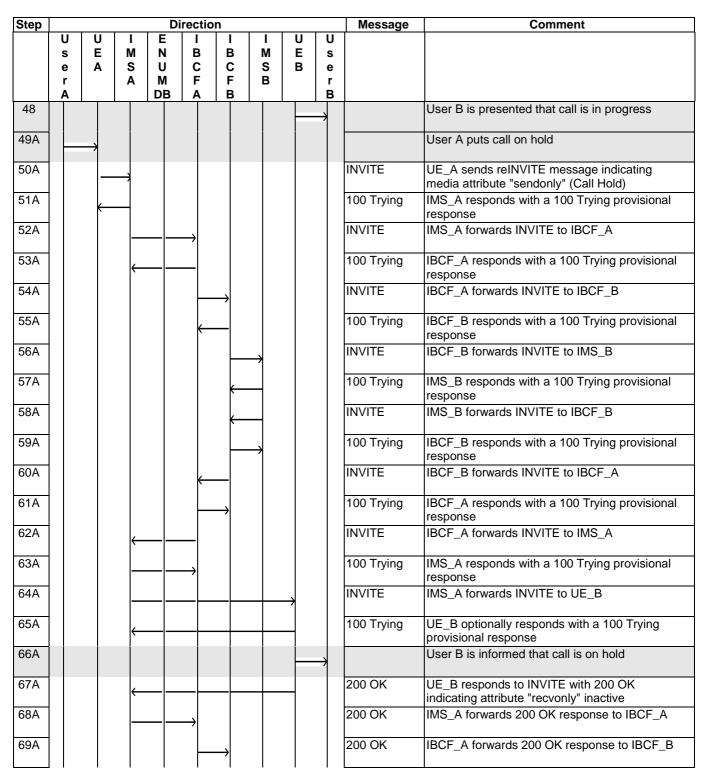
U U I I I E I U U S B e A S C C U S B e r A B DB B DB B DB B DB D	at it has started alerting Ringing response to
e A S C C W B B F F B  19 20 21 22 23 23 3   B   E F F M B DB   B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B   E F B B B B B B B B B B B B B B B B B B	incoming call of User B tial INVITE with 180 at it has started alerting Ringing response to
r A A F B DB B r B 100 Trying UE_A optionally resp provisional response  20 User A is informed of 180 Ringing UE_A responds to ini Ringing to indicate the 180 Ringing IMS_A forwards 180 IBCF_A 180 Ringing IBCF_A forwards 180 IBCF_B	incoming call of User B tial INVITE with 180 at it has started alerting Ringing response to
A B DB B 100 Trying UE_A optionally resp provisional response User A is informed of 180 Ringing UE_A responds to ini Ringing to indicate th 180 Ringing IMS_A forwards 180 IBCF_A 180 Ringing IBCF_A forwards 180 IBCF_B	incoming call of User B tial INVITE with 180 at it has started alerting Ringing response to
19 20 21 22 23 23 28 20 20 20 21 22 23 20 20 20 21 20 20 20 21 20 20 20 21 20 20 20 21 20 20 20 21 20 20 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20	incoming call of User B tial INVITE with 180 at it has started alerting Ringing response to
20 User A is informed of 180 Ringing UE_A responds to ini Ringing to indicate th 180 Ringing IMS_A forwards 180 IBCF_A  180 Ringing IBCF_A forwards 180 IBCF_B	incoming call of User B tial INVITE with 180 at it has started alerting Ringing response to
21 22 23 23 28 29 20 20 21 20 20 21 20 21 20 20 21 20 20 20 21 20 20 21 20 21 20 21 20 21 20 20 21 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20	tial INVITE with 180 at it has started alerting Ringing response to
22 Ringing to indicate th  180 Ringing IMS_A forwards 180 IBCF_A  180 Ringing IBCF_A forwards 180 IBCF_B	at it has started alerting Ringing response to
22 23 23 28 29 20 20 20 21 20 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20	Ringing response to
23   IBCF_A   180 Ringing   IBCF_B   IBCF_B	
23   180 Ringing IBCF_A forwards 180 IBCF_B	Ringing response to
24	
24	Ringing response to
25   180 Ringing   IMS_B forwards 180	Ringing response to
E	runging responses to
26   180 Ringing IBCF_B forwards 180	Ringing response to
IBCF_A	Dinging response to
27   180 Ringing   IBCF_A forwards 180   IMS_A	kinging response to
	180 Ringing response to
	3 3 1
29 User B is informed th	at UE_A is ringing
30 User A answers call	
	TE with 200 OK to indicate
32 that the call has been 200 OK IMS A forwards 200	answered  OK response to IBCF_A
	OK response to IBCF_B
	O OK response to IMS_B
	OK response to IBCF_B
	OK response to IBCF_A
	OK response to IMS_A
	OK response to UE_B
39 User B is presented t	
	the receipt of 200 OK for
INVITE	•
41 ACK IMS_A forwards ACK	
42 ACK IBCF_A forwards AC	
43 ACK IBCF_B forwards AC	
44 ACK IMS_B forwards ACK	
45 ACK IBCF_B forwards AC	
46 ACK IBCF_A forwards ACK	_
47 ACK IMS_A forwards ACK  48 User A is informed th	at the call is in progress
49A User A is informed th	at the call is in progress
50A BYE UE_A releases the ca	all with BYF
51A BYE IMS_A forwards BYE	
52A BYE IBCF_A forwards BYI	
53A BYE IBCF_B forwards BYI	
54A	
55A BYE IBCF_B forwards BYI	
56A BYE IBCF_A forwards BYI	
57A BYE IMS_A forwards BYE	
58A User B is informed th	
59A	
	OK response to IBCF_A
	OK response to IBCF_B
	OK response to IMS_B
63A	OK response to IBCF_B

Step				Di	rectio	n				Message	Comment
	C	U	ı		ı	Е	ı	U	U		
	s	E	M	В	В	N	M	Е	S		
	е	Α	S	С	С	U	S	В	е		
	r		Α	F	F	М	В		r		
	Α			Α	В	DB			В		
64A				$\downarrow$						200 OK	IBCF_B forwards 200 OK response to IBCF_A
65A			$\leftarrow$	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
66A		$\leftarrow$								200 OK	IMS_A forwards the 200 OK response to UE_A
67A	$\leftarrow$										User A is informed that call has ended

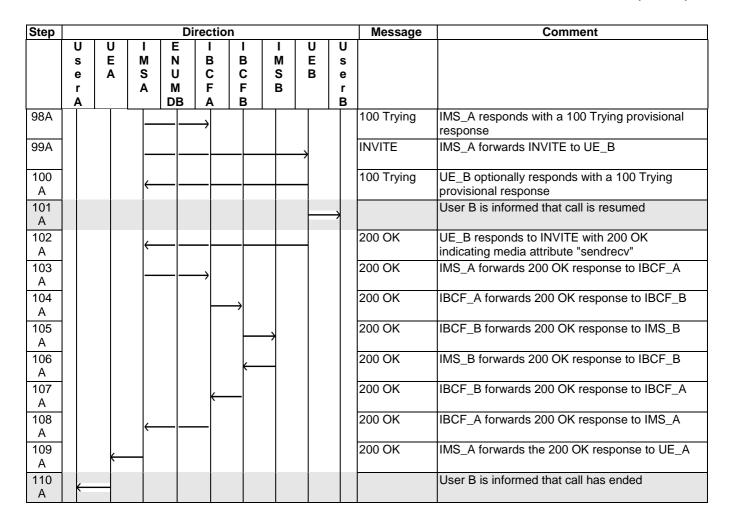
### 4.5.3.1.2.2 Normal call with hold/resume

		Interoperability Test Description
Identifier:	TD IMS	CALL_0008
Summary:		ork handles subsequent INVITEs correctly in case of a user initiated call hold
,		me when home caller puts roaming user on hold and resumes call
Configuration:	CF_ROA	
SUT:	IMS_A	<del>-</del> '
References:	Test Pur	pose Specification Reference
	TP_IMS_	
	TP_IMS_	
	TP_IMS_	
		(item 3 and 5 in 7 <sup>th</sup> numbered list)
Use Case ref.:	UC_03 R	
Pre-test	<ul> <li>HSS</li> </ul>	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
		lause 4.2.1
		A configured to perform user initiated hold/resume using INVITE
		A is registered in IMS_A using any user identity
		B is registered in IMS_B via IMS_A using any user identity
	<u> - 02</u>	5 to registered in inve_5 via inve_7 vacing any accordantity
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
	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 informed that call is on hold
	10	User A resumes call
	11	Verify that user B is informed that call is resumed
	12	Verify that user A is informed that call is resumed
	13	User A ends call
	14	Verify that user B is informed that call has ended
	15	Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5081_01 in CFW step 61A and 96A (100 Trying):
		ensure that {
		when { UE_A sends a subsequent INVITE to UE_B and
		IMS_A receives the INVITE from IMS_B }
		then { IMS_A sends a 100_response to IMS_B }
		}
	2	TP_IMS_5082_01 in CFW step 69A and 104A (200 OK):
		ensure that {
		when { IMS_A receives a 200_response from UE_B }
		then { IMS_A sends the 200_response to IMS_B
		containing a P-Charging-Vector_header
		containing an updated
I		access-network-charging-info_parameter



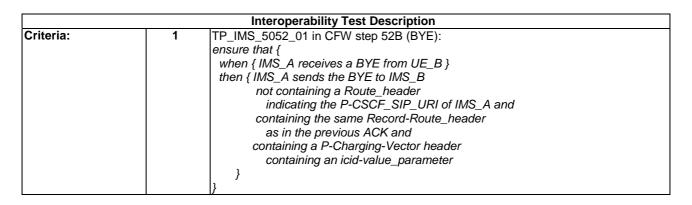


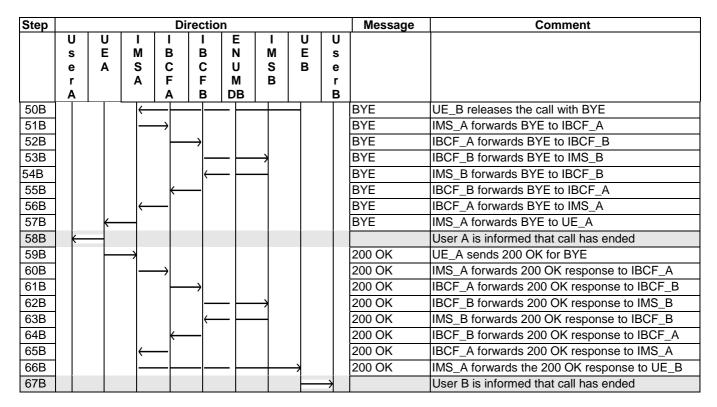
	U	U				n				Message	Comment
	S	Ē	M	E N	I B	I B	I M	U E	U		
	е	A	S	U	C F	C	S	В	е		
	r A			M DB	A	В	В		r B		
70A							$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
71A						<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
72A					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
73A			←	_	_					200 OK	IBCF_A forwards 200 OK response to IMS_A
74A		<b>-</b>								200 OK	IMS_A forwards 200 OK response to UE_A
75A			$\rightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
76A					$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
77A						$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
78A							$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
79A						<b>—</b>	_			ACK	IMS_B forwards ACK to IBCF_B
80A					$\leftarrow$					ACK	IBCF_B forwards ACK to IBCF_A
81A			←		_					ACK	IBCF_A forwards ACK to IMS_A
82A					_	_	_	$\rightarrow$		ACK	IMS_A forwards ACK to UE_B
83A	<b>K</b>										User A is informed that call is on hold
84A		$\rightarrow$						·			User A resumes call
85A			$\rightarrow$							INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
86A		←								100 Trying	IMS_A responds with a 100 Trying provisional response
87A					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
88A			<b>←</b>		_					100 Trying	IBCF_A responds with a 100 Trying provisional response
89A						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
90A					$\leftarrow$					100 Trying	IBCF_B responds with a 100 Trying provisional response
91A							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
92A						<b>—</b>	$\blacksquare$			100 Trying	IMS_B responds with a 100 Trying provisional response
93A						<b>—</b>	$\dashv$			INVITE	IMS_B forwards INVITE to IBCF_B
94A							$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
95A					$\leftarrow$	-				INVITE	IBCF_B forwards INVITE to IBCF_A
96A						$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
97A			<del></del>		_					INVITE	IBCF_A forwards INVITE to IMS_A



#### 4.5.3.1.2.3 Subsequent request (other than target refresh)

		Interoperability Test Descrip	otion			
Identifier:	TD_IMS_C	ALL_0009				
Summary:		k handles routing information in subsequent requests (other than target refresh)				
	received fro	om the UE before forwarding them to a	nother IMS network.			
Configuration:	CF_ROAM	_CALL				
SUT:	IMS_A					
References:	Test Purpo	ose	Specification Reference			
	TP_IMS_50	052_01	TS 124 229 [1], clause 5.2.6.3-9 ¶1 (1 <sup>st</sup> numbered list)			
Use Case ref.:	UC_02_R		,			
Pre-test conditions:	<ul><li>UE_B  </li><li>UE_A  </li></ul>	f IMS_A and of IMS B is configured acc has IP bearers established to their resp registered in IMS_A using any user ide is registered in IMS_B via IMS_A using	pective IMS networks as per clause 4.2.1			
Test Sequence:	Step					
	1	User B calls User A				
	2	Verify that user A is informed of incom	ning 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				
	9	Verify that user B is informed that call	has ended			
Conformance	Check					

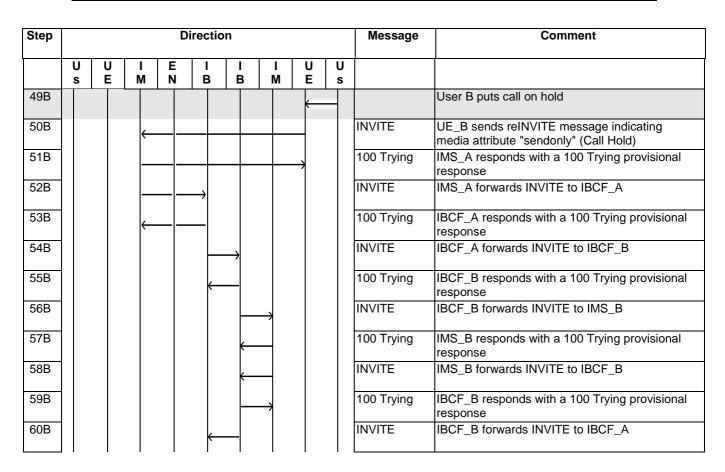




#### 4.5.3.1.2.4 Subsequent target refresh request (INVITE)

	Interoperability T	Test Description
Identifier:	TD_IMS_CALL_0010	
Summary:	IMS network handles subsequen	t INVITEs correctly in case of a user initiated call hold
	and resume when roaming caller	puts a home user on hold and resumes call
Configuration:	CF_ROAM_CALL	
SUT:	IMS_A	
References:	Test Purpose	Specification Reference
	TP_IMS_5048_01	TS 124 229 [1], clause 5.2.6.3.5 ¶1 (1 <sup>st</sup> numbered list)
	TP_IMS_5080_01	TS 124 229 [1], clause 5.2.9.1 ¶2
Use Case ref.:	UC_03_R	
Pre-test conditions:	<ul> <li>UE_A and UE_B have IP be per clause 4.2.1</li> <li>UE_B configured to perform</li> <li>UE_A registered in IMS_A u</li> </ul>	is configured according to table 1 arers established to their respective IMS networks as user initiated hold/resume using INVITE sing any user identity via IMS_A using any user identity
Test Sequence:	Step	
Tool ocquerioe.	1 User B calls User A	

		Interoperability Test Description
	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 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 that call is 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 that call has ended
	15	Verify that user A is informed that call has ended
	10	Verify that user A is informed that call has ended
Canfarmanaa	Chaole	
Conformance	Check	
Critoria	4	TD IMC 5049 04 in CEM stop 54D and 90D (INIVITE).
Criteria:	1	TP_IMS_5048_01 in CFW step 54B and 89B (INVITE):
Criteria:	1	ensure that {
Criteria:	1	ensure that { when { IMS_A receives a subsequent INVITE from UE_B }
Criteria:	1	ensure that {  when { IMS_A receives a subsequent INVITE from UE_B }  then { IMS_A sends the INVITE to IMS_B
Criteria:	1	ensure that {  when { IMS_A receives a subsequent INVITE from UE_B }  then { IMS_A sends the INVITE to IMS_B  containing a topmost Route_header
Criteria:	1	ensure that {  when { IMS_A receives a subsequent 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
Criteria:	1	ensure that {  when { IMS_A receives a subsequent 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 an additional Via_header
Criteria:	1	ensure that {   when { IMS_A receives a subsequent 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 an additional Via_header       containing ( the P-CSCF_via_port_number and
Criteria:	1	ensure that {   when { IMS_A receives a subsequent 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 an additional Via_header       containing ( the P-CSCF_via_port_number and
Criteria:	1	ensure that {   when { IMS_A receives a subsequent 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 an additional Via_header       containing ( the P-CSCF_via_port_number and
Criteria:	2	ensure that {   when { IMS_A receives a subsequent 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 an additional Via_header       containing ( the P-CSCF_via_port_number and
Criteria:	·	ensure that {   when { IMS_A receives a subsequent 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 an additional Via_header       containing ( the P-CSCF_via_port_number and
Criteria:	·	ensure that {   when { IMS_A receives a subsequent INVITE from UE_B }   then { IMS_A sends the INVITE to IMS_B
Criteria:	·	ensure that {   when { IMS_A receives a subsequent INVITE from UE_B }   then { IMS_A sends the INVITE to IMS_B
Criteria:	·	ensure that {   when { IMS_A receives a subsequent INVITE from UE_B }   then { IMS_A sends the INVITE to IMS_B
Criteria:	·	ensure that {   when { IMS_A receives a subsequent INVITE from UE_B }   then { IMS_A sends the INVITE to IMS_B



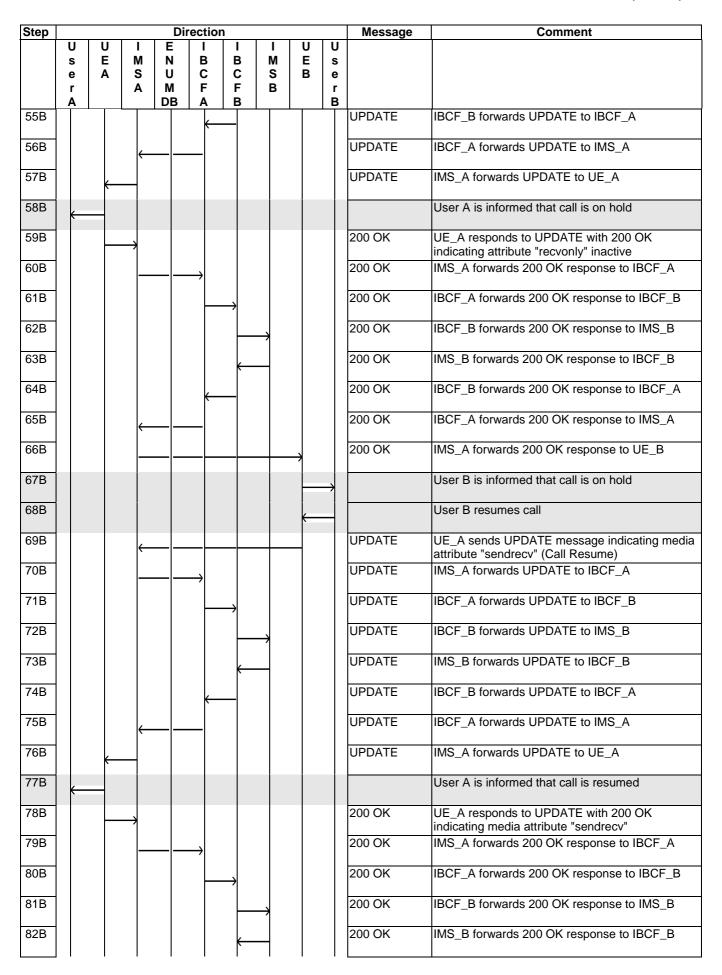
Step				[	Direc	tion						Message	Comment
	U s	U E	I M	E N	I B		I B	I M	U E	U	J s		
61B							→				1	100 Trying	IBCF_A responds with a 100 Trying provisional response
62B			$\leftarrow$	_							Ī	NVITE	IBCF_A forwards INVITE to IMS_A
63B			_	-	$\longrightarrow$						1	100 Trying	IMS_A responds with a 100 Trying provisional response
64B		←									Ī	NVITE	IMS_A forwards INVITE to UE_A
65B			$\longrightarrow$								1	100 Trying	UE_A optionally responds with a 100 Trying provisional response
66B	<b>←</b>												User A is informed that call is on hold
67B			$\rightarrow$								2	200 OK	UE_A responds to INVITE with 200 OK indicating attribute "recvonly" inactive
68B					$\longrightarrow$						2	200 OK	IMS_A forwards 200 OK response to IBCF_A
69B							$\rightarrow$				2	200 OK	IBCF_A forwards 200 OK response to IBCF_B
70B								$\rightarrow$			2	200 OK	IBCF_B forwards 200 OK response to IMS_B
71B							<b>—</b>				2	200 OK	IMS_B forwards 200 OK response to IBCF_B
72B					•	<del></del>					2	200 OK	IBCF_B forwards 200 OK response to IBCF_A
73B			$\leftarrow$								2	200 OK	IBCF_A forwards 200 OK response to IMS_A
74B			_	-				+	$\rightarrow$		2	200 OK	IMS_A forwards 200 OK response to UE_B
75B			$\leftarrow$					_			Ā	ACK	UE_B acknowledges the receipt of 200 OK for INVITE
76B			_		$\longrightarrow$						A	ACK	IMS_A forwards ACK to IBCF_A
77B					•		<b>→</b>				7	ACK	IBCF_A forwards ACK to IBCF_B
78B								$\rightarrow$			A	ACK	IBCF_B forwards ACK to IMS_B
79B							<b>—</b>	4			Ā	ACK	IMS_B forwards ACK to IBCF_B
80B					•	<del></del>					1	ACK	IBCF_B forwards ACK to IBCF_A
81B			←	-							Ā	ACK	IBCF_A forwards ACK to IMS_A
82B		<b>(</b>									Ā	ACK	IMS_A forwards ACK to UE_A
83B	<b>—</b>												User A is informed that call is on hold
84B									<b>←</b>				User B resumes call
85B			$\leftarrow$								Ī	NVITE	UE_B sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
86B			_					+	$\rightarrow$		1	100 Trying	IMS_A responds with a 100 Trying provisional response
87B			_		$\longrightarrow$						Ī	NVITE	IMS_A forwards INVITE to IBCF_A
88B			←								1	100 Trying	IBCF_A responds with a 100 Trying provisional response
89B					•		$\rightarrow$				Ī	NVITE	IBCF_A forwards INVITE to IBCF_B

Step					Di	rec	tior	1					Message	Comment
	U s	U	I		E N	I B		I B	ı	I VI	U E	U		
90B				·		•	<u>,                                     </u>			I			100 Trying	IBCF_B responds with a 100 Trying provisional response
91B								_	$\rightarrow$				INVITE	IBCF_B forwards INVITE to IMS_B
92B								$\leftarrow$					100 Trying	IMS_B responds with a 100 Trying provisional response
93B								$\leftarrow$					INVITE	IMS_B forwards INVITE to IBCF_B
94B									$\rightarrow$				100 Trying	IBCF_B responds with a 100 Trying provisional response
95B						•	<u>,                                     </u>	_					INVITE	IBCF_B forwards INVITE to IBCF_A
96B						-		$\rightarrow$					100 Trying	IBCF_A responds with a 100 Trying provisional response
97B				<del></del>	-	_							INVITE	IBCF_A forwards INVITE to IMS_A
98B					-	$\rightarrow$							100 Trying	IMS_A responds with a 100 Trying provisional response
99B		<b>←</b>											INVITE	IMS_A forwards INVITE to UE_A
100B			$\longrightarrow$										100 Trying	UE_A optionally responds with a 100 Trying provisional response
101B	<b>—</b>													User A is informed that call is resumed
102B		-	$\longrightarrow$										200 OK	UE_A responds to INVITE with 200 OK indicating media attribute "sendrecv"
103B					-	$\rightarrow$							200 OK	IMS_A forwards 200 OK response to IBCF_A
104B						-		$\rightarrow$					200 OK	IBCF_A forwards 200 OK response to IBCF_B
105B									$\rightarrow$				200 OK	IBCF_B forwards 200 OK response to IMS_B
106B								$\leftarrow$					200 OK	IMS_B forwards 200 OK response to IBCF_B
107B						•	<u>.                                    </u>	_					200 OK	IBCF_B forwards 200 OK response to IBCF_A
108B					<b>←</b>	_							200 OK	IBCF_A forwards 200 OK response to IMS_A
109B						_		_			$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
110B												$\rightarrow$		User B is informed that call is resumed

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

		Interoperability Te	st Description											
Identifier:	TD IMS	CALL_0011												
Summary:			IPDATEs 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:														
SUT:	IMS A	<del>_</del> -												
References:	Test Pur	oose	Specification Reference											
	TP_IMS_		TS 124 229 [1], clause 5.2.9.1 ¶2											
Use Case ref.:	UC_04_R		7											
Pre-test	<ul> <li>HSS</li> </ul>	of IMS A and of IMS B is	configured according to table 1											
conditions:			ed to their respective IMS networks as per											
		se 4.2.1	ou to mon respective into netheric de per											
		A registered in IMS_A												
			er initiated hold/resume using UPDATE											
		B is registered in IMS_B v	•											
	<u> </u>		<u></u>											
Test Sequence:	Step													
4.000	1	User B calls User A												
	2		med of incoming call of User A											
	3		med that UE_A is ringing											
	4	User A answers call												
	5		med that call has been answered											
	6		med that call is established											
	7	User B puts call on hold												
	8	Verify that user A is info	med that call is on hold											
	9	Verify that user B is info												
	10	User B resumes call	mod that can to off flord											
	11		med that call is resumed											
	12		med that call is resumed											
	13	User A ends call												
	14		med that call has ended											
	15		med that call has ended											
		1 1111 11111												
Conformance	Check													
Criteria:														
	1	TP IMS 5080 02 in CF	W step 50B and 68B (UPDATE):											
		ensure that {	, , , , , , , , , , , , , , , , , , , ,											
			subsequent UPDATE from UE_B }											
		then { IMS_A sends the												
			arging-Vector_header											
			updated access-network-charging-info_parameter}											
		}												

Step				Dir	ection	)				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	I B C F A	- BCFB	- М S В	U E B	U s e r B		
49B								<b>(</b>			User B puts call on hold
50B			$\leftarrow$							UPDATE	UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)
51B			_		$\rightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
52B						$\rightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
53B							$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
54B						<b>←</b>				UPDATE	IMS_B forwards UPDATE to IBCF_B



Step				Diı	ection	1				Message	Comment
	U	U	I	Е	ı	I	I	U	U		
	S	E	М	N	В	В	М	E	S		
	е	Α	S	U	С	С	S	В	е		
	r		Α	M	F	F	В		r		
	A			DB	A	В	<u> </u>		B		
83B					$\leftarrow$					200 OK	IBCF_B forwards 200 OK response to IBCF_A
84B			$\leftarrow$	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
85B			_	- -	_			$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
86B											User B is informed that call is resumed

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

		Interoperability Tes	at Description											
Identifier:	TD IMS	CALL_0012	2000. <b></b>											
Summary:	IMS netw	ork handles subsequent U	PDATEs correctly in case of a user initiated call											
J	hold and resume when home caller puts a roaming user on hold and resumes call  CF_ROAM_CALL													
Configuration:			sale a realiting accir on held and recallines call											
SUT:	IMS_A	<u> </u>												
References:	Test Pur	200	Specification Reference											
ixelefelices.	TP_IMS_		TS 124 220 [1], clause 5 4 3 3 ¶00											
	TT_IIVIS_	3120_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	(item 3 and 3 in 7 Humbered list)											
Ose Gase lel	UC_03_N													
Pre-test	• HSS	of IMS A and of IMS B is	configured according to table 1											
conditions:			rs established to their respective IMS networks as											
		lause 4.2.1												
			er initiated hold/resume using UPDATE											
		A registered in IMS_A using												
			a IMS_A using any user identity											
	OL_I	o is registered in livie_b via	time_/t daing any daer identity											
Test Sequence:	Step													
Tool ooquonoo.	1	User A calls User B												
	2		ned of incoming call of User A											
	3	Verify that user A is inforr												
	4	User B answers call	ned that OL_A is finging											
	5		ned that call has been answered											
	6		ned that call has been answered											
	7	User A puts call on hold	nied that call is established											
	8	Verify that user B is inforr	nod that call is an hold											
	9	Verify that user A is infor												
	10	User A resumes call	ned that call is on hold											
		Verify that user B is inforr	and that call in wanting and											
	11													
	12	Verify that user A is inforr	ned that call is resumed											
	13	User A ends call												
	14	Verify that user B is inforr												
	15	Verify that user A is inforr	ned that call has ended											
Conformance	Check													
Criteria:	1	TD IMC 5120 02 in CEV	Vistor FEA and ZAA (UDDATE).											
Criteria.	'	ensure that {	V step 55A and 74A (UPDATE):											
			n UPDATE to UE_B }											
			s the UPDATE from IMS_B											
			pmost Route_header											
			g the S-CSCF_SIP_URI											
			ecord-Route_header											
		containing a N	ne S-CSCF_SIP_URI }											
		1	10 0 0001 _011 _0111 }											
		IJ												

1	Step				Dir	rectio	n				Message	Comment
49A 49A 50A 51A 52A 53A 54A 55A 56A 56A 66A 67A 68A 69A 70A 71A 72A 75A 75A 49A 49A 50A 50A 51A 50A 51A 52A 53A 54A 55A 55A 56A 56A 66A 66A 66A 67A 68A 69A 70A 71A 72A 75A						I B	I B	I M				
A DB A B B B User A puts call on hold  UPDATE UE_A sends UPDATE message indicating media attribute "sendonly" (Call Hold)  UPDATE IMS_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE with 200 OK indicating attribute "revoronly" inactive  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 UPDATE to IBCF_B  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_B		е		S	U	С	С	S		е		
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	76A					_			$\rightarrow$		UPDATE	IMS_A forwards UPDATE to UE_B

Name	Step				Dir	ectio	n				Message	Comment
Part						I B	I B	I M		_		
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User A is informed that call has resumed  User B puts call on hold  UPDATE UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  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 UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards 200 OK response to IBCF_A	84A			$\leftarrow$		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
USER B puts call on hold  UPDATE UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  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 UPDATE to IBCF_A  UPDATE IMS_A forwards UPDATE to UE_A  USER A is informed that call is on hold  USER A is informed that call is on hold  USER A forwards 200 OK response to IBCF_A  200 OK IMS_A forwards 200 OK response to IBCF_B  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_B  200 OK IBCF_B forwards 200 OK response to IBCF_B  200 OK IBCF_B forwards 200 OK response to IBCF_B	85A		<b>—</b>								200 OK	IMS_A forwards the 200 OK response to UE_A
UPDATE UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold) UPDATE IMS_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IMS_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_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IBCF_A forwards UPDATE to UE_A  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to UE_A  UPDATE IBCF_A forwards UPDATE to UE_A  UPDATE IBCF_A forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards 200 OK response to IBCF_A	86A	<b>—</b>										User A is informed that call has resumed
attribute "sendonly" (Call Hold)  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_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  UPDATE IMS_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to IMS_A  UPDATE IMS_B forwards UPDATE to IMS_A  UPDATE IMS_B forwards UPDATE to IMS_A  UPDATE IMS_B forwards 200 OK response to IBCF_A  UPDATE IMS_B forwards 200 OK response to IBCF_B  UPDATE IMS_B forwards 200 OK response to IBCF_A	49B								<b>—</b>			User B puts call on hold
S1B   S2B   S3B   S4B   S4B   S5B	50B			<b>←</b>			+		+		UPDATE	
UPDATE IBCF_B forwards UPDATE to IMS_B  UPDATE IMS_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_B forwards UPDATE to IMS_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  USER A is informed that call is on hold  USER A is informed that call is on hold  USER A forwards 200 OK response to IBCF_A  200 OK IMS_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_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	51B				_	$\rightarrow$					UPDATE	
UPDATE IMS_B forwards UPDATE to IBCF_B  UPDATE IBCF_B forwards UPDATE to IBCF_A  UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  200 OK UE_A responds to UPDATE with 200 OK indicating attribute "recvonly" inactive  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_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	52B						$\rightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
55B  56B  57B  57B  58B  59B  59B  60B  61B  62B  63B  64B  65B	53B							$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
UPDATE IBCF_A forwards UPDATE to IMS_A  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  User A is informed that call is on hold  User A is informed that call is on hold  User A is informed that call is on hold  User A is informed that call is on hold  USER A responds to UPDATE with 200 OK indicating attribute "recvonly" inactive  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 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	54B						<b>←</b>				UPDATE	IMS_B forwards UPDATE to IBCF_B
57B  UPDATE IMS_A forwards UPDATE to UE_A  User A is informed that call is on hold  200 OK UE_A responds to UPDATE with 200 OK indicating attribute "recvonly" inactive  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_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	55B					$\leftarrow$					UPDATE	IBCF_B forwards UPDATE to IBCF_A
58B  59B  200 OK  UE_A responds to UPDATE with 200 OK indicating attribute "recvonly" inactive 200 OK IMS_A forwards 200 OK response to IBCF_A  200 OK  BCF_A forwards 200 OK response to IBCF_B  200 OK  BCF_B forwards 200 OK response to IBCF_B  200 OK  BCF_B forwards 200 OK response to IBCF_B  200 OK  BCF_B forwards 200 OK response to IBCF_B  200 OK  BCF_B forwards 200 OK response to IBCF_A  200 OK  BCF_B forwards 200 OK response to IBCF_A  200 OK  BCF_B forwards 200 OK response to IBCF_A	56B			<b>←</b>		_					UPDATE	IBCF_A forwards UPDATE to IMS_A
59B 60B 60B 61B 62B 63B 64B 65B	57B		<b>(</b>								UPDATE	IMS_A forwards UPDATE to UE_A
indicating attribute "recvonly" inactive  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_B forwards 200 OK response to IBCF_A	58B	<b>←</b>										User A is informed that call is on hold
60B 61B 62B 63B 63B 64B 65B 60B  200 OK IMS_A forwards 200 OK response to IBCF_A 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	59B			$\rightarrow$							200 OK	
62B 63B 63B 64B 65B  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_A 200 OK IBCF_A forwards 200 OK response to IMS_A	60B					$\rightarrow$					200 OK	,
63B  64B  65B  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	61B						$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
64B  200 OK IBCF_B forwards 200 OK response to IBCF_A  200 OK IBCF_A forwards 200 OK response to IMS_A	62B							$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
65B 200 OK IBCF_A forwards 200 OK response to IMS_A	63B						<b>-</b>	4			200 OK	IMS_B forwards 200 OK response to IBCF_B
	64B					$\leftarrow$	_				200 OK	IBCF_B forwards 200 OK response to IBCF_A
66B 200 OK IMS_A forwards 200 OK response to UE_B	65B			<b>←</b>		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
	66B					_ _			$\rightarrow$		200 OK	IMS_A forwards 200 OK response to UE_B

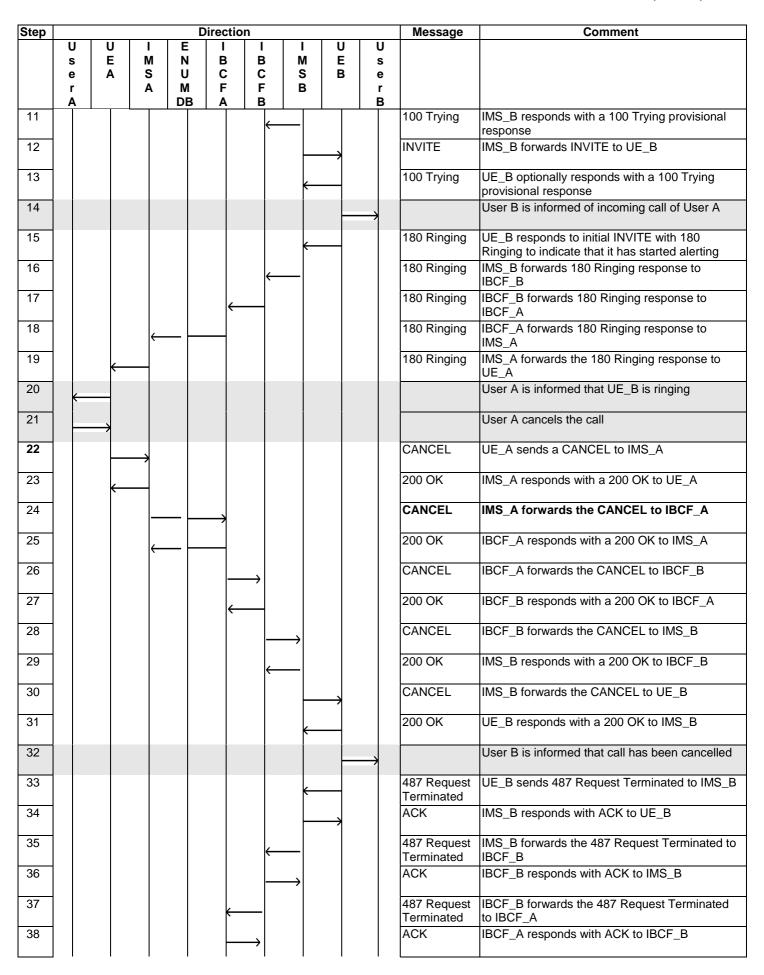
Step				Di	rectio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	I B C F A	I B C F B	I M S B	U E B	U s e r B		
67B									$\rightarrow$		User B is informed that call is on hold
68B								<b>—</b>			User B resumes call
69B			<b>←</b>					-		UPDATE	UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
70B					$\rightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
71B						$\rightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
72B							$\rightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
73B						<b>←</b>				UPDATE	IMS_B forwards UPDATE to IBCF_B
74B					<b>←</b>					UPDATE	IBCF_B forwards UPDATE to IBCF_A
75B			←	_						UPDATE	IBCF_A forwards UPDATE to IMS_A
76B		<b>←</b>								UPDATE	IMS_A forwards UPDATE to UE_A
77B	<b>←</b>										User A is informed that call is resumed
78B			$\rightarrow$							200 OK	UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
79B				_	$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
80B						$\rightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
81B							$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
82B						$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IBCF_B
83B					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
84B			<b>←</b>							200 OK	IBCF_A forwards 200 OK response to IMS_A
85B				_				$\rightarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
86B											User B is informed that call is resumed

# 4.5.3.1.3 Subsequent Request Procedures - Originating Network

## 4.5.3.1.3.1 Call CANCEL by calling user

		Interoperability Test Desc	ription									
Identifier:	TD IMS (	CALL_0014	•									
Summary:	IMS netwo	ork handles correctly calling user of	cancelling call before its establishment									
Configuration:	CF_INT_C	CALL	-									
SUT:	IMS_A											
References:	Test Purp	ose	Specification Reference									
	TP_IMS_5107_03 TS 124 229 [1], clause 5.4.3.2 ¶119 (item 1 in 8 <sup>th</sup> numbered list)											
Use Case ref.:	UC_02_I											
Pre-test conditions:	<ul><li>UE_A</li><li>per cl</li><li>UE_A</li></ul>	of IMS_A and of IMS B is configur A and UE_B have IP bearers estab lause 4.2.1 A is registered in IMS_A using any B is registered in IMS_B using any	olished to their respective IMS networks as user identity									
T	Otava											
Test Sequence:	Step	Hear A colle Hear D										
	2	User A calls User B	nooming call of Llaar A									
	3	Verify that user B is informed of i Verify that user A is informed tha										
	4	User A cancels call	t OE_B is finging									
	5	Verify that user B is informed that	t call has been cancelled									
	6	Verify that user A is informed that										
	U	Verify that user A is informed that	t can is terminated									
Conformance	Check											
Criteria:	1	TP_IMS_5107_03 in CFW step 2	26 (CANCEL):									
	-	ensure that {	(0 0 = = ):									
		when { UE_A sends CANCEL to	o UE_B }									
		then { IMS_B receives the CAN	CEL									
		not containing Route_h										
		indicating the S-CSCF	_SIP_URI of IMS_A									
	  }											

Step					Directio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	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
3		<del>(</del>								100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$						ENUM	IMSA sends query to ENUM DB
5			$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
6					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
8						<b>→</b>				INVITE	IBCF_A forwards INVITE to IBCF_B
9					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10							$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B

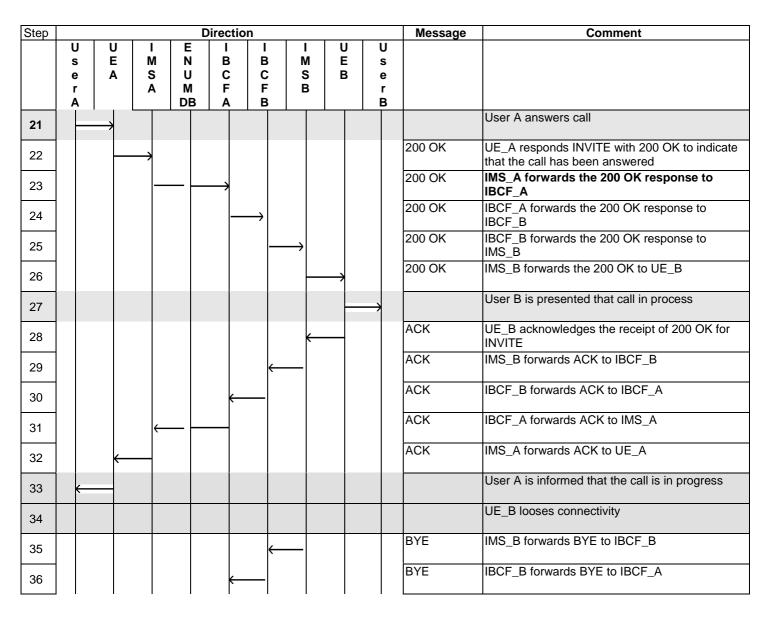


Step				D	irectio	n					Message	Comment
	U s e r A	D E A	I M S A	E N U M DB	I B C F A	I B C F B	M S B	U E B	,	U s e r B		
39			<b>←</b>						•		487 Request Terminated	IBCF_A forwards the 487 Request Terminated to IMS_A
40					$\rightarrow$						ACK	IMS_A responds with ACK to IBCF_A
41		<b>←</b>									487 Request Terminated	IMS_A forwards the 487 Request Terminated to UE_A
42			$\rightarrow$								ACK	UE_A responds with ACK to IMS_A
43	$\leftarrow$											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 Test Desc	ription							
Identifier:	TD_IMS_0	CALL_0015								
Summary:	IMS network ends call in case calling UE looses connectivity during a call									
Configuration:	CF_INT_CALL									
SUT:	IMS_B									
References:	Test Purp	oose	Specification Reference							
	TP_IMS_5	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 2 3 4 5 6 7	User B calls User A Verify that user A is informed of i Verify that user B is informed tha User A answers call Verify that user B is presented th Verify that user A is informed tha UE_B looses connectivity Verify that user A is informed tha	t UE_A is ringing at call in process t the call is in progress							

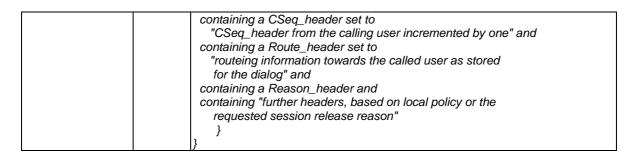
Interoperability Test Description									
Conformance	Check								
Conformance	Check	TD INC 5070 04 : 05W 4 00 (D)/F)							
Criteria:	1	TP_IMS_5073_01 in CFW step 36 (BYE):							
		ensure that {							
		when { IMS_B receives "an indication that UE_B is no_longer_available" }							
		then { IMS_B sends a BYE to IMS_A							
		containing Request_URI							
		indicating the Contact_header_value of UE_A and							
		containing To_header							
		indicating the initial 200_OK_To_value from UE_A							
		containing From_header							
		indicating the initial INVITE_From_value from UE_B and							
		containing Call-ID_header							
		indicating the initial INVITE_Call_Id_value from UE_B and							
		containing CSeq_header							
		indicating an incremented Sequence_Number and							
		containing Route header							
		indicating "dialog specific routing information for UE_A" and							
		_							
		containing Reason_header							
		indicating "503 Service Unavailable" and							
		containing							
		"further headers based on local policy or call release reason"							
		}							
		}							

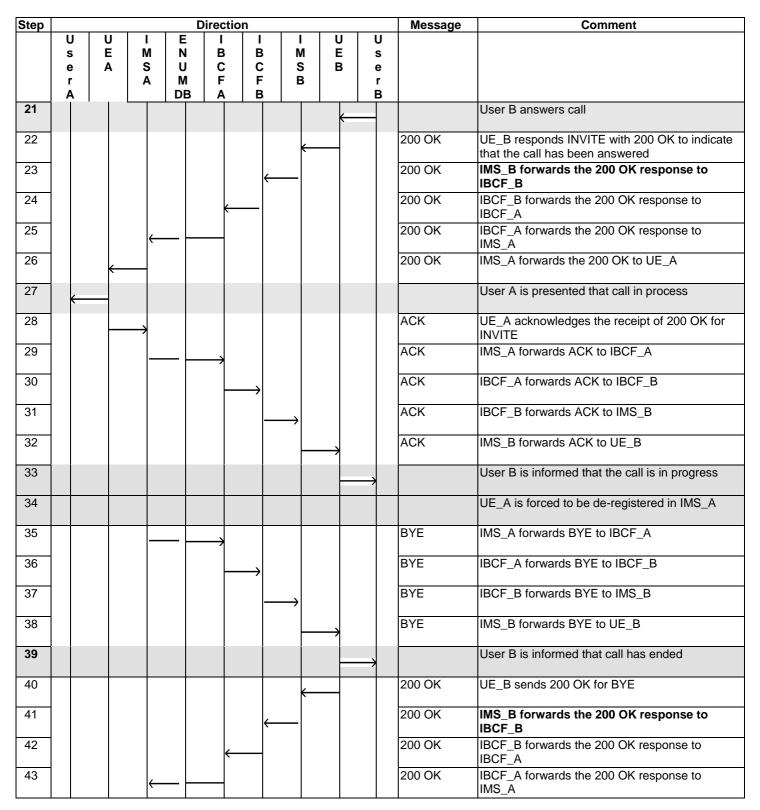


Step					irectio	n			Message	Comment	
	N e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	I M S B	UEB	U s e r B		
37			<b>←</b>	_						BYE	IBCF_A forwards BYE to IMS_A
38		$\leftarrow$								BYE	IMS_A forwards BYE to UE_A
39	←										User A is informed that call has ended
40			$\rightarrow$							200 OK	UE_A sends 200 OK for BYE
41			_	- -	$\rightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
42						$\rightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
43							$\rightarrow$			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

		lutava navability Taa	4 Decembries								
Identifier:	TD IME	Interoperability Tes	Description								
Summary:			UE is forcefully de-registered in IMS network during								
Summary.	a call	ork ends call in case calling	DE IS forcefully de-registered in livio hetwork during								
Configuration:	CF_INT_CALL										
SUT:											
	IMS_A										
References:			Specification Reference								
	TP_IMS_	5139_01	TS 124 229 [1], clause 5.4.5.1.2 ¶1 (item 1 and 2 in 1 <sup>st</sup> numbered list)								
			(item 1 and 2 in 1 numbered list)								
Use Case ref.:	UC_02_I										
D	1										
Pre-test			onfigured according to table 1								
conditions:			established to their respective IMS networks as								
		clause 4.2.1									
		A is registered in IMS_A usin									
		B is registered in IMS_B usin									
	<ul><li>Ther</li></ul>	e is an ongoing dialogue bet	ween UE_A and UE_B								
Test Sequence:	Step										
	1	User A calls User B									
	2	Verify that user B is informed	ed of incoming call of User A								
	3	Verify that user A is informed	ed that UE_B is ringing								
	4	User B answers call									
	5	Verify that User A is inform	ed that call has been answered								
	6		ed that the call is established								
	7	UE_A is forced to be de-re-									
	8		ed that call has been ended								
		Volley that door B to inform	ou that can had been ended								
Conformance	Check										
Criteria:	1	TP_IMS_5139_01 in CFW	step 34 (BYE):								
		ensure that {									
			network internal indication that the lifetime								
			dentity has expired"}								
		then { IMS_A sends a BYE									
			I set to Contact_header_value of UE_B and								
		containing a To_header s									
			00_response to initial INVITE and								
		containing a From_heade									
		the From_header of the									
		containing a Call-ID_head									
İ		the Call-ID header of th									





# 4.5.3.1.3.4 Subsequent target refresh request (INVITE)

	_	Interoperability Test Descr	iption					
Identifier:		CALL_0017						
Summary:			orrectly in case of a user initiated call hold					
	and resum	ne when home caller puts another	home user on hold and resumes call					
Configuration:	CF_INT_C	2411						
SUT:	IMS_A	DALL						
References:	Test Purp	0000	Specification Reference					
ivererences.	TP_IMS_5		TS 124 229 [1], clause 5.4.3.2 ¶108					
		7100_01	(6 <sup>th</sup> numbered list)					
	TP_IMS_5	5121 02	TS 124 229 [1], clause 5.4.3.3 ¶123					
		_	(9 <sup>th</sup> numbered list)					
Use Case ref.:	UC_03_I		·					
Pre-test		of IMS_A and of IMS B is configure						
conditions:			lished to their respective IMS networks as					
		ause 4.2.1						
		configured to perform user initiate						
		is registered in IMS_A using any						
	● UE_B	is registered in IMS_B using any	user identity					
Test Sequence:	Step							
rest ocquentes.	1	User A calls User B						
	2	Verify that user B is informed of in	ncoming call of User A					
	3	Verify that user A is informed that						
	4	User B answers call						
	5		r A is informed that call has been answered					
	6	Verify that user B is informed that						
	7	User A puts call on hold						
	8	Verify that user B is informed that						
	9	Verify that user A is informed that	formed that call is on hold					
	10	User A resumes call						
	11 12		at user B is informed that call is resumed					
	13	User A ends call	erify that user A is informed that call is resumed					
	14	Verify that user B is informed that call has ended						
	15	,	rify that user A is informed that call has ended					
		Training that door 7 the inhorning that	. can nac chaca					
Conformance	Check							
Criteria:								
	1	TP_IMS_5106_01 in CFW step 3	39A and 62A (INVITE):					
		ensure that {	AND THE A LIE DO					
		when { UE_A sends a subseque						
		then { IMS_B receives the subsection containing a Recor						
			CSCF_SIP_URI of IMS_A and					
		containing a Route						
			S-CSCF_SIP_URI of IMS_A and					
		containing a P-Cha	arging-Vector_header					
		not containing an	access-network-charging-info_parameter					
		}						
	2	TD IMS 5424 02 (IMS D) := 05	M aton 494 and 744 (200 OK):					
	2	TP_IMS_5121_02 (IMS_B) in CF	w step 48A and 71A (200 OK):					
		ensure that {    when { UE_B sends a 2xx_resp	onse to LIF_A }					
		then { IMS_A receives the 2xx_i						
		containing a P-Charging-						
			s-network-charging-info_parameter }					
		}						

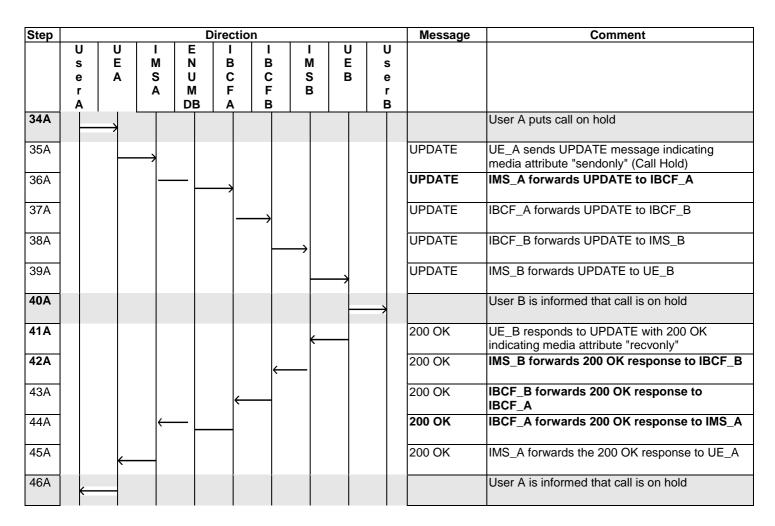
Step			Direction			Message	Comment
	U U s E	I E M N	I I B B	I M	U U E s		
	e A	S U	C C	S	Ве		
	r A	A M DB	F F	_	r B		
34A							User A puts call on hold
35A		>				INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
36A	<del></del>					100 Trying	IMS_A responds with a 100 Trying provisional response
37A			<b>→</b>			INVITE	IMS_A forwards INVITE to IBCF_A
38A		<b>←</b>				100 Trying	IBCF_A responds with a 100 Trying provisional response
39A			$\longrightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
40A			<b></b>			100 Trying	IBCF_A responds with a 100 Trying provisional response
41A				<b></b>		INVITE	IBCF_B forwards INVITE to IMS_B
42A				<u> </u>		100 Trying	IMS_B responds with a 100 Trying provisional response
43A						INVITE	IMS_B forwards INVITE to UE_B
44A				<b>←</b>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
45A							User B is informed that call is on hold
46A						200 OK	UE_B responds to INVITE with 200 OK
47A						200 OK	indicating media attribute "recvonly"  IMS_B forwards 200 OK response to IBCF_B
				<b>←</b>			·
48A			←			200 OK	IBCF_B forwards 200 OK response to IBCF_A
49A		<b>←</b>				200 OK	IBCF_A forwards 200 OK response to IMS_A
50A	<b>←</b>	4				200 OK	IMS_A forwards the 200 OK response to UE_A
51A							User A is informed that call is on hold
52A	_	>				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
53A			<b>→</b>			ACK	IMS_A forwards ACK to IBCF_A
54A			$\longrightarrow$			ACK	IBCF_A forwards ACK to IBCF_B
55A				$\longrightarrow$		ACK	IBCF_B forwards ACK to IMS_B
56A					$\rightarrow$	ACK	IMS_B forwards ACK to UE_B
57A	<b></b>						User A resumes call
58A		*				INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
59A	<b>←</b>					100 Trying	IMS_A responds with a 100 Trying provisional response
60A			$\longrightarrow$			INVITE	IMS_A forwards INVITE to IBCF_A
61A		<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response

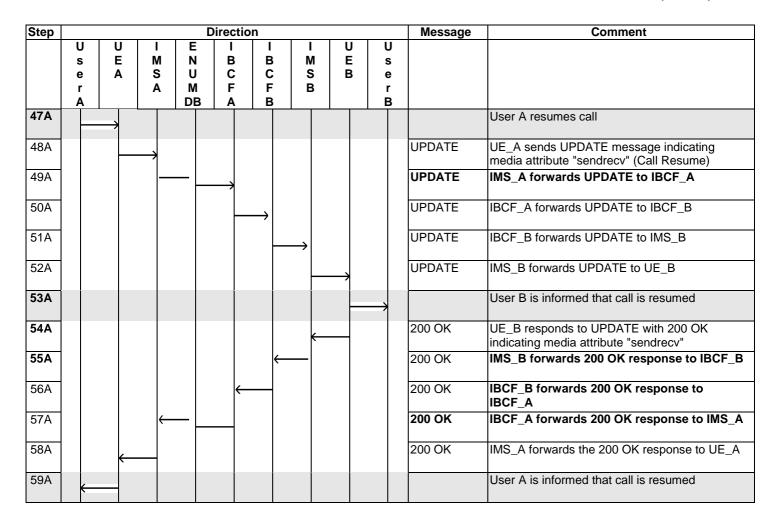
Step					Directio	n				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	I M S B	U E B	U s e r B		
62A	Î					$\rightarrow$		1		INVITE	IBCF_A forwards INVITE to IBCF_B
63A					<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
64A							$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
65A						-				100 Trying	IMS_B responds with a 100 Trying provisional response
66A								$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
67A							<b>←</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
68A								H	$\rightarrow$		User B is informed that call is resumed
69A							←			200 OK	UE_B responds to INVITE with 200 OK indicating media attribute "sendrecv"
70A						<b>←</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
71A					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
72A			<b>←</b>	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
73A		<b>←</b>								200 OK	IMS_A forwards the 200 OK response to UE_A
74A	←										User A is informed that call is resumed

## 4.5.3.1.3.5 Subsequent target refresh request (UPDATE)

		Interoperability 7	est Description							
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 call									
Configuration:	CF_INT_0	CALL								
SUT:	IMS_A, IN	NS_B								
References:	Test Purp	oose	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		·							
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 configured to perform user initiated hold/resume using UPDATE</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>									
Tarat Carrana	01									
Test Sequence:	Step									
	1	User A calls User B								
	2	•	ormed of incoming call of User A							
	3		ormed that UE_A is ringing							
	5	User B answers call	ormed that call has been anawared							
	6		ormed that call has been answered							
	7		ormed that call is established							
Į.	/	User A puts call on hol	u							

		Interoperability Test Description						
	8	Verify that user B is informed that call is on hold						
	9	Verify that user A is informed that call is on hold						
	10	User A resumes call						
	11	Verify that user B is informed that call is resumed						
	12	Verify that user A is informed that call is resumed						
	13	User A ends call						
	14	Verify that user B is informed that call has ended						
	15	Verify that user A is informed that call has ended						
Conformance	Check							
Criteria:	2	TP_IMS_5106_02 (IMS_A) in CFW step 37A and 50A (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  } }  TP_IMS_5121_02 (IMS_B) in CFW step 43A and 56A (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 } }						

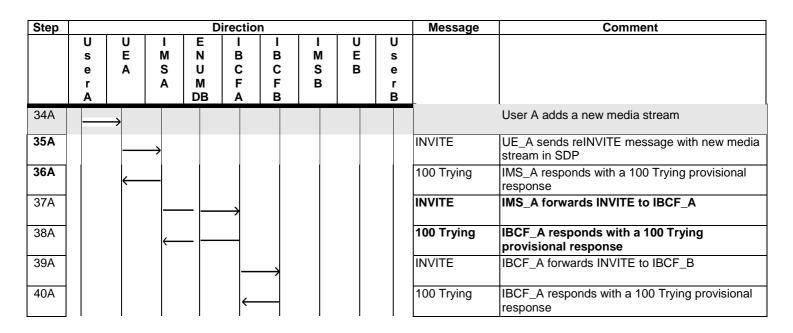




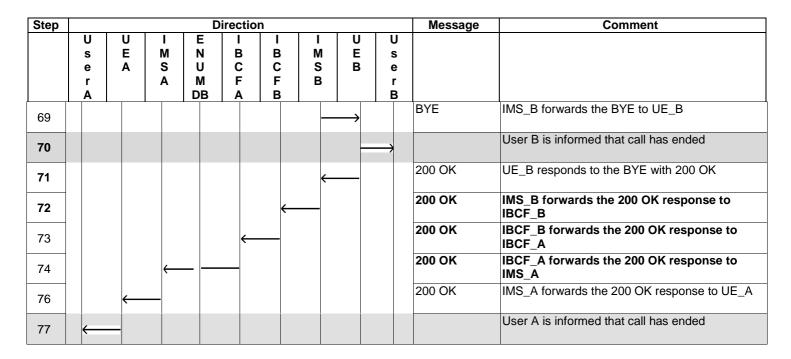
#### 4.5.3.1.3.6 Addition of media streams (reINVITE)

	Interoperability Test Description										
Identifier:	TD_IMS_CALL_0019										
Summary:	IMS network handles subsequent II	NVITEs 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	into operability real beautiful
	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 accepted
	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
Conformance	Check	
Criteria:		
	1	TP_IMS_5106_01 in CFW step 39A:
		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 }
	2	TP_IMS_5121_01 in CFW step 40A, 48A (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 }
		list containing a access network charging into_parameter j
	3	TP_IMS_5121_02 in CFW step 55A, 73 (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
	1	not containing a access-network-charging-info_parameter }
		not containing a access-network-charging-into_parameter }



Step				Dire	ection				Message	Comment
•	U s e r A		I M S A	E	I B C F A	I I B M C S F B B	В	U s e r B		
41A							·		INVITE	IBCF_B forwards INVITE to IMS_B
42A						<b></b>			100 Trying	IMS_B responds with a 100 Trying provisional response
43A							$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
44A							<del></del>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
45A								$\longrightarrow$		Verify that User B is informed to accept/reject new media stream (optional)
46A						•	<del></del>		180 Ringing	UE_B responds to reINVITE with 180 Ringing
47A						<b></b>			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
48A					<b></b>				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
49A			<del></del>		-				180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
50A		<del></del>	_						180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
51A	←	_								Verify that User A is informed that UE_B is alerting User B (optional)
52A							•			If informed, User B accepts the new media stream
53A						•	<del></del>		200 OK	UE_B responds with 200 OK to reINVITE
54A						<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
55A					<b></b>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
56A			$\leftarrow$		-				200 OK	IBCF_A forwards 200 OK response to IMS_A
57A		<del></del>	_						200 OK	IMS_A forwards the 200 OK response to UE_A
58A	<del></del>	-								User A is informed that new media stream has been accepted
59A			•						ACK	UE_A acknowledges the receipt of 200 OK for INVITE
60A					>				ACK	IMS_A forwards ACK to IBCF_A
61A						<b>→</b>			ACK	IBCF_A forwards ACK to IBCF_B
62									ACK	IBCF_B forwards ACK to IMS_B
63									ACK	IMS_B forwards ACK to UE_B
64		>							BYE	User A releases the call
65			•						BYE	UE_A sends BYE to indicate that the call has ended
66				.	>				BYE	IMS_A forwards the BYE to IBCF_A
67						<b>→</b>			BYE	IBCF_A forwards the BYE to IBCF_B
68						<b>──</b>			BYE	IBCF_B forwards the BYE to IMS_B
			1							



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

Interoperability T	est Description					
TD_IMS_CALL_0020						
IMS network handles subsequent INVITEs and UPDATEs correctly during modification of an existing media stream.						
CF_INT_CALL						
IMS_A						
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)					
UC_13						
<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>						
	TD_IMS_CALL_0020  IMS network handles subsequent of an existing media stream.  CF_INT_CALL  IMS_A  Test Purpose  TP_IMS_5106_01  TP_IMS_5121_01  TP_IMS_5121_02  UC_13  • HSS of IMS_A and of IMS B i e UE_A and UE_B have IP beat per clause 4.2.1  • UE_A and UE_B support multiple and support RTP and MSRP  • UE_A is registered in IMS_A					

		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	Verify 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
Conformance	Check	
Criteria:		
	1	TP_IMS_5106_01 in CFW step 39A and 697A (reINVITE):
	1	ensure that {
	1	ensure that { when { UE_A sends a subsequent INVITE to UE_B }
	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       containing a Record-Route_header
	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
		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
		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
		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
		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
	2	ensure that {     when { UE_A sends a subsequent INVITE to UE_B }     then { IMS_B receives the subsequent INVITE

Step				D	irection	on				Message	Comment
	U s	UE	M	ΕN	I B	I B	I M	UE	U		
	e r	Α	S A	U M	C F	C F	S	В	e r		
0.4.0	Α			DB	Α	В			В		
34A		$\rightarrow$									User A adds a new media stream
35A			<b>→</b>							INVITE	UE_A sends reINVITE message with new media stream in SDP
36A		<del></del>	_							100 Trying	IMS_A responds with a 100 Trying provisional response
37A					$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
38A			$\leftarrow$	- -						100 Trying	IBCF_A responds with a 100 Trying provisional response
39A						$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
40A					<b>←</b>					100 Trying	IBCF_A responds with a 100 Trying provisional response
41A							$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
42A						<del>(</del>				100 Trying	IMS_B responds with a 100 Trying provisional response
43A							-	$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
44A							<del>(</del>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
45A								•	$\longrightarrow$		Verify that User B is informed to accept/reject new media stream (optional)
46A							<del>(</del>			180 Ringing	UE_B responds to reINVITE with 180 Ringing
47A						<del>(</del>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
48A					<b>←</b>					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
49A			<b>←</b>	_						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
50A		←	_							180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
51A	←										Verify that User A is informed that UE_B is alerting User B (optional)
52A											If informed, User B accepts the new media stream
53A							<del>(</del>			200 OK	UE_B responds with 200 OK to reINVITE
54A						<b>(</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
55A					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
56A			$\leftarrow$	_						200 OK	IBCF_A forwards 200 OK response to IMS_A
57A		<b>-</b>	_							200 OK	IMS_A forwards the 200 OK response to UE_A
58A	<b>(</b>										User A is informed that new media stream has been accepted
59A			<b>→</b>							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
60A				- -	$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
61A						$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B

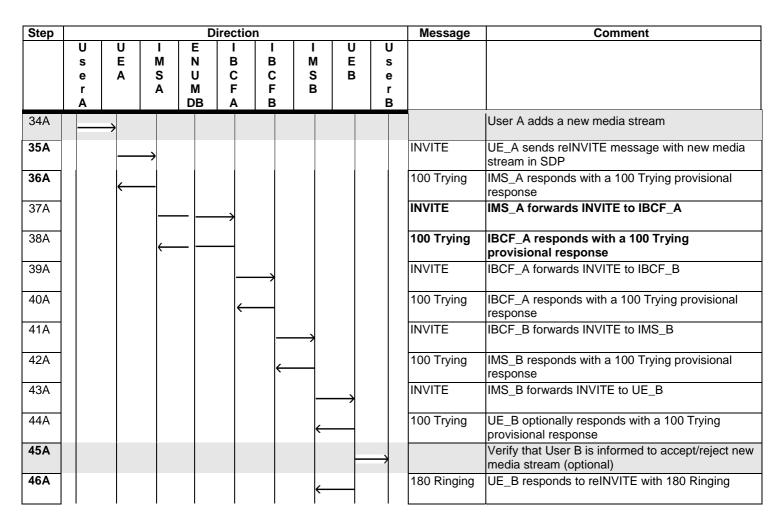
Step					Dire	ction				Message	Comment
	ι		U E	I M	E	I I B B	I	U I E	U		
	6		Ā	S	U	c c	S	В	s e		
	, i	r A				F F A B			r B		
62A		·		·						ACK	IBCF_B forwards ACK to IMS_B
63A										ACK	IMS_B forwards ACK to UE_B
64A	-	$\longrightarrow$									User A modifies the media stream
65A				>						INVITE	UE_A sends reINVITE message with new media stream in SDP
66A			<b></b>	-						100 Trying	IMS_A responds with a 100 Trying provisional response
67A						•				INVITE	IMS_A forwards INVITE to IBCF_A
68A				$\leftarrow$		-				100 Trying	IBCF_A responds with a 100 Trying provisional response
69A						$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
70A						<del></del>				100 Trying	IBCF_A responds with a 100 Trying provisional response
71A							$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
72A	Í						<b></b>			100 Trying	IMS_B responds with a 100 Trying provisional response
73A										INVITE	IMS_B forwards INVITE to UE_B
74A								<b></b>		100 Trying	UE_B optionally responds with a 100 Trying provisional response
75A									$\rightarrow$		Verify that User B is informed to accept/reject media stream modification (optional)
76A								<b></b>		180 Ringing	UE_B responds to reINVITE with 180 Ringing
77A	•						←—			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
78A						<del></del>				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
79A				$\leftarrow$		-				180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
80A			<del></del>	-						180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
81A	•										Verify that User A is informed that UE_B is alerting User B (optional)
82A								<b>—</b>			If informed, User B accepts the media stream modification
83A								<b>—</b>		200 OK	UE_B responds with 200 OK to reINVITE
84A							<b></b>			200 OK	IMS_B forwards 200 OK response to IBCF_B
85A						<b></b>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
86A				<del></del>		-				200 OK	IBCF_A forwards 200 OK response to IMS_A
87A			←	-						200 OK	IMS_A forwards the 200 OK response to UE_A
88A	•	(									User A is informed that media stream modification has been accepted
89A				>						ACK	UE_A acknowledges the receipt of 200 OK for INVITE

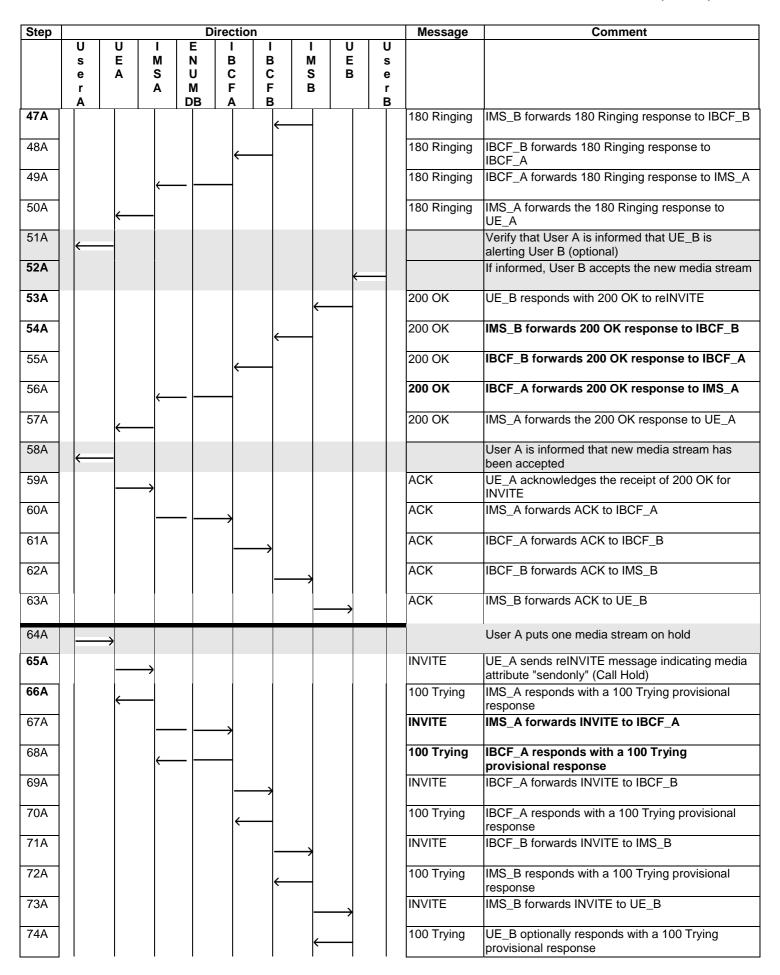
Step				D	irection	1				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	I B C F B	I M S B	U E B	U s e r B		
90A					$\longrightarrow$					ACK	IMS_A forwards ACK to IBCF_A
91A						$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
92A							$\longrightarrow$			ACK	IBCF_B forwards ACK to IMS_B
93A								<b>→</b>		ACK	IMS_B forwards ACK to UE_B
94								<b>←</b>		BYE	User B releases the call
95							<b>←</b>			BYE	UE_B sends BYE to indicate that the call has ended
96						$\leftarrow$				BYE	IMS_B forwards the BYE to IBCF_B
97					$\leftarrow$	_				BYE	IBCF_B forwards the BYE to IBCF_A
98			$\leftarrow$	_						BYE	IBCF_A forwards the BYE to IMS_A
99		$\leftarrow$								BYE	IMS_A forwards the BYE to UE_A
100	-	-									User A is informed that call has ended
101		-	$\rightarrow$							200 OK	UE_A responds to the BYE with 200 OK
102					$\longrightarrow$					200 OK	IMS_A forwards the 200 OK response to IBCF_A
103						$\rightarrow$				200 OK	IBCF_A forwards the 200 OK response to IBCF_B
104							$\longrightarrow$			200 OK	IBCF_B forwards the 200 OK response to IMS_B
105								$\longrightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
106									$\rightarrow$		User B is informed that call has ended

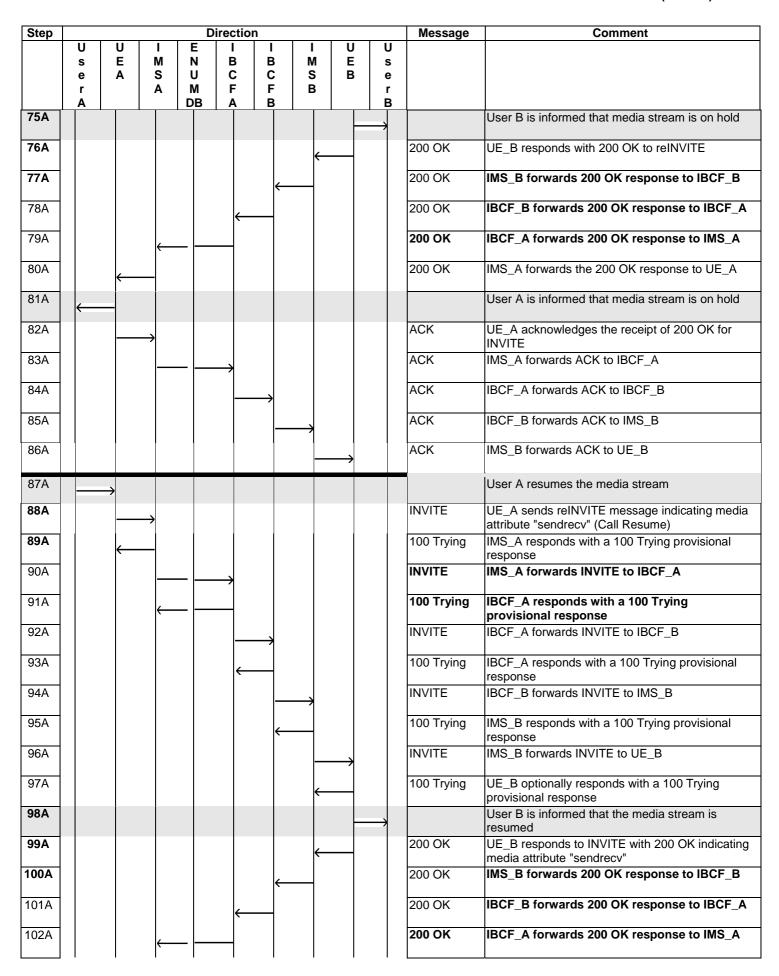
### 4.5.3.1.3.8 Hold/resume media streams (reINVITE)

		Interoperability Te	st Description						
Identifier:	TD_IMS_	CALL_0021	•						
Summary:			NVITEs correctly during hold/resume of media						
	streams								
O a verti averanti a ver	OF INT	2411							
Configuration: SUT:	CF_INT_0	JALL							
References:	_	IMS_A Test Purpose Specification Reference							
References.	TP_IMS_		TS 124 229 [1], clause 5.4.3.2 ¶108						
	11 _11VIO_	0100_01	(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, U	C_14							
Pre-test	• HSS	of IMS A and of IMS Dia	configured according to table 1						
conditions:			ers established to their respective IMS networks as						
oon and one	_	lause 4.2.1	ers established to their respective livio hetworks as						
			ole media streams (e.g. audio, video, messaging)						
	and s	support RTP and MSRP	(g,,,gg)						
		A is registered in IMS_A us	sing any user identity						
		B is registered in IMS_B us							
Test Sequence:	Step	Harry A. and a Harry D. /IMC	0.1/-IDII)						
	2	User A calls User B (IMS							
	3	Verify that user B is informed of incoming call of User A  Verify that user A is informed that UE_B is ringing							
	4	User B answers the call							
	5	I .	ed that call has been answered						
	6		med that call is established						
	7	User A adds a new medi	a stream						
	8	Verify that User B is info	rmed to accept/reject new media stream (optional)						
	9		rmed that UE_B is alerting User B (optional)						
	10		ser B accepts the new media stream						
	11	Verify that User A is information (optional)	rmed that new media stream has been accepted						
	12	User A puts one media s	tream on hold						
	13	Verify that user B is infor	med that media stream is on hold						
	14	Verify that user A is infor	med that media stream is on hold						
	15	User A resumes the med	lia stream						
	16	Verify that user B is infor	med that the media stream is resumed						
	17	Verify that user A is infor	med that the media stream is resumed						
	18	User A removes one of t	he media streams						
	19	Verify that user B is infor	med that the media stream has been removed						
	20		that UE_B is alerting User B (optional)						
	21	User A releases the call	<u> </u>						
	22	Verify that user B is infor	med that call has ended						
	23	Verify that user A is infor							
I		1. 2, 4001 7 10 111101							

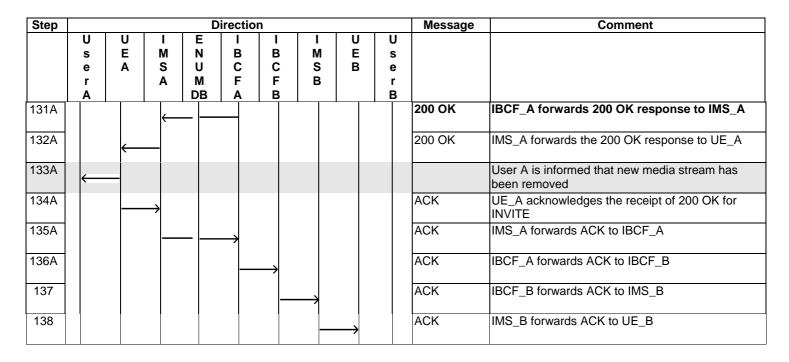
		Interoperability Test Description
Conformance Criteria:	Check	
	1	TP_IMS_5106_01 in CFW step 39A, 69A, 92A, 115A (reINVITE): ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_B receives the subsequent INVITE
	2	TP_IMS_5121_01 in CFW step 40A, 70A, 93A, 114A, 116A (100 trying), 122A (180 ringing) ensure that { when { UE_B sends a 1xx response to UE_A } then { IMS_A receives the 1xx response
	3	TP_IMS_5121_02 in CFW step 55A, 78A, 101A, 130A (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 } }







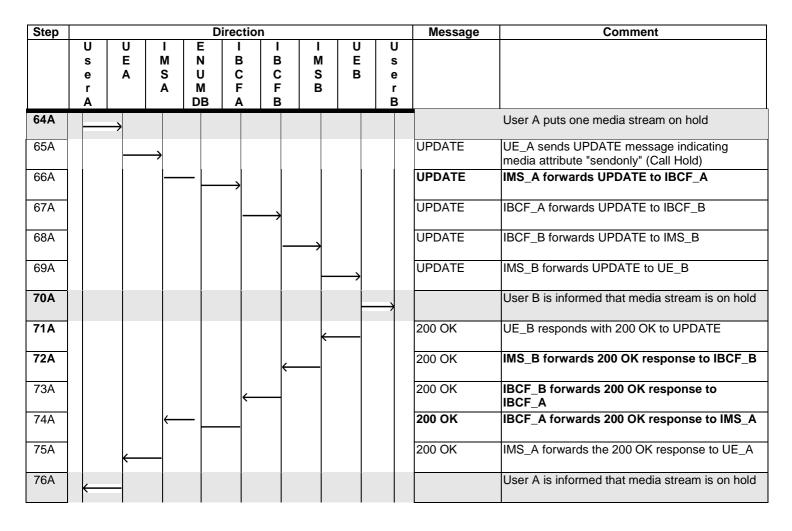
ACK UE. A acknowledges the receipt of 200 OK for INVITE INVITE ACK IMS. A forwards ACK to IBCF_A ACK IBCF_A forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IBCF_B ACK IBCF_B forwards ACK to IMS_B ACK IBCF_B forwards ACK to UE_B ACK IMS_B forwards ACK to UE_B ACK IMS_B forwards ACK to UE_B INVITE UE_A sends reINVITE to IMS_A INVITE UE_A sends reINVITE to IMS_A INVITE IMS_A responds with a 100 Trying provisional response INVITE IBCF_A responds with a 100 Trying provisional response INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IMS_B INVITE IMS_B forwards INVITE to IMS_B INVITE IMS_B forwards INVITE to UE_B IMS_B INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE INVITE IN	Step			Di	rection				Message	Comment
103A 104A 105A 106A 106A 107A 108A 109A 109A 109A 109A 109A 109A 109A 109		-			I B	I I B M		_		
103A 104A 105A 106A 106A 107A 108A 109A 109A 109A 109A 109A 109A 109A 109		e A	S	Ü	C	S		е		
User A is informed that media stream is resumed  ACK ULE, 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 IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to UE B  ACK IBCF_B forwards ACK to UE B  INVITE ULE_A sends reINVITE to IMS_A  100 Trying IMS_A responds with a 100 Trying provisional response  INVITE IBCF_A forwards INVITE to IBCF_B  100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_A 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 IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to UE_B  100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to UE_B  100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to UE_B  100 Trying IMS_B responds to reINVITE with 180 Ringing IMS_B reported that the media stream has been removed  121A  122A  123A  126A  127A  128A  128A  128A  129A  128A  129A  IMS_B forwards 180 Ringing response to IMS_B IMS_B forwards 180 Ringing response to IMS_B IMS_B forwards 180 Ringing response to UE_A  USER IS informed that UE_B is alerting USER B (optional)  180 Ringing IMS_A forwards 180 Ringing response to UE_A  USER A forwards 180 Ringing response to UE_A  USER A port number for the video stream is set of the video stream is set of the port number for the video stream is set of the port number for the port number for the video stream is set of the port number for the video stream is set of the port number for the port number for the video stream is set of the port number for the video stream is set of the port number for the video stream is set of the port number for the video stream is set of the port number for the video stream is set of the port number for the video stream is set of the port number			^			_				
ACK U.E. A acknowledges the receipt of 200 OK for INVITE INVITE ACK IMS, A forwards ACK to IBCF_A 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 IBCF_B forwards ACK to UE_B ACK IBCF_B forwards ACK to UE_B ACK IBCF_B forwards ACK to UE_B  INVITE U.E. A sends reINVITE to IMS_A INVITE U.E. A sends reINVITE to IMS_A INVITE IBCF_A forwards INVITE to IBCF_A INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_B forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to IBCF_B INVITE IBCF_A forwards INVITE to	103A	<b>←</b>							200 OK	IMS_A forwards the 200 OK response to UE_A
INVITE   ACK   IMS_A forwards ACK to IBCF_A	104A	<b>←</b>								User A is informed that media stream is resumed
ACK IBCF_B forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to UB_B  ACK IMS_B forwards ACK to UB_B  ACK IMS_B forwards ACK to UB_B  User A removes one of the media streams  INVITE UB_A sends reINVITE to IMS_A  1100 Trying IMS_A responds with a 100 Trying provisional response  INVITE IMS_A forwards INVITE to IBCF_A  1100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to IMS_B  1100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to IMS_B  1100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to UB_B  1100 Trying UB_B optionally responds with a 100 Trying provisional response  INVITE IMS_B forwards INVITE to UB_B  120A  121A  122A  123A  123A  124A  125A  126A  127A  128A  128A  128A  128A  128A  128B  129A  100 TW IMS_B forwards 180 Ringing response to IMS_B  128B Ringing IMS_A forwards 180 Ringing response to IBCF_B  129A  1200 OK IMS_B forwards 200 OK response to IBCF_B	105A	_	$\longrightarrow$						ACK	
ACK BCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to UE_B  ACK IMS_B forwards ACK to UE_B  User A removes one of the media streams  INVITE UE_A sends reINVITE to IMS_A  1100 Trying IMS_A responds with a 100 Trying provisional response  INVITE IMS_A forwards INVITE to IBCF_A  1100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_A forwards INVITE to IBCF_B  1100 Trying IBCF_A responds with a 100 Trying provisional response  INVITE IBCF_A forwards INVITE to IMS_B  1100 Trying IBCF_A forwards INVITE to IMS_B  1100 Trying IBCF_A forwards INVITE to IMS_B  1100 Trying IBCF_B forwards INVITE to IMS_B  1100 Trying IBCF_B forwards INVITE to IMS_B  1100 Trying IBCF_B forwards INVITE to IMS_B  1100 Trying IBCF_B forwards INVITE to UE_B  1100 Trying UE_B optionally responds with a 100 Trying provisional response  1100 Trying UE_B optionally responds to reINVITE with 180 Ringing IBCF_B forwards 180 Ringing response to IBCF_B  122A  123A  124A  125A  126A  127A  128A  128A  128A  129A  1200 OK UE_B responds to INVITE with 200 OK with SDi where the port number for the video stream is seen 129A	106A				$\rightarrow$				ACK	IMS_A forwards ACK to IBCF_A
ACK IMS_B forwards ACK to UE_B  User A removes one of the media streams  INVITE UE_A sends reINVITE to IMS_A  100 Trying IMS_A fresponds with a 100 Trying provisional response INVITE IBCF_A forwards INVITE to IBCF_A  116A  117A  118A  119A  120A  121A  122A  122A  123A  123A  126A  127A  128A  128A  129A  ACK IMS_B forwards ACK to UE_B  User A removes one of the media streams  INVITE UE_A sends reINVITE to IMS_A  100 Trying IMS_A forwards INVITE to IBCF_A  100 Trying IBCF_A forwards INVITE to IBCF_B  100 Trying IBCF_A forwards INVITE to IBCF_B  100 Trying IMS_B responds with a 100 Trying provisional response  INVITE IBCF_B forwards INVITE to IMS_B  100 Trying UE_B optionally responds with a 100 Trying provisional response on IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE to UE_B  100 Trying IMS_B forwards INVITE with 100 Trying provisional response to IMS_B forwards INVITE with 100 Trying provisional response to IMS_B forwards INVITE with 100 Trying provisional response to IMS_B forwards INVITE with 100 Trying INVITE with 100 Trying provisional response To INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying INVITE with 100 Trying Invite Invite Invite Invite Invite Invite Invite Invite Invite Invite Invite Invite	107A				<del></del>				ACK	IBCF_A forwards ACK to IBCF_B
User A removes one of the media streams    INVITE   UE_A sends reINVITE to IMS_A	108A								ACK	IBCF_B forwards ACK to IMS_B
111A 112A 112A 113A 114A 115A 115A 115A 115A 116A 115A 116A 117A 118A 118A 119A 120A 121A 122A 122A 122A 122A 122A 123A 124A 125A 126A 126A 127A 128A 128A 129A 129A  INVITE   UE_A sends reINVITE to IMS_A 100 Trying   IMS_A forwards INVITE to IBCF_B 100 Trying   IBCF_A forwards INVITE to IBCF_B 100 Trying   IBCF_A forwards INVITE to IBCF_B 100 Trying   IMS_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   IMS_B responds with a 100 Trying provisional response INVITE   IMS_B forwards INVITE to UE_B 100 Trying   IMS_B forwards INVITE with 180 Ringing   sponse to INS_B response to INS_B response to INS_B response to INS_B response to INVITE with 200 OK with SDF where the port number for the video stream is se 200 OK INS_B forwards 200 OK response to IBCF_B	109A					_	<b>──</b>		ACK	IMS_B forwards ACK to UE_B
112A 113A 114A 115A 115A 115A 115A 115A 115A 115	110A	<b></b>								User A removes one of the media streams
113A  114A  115A  116A  116A  117A  118A  119A  120A  122A  122A  122A  122A  123A  124A  125A  126A  127A  128A  128A  129A  129A  129A  120A	111A	_	<b>→</b>						INVITE	UE_A sends reINVITE to IMS_A
114A 115A 115A 115A 116A 116A 116A 117A 118A 119A 120A 122A 122A 122A 122A 122A 126A 127A 128A 128A 128A 129A 129A 129A 120	112A	<b>←</b>							100 Trying	
115A  116A  117A  118A  119A  120A  122A  123A  124A  125A  126A  127A  128A  128A  129A  129A  129A  129A  120	113A				$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
115A 116A 117A 118A 118A 119A 120A 121A 122A 123A 125A 126A 126A 127A 128A 129A 129A  INVITE   IBCF_A forwards INVITE to IBCF_B 100 Trying   IBCF_A responds with a 100 Trying provisional response   INVITE   IBCF_B forwards INVITE to IMS_B   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards INVITE to UE_B   INVITE   IMS_B forwards INVITE   INVITE   INVITE   IMS_B forwards INVITE   INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE   IMS_B forwards INVITE	114A		<b>←</b>						100 Trying	
117A  118A  119A  120A  121A  122A  123A  125A  126A  127A  127A  128A  129A  129A  120A  121A  120A	115A								INVITE	IBCF_A forwards INVITE to IBCF_B
117A 118A 119A 119A 119A 120A 121B 120A 122A 123A 124A 125A 126A 127A 128A 128A 129A 129A  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 that the media stream has been removed 180 Ringing UE_B optionally responds to reINVITE with 180 Ringing IMS_B forwards 180 Ringing response to IBCF_B Ringing IBCF_A forwards 180 Ringing response to IMS_UE_A 126A 127A 128A 129A  INVITE IMS_B forwards INVITE to IMS_B 100 Trying UE_B optionally responds with a 100 Trying provisional response INVITE IMS_B forwards 180 Ringing response to IBCF_B  180 Ringing IMS_B forwards 180 Ringing response to IMS_B Ringing IBCF_A forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_A forwards 180 Ringing response to IMS_UE_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_UE_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_UE_A 180 Ringing IMS_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IMS_UE_A 180 Ringing IBCF_B forwards 180 Ringing response to IBCF_B 180 Ringing IBCF_B forwards 180 Ringing response to IBCF_B 180 Ringing IMS_B forwards 180 Ringing response to IBCF_B 180 Ringing IMS_B forwards 180 Ringing response to IBCF_B 180 Ringing IMS_B forwards 180 Ringing response to IBCF_B 180 Ringing IMS_B forwards 180 Ringing response to IBCF_B 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 180 Ringing IMS_B forwards 18	116A				←—				100 Trying	
response INVITE IMS_B forwards INVITE to UE_B  120A  121A  121A  122A  123A  123A  124A  125A  126A  127A  127A  128A  129A  129A  120	117A					$\longrightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
120A  121A  122A  122A  123A  123A  124A  125A  126A  127A  127A  128A  129A  120	118A					<b></b>			100 Trying	, , , , , , , , , , , , , , , , , ,
provisional response  User B is informed that the media stream has been removed  180 Ringing UE_B optionally responds to reINVITE with 180 Ringing IBOF_B forwards 180 Ringing response to IBOF_  180 Ringing IBCF_B forwards 180 Ringing response to IBOF_A  180 Ringing IBOF_A forwards 180 Ringing response to IBOF_A  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards the 180 Ringing response to UE_A  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forwards 180 Ringing response to IMS_  180 Ringing IBOF_A forward	119A					-	<b>─</b>		INVITE	IMS_B forwards INVITE to UE_B
121A 122A 123A 123A 124A 125A 125A 126A 126A 127A 127A 128A 129A 129A 129A 129A 120 User B is informed that the media stream has been removed 180 Ringing UE_B optionally responds to reINVITE with 180 Ringing IMS_B forwards 180 Ringing response to IBCF_ 180 Ringing IBCF_B forwards 180 Ringing response to IBCF_A I80 Ringing IBCF_A forwards 180 Ringing response to IMS_ 180 Ringing IMS_A forwards 180 Ringing response to IMS_ 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_B User A may be informed that UE_B is alerting User B (optional)  200 OK UE_B responds to INVITE with 200 OK with SDF where the port number for the video stream is second to IMS_B forwards 200 OK response to IBCF_B	120A					€			100 Trying	
Ringing  180 Ringing IMS_B forwards 180 Ringing response to IBCF_  180 Ringing IBCF_B forwards 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IMS_  180 Ringing IMS_A forwards 180 Ringing response to IMS_  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_B forwards the 180 Ringing response to UE_B (UE_B)  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B	121A							$\rightarrow$		User B is informed that the media stream has
123A  124A  125A  125A  126A  127A  128A  129A  129A  130 Ringing IMS_B forwards 180 Ringing response to IBCF_  180 Ringing IBCF_B forwards 180 Ringing response to IBS_  180 Ringing IBCF_A forwards 180 Ringing response to IMS_  180 Ringing IMS_A forwards 180 Ringing response to IMS_  180 Ringing IMS_A forwards the 180 Ringing response to UE_A  180 Ringing IMS_A forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IBS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response to IMS_  180 Ringing IMS_B forwards 180 Ringing response	122A					•			180 Ringing	UE_B optionally responds to reINVITE with 180
125A  126A  127A  128A  129A  IBCF_A  180 Ringing IBCF_A forwards 180 Ringing response to IMS_  180 Ringing IMS_A forwards the 180 Ringing response to UE_A  USer A may be informed that UE_B is alerting User B (optional)  200 OK UE_B responds to INVITE with 200 OK with SDR where the port number for the video stream is see 200 OK IMS_B forwards 200 OK response to IBCF_B	123A					<del></del>			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
125A  126A  127A  127A  128A  129A  128A  129A  128B  128B  129B  128B  12B  12	124A				<b></b>				180 Ringing	
127A  127A  128A  129A  UE_A  User A may be informed that UE_B is alerting User B (optional)  200 OK  UE_B responds to INVITE with 200 OK with SDF where the port number for the video stream is see 200 OK  IMS_B forwards 200 OK response to IBCF_B	125A		<b>←</b>						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
127A  128A  129A  User A may be informed that UE_B is alerting User B (optional)  200 OK UE_B responds to INVITE with 200 OK with SDF where the port number for the video stream is see 200 OK IMS_B forwards 200 OK response to IBCF_B	126A	←							180 Ringing	
128A 129A 200 OK UE_B responds to INVITE with 200 OK with SDF where the port number for the video stream is see 200 OK IMS_B forwards 200 OK response to IBCF_B	127A						<b>(</b>			User A may be informed that UE_B is alerting
129A 200 OK IMS_B forwards 200 OK response to IBCF_B	128A					•			200 OK	UE_B responds to INVITE with 200 OK with SDP where the port number for the video stream is set
120A	129A					<u></u>			200 OK	-
130A	130A				<b></b>				200 OK	IBCF_B forwards 200 OK response to IBCF_A



#### 4.5.3.1.3.9 Hold/resume media streams (UPDATE)

		Interoperability Test Desc	ription							
ldentifier:		_CALL_0022								
Summary:	IMS netw	ork handles subsequent UPDATEs	s correctly during hold/resume of media							
	streams									
Configuration:	CF_INT_CALL									
SUT:	IMS_A		12							
References:	Test Pur		Specification Reference							
		_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_13, l	JC 14	/							
		_								
Pre-test	HSS	of IMS_A and of IMS B is configur	ed according to table 1							
conditions:			lished to their respective IMS networks as							
	per clause 4.2.1									
	<ul> <li>UE_A and UE_B support multiple media streams (e.g. audio, video, messaging)</li> </ul>									
	and support RTP and MSRP									
	UE_A is registered in IMS_A using any user identity									
	UE_B is registered in IMS_B using any user identity									
Tool Common on										
Test Sequence:	Step									
Test Sequence:	Step 1	User A calls User B (IMS VoIP ca								
Test Sequence:	1	User A calls User B (IMS VoIP ca Verify that user B is informed of i								
Test Sequence:		Verify that user B is informed of i	ncoming call of User A							
Test Sequence:	1 2		ncoming call of User A							
Test Sequence:	1 2 3 4	Verify that user B is informed of i Verify that user A is informed tha User B answers the call	ncoming call of User A t UE_B is ringing							
Test Sequence:	1 2 3	Verify that user B is informed of i Verify that user A is informed tha User B answers the call Verify that user A is informed tha	ncoming call of User A t UE_B is ringing t call has been answered							
Test Sequence:	1 2 3 4 5	Verify that user B is informed of i Verify that user A is informed tha User B answers the call	ncoming call of User A t UE_B is ringing t call has been answered t call is established							
Test Sequence:	1 2 3 4 5 6	Verify that user B is informed of inverify that user A is informed that User B answers the call Verify that user A is informed that Verify that user B is informed that User A adds a new media stream	t call has been answered t call is established							
Test Sequence:	1 2 3 4 5 6 7	Verify that user B is informed of i Verify that user A is informed tha User B answers the call Verify that user A is informed tha Verify that user B is informed tha User A adds a new media stream Verify that User B is informed to a	t call has been answered t call is established accept/reject new media stream (optional)							
Test Sequence:	1 2 3 4 5 6 7 8	Verify that user B is informed of i Verify that user A is informed that User B answers the call Verify that user A is informed that Verify that user B is informed that User A adds a new media stream Verify that User B is informed to a Verify that User A is informed that	t call has been answered t call is established accept/reject new media stream (optional) t UE_B is alerting User B (optional)							
Test Sequence:	1 2 3 4 5 6 7 8 9	Verify that user B is informed of i Verify that user A is informed tha User B answers the call Verify that user A is informed tha Verify that user B is informed tha User A adds a new media stream Verify that User B is informed to a Verify that User A is informed tha If informed, verify that User B according	t call has been answered t call is established accept/reject new media stream (optional) t UE_B is alerting User B (optional) cepts the new media stream							
Test Sequence:	1 2 3 4 5 6 7 8 9 10	Verify that user B is informed of i Verify that user A is informed tha User B answers the call Verify that user A is informed tha Verify that user B is informed tha User A adds a new media stream Verify that User B is informed to a Verify that User A is informed tha If informed, verify that User B acc Verify that User A is informed tha (optional)	t call has been answered t call has been answered t call is established accept/reject new media stream (optional) t UE_B is alerting User B (optional) cepts the new media stream t new media stream							
Test Sequence:	1 2 3 4 5 6 7 8 9	Verify that user B is informed of inverify that user A is informed that User B answers the call Verify that user A is informed that Verify that user B is informed that User A adds a new media stream Verify that User B is informed to a Verify that User A is informed that If informed, verify that User B according to the Verify that User A is informed that (optional)  User A puts one media stream or	t call has been answered t call is established accept/reject new media stream (optional) t UE_B is alerting User B (optional) tepts the new media stream t new media stream t new media stream has been accepted							
Test Sequence:	1 2 3 4 5 6 7 8 9 10	Verify that user B is informed of i Verify that user A is informed tha User B answers the call Verify that user A is informed tha Verify that user B is informed tha User A adds a new media stream Verify that User B is informed to a Verify that User A is informed tha If informed, verify that User B acc Verify that User A is informed tha (optional)	t call has been answered t call is established accept/reject new media stream (optional) t UE_B is alerting User B (optional) tepts the new media stream t new media stream t new media stream has been accepted							

		Interoperability Test Description							
	15	User A resumes the media stream							
	16	Verify that user B is informed that the media stream is resumed							
	17	Verify that user A is informed that the media stream is resumed							
	18	User A removes one of the media streams							
	19	Verify that user B is informed that the media stream has been removed							
	20 User A releases the call								
	21 Verify that user Bis informed that call has ended								
	22	Verify that user A is informed that call has ended							
Conformance Criteria:	Check								
	2	TP_IMS_5106_02 in CFW step 67A, 80A and 103A (UPDATE): ensure that { when { UE_A sends an UPDATE to UE_B } then { IMS_B receives the UPDATE							



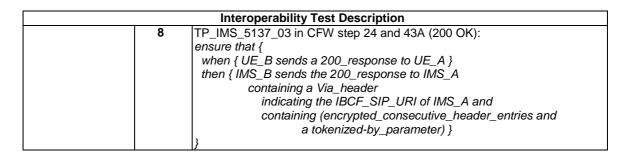
Step	<u> </u>			Direc	tion				Message	Comment
	U s	U E		E I	I B	I M	U I E	U		
	е	Ā	s l	J C	; c	S	В	е		
	r A			M F B A	_			r B		
77A		>								User A resumes the media stream
78A			•						UPDATE	UE_A sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
79A				$\longrightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
80A					<del></del>				UPDATE	IBCF_A forwards UPDATE to IBCF_B
81A						$\longrightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
82A							$\longrightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
83A							-	<b>→</b>		User B is informed that the media stream is resumed
84A							<del></del>		200 OK	UE_B responds to UPDATE with 200 OK indicating media attribute "sendrecv"
85A						<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
86A					$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A
87A			<del></del>						200 OK	IBCF_A forwards 200 OK response to IMS_A
88A		<del></del>							200 OK	IMS_A forwards the 200 OK response to UE_A
99A	<b>—</b>	-								User A is informed that media stream is resumed
100A		>								User A removes one of the media streams
101A			•						UPDATE	UE_A sends UPDATE to IMS_A
102A				$\longrightarrow$					UPDATE	IMS_A forwards UPDATE to IBCF_A
103A					$\longrightarrow$				UPDATE	IBCF_A forwards UPDATE to IBCF_B
104A						$\longrightarrow$			UPDATE	IBCF_B forwards UPDATE to IMS_B
105A							$\longrightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
106A								$\longrightarrow$		User B is informed that the media stream has been removed
107A							•		200 OK	UE_B responds to INVITE with 200 OK
108A						<del></del>			200 OK	IMS_B forwards 200 OK response to IBCF_B
109A					<del></del>				200 OK	IBCF_B forwards 200 OK response to IBCF_A
110A			<del></del>						200 OK	IBCF_A forwards 200 OK response to IMS_A
111A		<del></del>							200 OK	IMS_A forwards the 200 OK response to UE_A
112A	<b>—</b>									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

1	Interoperability To	est Description						
Identifier:	TD_IMS_CALL_0024							
Summary:	IMS network handles basic call wit	h topology hiding correctly						
Configuration:	CF_INT_CALL							
SUT:	IMS_A	<del>_</del>						
References:	Test Purpose	Specification Reference						
	TP_IMS_5135_01	TS 124 229 [1], clause 5.10.4.1 ¶7						
		(after note 4)						
	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						
	TD 1140 5400 04	(item 8 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5408_01	TS 124 229 [1], clause 5.10.2.3 ¶1						
	TD 1140 5400 00	(item 4 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5408_03	TS 124 229 [1], clause 5.10.2.3 ¶1						
	TD IN 0 5444 04	(item 4 in 1 <sup>st</sup> numbered list)						
	TP_IMS_5414_01	TS 124 229 [1], clause 5.10.3.2 ¶12						
	TD IMC 5407 00	(item 1 in 1 <sup>st</sup> numbered list) TS 124 229 [1], clause 5.10.4.2 ¶1						
	TP_IMS_5137_02							
	TD IMC 5427 02	(1 <sup>st</sup> numbered list) TS 124 229 [1], clause 5.10.4.2 ¶1						
	TP_IMS_5137_03	(1 <sup>st</sup> numbered list)						
Use Case ref.:	UC_02_I	I(1 Hambered list)						
Ose Case lel	00_02_1							
Pre-test	- HCC of IMC A and of IMC Dir	a configured appording to table 1						
conditions:	HSS of IMS_A and of IMS B is configured according to table 1      HS A and LIF B bayes IB begrees a stablished to their reproduct IMS naturally as							
	LIE A and LIE D have ID had	rore actablished to their respective IMC networks as						
Conditions.		rers established to their respective IMS networks as						
Conditions.	per clause 4.2.1	·						
conditions.	per clause 4.2.1  UE_A is registered in IMS_A to	using any user identity						
conditions.	per clause 4.2.1  UE_A is registered in IMS_A to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B to UE_B is registered in IMS_B	using any user identity using any user identity						
conditions.	per clause 4.2.1  UE_A is registered in IMS_A to	using any user identity using any user identity						
	per clause 4.2.1  UE_A is registered in IMS_A uuE_B is registered in IMS_B uuE_B is configured for topolo	using any user identity using any user identity						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A uuE_B is registered in IMS_B uuE_B is configured for topolo	using any user identity using any user identity						
	per clause 4.2.1  UE_A is registered in IMS_A uus_B is registered in IMS_B uus_B is configured for topolo  Step  1 User A calls user B	using any user identity using any user identity ogy hiding						
	per clause 4.2.1  UE_A is registered in IMS_A user B  UE_B is registered in IMS_B user B  Verify that user B is info	using any user identity using any user identity ogy hiding ormed of incoming call of User A						
	per clause 4.2.1  UE_A is registered in IMS_A user B  UE_B is registered in IMS_B user B  Verify that user A is info	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing						
	per clause 4.2.1  UE_A is registered in IMS_A user B  UE_B is registered in IMS_B user B  USer A calls user B  Verify that user A is info	ormed that UE_B is ringing						
	per clause 4.2.1  UE_A is registered in IMS_A user B  UE_B is registered in IMS_B user B  USER A calls user B  Verify that user A is information and the series are all the series and the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all the series are all t	busing any user identity busing any user identity busing any user identity busing any user identity busing hiding business of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state						
	per clause 4.2.1  UE_A is registered in IMS_A user B  IMS_A is configured for topolo  Step  User A calls user B  Verify that user B is info User B answers the call Verify that user A is info Verify that user A is info Verify that user B is info Verify that user B is info	ormed that UE_B is ringing						
	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topological between the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the c	ormed that call has been answered ormed that the call is established						
	per clause 4.2.1  UE_A is registered in IMS_A user B is registered in IMS_B user B is configured for topological by the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o	ormed that call has ended						
	per clause 4.2.1  UE_A is registered in IMS_A user B is registered in IMS_B user B is configured for topological by the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second o	ormed that call has been answered ormed that the call is established						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  User A calls user B  Verify that user B is information in the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the s	ormed that call has ended						
	per clause 4.2.1  UE_A is registered in IMS_A user B is registered in IMS_B user B is registered for topological limits. We refer to the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the cont	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established ormed that call has ended ormed that call has ended						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  User A calls user B  Verify that user B is information in the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the s	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established ormed that call has ended ormed that call has ended						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  1	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established ormed that call has ended ormed that call has ended						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  1	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established  ormed that call has ended ormed that call has ended ormed that call has ended						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  1	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established  ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended						
Test Sequence:	per clause 4.2.1  UE_A is registered in IMS_A user B is registered for topology  IMS_A is configured for topology  Step  1	using any user identity using any user identity ogy hiding  ormed of incoming call of User A ormed that UE_B is ringing  ormed that call has been answered ormed that the call is established  ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended ormed that call has ended						

		Interoperability Test Description
	2	TP_IMS_5137_01 in CFW step 8 (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 8 (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 30 (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 37A (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 9 (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	TD_IMS_5137_02 in CEM stop 17 (190 Dinging):
	1	TP_IMS_5137_02 in CFW step 17 (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) }
		]
		ACC.



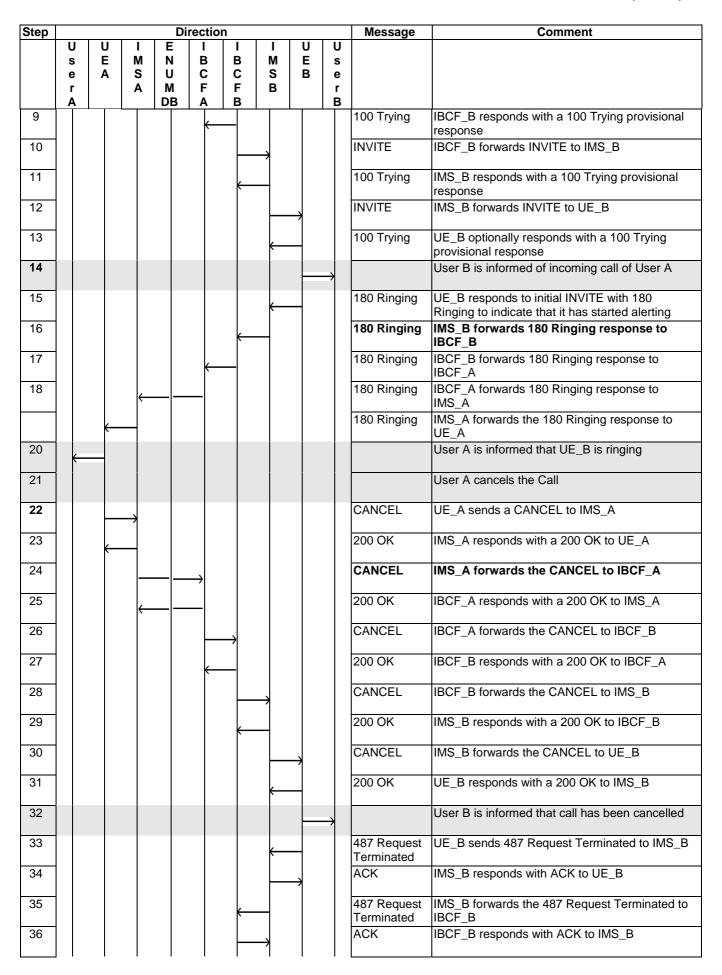
Step					Dire	ction					Message	Comment
	U	U	I N	IE /IN		I B	I B	I M	U E	U		
	s e	A		U S		C	C	S	В	s e		
	r		Ā	A M		F	F	В	_	r		
4	A			DE	3   1	A	В			В		Harri A calla Harri D
1		$\rightarrow$										User A calls User B
2											INVITE	UE_A sends INVITE with the first SDP offer
			$\longrightarrow$									indicating all desired medias and codecs that
3		K									100 Trying	IMS_A responds with a 100 Trying provisional
4											ENUM	response IMSA sends query to ENUM DB
7				$\longrightarrow$							LINOW	INISA Serius query to ENOW DB
5				←							ENUM	ENUM DB sends response to IMS A
6					<del></del>	,					INVITE	IMS_A forwards INVITE to IBCF_A
7				<del></del>							100 Trying	IBCF_A responds with a 100 Trying provisional response
8							$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
9						<b>—</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
10								$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
11							<b>—</b>	_			100 Trying	IMS_B responds with a 100 Trying provisional response
12									$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
13								<b>—</b>			100 Trying	UE_B optionally responds with a 100 Trying provisional response
14										$\rightarrow$		User B is informed of incoming call of User A
15								<b>—</b>			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16							<b>—</b>				180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
17						<u></u>					180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
18				<del></del>							180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
19		+									180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
20	$\leftarrow$											User A is informed that UE_B is ringing
21									<b>—</b>			User B answers call
22								<b>—</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
23							<b>—</b>	_			200 OK	IMS_B forwards 200 OK response to IBCF_B

S	Step				Di	rectio	n				Message	Comment
A		U			Е	ı	I	ı		U		
r A M M DB A B B B P B B P B B P COUNTY OF THE PROPERTY OF THE												
A			A		_				В			
25 26 27 28 29 30 30 31 32 33 34A 35A 36A 37A 38A 39A 40A 41A 42A 45A						_		-				
200 OK IMS_A forwards 200 OK response to UE_A  200 OK IMS_A forwards 200 OK response to UE_A  User A is informed that call has been answered  ACK IUE_A acknowledges the receipt of 200 OK for INS_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 UE_B  User A ends call  BYE UE_A releases the call with BYE  BYE IBCF_B forwards BYE to IBCF_A  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to UE_B  User B is informed that call has ended  IMS_B forwards BYE to UE_B  User B is informed that call has ended  IMS_B forwards BYE to UE_B  IMS_B forwards BYE to UE_B  IMS_B forwards 200 OK for BYE  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	24					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_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 forwards ACK to UE_B  User B is informed that the call is established  User A ends call  BYE UE_A releases the call with BYE  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to UE_B  User B is informed that call has ended  IBCF_B forwards BYE to UE_B  USER B is informed that call has ended  USER B is informed that call has ended  IBCF_B forwards BYE to UE_B  USER B is informed that call has ended  IBCF_B forwards 200 OK for BYE  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 IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A	25			$\leftarrow$		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
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 IBCF_B  ACK IBCF_B forwards ACK to UE_B  ACK IMS_B forwards ACK to UE_B  User B is informed that the call is established  User A ends call  BYE UE_A releases the call with BYE  BYE IBCF_B forwards BYE to IBCF_A  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to UE_B  USER B is informed that call has ended  USER B is informatds 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 IMS_A  200 OK IMS_B forwards 200 OK response to IMS_A	26		<b>←</b>								200 OK	·
INVITE	27	<b>←</b>										User A is informed that call has been answered
ACK IBCF_A forwards ACK to IBCF_B  ACK IBCF_B forwards ACK to IMS_B  ACK IMS_B forwards ACK to UE_B  ACK IMS_B forwards ACK to UE_B  ACK IMS_B forwards ACK 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_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to UE_B  BYE IBCF_B forwards BYE to UE_B  User B is informed that call has ended  User B is informed that call has ended  USER B imformed that call has ended  USER B imformed that call has ended  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 IMS_A  200 OK IBCF_A forwards 200 OK response to IMS_A	28			$\rightarrow$							ACK	
ACK IBCF_B forwards ACK to IMS_B ACK IMS_B forwards ACK to UE_B  33 34A 35A 36A 37A 37A 38A 39A 39A 40A 41A 42A 43A 44A 45A	29			_		$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
32 33 34A 35A 36A 37A 38A 39A 39A 40A 41A 42A 42A 44A 45A	30						$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
User B is informed that the call is established  User A ends call  User A ends call With BYE  BYE  IMS_A forwards BYE to IBCF_A  BYE  IBCF_A forwards BYE to IBCF_B  BYE  IBCF_B forwards BYE to IMS_B  BYE  IMS_B forwards BYE to UE_B  User B is informed that call has ended	31							$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
34A  35A  36A  37A  38A  38A  39A  40A  41A  42A  43A  44A  45A	32								$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
BYE UE_A releases the call with BYE  BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to UE_B  We will be a sended  User B is informed that call has ended  IMS_B forwards 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B  We will be a sended 200 OK response to IBCF_B	33									$\rightarrow$		User B is informed that the call is established
BYE IMS_A forwards BYE to IBCF_A  BYE IBCF_A forwards BYE to IBCF_B  BYE IBCF_B forwards BYE to IMS_B  BYE IBCF_B forwards BYE to UE_B  We are a significant of the content	34A	F	$\rightarrow$						·			User A ends call
BYE IBCF_A forwards BYE to IBCF_B BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to UE_B  User B is informed that call has ended  200 OK UE_B sends 200 OK for BYE  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 UE_A	35A			$\rightarrow$							BYE	UE_A releases the call with BYE
BYE IBCF_B forwards BYE to IMS_B BYE IMS_B forwards BYE to UE_B  User B is informed that call has ended  200 OK UE_B sends 200 OK for BYE  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 UE_A	36A					$\rightarrow$					BYE	IMS_A forwards BYE to IBCF_A
BYE IMS_B forwards BYE to UE_B  User B is informed that call has ended  200 OK UE_B sends 200 OK for BYE  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 UE_A	37A						$\rightarrow$				BYE	IBCF_A forwards BYE to IBCF_B
40A  41A  42A  43A  44A  45A  User B is informed that call has ended  200 OK UE_B sends 200 OK for BYE  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	38A							$\rightarrow$			BYE	IBCF_B forwards BYE to IMS_B
41A  42A  43A  44A  44A  45A  41A  200 OK UE_B sends 200 OK for BYE  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	39A								$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
42A 43A 44A 45A  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	40A									$\rightarrow$		User B is informed that call has ended
43A  44A  45A  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	41A							<b>—</b>			200 OK	UE_B sends 200 OK for BYE
44A  45A  200 OK IBCF_A forwards 200 OK response to IMS_A  200 OK IMS_A forwards the 200 OK response to UE_A	42A						<b>-</b>				200 OK	IMS_B forwards 200 OK response to IBCF_B
45A 200 OK IMS_A forwards the 200 OK response to UE_A	43A					<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
	44A			$\leftarrow$		_					200 OK	IBCF_A forwards 200 OK response to IMS_A
46A User B is informed that call has ended	45A		<b>—</b>								200 OK	IMS_A forwards the 200 OK response to UE_A
	46A	$\leftarrow$										User B is informed that call has ended

### 4.5.3.1.4.2 CANCEL call by calling user

Identifier:   TD_IMS_CALL_0025	lishment with
topology hiding  Configuration: CF_INT_CALL  SUT: IMS_A and IMS_B	lishment with
Configuration: CF_INT_CALL SUT: IMS_A and IMS_B	
SUT: IMS_A and IMS_B	
inio_r tana inio_p	
References: Test Purpose Specification Reference	
TP_IMS_5408_02 TS 124 229 [1], clause 5.10.2	2.3 ¶1
(item 4 in 1 <sup>st</sup> numbered list)	
Use Case ref.: UC_02_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 bearers established to their respective IMS	networks as
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	
IMS_A is configured for topology hiding	
Test Sequence: Step	
1 User A calls User B	
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	
Our farmance Ohook	
Conformance Check Criteria: 1 TP IMS 5408 02 in CFW step 26 (CANCEL):	
11 _1110_0 100_02 III 01 11 0100 20 (07 II 022).	
ensure that {    when { UE_A sends a CANCEL to UE_B }	
then { IMS_A sends the CANCEL to IMS_B	
containing a Via_header	
indicating the IBCF_SIP_URI of IMS_A and	
containing (encrypted_consecutive_header_entries	s and
a tokenized-by_parameter) and	- aa
containing a Route_header	
indicating the IBCF_SIP_URI of IMS_A and	
containing (encrypted_consecutive_header_entries	s and
a tokenized-by_parameter) }	
}	

Step				Di	rectio	า				Message	Comment
	U s e r A	U E A	M S A	E N U M DB	I B C F A	- 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			_	$\rightarrow$						ENUM	IMSA sends query to ENUM DB
5			$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
6			_		$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
7			$\leftarrow$							100 Trying	IBCF_A responds with a 100 Trying provisional response
8						$\rightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B

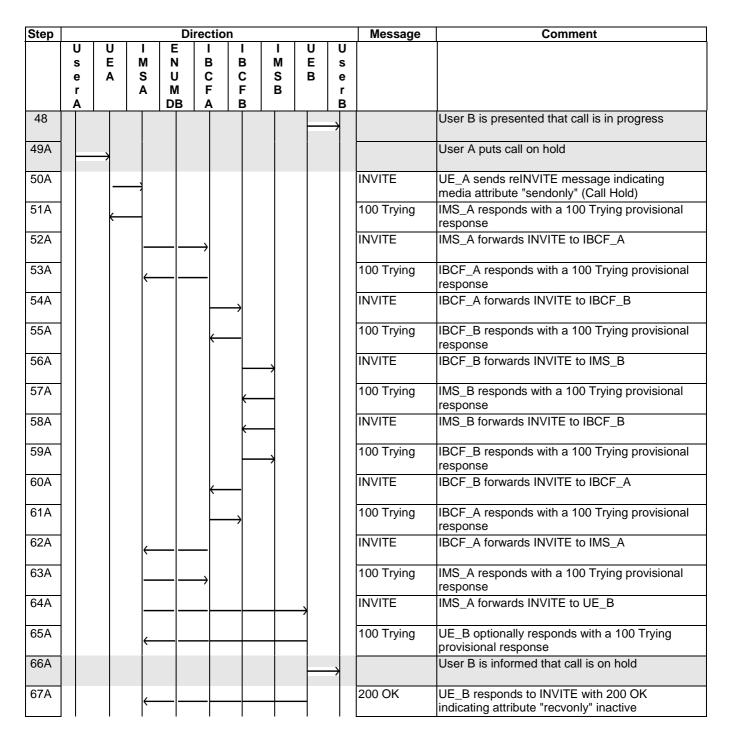


Step				Di	rectio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	I B C F A	I B C F B	I M S B	U E B	U s e r B		
37					<del></del>					487 Request Terminated	IBCF_B forwards the 487 Request Terminated to IBCF_A
38						$\rightarrow$				ACK	IBCF_A responds with ACK to IBCF_B
39			<b>←</b>		_					487 Request Terminated	IBCF_A forwards the 487 Request Terminated to IMS_A
40					$\rightarrow$					ACK	IMS_A responds with ACK to IBCF_A
41		<b>←</b>								487 Request Terminated	IMS_A forwards the 487 Request Terminated to UE_A
42			$\rightarrow$							ACK	UE_A responds with ACK to IMS_A
43	$\vdash$										User A is informed that call is terminated

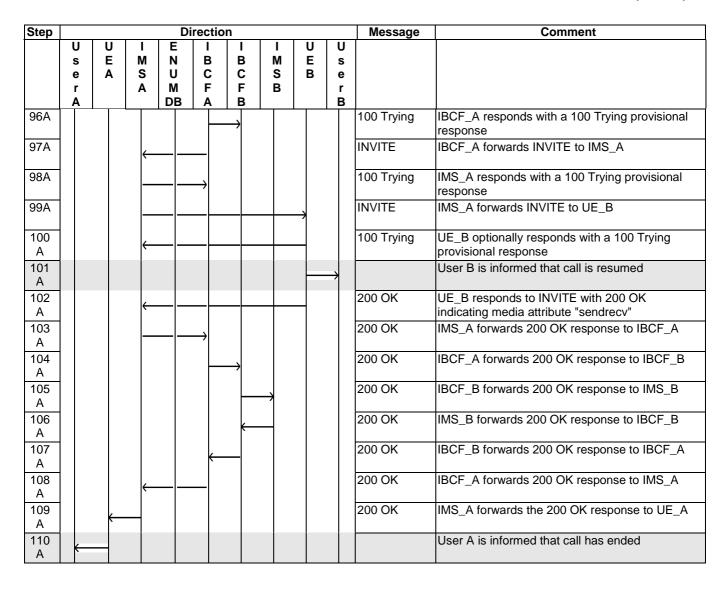
#### 4.5.3.1.4.3 Normal call with hold/resume

		Interoperability Test Desc	ription							
Identifier:	TD_IMS_	CALL_0026								
Summary:			I and resume correctly when a home caller							
	puts a roa	aming user on hold and resumes o	all with topology hiding							
Configuration:	CF_ROAM_CALL									
SUT:	IMS_A									
References:	Test Pur	pose	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)							
			(item 4 in 1 <sup>st</sup> numbered list)							
Use Case ref.:	UC_03_F	8								
Pre-test	<ul><li>HSS</li></ul>	of IMS_A and of IMS B is configu	red according to table 1							
conditions:	_		blished to their respective IMS networks as							
	per clause 4.2.1									
		A configured to perform user initiat								
		A is registered in IMS_A using any								
	<ul> <li>UE_I</li> </ul>	B is registered via IMS A in IMS_B	susing any user identity							
	<ul> <li>IMS_</li> </ul>	A is configured for topology hiding								
Test Sequence:	Step									
	1	User A calls User B								
	2	Verify that user B is informed of								
	3	Verify that user A is informed that	at UE_A is ringing							
	4	User B answers call								
	5	5 Verify that user A is informed that call has been answered								
	6	Verify that user B is informed that	at call is established							
	7	User A puts call on hold								
	8									
	9	9 Verify that user A is informed that call is on hold								
	10	User A resumes call								
	11	Verify that user B is informed that								
	12	Verify that user A is informed that	at call is resumed							
	12									
	13	User A ends call								
		User A ends call Verify that user B is informed that	at call has ended							
	13									

	Interoperability Test Description										
Conformance	Check										
Criteria:	1	TP_IMS_5408_04 in CFW step 54A and 89A (INVITE): ensure that {   when { UE_A sends a subsequent INVITE to UE_B }   then { IMS_A sends the INVITE to IMS_B									



Step				Di	recti	on				Message	Comment
	U s	U E	I M	E N	I B	I B	I M	U E	U s		
	е	Ā	S	U	С	С	S	В	е		
	r A		Α	M DB	F	F B	В		r B		
68A					$\rightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
69A						$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
70A							$\rightarrow$			200 OK	IBCF_B forwards 200 OK response to IMS_B
71A						<b>←</b>	_			200 OK	IMS_B forwards 200 OK response to IBCF_B
72A					<del>(</del>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
73A			$\leftarrow$							200 OK	IBCF_A forwards 200 OK response to IMS_A
74A		<del></del>								200 OK	IMS_A forwards 200 OK response to UE_A
75A			$\rightarrow$							ACK	UE_A acknowledges the receipt of 200 OK for INVITE
76A			_	_	$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
77A						$\longrightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
78A							$\rightarrow$			ACK	IBCF_B forwards ACK to IMS_B
79A						<b>—</b>				ACK	IMS_B forwards ACK to IBCF_B
80A					<b>←</b>					ACK	IBCF_B forwards ACK to IBCF_A
81A			$\leftarrow$	_ _						ACK	IBCF_A forwards ACK to IMS_A
82A				_				$\rightarrow$		ACK	IMS_A forwards ACK to UE_B
83A	$\leftarrow$										User A is informed that call is on hold
84A	F	$\rightarrow$									User A resumes call
85A		_	$\rightarrow$							INVITE	UE_A sends reINVITE message indicating media attribute "sendrecv" (Call Resume)
86A		<b>—</b>	_							100 Trying	IMS_A responds with a 100 Trying provisional response
87A			_	_	$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
88A			$\leftarrow$		_					100 Trying	IBCF_A responds with a 100 Trying provisional response
89A						$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
90A					<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
91A							$\rightarrow$			INVITE	IBCF_B forwards INVITE to IMS_B
92A						<b>—</b>	$\dashv$			100 Trying	IMS_B responds with a 100 Trying provisional response
93A						<b>—</b>				INVITE	IMS_B forwards INVITE to IBCF_B
94A							$\rightarrow$			100 Trying	IBCF_B responds with a 100 Trying provisional response
95A					<del> </del>					INVITE	IBCF_B forwards INVITE to IBCF_A



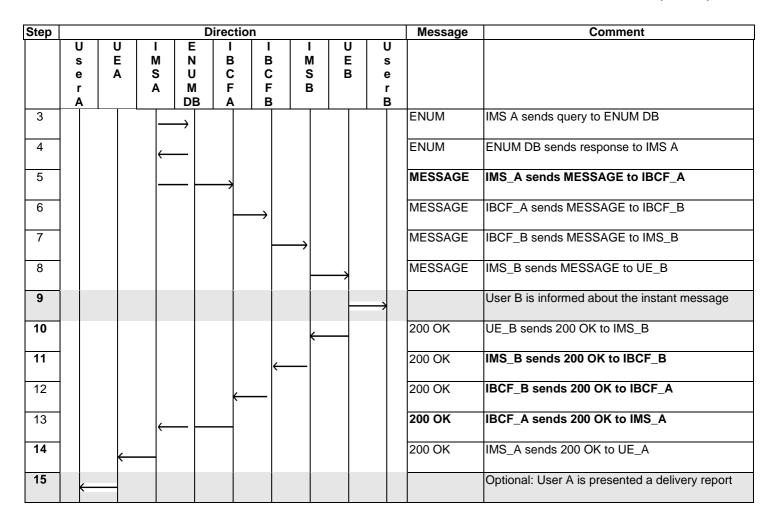
## 4.5.4 Messaging

### 4.5.4.1 Messaging with ENUM lookup procedure

	Interoperability Test Descr	ription								
Identifier:	TD_IMS_MESS_0004									
Summary:	IMS network handles messaging with DNS/ENUM lookup procedure correctly									
Configuration:	CF_INT_CALL									
SUT:	IMS_A									
References:	Test Purpose	Specification Reference								
	TP_IMS_ENUM_01	TS 124 229 [1], clause 5.4.3.2 ¶11 (item 10 in 1 <sup>st</sup> numbered list)								
	TP_IMS_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.:	UC_05_I									
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configure.</li> <li>UE_A and UE_B have IP bearers networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using a UE_B is registered in IMS_B using upon IMS_A is within the trust domain of II Common DNS is configured with a D</li> </ul>	s established to their respective IMS  ny user identity serTEL_priv according to table 1  MS_B								

	1	Interoperability Test Description
	<ul><li>MES</li></ul>	SAGE request and response has to be supported at II-NNI (TS 129
	165 [	[16] see Table 6.1 and Table 6.3)
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 message from user A
Conformance	Check	
Criteria:	1	TP_IMS_ENUM_01 in CFW step 4 (NAPTR Response):
		ensure that {
		when { UE_A sends an initial INVITE for UE_B to IMS_A
		containing a Request_URI
		indicating a Tel_URI
		and IMS_A sends a NAPTR_Query to ENUM_DB
		containing the TN derived_from the Tel_URI_E.164_Number
		)
		then { ENUM_DB sends a NAPTR_Response to IMS_A
		containing a NAPTR_Resource_Record
		containing the TTL of the NAPTR_record
		containing the service_type
		indicating E2U+sip
		containing the_regular_expressiob
		indicating !^(.*)\$!
		containing the SIP_URI of UE_B
		indicating backreference (\1) for the user part
		indicating domain name for the host part
		containing SIP_URI_parameters 'if applicable' }
	2	TP_IMS_5097_08 in CFW step 6 (MESSAGE)
		ensure that {
		when { UE_A sends a MESSAGE to UE_B
		containing a Request_URI
		indicating a Tel_URI }
		then { IMS_A sends a NAPTR_Query to ENUM DB
		containing the Tel_URI_E.164_Number }
		when { IMS_A receives NAPTR_Response
		containing a NAPTR_Resource_Record
		indicating the SIP_URI of UE_B }
		then { IMS_A sends the MESSAGE to IMS_B
		containing a Request_URI
		indicating a SIP_URI
		containing a P-Charging-Vector_header
		not containing a access-network-charging-info_parameter }
		}
	3	TP_IMS_5117_06 in CFW step 12 (200 OK)
		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}
		, maidaling the response of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular section of the particular s

Step				D	irectio	n				Message	Comment
	C	U	ı	Е	I	I	I	U	U		
	S	E	M	N	В	В	M	E	S		
	е	Α	S	U	C	C	S	В	е		
	r		Α	M	F	F	В		r		
	Ą			DB	A	В			В		
1		$\rightarrow$									User A sends an instant message to user B
2			$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A

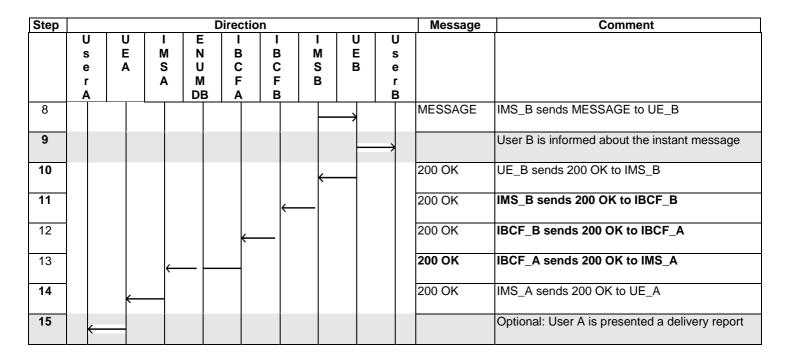


### 4.5.4.2 Messaging with SIP URI public identities

	Interoperability Test Desc	cription									
Identifier:	TD_IMS_MESS_0002	•									
Summary:	IMS network handles messaging with SIP in	dentity correctly without topology hiding									
Configuration:	CF_INT_CALL										
SUT:	IMS_B										
References:	Test Purpose	Specification Reference									
	TP_IMS_5097_05	TS 124 229 [1], clause 5.4.3.2 ¶1									
	TP_IMS_5097_06	TS 124 229 [1], clause 5.4.3.2 ¶11									
		(item 9 in 1 <sup>st</sup> numbered list)									
	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)									
Use Case ref.:	UC_05_I										
Pre-test	<ul> <li>HSS of IMS_A and of IMS B is configured</li> </ul>										
conditions:		lished to their respective IMS networks as									
	per clause 4.2.1										
	<ul> <li>UE_A is registered in IMS_A using user</li> </ul>										
	UE_B is registered in IMS_B using any	-									
	<ul> <li>IMS_A is within the trust domain of IMS_</li> </ul>										
	<ul> <li>UE_A and UE_B registered with SIP UF</li> </ul>										
	<ul> <li>IMS_A not configured for topology hidin</li> </ul>	g									
	<ul> <li>MESSAGE request and response has to</li> </ul>	b be supported at II-NNI (TS 129 165 [16]									
	see Tables 6.1 and 6.3)										
Test Sequence:	Step										
	User A sends message to user B										

		Interoperability Test Description
	2	Verify that user B receives message from user A
Conformance	Check	
Criteria:	1	TP_IMS_5097_05 in CFW step 6 (MESSAGE)
		ensure that {
		when { UE_A sends a MESSAGE to UE_B }
		then { IMS_B receives the MESSAGE
		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) }
	2	
		TP_IMS_5097_06 in CFW step 6 (MESSAGE)
		ensure that { when { UE_A sends a MESSAGE to UE_B
		When { OL_A serius a WLOGAOL to OL_B
		then { IMS_B receives the MESSAGE
		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_5117_02 in CFW step 12 (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 an access-network-charging-info_parameter }
		}
	4	TP_IMS_5118_01 in CFW step 12 (200 OK)
		ensure that {
		when { UE_B sends 200_response to UE_A }
		then { IMS_A receives the 200_response containing a P-Charging-Vector_header
		containing a r-charging-vector_neader
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B }
		}
		V

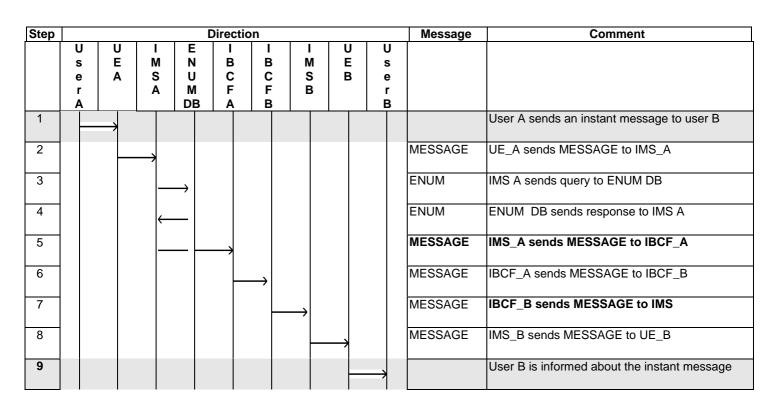
Step				0	irectio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	I B C F A	I B C F B	M S B	U E B	U s e r B		
1		$\rightarrow$									User A sends an instant message to user B
2			$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
4			$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
5				_ -	$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
6						$\rightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
7							$\longrightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS

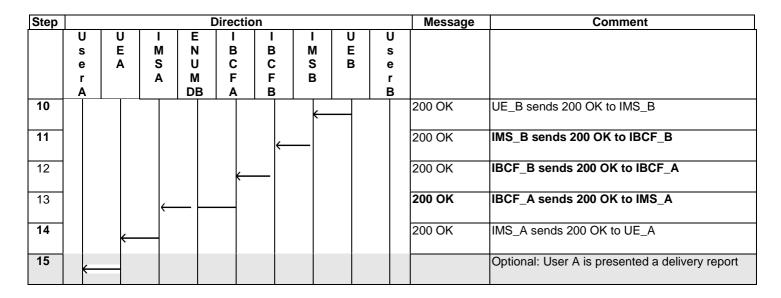


### 4.5.4.3 Messaging with TEL URI identities

	Interoperab	ility Test Description									
ldentifier:	TD_IMS_MESS_0003										
Summary:	IMS network handles messa	ging with TEL URI identities correctly									
Configuration:	CF_INT_CALL										
SUT:	IMS_B										
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:	<ul> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as</li> </ul>										
	per clause 4.2.1										
		S_A using userTEL_priv according to table 1									
	<ul> <li>UE_B is registered in IMS</li> </ul>	S_B using userTEL_priv according to table 1									
	<ul> <li>IMS_A is within the trust</li> </ul>	domain of IMS_B									
	<ul> <li>MESSAGE request and r</li> </ul>	response has to be supported at II-NNI (TS 129 165 [16]									
	see Tables 6.1 and 6.3)										
Test Sequence:	Step										
	1 User A sends me	ssage to User B (i.e. userTEL in IMS_B)									
	<ol><li>Verify that user B</li></ol>	receives message from user A									

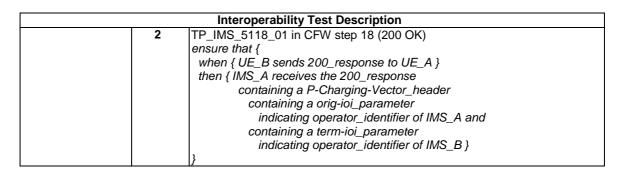
		Interoperability Test Description
Conformance	Check	
Criteria:		
	1	TP_IMS_5097_07 in CFW step 6 (MESSAGE)
		ensure that {
		when { UE_A sends a MESSAGE to UE_B
		<b> </b> }
		then { IMS_B receives the MESSAGE
		containing a P-Asserted-Identity_header
		indicating the SIP_URI of UE_A and
		containing a P-Asserted-Identity_header
		indicating the Tel_URI of UE_A }
		}  TD_INO_5447_00:_0FM_+_40 (000_0!/)
	2	TP_IMS_5117_02 in CFW step 12 (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 }
		Not containing a access-network-charging-into_parameter }
	3	TP_IMS_5118_01 in CFW step 12 (200 OK)
		ensure that {
		when { UE_B sends 200_response to UE_A }
		then { IMS_A receives the 200_response
		containing a P-Charging-Vector_header
		containing a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B }
	4	TP_IMS_5117_06 in CFW step 12 (200 OK)
		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 }
		I)

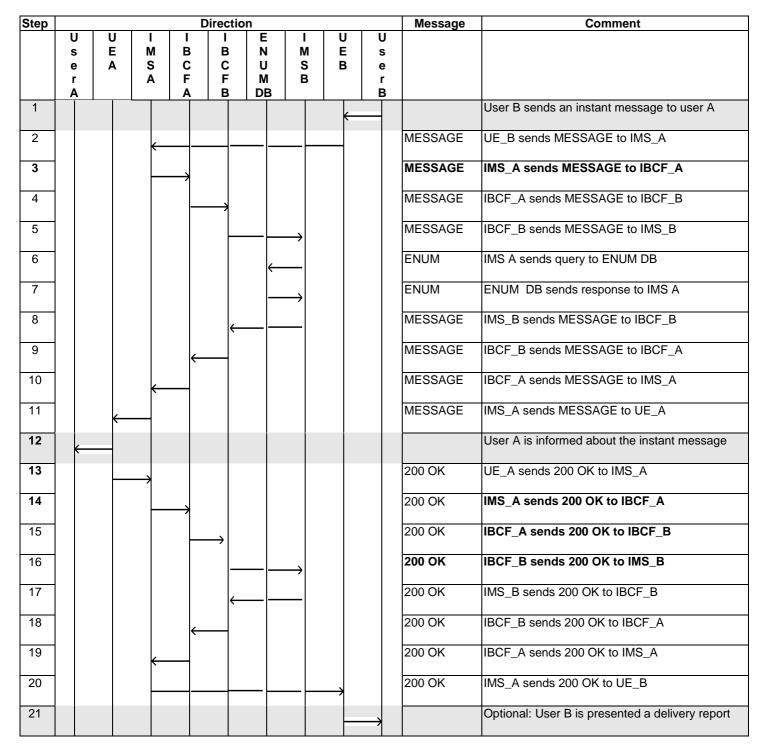




## 4.5.4.4 Messaging when roaming

		Interoperability Test D	escription								
Identifier:	TD IMS I	MESS_0005	escription								
Summary:	IMS netwo	ork handles messaging while	roaming correctly								
Configuration:	CF_ROAM_CALL										
SUT:	IMS_A and IMS_B										
References:	Test Purp		Specification Reference								
	TP_IMS_	_	TS 124 229 [1], clause 5.4.3.3 ¶5 (1 <sup>st</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)								
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>										
Test Sequence:	Step										
	1	User A sends message to user B									
	2	Verify that user B receives m	essage from user A								
Conformance	Check										
Criteria:	1	P_IMS_5108_02 in CFW step 7 (MESSAGE)									
	_		ep 7 (MESSAGE)								
		ensure that {									
		ensure that { when { UE_A sends a MES	SAGE to UE_B								
		ensure that { when { UE_A sends a MES IMS_A sends the MES	SAGE to UE_B SAGE to IMS_B								
		ensure that { when { UE_A sends a MES IMS_A sends the MES containing a P-Charg	SAGE to UE_B SAGE to IMS_B ing-Vector_header								
		ensure that { when { UE_A sends a MES IMS_A sends the MES containing a P-Charg containing an icid-v	SAGE to UE_B SAGE to IMS_B ing-Vector_header alue_parameter }								
		ensure that { when { UE_A sends a MES IMS_A sends the MES containing a P-Charg containing an icid-v then { IMS_B sends the ME	SAGE to UE_B SAGE to IMS_B ing-Vector_header alue_parameter } SSAGE to IMS_A								
		ensure that { when { UE_A sends a MES IMS_A sends the MES containing a P-Charg containing an icid-v then { IMS_B sends the ME containing a Route_h	SAGE to UE_B SAGE to IMS_B ing-Vector_header alue_parameter } SSAGE to IMS_A eader								
		ensure that {  when { UE_A sends a MES  IMS_A sends the MES  containing a P-Charg  containing an icid-v  then { IMS_B sends the ME  containing a Route_h  not indicating the S	SAGE to UE_B SAGE to IMS_B ing-Vector_header value_parameter } SSAGE to IMS_A veader -CSCF_SIP_URI of IMS_B and								
		ensure that {  when { UE_A sends a MES  IMS_A sends the MES  containing a P-Charg  containing an icid-v  then { IMS_B sends the ME  containing a Route_h  not indicating the S  containing a P-Charg	SAGE to UE_B SAGE to IMS_B ing-Vector_header value_parameter } SSAGE to IMS_A veader -CSCF_SIP_URI of IMS_B and ing-Vector_header								
		ensure that {  when { UE_A sends a MES  IMS_A sends the MES  containing a P-Charg  containing an icid-v  then { IMS_B sends the ME  containing a Route_h  not indicating the S  containing a P-Charg	SAGE to UE_B SAGE to IMS_B ing-Vector_header value_parameter } SSAGE to IMS_A veader -CSCF_SIP_URI of IMS_B and ing-Vector_header vector_header vector_value_parameter and								
		ensure that {  when { UE_A sends a MES   IMS_A sends the MES       containing a P-Charg       containing an icid-v  then { IMS_B sends the ME       containing a Route_h       not indicating the S       containing the sam	SAGE to UE_B SAGE to IMS_B ing-Vector_header value_parameter } SSAGE to IMS_A veader -CSCF_SIP_URI of IMS_B and ing-Vector_header vector_header vector_value_parameter and varameters								
		ensure that {  when { UE_A sends a MES   IMS_A sends the MES       containing a P-Charg       containing an icid-v  then { IMS_B sends the ME       containing a Route_h       not indicating the S       containing a P-Charg       containing the sam       not containing ioi_p       containing a Record-	SAGE to UE_B SAGE to IMS_B ing-Vector_header value_parameter } SSAGE to IMS_A veader -CSCF_SIP_URI of IMS_B and ing-Vector_header vector_header vector_value_parameter and varameters								





# 4.5.4.5 Messaging with receiving user not registered

		Interoperability Test Descr	iption									
Identifier:	TD_IMS_MESS_0006											
Summary:	IMS netwo	ork handles messaging correctly w	hen receiving user is not registered									
Configuration:	CF_INT_C	_INT_CALL										
SUT:	IMS_B											
References:	Test Purpose Specification Reference											
	TP_IMS_5	P_IMS_5114_02 TS 124 229 [1], clause 5.4.3.3 (item 3 in 3 <sup>rd</sup> numbered list)										
Use Case ref.:	UC_05_I		(nem 3 m 3 mumbered list)									
Pre-test conditions:	<ul><li>UE_A per cl.</li><li>UE_A</li><li>UE_B</li><li>IMS_I</li><li>MESS</li></ul>	ause 4.2.1 is registered in IMS_A using any is not registered in IMS_B B is <i>not</i> configured with any filter c	lished to their respective IMS networks as user identity									
Test Sequence:	Step											
	1	User A sends message to a valid user B identity										
	2	Verify that user A is informed that	user B could not be reached									
Canfarmanaa	Chaol											
Conformance Criteria:	Check	TD IMC 5444 00 in CEW stor 4	2 (Aver Decrease)									
Criteria:	1	TP_IMS_5114_02 in CFW step 1	2 (4xx Response)									
		ensure that {    when { UE_A sends a MESSAG	E to UE R and									
		IMS A sends the MESSAG	_									
		then { IMS B sends a 4xx response.	,									
		}										
		}										

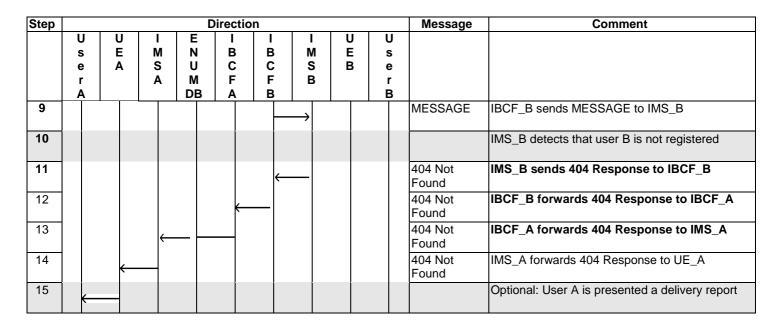
Step					irectio	n				Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	B C F A	B C F B	M S B	U E B	U s e r B		
1		$\rightarrow$						•			User A sends an instant message to user B
2		_	$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A
3			_	$\rightarrow$						ENUM	IMS A sends query to ENUM DB
4			$\leftarrow$							ENUM	ENUM DB sends response to IMS A
5				_	$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
7						$\longrightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B
9						_	$\longrightarrow$			MESSAGE	IBCF_B sends MESSAGE to IMS_B
10											IMS_B detects that user B is not registered
11						<b>←</b>	_			4xx Response	IMS_B sends 4xx Response to IBCF_B
12					<b>(</b>					4xx Response	IBCF_B forwards 4xx Response to IBCF_A
13			$\leftarrow$							4xx Response	IBCF_A forwards 4xx Response to IMS_A
14		<b>←</b>								4xx Response	IMS_A forwards 4xx Response to UE_A

Step		Direction									Comment
	C	U	ı	Е	-	ı	ı	U	U		
	s	E	М	N	В	В	M	E	s		
	е	Α	S	U	С	С	S	В	е		
	r		Α	M	F	F	В		r		
	Α			DB	Α	В			В		
15	$\leftarrow$										Optional: User A is presented a delivery report

## 4.5.4.6 Messaging with receiving user barred

	Interoperability Test	Description							
Identifier:	TD_IMS_MESS_0007								
Summary:	IMS network handles messaging correctly when receiving user has been barred								
Configuration:	CF INT CALL								
SUT:	IMS B								
References:	Test Purpose	Specification Reference							
	TP_IMS_5108_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>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>User B is barred in IMS_B</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 2 Verify that user A is informed.	User B ed that user B could not be reached							
Conformance	Check TR IMO 5100 00 : OFFW	10 (104 P							
Criteria:	1 TP_IMS_5108_06 in CFW ensure that {     when { UE_A sends a ME IMS_A sends the ME containing a Requeindicating a bar then { IMS_B sends 404_} }	ESSAGE to UE_B and ESSAGE to IMS_B est_URI red_user in IMS_B }							

Step	Direction									Message	Comment
	U s e r A	U E A	M S A	E N U M DB	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 sends an instant message to user B
2			$\rightarrow$							MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$						ENUM	IMS A sends query to ENUM DB
4			←	-						ENUM	ENUM DB sends response to IMS A
5				_ -	$\rightarrow$					MESSAGE	IMS_A sends MESSAGE to IBCF_A
7						$\longrightarrow$				MESSAGE	IBCF_A sends MESSAGE to IBCF_B

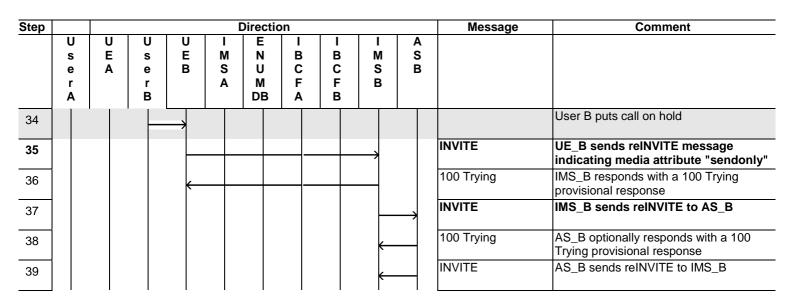


### 4.5.5 Supplementary Services

### 4.5.5.1 Supplementary Service HOLD with AS

		Interoperability Test De	escription
Identifier:	TD_IMS_		
Summary:	IMS netw	ork supports properly application	on services based on the example of the HOLD
		entary service	
Configuration:	CF_INT_	AS	
SUT:	IMS_B		
References:	Test Pur	pose	Specification Reference
	TP_IMS_	5310_01	TS 124 229 [1], clause 5.4.6.1.2 ¶1
	TP_IMS_	5312_01	TS 124 229 [1], clause 5.4.6.1.3 ¶1
Use Case ref.:	UC_10_I		
Pre-test	• HSS	of IMS_A and of IMS B is conf	igured according to table 1
conditions:	• UE_	A and UE_B have IP bearers e	stablished to their respective IMS networks as
	per (	clause 4.2.1	
	<ul> <li>UE_</li> </ul>	A is registered in IMS_A using	any user identity
	• UE_	B is registered in IMS_B using	userHOLD identity according to table 1
	<ul> <li>IMS</li> </ul>	_B is configured to contact AS_	B (HOLD)
	• UE_	B is subscribed to HOLD service	e
	AS I	B in same trust domain as IMS	В
Test Sequence:	Step		
	1	User A calls User B (i.e. userl	
	2	Verify that user B is informed	
	3	Verify that user A is informed	that UE_B is ringing
	4	User B answers call	
	5	Verify that user A is informed	
	6	Verify that user B is informed	that call is established
	7	User B puts call on hold	
	8		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	that call has ended
	15	Verify that user A is informed	that call has ended

		Interoperability Test Description
Conformance	Check	
Criteria:	1	TP_IMS_5310_01 in CFW step 37 (INVITE)
		ensure that {
		when { UE_B sends a subsequent INVITE to IMS_B
		containing a P-Charging-Vector_header
		containing an access-network-charging-info_parameter
		<b> </b> }
		then { IMS_B sends the INVITE to AS_B
		containing a P-Charging-Vector_header
		containing an access-network-charging-info_parameter
		}
		<u>}</u>
	2	TP_IMS_5312_01 in CFW step 52 and Step 54 (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 r-charging-vector_neader  containing a access-network-charging-info_parameter
		t
	3	TP_IMS_5310_01 in CFW step 65 (INVITE)
		ensure that {
		when { UE_B sends a subsequent INVITE to IMS_B
		containing a P-Charging-Vector_header
		containing an access-network-charging-info_parameter
		}
		then { IMS_B sends the INVITE to AS_B
		containing a P-Charging-Vector_header
		containing an access-network-charging-info_parameter
		}
		<b> </b> }
	4	TP_IMS_5312_01 in CFW step 80 and Step 82 (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
		}
		}



Step						Directio	on .				Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	E N U M DB	I B C F A	I B C F B	I M S B	В		
40										$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
41								•			INVITE	IMS_B forwards reINVITE to IBCF_B
42								_			100 Trying	IBCF_B responds with a 100 Trying provisional response
43							<b>←</b>				INVITE	IBCF_B forwards reINVITE to IBCF_A
44							_	$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
45					$\leftarrow$						INVITE	IBCF_A forwards reINVITE to IMS_A
46							$\rightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
47		$\leftarrow$									INVITE	IMS_A forwards reINVITE to UE_A
48					<del>-</del>						100 Trying	UE _A optionally responds with a 100 Trying provisional response
49	<b>←</b>											User A is informed that call is on hold with AS tone
50					>						200 OK	UE_A responds to reINVITE with 200 OK indicating media attribute "recvonly"
51							$\rightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
52								$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
53								_	$\longrightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
54										$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
55									•	·	200 OK	AS_B forwards 200 OK response to IMS_B
56				<del></del>							200 OK	IMS_A forward the 200 OK to UE_B
57			<b>←</b>									User B is informed that the call is on hold
58				$\vdash$							ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
59										$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
60									•		ACK	AS_B forwards ACK to IMS_B
61				<del></del>							ACK	IMS_B forwards ACK to UE_B
62				<del>)</del>								User B resumes call
63											INVITE	UE_B sends second reINVITE message indicating media attribute
64				<del></del>			_				100 Trying	IMS_B responds with a 100 Trying provisional response
65										<b></b>	INVITE	IMS_B sends reINVITE to AS_B
66									<b> </b>	<u>.                                    </u>	100 Trying	AS_B optionally responds with a 100 Trying provisional response
67									•		INVITE	AS_B forwards INVITE to IMS_B

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	E N U M DB	I B C F A	I B C F B	⊢MSB	A S B		
68										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
69								•			INVITE	IMS_B sends reINVITE to IBCF_B
70									<del>)</del>		100 Trying	IBCF_B responds with a 100 Trying provisional response
71							<b>←</b>				INVITE	IBCF_B sends reINVITE to IBCF_A
72								$\longrightarrow$			100 Trying	IBCF_A responds with a 100 Trying provisional response
73											INVITE	IBCF_A sends reINVITE to IMS_A
74							$\rightarrow$				100 Trying	IMS_A responds with a 100 Trying provisional response
75		<b>←</b>									INVITE	IMS_A forwards reINVITE to UE_A
76					$\rightarrow$						100 Trying	UE_A optionally responds with a 100 Trying provisional response
77	<b>←</b>											User A is informed that call is resumed
78		_	-		$\rightarrow$						200 OK	UE_A sends the 200 OK indicating media attribute "sendrecv" to IMS_A
79							$\rightarrow$				200 OK	IMS_A forwards 200 OK response to IBCF_A
80								$\longrightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
81								_	<del>)</del>		200 OK	IBCF_B forwards 200 OK response to IMS_B
82										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
83									<b>←</b>		200 OK	AS_B forwards the 200 OK for INVITE
84				<b>←</b>							200 OK	IMS_B forwards 200 OK to UE_B
85			<b>(</b>									User B is informed that call is resumed

## 4.5.5.2 Supplementary Service HOLD with AS in roaming

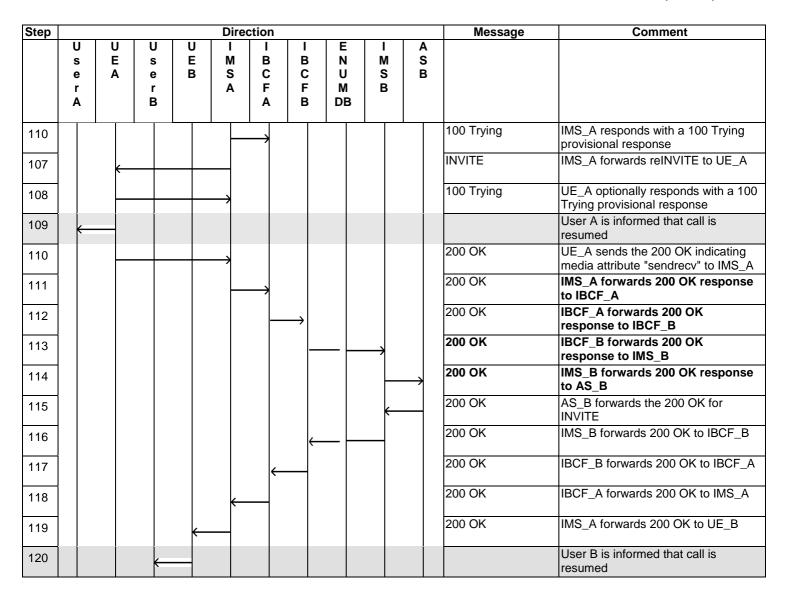
		Interoperability Test Desc	ription						
Identifier:	TD_IMS_								
Summary:			ervices based on the example of the HOLD						
		entary service							
Configuration:	CF_ROAI	M_AS							
SUT:	IMS_B								
References:	Test Purp		Specification Reference						
	TP_IMS_		TS 124 229 [1], clause 5.4.6.1.2 ¶1						
	TP_IMS_		TS 124 229 [1], clause 5.4.6.1.3 ¶1						
Use Case ref.:	UC_10_R	2							
Pre-test	<ul> <li>HSS c</li> </ul>	of IMS_A and of IMS B is configure	d according to table 1						
conditions:	<ul><li>UE_A</li></ul>	and UE_B have IP bearers establi	shed to their respective IMS networks as						
		ause 4.2.1							
		is registered in IMS_A using any ι							
			using userHOLD identity according to						
	table 1								
		B is configured to contact AS_B (H	OLD)						
	<ul><li>UE_B</li></ul>	is subscribed to HOLD service							
	<ul><li>AS B</li></ul>	in same trust domain as IMS B							
Test Sequence:	Step								
	1	User A calls User B (i.e. userHOl	<u> </u>						
	2	Verify that user B is informed of i							
	3	Verify that user A is informed that	t UE_B is ringing						
	4	User B answers call							
	5	Verify that user A is informed that							
	6	Verify that user B is informed that	t call is established						
	7	User B puts call on hold							
			4 II I I-I <del>-</del>						
	8	Verify that user A is informed that							
	9	Verify that user B is informed tha							
	9	Verify that user B is informed that User B resumes call	t call on hold						
	9 10 11	Verify that user B is informed tha User B resumes call Verify that user A is informed tha	t call on hold t call is resumed						
	9 10 11 12	Verify that user B is informed that User B resumes call Verify that user A is informed that Verify that user B is informed that	t call on hold t call is resumed						
	9 10 11 12 13	Verify that user B is informed that User B resumes call Verify that user A is informed that Verify that user B is informed that User A ends call	t call on hold t call is resumed t call is resumed						
	9 10 11 12	Verify that user B is informed that User B resumes call Verify that user A is informed that Verify that user B is informed that	t call on hold  t call is resumed t call is resumed t call has ended						

		Interoperability Test Description
		interoperability rest besomption
Conformance	Check	
Criteria:	1	TP_IMS_5310_01 in CFW step 54 and Step 58 (INVITE) ensure that {   when { UE_B sends a subsequent INVITE to IMS_B
	2	TP_IMS_5312_01 in CFW step 73 and Step 75 (200 OK) ensure that {   when { IMS_B receives a 200_response from IMS_A
	3	TP_IMS_5310_01 in CFW step 95 and Step 101 (INVITE) ensure that {   when { UE_B sends a subsequent INVITE to IMS_B
	4	TP_IMS_5312_01 in CFW step 112 and Step 114 (200 OK) ensure that {   when { IMS_B receives a 200_response from IMS_A

Step					Direc	ction					Message	Comment
	U s e r A	UEA	U s e r B	U E B	I M S A	I B C F A	I B C F B	E N U M DB	I M S B	A S B		
49												User B puts call on hold
50					$\rightarrow$						INVITE	UE_B sends reINVITE message indicating media attribute
51				<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
52						$\rightarrow$					INVITE	IMS_A forwards INVITE to IBCF_A
53					<b>←</b>						100 Trying	IBCF_A responds with a 100 Trying provisional response

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	I B C F A	I B C F B	E N U M DB	I M S B	A S B		
54							$\longrightarrow$				INVITE	IBCF_A forwards INVITE to IBCF_B
55						<b>←</b>					100 Trying	IBCF_B responds with a 100 Trying provisional response
56							_		$\longrightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
57							←				100 Trying	IMS_B responds with a 100 Trying provisional response
58										$\longrightarrow$	INVITE	IMS_B sends reINVITE to AS_B
59									<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
60									<b>←</b>		INVITE	AS_B sends reINVITE to IMS_B
61										$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
62							<b>←</b>				INVITE	IMS_B forwards reINVITE to IBCF_B
63							_		<b>→</b>		100 Trying	IBCF_B responds with a 100 Trying provisional response
64						<b>←</b>					INVITE	IBCF_B forwards reINVITE to IBCF_A
65							$\longrightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
66					<b>←</b>						INVITE	IBCF_A forwards reINVITE to IMS_A
67						$\longrightarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
68		←			_						INVITE	IMS_A forwards reINVITE to UE_A
69					$\longrightarrow$						100 Trying	UE _A optionally responds with a 100 Trying provisional response
70	<b>—</b>											User A is informed that call is on hold with AS tone
71		-		-	$\rightarrow$						200 OK	UE_A responds to reINVITE with 200 OK indicating media attribute
72						$\longrightarrow$					200 OK	IMS_A forwards 200 OK response to IBCF_A
73							$\longrightarrow$				200 OK	IBCF_A forwards 200 OK response to IBCF_B
74							_		$\longrightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
75										$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
76									<b>+</b>		200 OK	AS_B forwards 200 OK response to IMS_B
77							←				200 OK	IMS_B forwards 200 OK response to IBCF_B
78						<b>←</b>					200 OK	IBCF_B forwards 200 OK response to IBCF_A
79					$\leftarrow$						200 OK	IBCF_A forwards 200 OK response to IMS_A
80				<b>←</b>							200 OK	IMS_A forward the 200 OK to UE_B
81			←									User B is informed that the call is on hold

Step					Direc	tion					Message	Comment
	U s	U E	U s	U E	I M	I B	I B	E N	I M	A S		
	e r	Α	e r	В	S	C F	C F	U M	S B	В		
	A		В			A	В	DB				
82					$\rightarrow$						ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
83						$\rightarrow$					ACK	IMS_A forwards ACK to IBCF_A
84						_	$\rightarrow$				ACK	IBCF_A forwards ACK to IBCF_B
85								_	$\rightarrow$		ACK	IBCF_A forwards ACK to IMS_B
86										$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
87									<del>(</del>	_	ACK	AS_B forwards ACK to IMS_B
88							$\leftarrow$				ACK	IMS_B forwards ACK to IBCF_B
89						←					ACK	IBCF_B forwards ACK to IBCF_A
90					<b>←</b>						ACK	IBCF_A forwards ACK to IMS_A
91				<del>(</del>							ACK	IMS_A forwards ACK to UE_B
92				<b>—</b>								User B resumes call
93					$\rightarrow$						INVITE	UE_B sends second relNVITE message indicating media
94				<b>←</b>							100 Trying	IMS_A responds with a 100 Trying provisional response
95						$\rightarrow$					INVITE	IMS_A sends reINVITE to IBCF_A
96					<b>←</b>						100 Trying	IBCF_A responds with a 100 Trying provisional response
97						_	$\rightarrow$				INVITE	IBCF_A sends reINVITE to IBCF_B
98						$\leftarrow$	_				100 Trying	IBCF_B responds with a 100 Trying provisional response
99									$\rightarrow$		INVITE	IBCF_B sends reINVITE to IMS_B
100							$\leftarrow$	_			100 Trying	IMS_B responds with a 100 Trying provisional response
101										$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
102									<b>—</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
103									←		INVITE	AS_B forwards INVITE to IMS_B
104										$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
105							<b>←</b>				INVITE	IMS_B sends reINVITE to IBCF_B
106									$\rightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
107						$\leftarrow$					INVITE	IBCF_B forwards reINVITE to IBCF_A
108							$\longrightarrow$				100 Trying	IBCF_A IBCF_A responds with a 100 Trying provisional response
109					<b>←</b>						INVITE	IBCF_A forwards reINVITE to IMS_A
	l		- 1	I	ľ		I		1			



#### 4.5.5.3 Supplementary Service OIP with AS

MS_SS_0003 network supports properly applications application of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of the support of t	Specification Reference TS 124 229 [1], clause 5.4.3.2 ¶11
lementary service  NT_AS A and IMS_B  Purpose	Specification Reference TS 124 229 [1], clause 5.4.3.2 ¶11
A and IMS_B Purpose	TS 124 229 [1], clause 5.4.3.2 ¶11
Purpose	TS 124 229 [1], clause 5.4.3.2 ¶11
•	TS 124 229 [1], clause 5.4.3.2 ¶11
MS_5097_02	
	(item 9 in 1 <sup>st</sup> numbered list)
MS_5108_03	TS 124 229 [1], clause 5.4.3.3 ¶5 (item 4 in 1 <sup>st</sup> numbered list)
MS_5115_08	TS 124 229 [1], clause 5.4.3.3 ¶89 (4 <sup>th</sup> numbered list)
08_I	
per clause 4.2.1 UE_A is registered in IMS_A usi	s established to their respective IMS networks as ng any user identity ng userOIP identity according to table 1 is B (OIP)
	D8_I  HSS of IMS_A and of IMS B is c UE_A and UE_B have IP bearer per clause 4.2.1  UE_A is registered in IMS_A usi UE_B is registered in IMS_B usi IMS_B is configured to contact A

		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
	T a	
Conformance	Check	
Criteria:	1	TP_IMS_5097_02 in CFW step 8 (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 }
		}
	2	TP_IMS_5108_03 in CFW step 12 (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 32 (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 }
	1	indicating operator_identifier of fivis_b }
	1	}

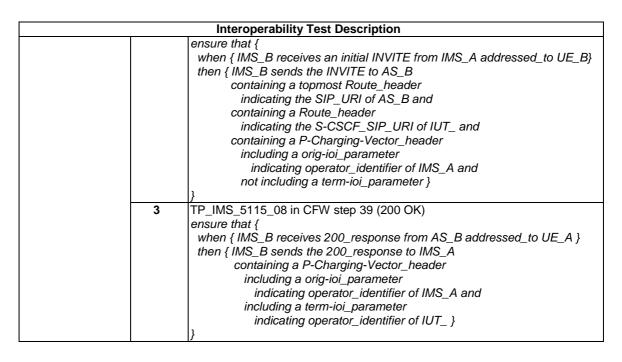
Step					Direc	ction					Message	Comment
	U	U	U	U	ı	Е	- 1	I	I	Α		
	s	E	s	E	M	N	В	В	M	S		
	е	Α	е	В	S	U	C	С	S	В		
	r		r		Α	M	F	F	В			
1	A 	$\rightarrow$	B			DB	A	B				User A calls User B
2		H		-	<b>&gt;</b>						INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that
3		<b>←</b>									100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$					ENUM	IMS A sends query to ENUM DB
5					$\leftarrow$	_					ENUM	ENUM DB sends response to IMS

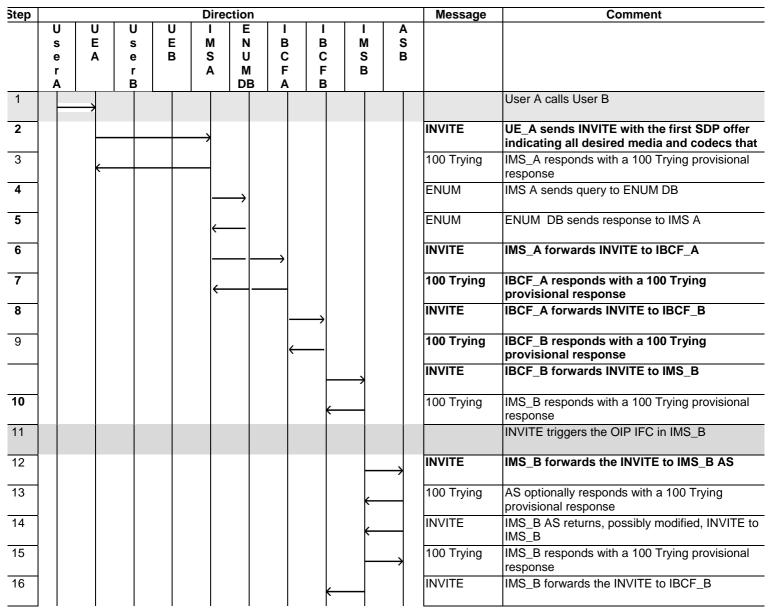
Invite triggers the OIP IFC in IMS_B	Step					Dire	ction					Message	Comment
e A e B S U C C C S B  INVITE IMS_A forwards INVITE to IBCF_A  100 Trying invisional response with a 100 Trying provisional response invisional response invitational response invitational response invitational response invitat				_		I M		I B	I R	I M			
B DB A B INVITE MS A forwards INVITE to IBCF A 100 Trying BCF_A responds with a 100 Trying provisional response INVITE to IBCF_B 100 Trying BCF_A forwards INVITE to IBCF_B 100 Trying Provisional response INVITE to IBCF_B 100 Trying BCF_B responds with a 100 Trying provisional response INVITE to IMS_B 100 Trying Provisional response INVITE to IMS_B 100 Trying AS optionally response Will a 100 Trying Provisional response INVITE to IMS_B AS 100 Trying Provisional response INVITE to IMS_B AS 100 Trying Provisional response INVITE to IMS_B AS 100 Trying Provisional response INVITE To IMS_B AS 100 Trying Provisional response INVITE To IMS_B AS 100 Trying Provisional response INVITE To IMS_B AS 100 Trying Provisional response INVITE To IMS_B AS 100 Trying Provisional response INVITE To IMS_B AS 100 Trying Provisional response InvITE To IMS_B AS 100 Trying Provisional response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional Response InvITE To IMS_B AS 100 Trying Provisional		е		е		S	U	С	С	S			
100 Trying   BCF, A responds with a 100 Trying provisional response   INVITE   BCF, A forwards INVITE to IBCF, B   100 Trying   BCF, B responds with a 100 Trying   INVITE   IBCF, B responds with a 100 Trying   INVITE   IBCF, B responds with a 100 Trying   INVITE		-		-		Α	1			В			
B NVITE IBCF A forwards INVITE to IBCF B 100 Trying IBCF B responds with a 100 Trying provisional response INVITE 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 the INVITE IMS B S responds with a 100 Trying provisional response INVITE IMS B forwards the INVITE IMS B S responds with a 100 Trying provisional response INVITE IMS B forwards the INVITE INVITE IMS B S responds with a 100 Trying provisional response INVITE IMS B forwards the INVITE INV	6							$\rightarrow$			•	INVITE	IMS_A forwards INVITE to IBCF_A
INVITE   IBCF_A forwards INVITE to IBCF_B	7					$\leftarrow$						100 Trying	
Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   Invite   I	8								$\rightarrow$			INVITE	
INVITE   IBCF_B forwards INVITE to IMS_B	9							$\leftarrow$				100 Trying	
Invite triggers the OIP IFC in IMS_B										<b>→</b>		INVITE	-   -   -   -   -   -   -   -   -   -
INVITE triggers the OIP IFC in IMS_B	10								<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
13 14 15 15 16 17 18 19 100 Trying	11												-
14   15   100 Trying   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B responds with a 100 Trying provisional response   INVITE   IMS_B forwards the INVITE to UE_B   100 Trying   UE_B optionally responds with a 100 Trying provisional response   INVITE   IMS_B forwards the INVITE to UE_B   100 Trying   UE_B optionally responds with a 100 Trying provisional response   User Is informed of incoming call of User A. User A's identity is displayed   180 Ringing   UE_B responds to initial INVITE with 180 Ringing   IMS_B forwards 180 Ringing response to IMS_B AS   180 Ringing   IMS_B forwards 180 Ringing response to IMS_B AS   180 Ringing   IMS_B forwards 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   IBCF_A forwards the 180 Ringing response to IBCF_B   180 Ringing   180 Rin	12									-	$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
INVITE IMS_B AS returns, possibly modified, INVITE IMS_B 100 Trying IMS_B responds with a 100 Trying provisional response INVITE IMS_B forwards the 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 User A's identity is displayed 180 Ringing UE_B responds to initial INVITE with 180 Ringing Ims_B AS 180 Ringing to indicate that it has started alterting 180 Ringing Ims_B AS forwards 180 Ringing response to IMS_B AS 180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B AS 180 Ringing IBS_F B forwards the 180 Ringing response to IMS_B AS 180 Ringing IBS_F B forwards the 180 Ringing response to IMS_B AS 180 Ringing Ims_B forwards the 180 Ringing response to IMS_B AS 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 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ringing Ims_B forwards 180 Ring	13									€		100 Trying	
15 16 17 18 18 19 20 21 22 23 24 25 26 27 28 29 30 31 31 31 32 32 32 32 32 33 31 31 32 32 32 33 36 37 37 38 38 38 30 30 31 31 30 30 30 31 31 30 30 30 30 31 30 30 30 30 30 30 30 30 30 30 30 30 30	14									€		INVITE	IMS_B AS returns, possibly modified, INVITE to
16 17 18 18 19 20 21 21 22 23 24 25 26 27 28 30 30 31 31 31 32 32 32 32 32 33 34 35 36 36 37 37 38 38 38 38 38 38 38 38 38 38 38 38 38	15										<b></b> >	100 Trying	IMS_B responds with a 100 Trying provisional
provisional response User B is informed of incoming call of User A, User A's identity is displayed  180 Ringing UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting 180 Ringing IMS_B rowards 180 Ringing response to IMS_B AS 180 Ringing IMS_B AS forwards 180 Ringing response to IMS_B AS 180 Ringing IMS_B forwards the 180 Ringing response to IMS_B Ringing IMS_B rowards the 180 Ringing response to IMS_B Ringing IMS_B rowards the 180 Ringing response to IMS_A 180 Ringing IMS_B 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 rowards the 180 Ringing response to IMS_A 180 Ringing IMS_B rowards the 180 Ringing response to IMS_A 180 Ringing IMS_B forwards the 180 Ringing response to IMS_B 180 Ringing IMS_B forwards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B forwards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B rowards the 180 Ringing response to IMS_B 180 Ringing IMS_B 180 Ringing IMS_B 180 Ringing IMS_B 180 Ringing IMS_B 180 Ringing IMS_B 180 Ringing	16				<u></u>							INVITE	
User B is informed of incoming call of User A, User B is informed of incoming call of User A, Identity is displayed  180 Ringing UE B responds to initial INVITE with 180 Ringing to indicate that it has started alerting IMS. B forwards 180 Ringing response to IMS. B AS  180 Ringing IMS. B forwards 180 Ringing response to IMS. B AS  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_A forwards the 180 Ringing response to IBCF_A  180 Ringing IBCF_A forwards the 180 Ringing response to UE_A  180 Ringing IBCF_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 INVITE with 200 OK to indica that the call has been answered  200 OK IMS_B AS forwards 200 OK response to IMS_B AS forwards 200 OK response to IMS_B AS IMS_B forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B Forwards the 200 OK response to IMS_B AS IMS_B FORWARD THE IMS_B AS IMS_B AS IMS_B FORWARD THE IMS_B AS IMS_B AS IMS_B FORWARD THE IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS IMS_B AS	17									$\longrightarrow$		100 Trying	
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UE_A  User A is informed that UE_B is ringing  User B answers call  200 OK  UE_B responds INVITE with 200 OK to indicate that the call has been answered  200 OK  IMS_B forwards 200 OK response to IMS_B AS forwards 200 OK response to IMS_B  200 OK  IMS_B forwards the 200 OK response to IBCF_B  200 OK  IBCF_B forwards the 200 OK response to IBCF_B forwards the 200 OK response to IBCF_B	24						<b>←</b>					180 Ringing	IBCF_A forwards the 180 Ringing response to
User A is informed that UE_B is ringing  User B answers call  200 OK  UE_B responds INVITE with 200 OK to indicate that the call has been answered  200 OK  IMS_B forwards 200 OK response to IMS_B AS forwards 200 OK response to IMS_B  200 OK  IMS_B forwards the 200 OK response to IBCF_B  200 OK  IMS_B forwards the 200 OK response to IBCF_B forwards the 200 OK response to IBCF_B	25		<b>—</b>				_					180 Ringing	
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29 30 30 31 31 32 32 30 30 30 30 30 30 30 30 30 30 30 30 30	28									<b></b>		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
31   IMS_B   200 OK   IMS_B forwards the 200 OK response to IBCF_B   200 OK   IBCF_B forwards the 200 OK response to	29									-	$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
31 200 OK IMS_B forwards the 200 OK response to IBCF_B 32 200 OK IBCF_B forwards the 200 OK response to	30									€		200 OK	
32 200 OK IBCF_B forwards the 200 OK response to	31								<b>←</b>			200 OK	IMS_B forwards the 200 OK response to
	32							<b>←</b>				200 OK	IBCF_B forwards the 200 OK response to

Step					D	irec	tion						Message	Comment
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	s	Ē	S	1 -		M	N	В	B	_		S		
	e	Α	е			S	U M	C	C			В		
	A		B		'	Α	DB	A	В		<b>'</b>			
33			Ī			<del>-</del>							200 OK	IBCF_A forwards the 200 OK response to IMS_A
34		$\leftarrow$				-							200 OK	IMS_A forwards the 200 OK response to UE_A
35	<b>(</b>													User A is informed that call has been answered

### 4.5.5.4 Supplementary Service OIP with AS in roaming

		Interoperability To	est Description									
Identifier:	TD_IMS_	_SS_0004										
Summary:		IMS network supports properly application services based on the example of the OIP supplementary service  CF ROAM AS										
Configuration:	CF_ROA	M_AS										
SUT:	IMS_A aı	nd IMS_B										
References:	Test Pur	pose	Specification Reference									
		_5097_02 _5108_03	TS 124 229 [1], clause 5.4.3.2 ¶11 (item 9 in 1 <sup>st</sup> numbered list) 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_F	2	( 1 Hamborod not)									
220 0400 10111												
Pre-test conditions:	rice of inte_riance of inte_pic configured according to table											
<b>-</b>												
Test Sequence:	Step											
	2	displayed	rmed of incoming call of User A, user A's identity is									
	3		rmed that UE_B is ringing									
	4	User B answers call	was ad the step all the self-self-self-self-self-self-self-self-									
	5		rmed that call has been answered									
	6		ormed that the call is established									
	7	User A ends call										
	8		ormed that call has ended									
	9	Verify that user A is info	rmed that call has ended									
Conformance	Check											
Criteria:	1	then { IMS_A sends the containin indication	the initial INVITE to IMS_B ing a P-Asserted-Identity_header ting the SIP_URI of UE_A ing a P-Asserted-Identity_header ting the Tel_URI of UE_A CFW step 12 (INVITE)									
	2	indicati. }	ng the Tel_URI of UE_A }									



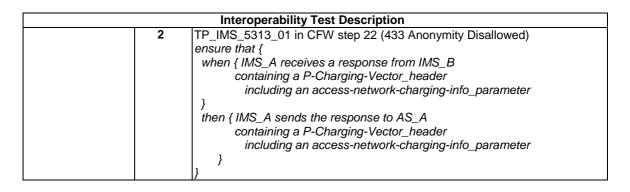


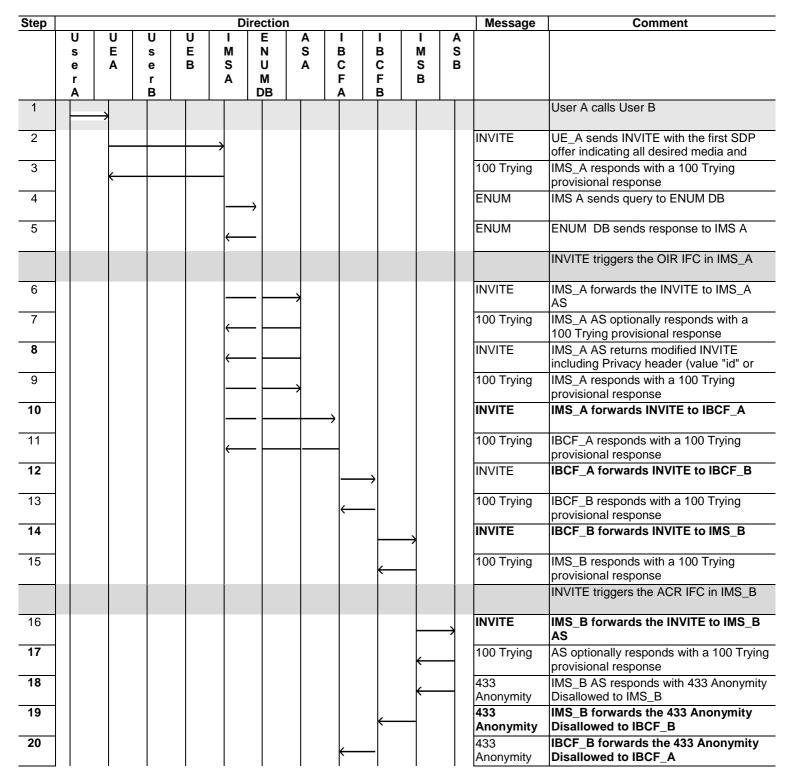
100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B forwards the 1NVITE to IBCF_A 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B forwards INVITE to IBCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response INVITE IBCF_B forwards INVITE to IBCF_B 100 Trying IBCF_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 IDCF_B 100 Trying IBCF_B responds with a 100 Trying provisional response IDCF_B IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B response IDCF_B IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B response IDCF_B IBCF_B responds with a 100 Trying IBCF_B response IDCF_B IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B responds with a 100 Trying IBCF_B responds to incide that it has started alerting IBCF_B responds to incide that it has started alerting IBCF_B responds to incide that it has started alerting IBCF_B responds to incide that it has started alerting IBCF_B responds to incide that it has started alerting IBCF_B responds to incide that it has started alerting IBCF_B response to income IBCF_B responds to incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide that it has started incide	Step					Direction					Message	Comment
T B D D D D D D D D D D D D D D D D D D				_	E	M N			I M			
100 Trying   BGF, B responds with a 100 Trying provisional response   NVITE   BGF, B forwards INVITE to IBGF, A   100 Trying   BGF, A responds with a 100 Trying provisional response   INVITE   BGF, A forwards the INVITE to IMS_A   100 Trying   MS_A responds with a 100 Trying provisional response   INVITE   BGF, A forwards the INVITE to IMS_A   100 Trying   UE_B optionally response with a 100 Trying provisional response   INVITE   I		-	Α	_						В		
INVITE   IBCF_B forwards INVITE to IBCF_A	17	_ <b>A</b> _		B		DB	A	В	<u> </u>		100 Trying	1
response INVITE IBCF_A forwards INVITE to IMS_A 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to UE_B 100 Trying IMS_A responds with a 100 Trying provisional response INVITE IMS_A forwards the INVITE to UE_B 100 Trying UE_B optionally responds with a 100 Trying provisional response to IMS_A forwards the INVITE with 180. Use I is informed of incoming call of User A, User II is informed of incoming call of User A, User II is informed of incoming call of User A, User II is informed of incoming call of User A, Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdity Imsterdi	18						_				INVITE	
INVITE   BCF_A forwards INVITE to IMS_A	19										100 Trying	
response INVITE IMS_A forwards the INVITE to UE_B  100 Trying UE_B optionally responds with a 100 Trying provisional response or User B is informed of incoming call of User A, User B is informed of incoming call of User A, User B is informed of incoming call of User A, User B is informed of incoming call of User A, User A's identity is displayed  180 Ringing UE_B responds to initial INVITE with 180 Ringing in User B arrowards 180 Ringing response to IBGF_A forwards 180 Ringing response to IBGF_B 180 Ringing IBGF. A forwards 180 Ringing response to IMS_B B Is Ringing IBGF. A forwards 180 Ringing response to IMS_B B Is Ringing IBGF. A forwards 180 Ringing response to IMS_B B Is Ringing IBGF. A forwards 180 Ringing response to IMS_B Ringing IBGF. A forwards 180 Ringing response to IMS_B Ringing IBGF. A forwards the 180 Ringing response to IMS_B Ringing IBGF. A forwards the 180 Ringing response to IMS_B Ringing IBGF. A forwards the 180 Ringing response to IMS_B Ringing IBGF. A forwards the 180 Ringing response to IMS_B Ringing IBGF. A forwards the 180 Ringing response to IMS_B Ringing IBGF. A forwards 200 OK response to IMS_B Ringing IBGF. A forwards 200 OK response to IBGF_B Ringing IBGF. A forwards 200 OK response to IMS_B Ringing IBGF. A forwards 200 OK response to IMS_B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B forwards 180 Ringing response to IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ringing IBGF. B Ring	20										INVITE	l ·
22   INVITE   IMS_A forwards the INVITE to UE_B   100 Trying   UE_B optionally responds with a 100 Trying   USE_B optionally responds with a 100 Trying   100 Trying   USE_B is price in incoming call of User A, User A's identity is displayed   180 Ringing UE_B responds to initial INVITE with 180   Ringing to Indicate that it has started alerting   180 Ringing to indicate that it has started alerting   180 Ringing in IMS_A forwards 180 Ringing response to   IBCF_A   180 Ringing   IBCF_B forwards 180 Ringing response to   IBCF_B fo	21										100 Trying	IMS_A responds with a 100 Trying provisional
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User A is informed that UE_B is ringing  User B answers call  200 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered  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 AS forwards 200 OK response to IMS_B AS  200 OK IMS_B Forwards 200 OK response to IMS_B AS  200 OK IMS_B AS forwards 200 OK response to IMS_B AS  200 OK IMS_B Forwards 200 OK response to IMS_B AS  200 OK IMS_B Forwards 200 OK response to IMS_B Forwards the 200 OK response to IBCF_B Forwards the 200 OK response to IBCF_B Forwards the 200 OK response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing response to IBCF_B Forwards the 180 Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing Ringing	34		<b>←</b>								180 Ringing	IMS_A forwards the 180 Ringing response to
200 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered 200 OK response to IBCF_A  200 OK IMS_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 AS forwards 200 OK response to IMS_B AS forwards 200 OK response to IMS_B AS IMS_B AS forwards 200 OK response to IMS_B AS IMS_B forwards the 200 OK response to IMS_B AS IMS_B forwards the 200 OK response to IMS_B AS IMS_B forwards the 200 OK response to IBCF_B BOO OK IMS_B forwards the 200 OK response to IBCF_B BOO OK IMS_B forwards the 200 OK response to IBCF_B BOO OK IMS_B forwards the 200 OK response to IBCF_B BOO OK IMS_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response to IBCF_B BOO OK IBCF_B forwards the 180 Ringing response for IBCF_B forwards the 180 Ringing response for IBCF_B forwards the 180 Ringing response for IBCF_B forwards forwards for IBCF_B forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwards forwa	35	<b>←</b>										
that the call has been answered  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 AS  200 OK IMS_B AS forwards 200 OK response to IMS_B AS  200 OK IMS_B AS forwards 200 OK response to IMS_B AS  200 OK IMS_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards the 200 OK response to IBCF_B  200 OK IMS_B forwards the 200 OK response to IBCF_B	36	,			$\rightarrow$							User B answers call
38 39 40 41 42 42 43 44 44  200 OK IMS_A forwards 200 OK response to IBCF_A 200 OK IBCF_B forwards 200 OK response to IMS_B AS 200 OK IMS_B forwards 200 OK response to IMS_B AS 200 OK IMS_B AS forwards 200 OK response to IMS_B AS 200 OK IMS_B AS forwards 200 OK response to IMS_B AS 200 OK IMS_B forwards the 200 OK response to IBCF_B 200 OK IMS_B forwards the 200 OK response to IBCF_B 200 OK IBCF_B forwards the 180 Ringing response to	37					*					200 OK	
200 OK IBCF_B forwards 200 OK response to IMS_B  200 OK IMS_B forwards 200 OK response to IMS_B AS  200 OK IMS_B AS forwards 200 OK response to IMS_B AS  200 OK IMS_B forwards the 200 OK response to IBCF_B  200 OK IBCF_B forwards the 180 Ringing response to	38						<b>→</b>				200 OK	
200 OK IMS_B forwards 200 OK response to IMS_B AS  200 OK IMS_B AS forwards 200 OK response to IMS_B AS  200 OK IMS_B forwards the 200 OK response to IBCF_B  200 OK IBCF_B forwards the 180 Ringing response to	39							$\rightarrow$			200 OK	IBCF_A forwards 200 OK response to IBCF_B
200 OK IMS_B AS forwards 200 OK response to IMS_B forwards the 200 OK response to IBCF_B  200 OK IBCF_B forwards the 180 Ringing response to	40								$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
43   IMS_B   200 OK   IMS_B forwards the 200 OK response to IBCF_B   200 OK   IBCF_B forwards the 180 Ringing response to	41									<b>→</b>	200 OK	IMS_B forwards 200 OK response to IMS_B AS
43 200 OK IMS_B forwards the 200 OK response to IBCF_B 200 OK IBCF_B forwards the 180 Ringing response to	42								<b></b>		200 OK	
44 200 OK IBCF_B forwards the 180 Ringing response to	43							<b>—</b>			200 OK	IMS_B forwards the 200 OK response to
	44						<b>←</b>				200 OK	

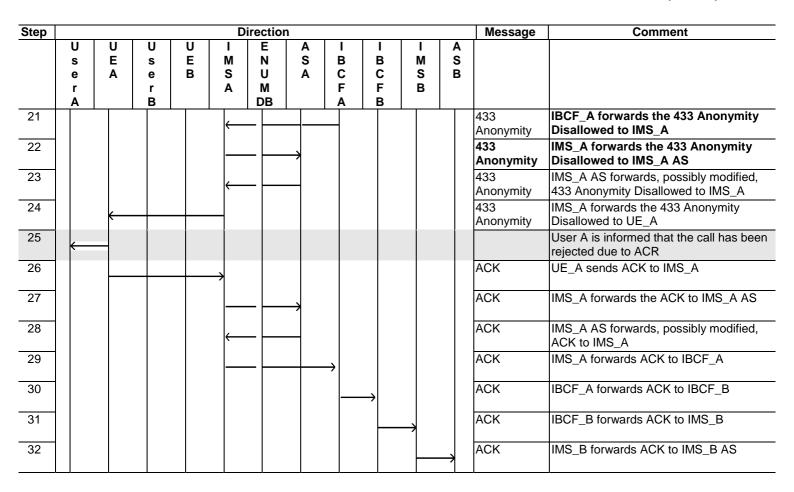
Step					Direc	ction						Message	Comment
	U	U	U	U	ı	Е	I	I	ı	-	1		
	s	Е	s	E	M	N	В	В	M	8	3		
	е	Α	е	В	S	U	C	C	S	E	3		
	r		r		A	M	F	F	В				
	A		В			DB	A	В	1				
45					$\leftarrow$							200 OK	IBCF_A forwards the 180 Ringing response to IMS_A
46		$\leftarrow$										200 OK	IMS_A forwards the 200 OK response to UE_A
47	<b>←</b>												User A is informed that call has been answered

### 4.5.5.5 Supplementary Services OIR and ACR with AS

	Interope	rability Test Description									
Identifier:	TD_IMS_SS_0005										
Summary:	IMS network supports pro	operly application services based on the example of the OIR									
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									
	TP_IMS_5313_01	(item 4 in 1 <sup>st</sup> numbered list)  TS 124 229 [1], clause 5.4.6.1.3 ¶2									
Use Case ref.:	UC_06_I	13 124 229 [1], Clause 5.4.0.1.3   2									
Ose Case lel	00_00_1										
Pre-test conditions:	<ul> <li>UE_A and UE_B hat per clause 4.2.1</li> <li>UE_A is registered</li> <li>UE_B is registered</li> </ul>	of IMS B is configured according to table 1 ve IP bearers established to their respective IMS networks as IMS_A using userOIR identity according to table 1 INS_B using any userACR identity according to table 1 It to contact AS_A (OIR) To ACR service									
	_	I to contact AS_B (ACR)									
Test Sequence:	IMS_B is configured										
Test Sequence:	IMS_B is configured  Step	I to contact AS_B (ACR)									
Test Sequence:	IMS_B is configured      Step     User A calls U	ser B (i.e. userACR in IMS_B)									
Test Sequence:	IMS_B is configured      Step     User A calls U	I to contact AS_B (ACR)									
Test Sequence:  Conformance Criteria:	IMS_B is configured      Step     User A calls U	ser B (i.e. userACR in IMS_B)									
Conformance	Step 1 User A calls U 2 Verify that use	ser B (i.e. userACR in IMS_B)									







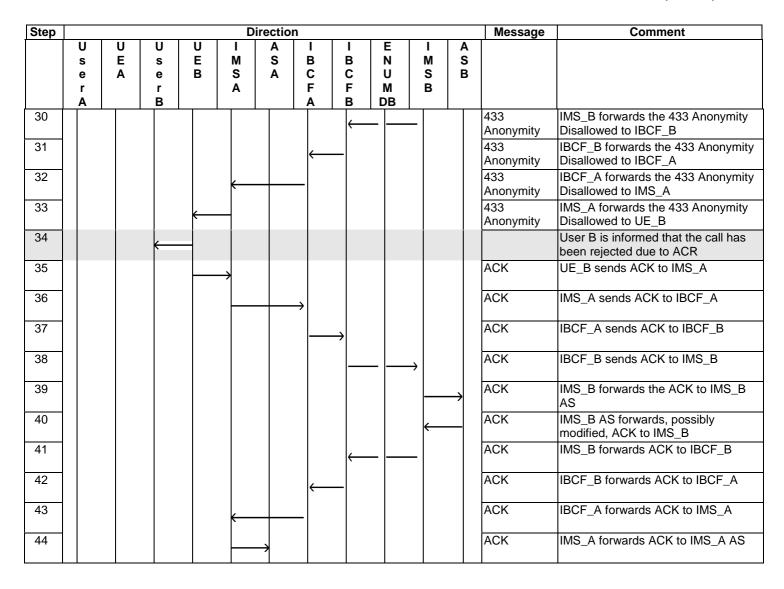
#### 4.5.5.6 Supplementary Services OIR and ACR with AS in roaming

	Interoperability	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	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1									
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 contact AS_A (ACR)</li> <li>UE_B is subscribed to OIR service</li> </ul>										
Test Sequence:	Ston										
rest sequence.	Step  1 User B calls User A (i.e. userACR in IMS_B)										
	1	nformed that call has been rejected due to ACR									
	voiny that about B to t	member that ball had boom rojoolog ago to Nort									

		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
		}
		1
	3	TP_IMS_5097_09 in CFW step 12 (INVITE)
		ensure 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-Vector_header
		(including a orig-ioi_parameter
		indicating a ong-loi_parameter indicating operator_identifier of IMS_A and
		not including a term-ioi_parameter and
		including access-network-charging-info) }
	l	I/

Step					D	irectio	n					Message	Comment
	U ø e r ∢	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	E N U M DB	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
3				<b>-</b>	$\dashv$							100 Trying	IMS_A responds with a 100 Trying provisional response

9	U Us E	s	U E		Α	-					Message	Comment
4	e A r			M		I B		E N	I M	A S		
4		r	В		Α (		С	U M	S	В		
		В		^		A		DB				
5					$\longrightarrow$						INVITE	IMS_A sends INVITE to IBCF_A
				<del></del>							100 Trying	IBCF_A responds with a 100 Trying provisional response
6						$\longrightarrow$					INVITE	IBCF_A sends INVITE to IBCF_B
7						<del></del>					100 Trying	IBCF_B responds with a 100 Trying provisional response
8								$\longrightarrow$			INVITE	IBCF_B sends INVITE to IMS_B
9							←—				100 Trying	IMS_B responds with a 100 Trying provisional response
10								←—			ENUM	IMS B sends query to ENUM DB
11								$\longrightarrow$			ENUM	ENUM DB sends response to IMS B
												INVITE triggers the OIR IFC in IMS_B
12										$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
13									<del></del>		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
14									$\leftarrow$		INVITE	IMS_B AS returns modified INVITE including Privacy header (value "id"
15										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
16							←				INVITE	IMS_B forwards INVITE to IBCF_B
17								$\longrightarrow$			100 Trying	IBCF_B 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	IBCF_A forwards INVITE to IMS_A
21					$\longrightarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the ACR IFC in IMS_A
22				$\longrightarrow$							INVITE	IMS_A forwards the INVITE to IMS_A AS
23				<b></b>							100 Trying	AS optionally responds with a 100 Trying provisional response
24				<b></b>							433 Anonymity	IMS_A AS responds with 433 Anonymity Disallowed to IMS_A
25					<b></b> →						433 Anonymity	IMS_A forwards the 433 Anonymity Disallowed to IBCF_A
26						$\longrightarrow$					433 Anonymity	IBCF_A forwards the 433 Anonymity Disallowed to IBCF_B
27								$\longrightarrow$			433 Anonymity	IBCF_B forwards the 433 Anonymity Disallowed to IMS_B
28										$\rightarrow$	433 Anonymity	IMS_B forwards the 433 Anonymity Disallowed to IMS_B AS
29									<del></del>		433 Anonymity	IMS_B AS forwards, possibly modified, 433 Anonymity Disallowed



#### 4.5.5.7 Supplementary Service CFU with AS

	Interoperability	Test Description									
Identifier:	TD_IMS_SS_0007										
Summary:	IMS network supports properly application 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 conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B2 have IP bearers established to IMS_B as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B2 is registered in IMS_B using any user identity</li> <li>IMS_B is configured to contact AS_B (CFU) for userCFU</li> <li>UE_B1 is subscribed to IMS_B and has activated CFU service</li> </ul>										

		Interoperability Test Description
Test Sequence:	Step	interopolability 1000 booonphion
i oot ooquonoot	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
	9	Verify that user A is informed that call has ended
Conformance	Check	
Criteria:	1	TP_IMS_5097_01 in CFW step 8 (INVITE):
Oritoria.	•	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 containing a orig-ioi_parameter indicating IMS_A and
		not containing an access-network-charging-info_parameter and
		not containing an access-network-charging-inio_parameter and not containing a term-ioi_parameter) and
		containing a term-lot_parameter) and containing a Record-Route_header
		indicating the originating S-CSCF_SIP_URI }
		Indicating the originating 3-0301_311_01(1)
	2	TP_IMS_5108_03 in CFW step 12 (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 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_BIUT_ }
		}

Step					Dire	ction					Message	Comment
	U s e r A	U E A	U s e r B2	U E B2	I M S A	E N U M DB	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
3		<b>←</b>									100 Trying	IMS_A responds with a 100 Trying provisional response
4					_	$\rightarrow$					ENUM	IMS A sends query to ENUM DB

Step					Direct	ion					Message	Comment
	U s	U E	U s	U E	I M	E N	I B	I B	I M	A S		
	e r	Α	e r	B2	S A	U M	C F	C F	S B	В		
5	A		B2			DB	<u> </u>	B			ENUM	ENUM DB sends response to IMS A
6							$\rightarrow$				INVITE	IMS_A forwards INVITE to IBCF_A
7					←						100 Trying	IBCF_A responds with a 100 Trying provisional response
8								$\rightarrow$			INVITE	IBCF_A forwards INVITE to IBCF_B
9							$\leftarrow$	-			100 Trying	IBCF_B responds with a 100 Trying provisional response
10									$\rightarrow$		INVITE	IBCF_B forwards INVITE to IMS_B
11								←			100 Trying	IMS_B responds with a 100 Trying provisional response
												INVITE triggers the CFU IFC in IMS_B
12										$\rightarrow$	INVITE	IMS_B forwards the INVITE to AS_B
13									<del>(</del>		100 Trying	AS_B optionally responds with the 100 Trying to IMS_B
												AS_B applies the CDIV CFU procedure
14									$\leftarrow$		181 Call is being	AS_B indicates optionally to IMS_B that call has been
15								$\leftarrow$			181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
16							$\leftarrow$				181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
17					$\leftarrow$						181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
18		<del></del>			-						181 Call is being	IMS_A indicates that call to UE_B has been forwarded
19	<b>←</b>											User A may be informed of call diversion
20									$\leftarrow$		INVITE	AS_B returns modified INVITE including new request URI and
21										$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
22				<del></del>					-		INVITE	IMS_B forwards the INVITE to UE_B2
23									$\rightarrow$		100 Trying	UE_B2 optionally responds with a 100 Trying provisional response
24			<b>—</b>									User B2 is informed of incoming call of User A
25				$\rightarrow$								User B2 answers call
26									$\rightarrow$		200 OK	UE_B2 responds to INVITE with 200 OK to indicate that the call
27										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
28									$\leftarrow$		200 OK	AS_B returns, possibly modified, 200 OK to IMS_B
29								<b>←</b>	$\dashv$		200 OK	IMS_B forwards 200 OK response to IBCF_B
30							$\leftarrow$				200 OK	IBCF_B forwards 200 OK response to IBCF_A

Step					Dire	ction					Message	Comment
	U s e r A	U E A	U s e r B2	U E B2	M S A	E N U M DB	I B C F A	I B C F B	M S B	A S B		
31					<b>←</b>				,		200 OK	IBCF_A forwards 200 OK response to IMS_A
32		$\leftarrow$									200 OK	IMS_A forwards 200 OK response to UE_A
33	<del></del>											User A is informed that call has been answered

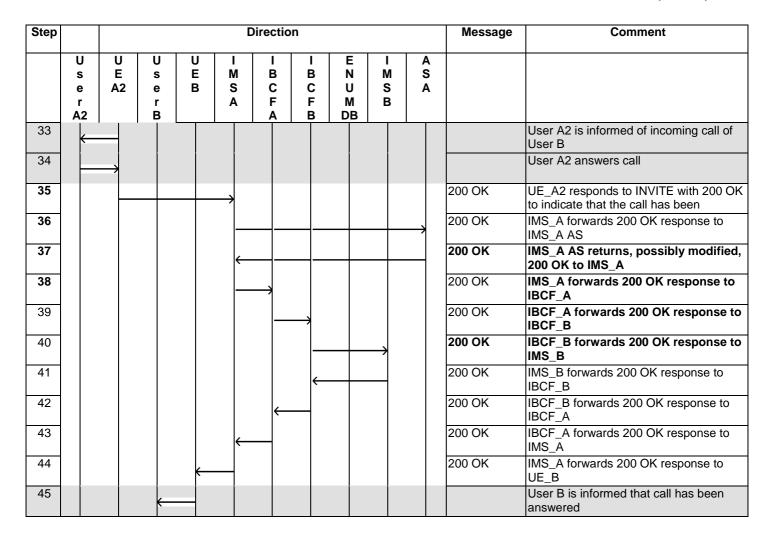
# 4.5.5.8 Supplementary Service CFU with AS in roaming

		Interoperability Te	st Description							
Identifier:	TD_IMS_S	SS_0008	-							
Summary:	IMS netwo	ork supports properly appl	ication services based on the example of the CFU							
·	suppleme	ntary service								
Configuration:	CF_ROAM	M_AS								
SUT:	IMS_A an	d IMS_B								
References:	Test Purp	oose	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_R									
Pre-test conditions:	<ul><li>UE_/</li><li>UE_/</li><li>UE_I</li><li>IMS_</li></ul>	A and UE_B2 have IP bea A is registered in IMS_A u B2 is registered in IMS_B _A is configured to contact	configured according to table 1 arers established to IMS_B as per clause 4.2.1 sing any user identity via IMS_A using any user identity AS_A (CFU) for userCFU a and has activated CFU service							
Toot Coguenes	Ston									
Test Sequence:	Step	User B calls User A (i.e.	uporCELL in IMC A)							
	2	User B may be informed	_ ,							
	3	User A2 answers call	or can diversion							
	4	Verify that user B is informed that call has been answered								
	6		ormed that call is established							
	7	User B ends call	annoa triat oan lo ostabilorioa							
	8		ormed that call has ended							
	9	Verify that user B is informed that call has ended								

		Interoperability Test Description							
Conformance	Check								
Conformance 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							
	2	containing an icid-value_parameter } } 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							
	3	TP_IMS_5070_01 in CFW step 15 (100 Trying) ensure that {  when { IMS_A receives an initial INVITE from UE_B }  then { IMS_A sends a 100_response to IMS_B  } }							
	4	TP_IMS_5110_01 in CFW step 39 (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					C	Directio	n				Message	Comment
	U s e r A2	U E A2	U s e r B	U E B	I M S A	I B C F A	I B C F B	E N U M DB	I M S B	A S A		
1			Ė	$\rightarrow$								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
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

Step					I	Directio	on				Message	Comment
	U	U E	U s	U	I M	I B	I B	E N	I M	A		
	е	A2	е	В	S	С	С	U	S	A		
	r A2		r B		Α	F A	F B	M DB	В			
7						$\leftarrow$					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
10								←			ENUM	IMS A sends query to ENUM DB
11									$\longrightarrow$		ENUM	ENUM DB sends response to IMS A
12							<b>←</b>				INVITE	IMS_B forwards INVITE to IBCF_B
13							_		$\longrightarrow$		100 Trying	IBCF_B responds with a 100 Trying provisional response
14						$\leftarrow$					INVITE	IBCF_B forwards INVITE to IBCF_A
15							$\rightarrow$				100 Trying	IBCF_A responds with a 100 Trying provisional response
16					$\leftarrow$						INVITE	IBCF_A forwards INVITE to IMS_A
17					ŀ	<b>-</b>					100 Trying	IMS_A responds with a 100 Trying provisional response
												INVITE triggers the CFU IFC in IMS_A
18										$\longrightarrow$	INVITE	IMS_A forwards the INVITE to IMS_A AS
19					$\leftarrow$						100 Trying	IMS_A AS optionally responds with the 100 Trying to IMS_A
												IMS_A AS applies the CDIV CFU procedure
20					$\leftarrow$	_					181 Call is being	IMS_A AS indicates optionally to IMS_A that call has been forwarded
21					_	$\longrightarrow$					181 Call is being	IMS_A indicates to IBCF_A that call has been forwarded
22							<b>→</b>				181 Call is being	IBCF_A indicates to IBCF_B that call has been forwarded
23							_		$\longrightarrow$		181 Call is being	IBCF_B indicates to IMS_B that call has been forwarded
24							<b>←</b>				181 Call is being	IMS_B indicates to IBCF_B that call has been forwarded
25						$\leftarrow$					181 Call is being	IBCF_B indicates to IBCF_A that call has been forwarded
26					<b>←</b>						181 Call is being	IBCF_A indicates to IMS_A that call has been forwarded
27				<b>—</b>							181 Call is	IMS_A indicates to UE_B that call to
28			<b>—</b>								being	UE_A has been forwarded User B may be informed of call diversion
29					<b>←</b>						INVITE	IMS_A AS returns modified INVITE including new request URI and history
30										$\longrightarrow$	100 Trying	IMS_A responds with a 100 Trying provisional response
31		<b>—</b>									INVITE	IMS_A forwards the INVITE to UE_A2
32					$\rightarrow$						100 Trying	UE_A2 optionally responds with a 100 Trying provisional response



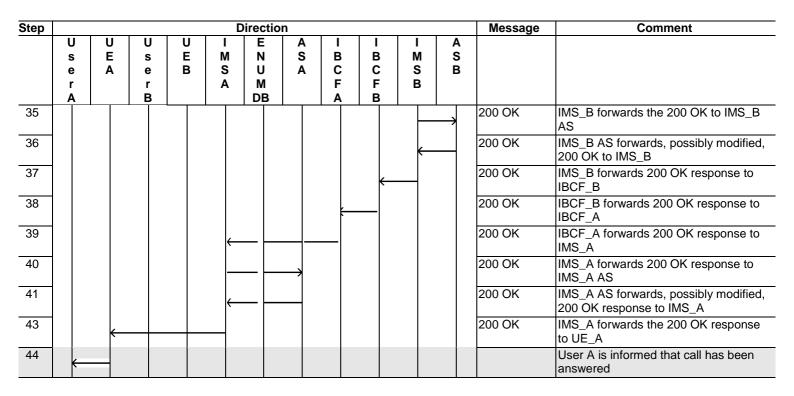
#### 4.5.5.9 Supplementary Services OIP and OIR with AS

	Interopera	bility Test Description									
Identifier:	TD_IMS_SS_0009	·									
Summary:	IMS network supports properly application services based on the example of the OIP and OIR										
	supplementary services										
Configuration:	CF_INT_AS										
SUT:	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)										
Use Case ref.:	UC_09_I										
Pre-test	<ul> <li>HSS of IMS_A and of IMS B is cor</li> </ul>	nfigured 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 userOIR_priv identity according to table 1										
	UE_B is registered in IMS_B using userOIP_priv identity according to table 1										
	IMS_A is configured to contact AS_A (OIR)										
	UE_A is subscribed to OIR service										
	IMS_B is configured to contact AS_B (OIP)										
	UE_B is subscribed to OIP service										

est Sequence:	1 2 3 4	User A calls User B (i.e. userOIP in IMS_B)  Verify that user B is informed of incoming call of User A and User A's identity is not displayed Verify that user A is informed that UE_A is ringing
	3	Verify that user B is informed of incoming call of User A and User A's identity is not displayed
	3	Varify that user A is informed that UE. A is ringing
	•	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 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
		Voting that 4001 B to informed that our had direct
Conformance	Check	
Criteria:	Onoon	
	1	TP_IMS_5097_01 in CFW step 120 (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 the 3-030r _5rr _6rt of find_A
		(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 16 (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 }

Step					D	irectio	n					Message	Comment
	U s e r A	U E A	U s e r B	U E B	I M S A	E N U M DB	A 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		$\leftarrow$										100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$						ENUM	IMS B sends query to ENUM DB
5					←	_						ENUM	ENUM DB sends response to IMS B
													INVITE triggers the OIR IFC in IMS_A
6						_	$\rightarrow$					INVITE	IMS_A forwards the INVITE to IMS_A AS
7					$\leftarrow$	- -	$\dashv$					100 Trying	IMS_A AS optionally responds with a 100 Trying provisional response

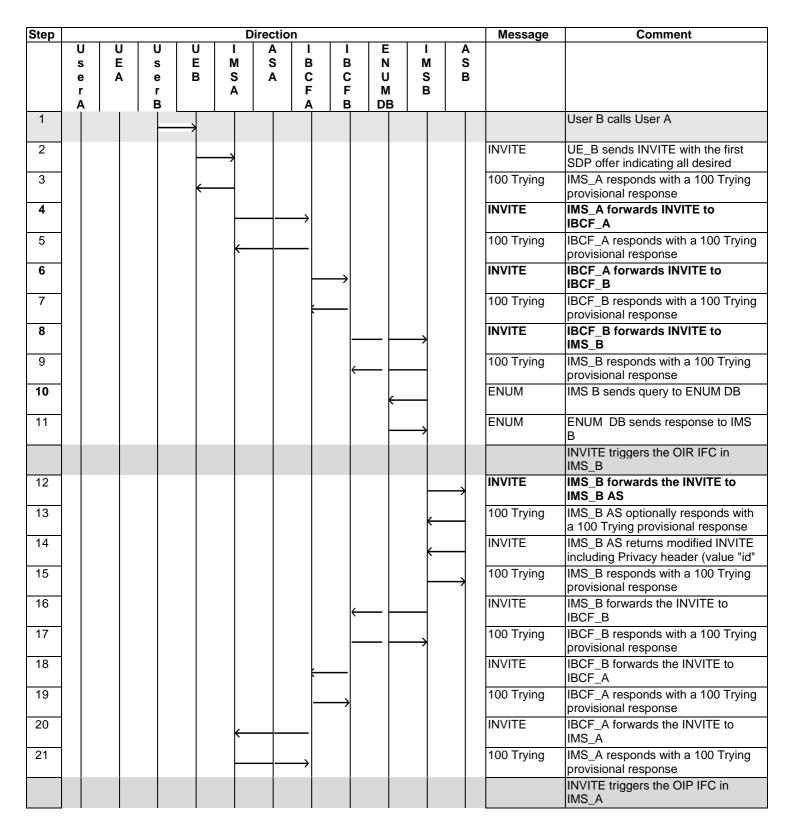
Step				Direct	tion					Message	Comment
	U U s E	U s	U E	I E	A	I B	I B	I M	A S		
	e A	e r	В	S U A M	Ā	C	C	S	В		
	A	B		DB		A	B				
8				<del></del>						INVITE	IMS_A AS returns modified INVITE including Privacy header (value "id" or
9					<b>─</b>					100 Trying	IMS_A responds with a 100 Trying provisional response
10						$\longrightarrow$				INVITE	IMS_A forwards the INVITE to IBCF_A
11				<del></del>						100 Trying	IBCF_A responds with a 100 Trying provisional response
12						-	<b>─</b>			INVITE	IBCF_A forwards the INVITE to IBCF_B
13						ŧ				100 Trying	IBCF_B responds with a 100 Trying provisional response
14								$\longrightarrow$		INVITE	IBCF_B forwards the INVITE to IMS_B
15							<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
											INVITE triggers the OIP IFC in IMS_B
16									$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
17								<b>←</b>		100 Trying	IMS_B AS optionally responds with a 100 Trying provisional response
18								←		INVITE	IMS_B AS returns modified INVITE including modified From and P-
19									$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
20			€	<b>├</b>						INVITE	IMS_B forwards the INVITE to UE_B
21				<del>  </del>				$\longrightarrow$		100 Trying	UE_B optionally responds with a 100 Trying provisional response
22		<b>←</b>									User B is informed of incoming call of User A, user A's identity is not
23								$\rightarrow$		180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has
24									$\rightarrow$	180 Ringing	IMS_B forwards the 180 Ringing to IMS_B AS
25								<b>-</b>		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing to IMS_B
26							<b>←</b>			180 Ringing	IMS_B forwards 180 Ringing response to IBCF_B
27						ŧ				180 Ringing	IBCF_B forwards 180 Ringing response to IBCF_A
28				<del></del>						180 Ringing	IBCF_A forwards 180 Ringing response to IMS_A
29					<b>→</b>					180 Ringing	IMS_A forwards 180 Ringing response to IMS_A AS
30				<b>←</b>						180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing response to IMS_A
31										180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
32	<b>—</b>										User A is informed that UE_B is ringing
33			<del>)</del>								User B answers call
34				_				<b>—</b>		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been
		I	ļ	I I	I		I	I	I		Indicate that the call has been



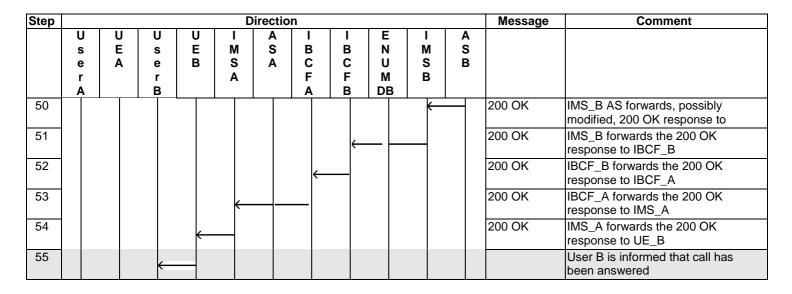
#### 4.5.5.10 Supplementary Services OIP and OIR with AS in roaming

		Interoperability Te	est Description								
Identifier:	TD_IMS_SS_0010  IMS network supports properly application services based on the example of the OIP										
Summary:			lication services based on the example of the OIP								
	and OIR su	upplementary services									
Configuration:	CF_ROAM										
SUT:	IMS_A and	d IMS_B									
References:	Test Purp	ose	Specification Reference								
	TP_IMS_5	046_01	TS 124 229 [1], clause 5.2.6.3.3 ¶1 (1 <sup>st</sup> numbered list)								
	TP_IMS_5	097_09	TS 124 229 [1], clause 5.4.3.2 ¶11 (items 5 and 8 in 1 <sup>st</sup> numbered list)								
	TP_IMS_5	308_01	TS 124 229 [1], clause 5.4.4.2.2 ¶2								
	TP_IMS_5	308_02	TS 124 229 [1], clause 5.4.4.2.2 ¶2								
	TP_IMS_5	067_01	TS 124 229 [1], clause 5.2.7.2 ¶5								
Use Case ref.:	UC_09_R		<u> </u>								
Pre-test conditions:	<ul> <li>UE_A a per clau</li> <li>UE_A is</li> <li>UE_B is table 1</li> <li>IMS_A</li> <li>UE_A is</li> <li>IMS_B</li> </ul>	A and UE_B have IP bearers established to their respective IMS networks as clause 4.2.1  A is registered in IMS_A using userOIP_priv identity according to table 1  B is registered in IMS_B via IMS_A using userOIR_priv identity according to e1  A is configured to contact AS_A (OIP)  A is subscribed to OIP service  B is configured to contact AS_B (OIR)  B is subscribed to OIR service									
Test Sequence:	Step  1  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 identity is not displayed 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 A ends call										

	_	Interoperability Test Description
	9	Verify that user B is informed that call has ended  Verify that user A is informed that call has ended
	9	Verify that user A is informed that call has ended
Conformance	Check	
Conformance Criteria:	Check 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-IP_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-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 12 (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) }
	3	TP_IMS_5308_01 in CFW step 30 (180 ringing) ensure that {   when { IMS_A receives a 180 response from UE_A
	3	TP_IMS_5308_02 in CFW step 44 (200 OK) ensure that {   when { IMS_A receives a 200 response from UE_A



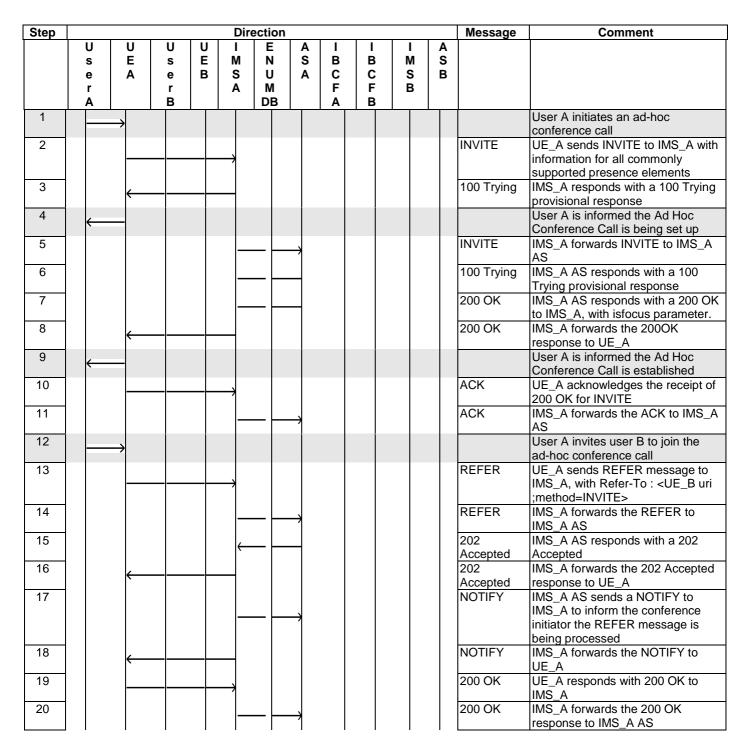
Step				Direct	tion						Message	Comment
		J U S	U E	I A		l B		E N	I M	A S		
	e /	A e r	В	S A		C		U M	S B	В		
00	À	B			A	B		В			INIV/ITE	INAC A farmenda tha INN/ITE ta
22				$\longrightarrow$							INVITE	IMS_A forwards the INVITE to IMS_A AS
23				<del></del>							100 Trying	IMS A AS optionally responds with a 100 Trying provisional response
24				<del></del>							INVITE	IMS_A AS returns modified INVITE including modified From and P-
25				<del></del>							100 Trying	IMS_A responds with a 100 Trying provisional response
26		<del>-  </del>									INVITE	IMS_A forwards the INVITE to UE_A
27				<del></del>							100 Trying	UE_A optionally responds with a 100 Trying provisional response
28	<del></del>											User A is informed of incoming call of User B, user B's identity is not
29				$\rightarrow$							180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it
30				<del></del>							180 Ringing	IMS_A forwards the 180 Ringing to IMS_A AS
31				<b>←</b>							180 Ringing	IMS_A AS forwards, possibly modified, 180 Ringing to IMS_A
32					$\longrightarrow$						180 Ringing	IMS_A forwards 180 Ringing response to IBCF_A
33					-	$\longrightarrow$					180 Ringing	IBCF_A forwards 180 Ringing response to IBCF_B
34									$\rightarrow$		180 Ringing	IBCF_B forwards 180 Ringing response to IMS_B
35										$\rightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to IMS_B AS
36									$\leftarrow$		180 Ringing	IMS_B AS forwards, possibly modified, 180 Ringing response to
37							<del></del>		_		180 Ringing	IMS_B forwards the 180 Ringing response to IBCF_B
38					•	<del></del>					180 Ringing	IBCF_B forwards the 180 Ringing response to IBCF_A
39					<del></del>						180 Ringing	IBCF_A forwards the 180 Ringing response to IMS_A
40			←								180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
41		<b>←</b>										User B is informed that UE_A is ringing
42	$\longrightarrow$											User A answers call
43				$\rightarrow$							200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been
44				$\longrightarrow$							200 OK	IMS_A forwards the 200 OK to IMS_A AS
45				<b></b>							200 OK	IMS_A AS forwards, possibly modified, 200 OK to IMS_A
46					$\longrightarrow$						200 OK	IMS_A forwards 200 OK response to IBCF_A
47						<b></b> →					200 OK	IBCF_A forwards 200 OK response to IBCF_B
48									$\rightarrow$		200 OK	IBCF_B forwards 200 OK response to IMS_B
49										$\rightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS



#### 4.5.5.11 Ad-hoc Conference Call service

		Interoperability Test	Description							
Identifier:	TD_IMS	_CONF_0001								
Summary:	IMS network handles subsequent INVITEs, UPDATEs, REFERs and NOTIFYs									
	correctly during Ad-Hoc Conference calls									
Configuration:	CF_INT_	_CONF_CALL								
SUT:	IMS_A									
References:	Test Pui	rpose	Specification Reference							
	TP_IMS_	_5121_02	TS 124 229 [1], clause 5.4.3.3 ¶123							
			(9 <sup>th</sup> numbered list)							
Use Case ref.:	UC_16									
	<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>IMS_A is configured to contact AS_A (CONF)</li> <li>UE_B is registered in IMS_B using any user identity</li> <li>IMS_B is configured to contact AS_B (CONF)</li> <li>User A and B are subscribed to CONF service</li> <li>User A is pre-provisioned with conference-factory URI in IMS A</li> </ul>									
Test Sequence:	Step									
	1	User A initiates an ad-hoc of factory URI	conference call with a pre-configured conference							
	2	Verify that User A is informed	ned the Ad Hoc Conference Call is being set up							
	3									
	4	4 User A invites User B to join the Conference Call.								
	5	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									
	8	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	ed that the Conference Call has ended							

Interoperability Test Description									
Conformance Criteria:	Check								
	1	TP_IMS_5121_02 in CFW in step 36 & 46 (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					Direc	ction						Message	Comment
	U	Ū	U	Ū	I	E	A	1	I	I	A		
	s e	E A	s e		M S	N U	S	B	B	M	S		
	r		r		Α	M		F	F	В			
21	Α		В			DB	<u> </u>	Α	В	<u> </u>	<u> </u>	INVITE	IMS_A AS sends INVITE to UE_B
21												IINVIIE	with conference-factory URI
													(received in the REFER message
22												100 Trying	from UE A) IMS_A responds with a 100 Trying
					-		$\rightarrow$						provisional response
23						→						ENUM	IMSA sends query to ENUM DB
24					$\leftarrow$	_						ENUM	ENUM DB sends response to IMS A
25												INVITE	IMS_A forwards the INVITE to
20												400 Tm din m	IBCF_A
26					$\leftarrow$	_	- -					100 Trying	IBCF_A responds with a 100 Trying provisional response
27												INVITE	IBCF_A forwards the INVITE to
28												100 Trying	IBCF_B IBCF_B responds with a 100
									$\leftarrow$				Trying provisional response
29										$\longrightarrow$		INVITE	IBCF_B forwards the INVITE to IMS_B
30									<b>←</b>			100 Trying	IMS_B responds with a 100 Trying
31				<del></del>		_	_ _					INVITE	provisional response IMS_B forwards the INVITE to
32												100 Trying	UE_B UE_B responds with a 100 Trying
										$\rightarrow$			provisional response
33													User B is informed of incoming invitation from User A to join the
			`										Conference Call
34						_	4-			$\longrightarrow$		180 Ringing	UE_B sends a 180 ringing to IMS_B
35									,			180	IMS_B forwards the 180 ringing to
												Ringing	IBCF_B
36									<del></del>			180 Ringing	IBCF_B forwards the 180 ringing to IBCF_A
37						_						180	IBCF_A forwards the 180 ringing
38					`							Ringing 180	to IMS_A IMS_A forwards the 180 ringing to
36					-	_	$\rightarrow$					Ringing	IMS_A AS
39												NOTIFY	Upon reception of 180 Ringing
													from UE_B, IMS_A AS sends NOTIFY with sipfrag: 180 Ringing
					<b>—</b>	_							to inform conference initiator that
													UE_B is being invited to join the conference
40		<del></del>										NOTIFY	IMS_A forwards the NOTIFY to UE_A
41	<b>←</b>												User A is notified that User B is being invited to join the call
42					<b>&gt;</b>							200 OK	UE_A responds with 200 OK to IMS_A for NOTIFY
43					_	_	$\rightarrow$					200 OK	IMS_A forwards the 200 OK
44						_	_ _			<b>→</b>		200 OK	response to IMS_A AS UE_B responds with 200 OK to
45									  -			200 OK	IMS_B for INVITE IMS B forwards the 200 OK
46												200 OK	response to IBCF_B IBCF_B forwards the 200 OK
47												200 OK	response to IBCF_A IBCF_A forwards the 200 OK
41					$\leftarrow$	-	$\dashv$					200 UK	response to IMS_A

Step					Direc	tion						Message	Comment
	U	Ū		U	I	E	Α	Ī	I	I	Α		
	s e	E A	s e		M S	N U	S A	B C	B	M	S B		
	r	^	r	٦		М		F	F	В	-		
	Α		В			DB		Α	В				
48						-	$\rightarrow$					200 OK	IMS A forwards the 200 OK response to IMS_A AS
49				<b>→</b>									User B joins the conference
50												ACK	UE_B acknowledges the 200 OK
													for INVITE
51									+			ACK	IMS B forwards the ACK to IBCF_B
52								K				ACK	IBCF_B forwards the ACK to IBCF_A
53					<del></del>	-	_					ACK	IBCF_A forwards the ACK to IMS_A
54						_	$\rightarrow$					ACK	IMS A forwards the ACK to IMS_A AS
55												NOTIFY	AS_A sends NOTIFY to UE_A to
					$\leftarrow$	-							inform it has successfully joined
												NOTIEN	the conference
56 57		$\leftarrow$										NOTIFY	IMS_A forwards NOTIFY to UE_A User A is alerted that User B has
57	←												joined the conference
58					,							200 OK	UE_A sends 200 OK response for
					1							000 01/	NOTIFY
59						-	$\rightarrow$					200 OK	IMS_A forwards the 200 OK response to IMS_A AS
60				<del>)</del>									User B leaves the conference
61												BYE	UE_B sends BYE to IMS_B to
62												BYE	leave the conference IMS_B forwards the BYE to
									+				IBCF_B
63								K				BYE	IBCF_B forwards the BYE to IBCF_A
64					$\leftarrow$	-	_					BYE	IBCF_A forwards the BYE to IMS_A
65						-	$\rightarrow$					BYE	IMS_A forwards the BYE to IMS_A AS
66												200 OK	IMS_A AS releases resources for
					$\leftarrow$	-							this conference caller and sends a 200 OK response for BYE
67						_	_ _	$\longrightarrow$				200 OK	IMS_A forwards the 200 OK
68												200 OK	response to IBCF_A IBCF_A forwards the 200 OK
													response to IBCF_B
69									-	$\longrightarrow$		200 OK	IBCF_B forwards the 200 OK response to IMS_B
70				<b>-</b>		_	-					200 OK	IMS_B forwards the 200 OK response to UE_B
71			<del></del>										User B is informed that the conference has ended
72												NOTIFY	AS_A sends NOTIFY to IMS _A to
													inform UE_A that UE_B has left the conference
73		$\leftarrow$		_	4							NOTIFY	IMS_A forwards NOTIFY to UE_A
74	<b>←</b>												User A is notified that user B has
75												200 OK	left the conference UE_A sends a 200 OK response
					*								for NOTIFY
76					<u> </u>	-	$\rightarrow$					200 OK	IMS_A forwards the 200 OK
					1							<u> </u>	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

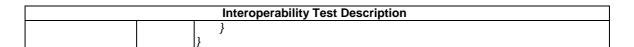
#### 4.5.7.1 IPTV registration and Service Attachment. Push mode

Interoperability Test Description											
Identifier:		PTV_0001									
Summary:	IMS network supports properly IPTV registration and service attachment in Push mode										
Configuration:	CF_IPTV										
SUT:	IMS_A										
References:	Test Purp	ose	Specification Reference								
	TP_IMS_5		TS 124 229 [1], clause 5.4.1.2.2 F ¶15								
			(before NOTE 3)								
	TP_IMS_5	308_02	TS 124 229 [1], clause 5.4.4.2.2 ¶2								
Use Case ref.:											
Pre-test	<ul> <li>HSS of</li> </ul>	IMS_A is configured according to	table 1								
conditions:			espective IMS networks as per clause 4.2.1								
		s registered in IMS_A using userI									
		is configured to send a third party									
		not configured for topology hiding									
	1 11VIO_7	The cominguiou for topology maining									
Test Sequence:	Step										
rest ocquerioc.	29	Verify that user A receives service	e attachment information								
	23	verily that user A receives service	e attachment information								
Conformance	Check										
Criteria:	1	TD IMS 5206 01 in CEW step 2	2 (DECISTED)								
Oriteria.	•	FP_IMS_5206_01 in CFW step 23 (REGISTER)									
		ensure that { when { IMS_A receives a protected REGISTER									
		•	containing an Authorization header containing a integrity protected parameter indicating								
		(ves or	0 0 1 1								
		1	tls-pending or								
		tls-yes or									
		ip-assoc-pending or	•								
		ip-assoc-yes)}									
		then { IMS_A sends a third party	v register to AS A								
		containing a P-Access-									
		containing a P-Visited-									
		}	Notificial 12 floader								
		)									
	2	TP_IMS_5308_02 in CFW step 2	28 (200 OK)								
	_	ensure that {	.5 (255 511)								
		when { IUT receives a 200_resp	oonse from UF_A								
		containing a P-Charging-									
			twork-charging-info_parameter								
		}									
		then { IUT sends the 200_respo	onse to AS A								
		containing a P-Charging-									
			twork-charging-info_parameter								
		}									
		), ´									
L	ı	IJ									

Step				Dire	ction			Message	Comment	
	U	U	C	U	I	Α	ı	Α		
	S	E	S	E	M	S	M	S		
	е	Α	е	В	S	Α	S	В		
	r		r		Α		В			
	A		В							10.40 A ( ) ( ) ( ) ( )
										IMS_A matches the iFC of the service
										profile belong to the user, and find out the
										AS (SDF) that user has subscribed
23						$\longrightarrow$			REGISTER	IMS_A sends a REGISTER to AS_A
						1				(third party registration)
24					$\leftarrow$				200 OK	AS_A responds with 200 OK
25									MESSAGE	AS_A sends a MESSAGE containing the
										service attachment information
26		←							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
						$\longrightarrow$				to AS_A
29										UE receives service attachment
										information

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

		Interoperability Test D	escription						
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 Purp	oose	Specification Reference						
	TP_IMS_		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	<ul> <li>HSS o</li> </ul>	f IMS_A is configured according	ng to table 1						
conditions:	• UE_A	has IP bearers established to	its respective IMS networks as per clause 4.2.1						
		is registered in IMS A using us							
	<ul> <li>UE_A,</li> </ul>	IMS_A, AS_A support pull mo	ode service discovery						
	<ul><li>IMS_A</li></ul>	not configured for topology hi	ding						
Test Sequence:	Step								
	31	Verify that user A receives se	rvice attachment information						
Conformance	Check								
Criteria:	1	TP_IMS_5097_14 in CFW st	ep 24 (SUBSCRIBE):						
		ensure that {	2000/05 / 40 43						
		when { IMS_A sends the SUI							
		then { AS_A receives the St							
		containing a Route_h indicating the SIP_U							
			ing-Function-Addresses_header						
		containing a P-Charg							
			parameter indicating IMS_A and						
		not including a term							
		including access-ne							
		}	3 3 3,						
	2	TP_IMS_5308_02 in CFW st	ep 30 (200 OK)						
		ensure that {	,						
		when { IUT receives a 200_							
		containing a P-Charg							
			-network-charging-info_parameter						
		}							
		then { IUT sends the 200_re							
		containing a P-Charg							
		including an access	-network-charging-info_parameter						

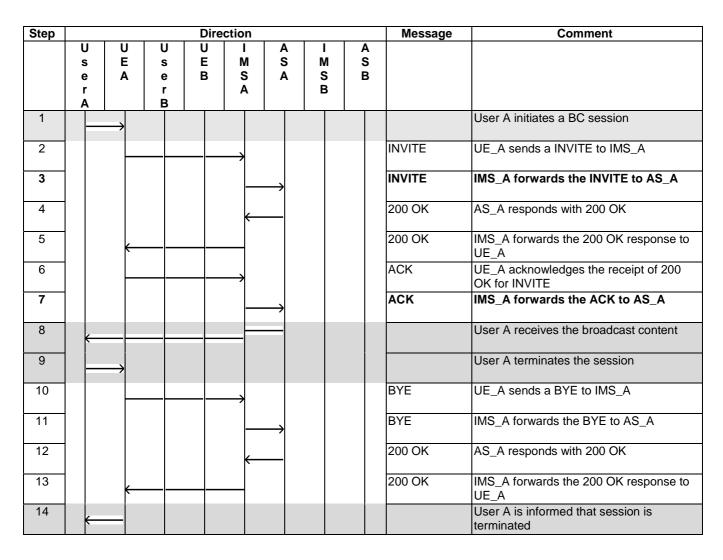


Step				Dire	ction			Message	Comment	
	U s e r A	U E A	U s e r B	U E B	I M S A	A S A	I M S B	A S B		
										UE retrieves the PSI/address of AS_A (SDF)
23					$\rightarrow$				SUBSCRIBE	UE_A sends a SUBSCRIBE for "ua-profile" event to IMS_A
24						$\longrightarrow$			SUBSCRIBE	IMS_A forwards the SUBSCRIBE to AS_A
25					←	_			200 OK	AS_A responds with 2000K
26		$\leftarrow$							200 OK	IMS_A forwards the 200 OK response to UE_A
27					←	_			NOTIFY	AS_A sends a NOTIFY for the service attachment information to IMS_A
28		$\leftarrow$							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

	Inte	roperability Test Description							
Identifier:	TD_IMS_IPTV_000	TD_IMS_IPTV_0003							
Summary:	IMS network suppo	rts properly IPTV Broadcast 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_19								
Pre-test conditions:	<ul><li>UE_A has IP be</li><li>UE_A is register</li><li>UE_A has done pull mode</li></ul>	s configured according to table 1 arers established to its respective IMS networks as per clause 4.2.1 red in IMS A using userIPTV according to table 1 IPTV registration and service attachment procedures using push or gured for topology hiding							
Test Sequence:	11 Verify th 12 User A to	User A initiates a BC session  Verify that user A receives the broadcast content  User A terminates the session  Verify that user A is informed that session is terminated							

		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						
	2	TP_IMS_5107_02 in CFW step 7 (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 } }						



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

		Interoperability Test [	Description					
Identifier:		IPTV_0004						
Summary:		ork supports properly IPTV co	ontent on demand session					
Configuration:	CF_IPTV							
SUT:	IMS_A							
References:	Test Purp	oose	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	<ul> <li>HSS</li> </ul>	of IMS_A is configured accor-	ding to table 1					
conditions:			to its respective IMS networks as per					
	claus	e 4.2.1	·					
	<ul> <li>UE A</li> </ul>	A is registered in IMS A using	userIPTV according to table 1					
			and service attachment procedures using push					
		Il mode						
			gured to establish content control channel and					
		ent delivery channels using R						
		A not configured for topology						
		1 09	<u> </u>					
Test Sequence:	Step							
•	1	User A initiates a CoD sessi	on (content selection)					
	26	Verify that user A starts rece						
	27	User A terminates the session						
	36	Verify that user A is informed						
Conformance	Check							
Criteria:	1	TP_IMS_5108_03 in CFW s	tep 3 (INVITE)					
		ensure that {						
		when { IUT receives an init	ial 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_h	neader					
		indicating the S-CS	SCF SIP_URI of IMS_A and					
		containing a P-Charg	ning-Vector_header					
		including a orig-ioi_						
			or_identifier of IMS_A and					
		not including a tern	n-ioi_parameter }					
		}						
	2	TP_IMS_5107_02 in CFW s	tep 11 (ACK)					
		ensure that {						
		when { UE_A sends ACK to						
		then { IMS_B receives th						
	not containing a Route_header indicating the S-CSCF_SIP_URI of IMS_A and							
			Access-Network-Info_header					

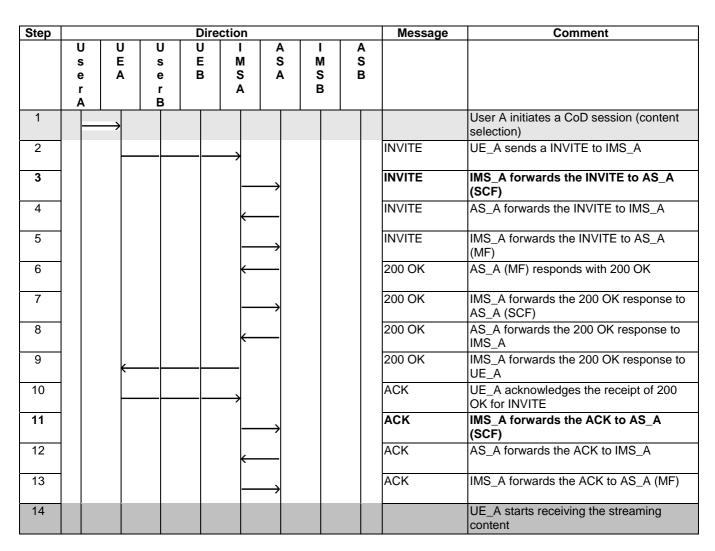
Step			I	Directio	n				Message	Comment
	U s	_		J     E   N		A S	I M	A S		
	е	_	e l	3   8	S	Ā	S B	В		
	r A		r B		4		В			
1		→								User A initiates a CoD session (content selection)
2									INVITE	UE_A sends a INVITE to IMS_A
3						>			INVITE	IMS_A forwards the INVITE to AS_A (SCF)
4					<del></del>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

Step		Direction								Comment
	U	ו כ	U			Α		Α		
	s e	E A	s e	l _		S	M S	S		
	r	^	r		Ä	^	В			
	Α		В	,						
28					<b></b>				BYE	UE_A sends a BYE to IMS_A
29						$\longrightarrow$			BYE	IMS_A forwards the BYE to AS_A (SCF)
30					←				BYE	AS_A forwards the BYE to IMS_A
31						<b>→</b>			BYE	IMS_A forwards the BYE to AS_A (MF)
32					<b>←</b>				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					<b>←</b>				200 OK	IMS_B forwards the 200 OK response to IMS_A
35		<del>(</del>							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 <sup>*</sup>	Test Description						
Identifier:	TD_IMS_IPTV_0005							
Summary:	IMS network supports properly IP	TV 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>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</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 with RTSP method 2</li> <li>IMS_A not configured for topology hiding</li> </ul>							
Tost Soguence:	Ston							
Test Sequence:	1 User A initiates a CoD	session (content selection)						
		session (content selection)						
	J 32   Verilly triat user A start	s 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 Description								
Identifier:	TD_IMS_IPTV_0006							
Summary:	IMS network supports properly N-PVR offline capture requests							
Configuration:	CF_IPTV							
SUT:	IMS_A							
References:	Test Purp	oose	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	IPTV according to table 1					
		•	ervice attachment procedures using either					
		or pull mode	3					
		A not configured for topology hidin	a					
	<u> </u>	<u> </u>						
Test Sequence:	Step							
,	1	User A requests to record a live p	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_header							
	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	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	M S B	A S B		
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						$\rightarrow$			MESSAGE	IMS_A forwards the MESSAGE to AS_A
4					<b>←</b>				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 ENUM Query - IMS-to-PSTN call

		Interoperability Test Desc	ription					
Identifier:	TD_IMS_E	NUM_0002						
Summary:	ENUM que	ry should result in return of NAP	TR with correct Tel URI					
Configuration:	CF_INT_C	ÄLL						
SUT:	ENUM_A	and ENUM_DB						
References:	Test Purpo	ose	Specification Reference					
	TP_IMS_E	NUM_01	TS 124 229 [1], clause 5.4.3.2 ¶11 (item 10 in 1 <sup>st</sup> numbered list)					
Use Case ref.:	UC_I_23							
Pre-test conditions:	<ul><li>IMS A</li><li>HSS o</li><li>UE_A</li></ul>	I DB is configured according to to is configured to support ENUM If IMS_A and of IMS B is configur has IP bearer established to its r is registered in IMS_A using any	red according to table 1 espective IMS networks as per clause 4.2.1					
Toot Coguenes	Cton							
Test Sequence:	Step	Llaar A galla ugar D						
		User A calls user B	ar cell of year D					
		User B is informed about incoming	ig call of user B					
Conformance	Check							
Criteria:		TP_IMS_ENUM_01 in CFW step	4 (NADTE Bosponso):					
Criteria.		ensure that {	14 (NAFTR Response).					
		when { UE_A sends an initial IN	IVITE for LIE B to IMS A					
		containing a Reque						
		indicating a Tel_						
		and IMS_A sends a NAPTI						
			derived_from the Tel_URI_E.164_Number					
		}	denved_nem the ren_era_z.ren_ramber					
		, then { ENUM_DB sends a NAP	TR Response to IMS A					
			TR_Resource_Record					
			TL of the NAPTR_record					
		containing the se						
		indicating E2						
			egular_expressiob					
		indicating !^(.*,	)\$!					
		containing the S						
		indicating bad	ckreference (\1) for the user part					
			main name for the host part					
		containing SIP_0	URI_parameters 'if applicable' }					
	1	}						

Step			D	irectio	n			Message	Comment
	U	U	I	Е	M	Р	U		
	S	Ε	M	N	G	S	S		
	е	Α	S	U	С	Т	е		
	r		Α	М	F	N	r		
	Α			DB			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			_	$\rightarrow$				ENUM	IMS A sends query to ENUM DB
4			$\leftarrow$	-				ENUM	ENUM DB sends response to IMS A

Step			D	irectio	on			Message	Comment
	U s e r A	U E A	I M S A	E N U M DB	M G C F	P S T N	U s e r B		
5		<b>←</b>						100 Trying	IMS_A responds with a 100 Trying provisional response
6					$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
7			$\leftarrow$					100 Trying	MGCF responds with a 100 Trying provisional response
8			<b>←</b>		_			183 Session Progress	MGCF responds with 183 Session Progress response
9		<b>—</b>						183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
10			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A
11					$\rightarrow$			PRACK	IMS_A forwards PRACK to MGCF
12			←					200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
13		<b>—</b>						200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
14						$\rightarrow$		IAM	MGCF sends IAM to PSTN
15							$\rightarrow$		User B is informed of incoming call of User A

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

		Interoperability Te	st Description							
Identifier:	TD_IMS_	_PSTN_0001								
Summary:	Outgoing	call to PSTN, PSTN user	clears call							
Configuration:	CF_PSTI	TN								
SUT:	IMS_A ar	d MGCF								
References:	Test Pur	pose	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_23									
Pre-test conditions:	<ul><li>UE_</li></ul>	of IMS_A is configured ac A has IP bearers establishe A is registered in IMS_A us CF within the trust domain o	ed to its IMS networks as per clause 4.2.1 sing any user identity							
			_							
Test Sequence:	Step									
	1	User A calls User B								
	2		med of incoming call of User A							
	3	Verify that user A is infor	med that UE_B is ringing							
	4	User B answers call								
	5	Verify that user A is infor	med that call has been answered							
	6	Verify that user A and B	can communicate							
	7	User B ends call								
	8	Verify that user B is infor	med that call has ended							
	9	Verify that user A is infor	med that call has ended							
	9 Verify that user A is informed that call has ended									

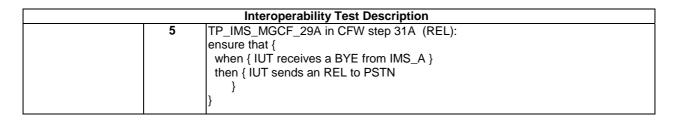
		Interoperability Test Description						
Conformance	Check							
Criteria:	1	TP_IMS_MGCF_02 in CFW step 7 (100 Trying):						
		ensure that {						
		when { IUT receives an initial INVITE from IAM_A}						
		then { IUT sends a 100_response to IMS_A						
		}						
	_	}						
	2	TP_IMS_MGCF_03 in CFW step 7 and 8 (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						
		}						
	3	TP_IMS_MGCF_06 in CFW step 17 (180 Ringing):						
	"	lensure that {						
		when { IUT receives an ACM indicating subscriber_free						
		or receives a CPG indicating ALERTING from PSTN }						
		then { IUT sends a 180_response to IMS_A						
		}						
		}						
	4	TP_IMS_MGCF_07 in CFW step 22 (200 OK):						
		ensure that {						
		when { IUT receives an ANM from PSTN}						
		then { IUT sends a 200_response to IMS_A						
		}						
		<b> </b> }						
	5	TP_IMS_MGCF_08 in CFW step 32B (BYE):						
		ensure that {						
		when { IUT receives an REL from PSTN}						
		then { IUT sends a BYE to IMS_A						
		}						
		}						

Step				Direction	on			Message	Comment
	U s e r A	U E A	M S A	E N U M DB	M G C F	P S T N	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		<del>(</del>						100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\rightarrow$				ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$	_				ENUM	ENUM DB sends response to IMS A
6				- -	$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
7			←					100 Trying	MGCF responds with a 100 Trying provisional response
8			$\leftarrow$	- -				183 Session Progress	MGCF responds with 183 Session Progress response
9		←						183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
10			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A

Step				Direct	ion			Message	Comment
	U s	U	I M	E N	M G	P S	U s		
	е	A	S	U	C	T	е		
	r A		Α	DB		IN .	r B		
11				_	$\longrightarrow$			PRACK	IMS_A forwards PRACK to MGCF
12			$\leftarrow$					200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
13		<b>←</b>	_					200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
14						$\rightarrow$		IAM	MGCF sends IAM to PSTN
15							$\rightarrow$		User B is informed of incoming call of User A
16					<del>(</del>			ACM/CPG	PSTN responds with ACM/CPG
17			$\leftarrow$					180 Ringing	MGCF sends 180 Ringing response to IMS_A
18		<b>←</b>	_					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
19	+								User A is informed that UE_B is ringing
20						<b>—</b>			User B answers call
21					<b>←</b>			ANM	PSTN sends ANM to MGCF
22			$\leftarrow$					200 OK	MGCF sends 200 OK response to IMS_A
23		<b>←</b>						200 OK	IMS_A forwards 200 OK response to UE_A
24	+								User A is informed that call has been answered
25			$\rightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
26					$\longrightarrow$			ACK	IMS_A forwards ACK to MGCF
27									User A and B can communicate
28B						<del>(</del>			User B ends call
29B					<b>←</b>			REL	PSTN sends BYE to MGCF
30B						$\rightarrow$		RLC	MGCF responds RLC to PSTN
31B							$\rightarrow$		User B is informed that call has ended
32B			$\leftarrow$	_ _				BYE	MGCF sends BYE to IMS_A
33B		<del></del>	$\dashv$					BYE	IMS_A forwards BYE to UE_A
34B	+								User A is informed that call has ended
35B			$\rightarrow$					200 OK	UE_A sends 200 OK for BYE
36B					$\longrightarrow$			200 OK	IMS_A forwards 200 OK response to MGCF

#### 4.5.8.1.3 Normal Call, IMS user clears call

		Interoperability Tes	Description							
Identifier:	TD_IMS_PS									
Summary:	Outgoing cal	to PSTN, IMS user clears	call							
Configuration:	CF_PSTN									
SUT:	IMS_A and N	1GCF								
References:	Test Purpos	е	Specification Reference							
	TP_IMS_MG	CF_02	TS 124 229 [1], clause 5.5.3.1.2							
	TP_IMS_MG	CF_03	TS 124 229 [1], clause 5.5.3.1.2							
	TP_IMS_MG	CF_06	TS 124 229 [1], clause 5.5.3.2.2							
			TS 129 163 [18], clause 7.2.3.1.4							
	TP_IMS_MG	CF_07	TS 124 229 [1], clause 5.4.1.2.2							
			TS 129 163 [18], clause 7.2.3.1.5							
	TP_IMS_MG	CF_17	TS 129 163 [18], clause 7.2.3.2.13							
Use Case ref.:	UC_23		· ·							
Pre-test	HSS (	of IMS_A is configured acc	ording to table 1							
conditions:			to its IMS networks as per clause 4.2.1							
		A is registered in IMS_A using any user identity  F within the trust domain of IMS_A								
	141301		<u>.</u>							
Test Sequence:	Step									
Tool Coquenter		Iser A calls User B								
			d of incoming call of User A							
	3 V	erify that user A is informe	d that LIF R is ringing							
		Verify that user A is informed that UE_B is ringing User B answers call								
		Verify that user A is informed that call has been answered								
	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								
		Verify that user B is informed that call has ended								
		erify that user A is informe								
	9 V	erily that user A is illionne	u triat cair rias eriueu							
Conformance	Check									
Conformance Criteria:	Check 1 T	P IMS MGCE 02 in CEW	sten 7 (100 Trying):							
Conformance Criteria:	1 T	P_IMS_MGCF_02 in CFW	step 7 (100 Trying):							
	1 T	nsure that {								
	1 T	nsure that { when {    IUT receives an ini	ial INVITE from IAM_A}							
	1 T	nsure that {	ial INVITE from IAM_A}							
	1 T	nsure that { when {    IUT receives an ini	ial INVITE from IAM_A}							
	1 T e	nsure that { when { IUT receives an ini then { IUT sends a 100_re }	ial INVITE from IAM_A} sponse to IMS_A							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW	ial INVITE from IAM_A}							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that {	step 7 and 8 (183 Session Progress):							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init	step 7 and 8 (183 Session Progress):  stal INVITE from IMS_A }							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re	step 7 and 8 (183 Session Progress):  stal INVITE from IMS_A }  sponse to IMS_A and							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re sends 183_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re sends 183_re containing	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re sends 183_re containing containing a P-( inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter inter int	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re sends 183_re containing containing a P-( in in }  P_IMS_MGCF_06 in CFW	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A							
	1 Te	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 initing } } P_IMS_MGCF_06 in CFW nsure that {	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A							
	1 Te	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 initing a P-0 initing } } P_IMS_MGCF_06 in CFW nsure that { when { IUT receives an AC	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing):							
	1 Te	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 initing a P-0 initing } } P_IMS_MGCF_06 in CFW nsure that { when { IUT receives an AC	ial INVITE from IAM_A} sponse to IMS_A  step 7 and 8 (183 Session Progress):  ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A  step 17 (180 Ringing):  EM indicating subscriber_free CPG indicating ALERTING from PSTN }							
	1 Te	nsure that { when { IUT receives an init then { IUT sends a 100_re     }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A  step 7 and 8 (183 Session Progress):  ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and Charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A  step 17 (180 Ringing):  EM indicating subscriber_free CPG indicating ALERTING from PSTN }							
	1 Te	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A							
	1 Te	nsure that { when { IUT receives an init then { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A							
	1 T e	nsure that { when { IUT receives an init then { IUT sends a 100_re     }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an init then { IUT sends a 100_re	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A							
	1 T e	nsure that { when { IUT receives an inithen { IUT sends a 100_re }  P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_re sends 183_re containing containing a P-0 in in }  P_IMS_MGCF_06 in CFW nsure that { when { IUT receives an A0 or receives a then { IUT sends a 180_re }  P_IMS_MGCF_07 in CFW	ial INVITE from IAM_A} sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A step 22 (200 OK):							
	1 Tee	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 in initity } P_IMS_MGCF_06 in CFW nsure that { when { IUT receives an ACorreceives a then { IUT sends a 180_reseives a 180_reseives a then { IUT sends a 180_reseives a 180_resei	ial INVITE from IAM_A) sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A step 22 (200 OK): IM from PSTN}							
	1 Tee	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 initing a P-0 in	ial INVITE from IAM_A) sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A step 22 (200 OK): IM from PSTN}							
	1 Tee	nsure that { when { IUT receives an inithen { IUT sends a 100_re} } P_IMS_MGCF_03 in CFW nsure that { when { IUT receives an inithen { IUT sends a 100_resends 183_recontaining a P-0 initing a P-0 in	ial INVITE from IAM_A) sponse to IMS_A step 7 and 8 (183 Session Progress): ial INVITE from IMS_A } sponse to IMS_A and sponse to IMS_A Require_header indicating 100rel_value and charging-Vector_header cluding a term-ioi_parameter dicating the operator_identifier of IMS_A step 17 (180 Ringing): cM indicating subscriber_free CPG indicating ALERTING from PSTN } sponse to IMS_A step 22 (200 OK): IM from PSTN}							

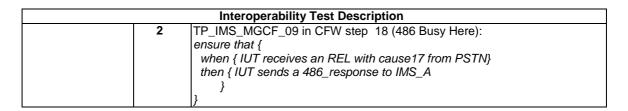


Step			-	Direction	on			Message	Comment
7.56	U	U	I	Е	M	Р	U		
	s	E	M	N	G	S	S		
	e r	Α	S A	U M	C	T N	e r		
	Ā		^	DB	•		В		
1		$\rightarrow$							User A calls User B
2								INVITE	UE_A sends INVITE with the first SDP offer
_			$\rightarrow$						indicating all desired medias and codecs that
3		<b>←</b>						100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$				ENUM	IMS A sends query to ENUM DB
5			$\leftarrow$	_				ENUM	ENUM DB sends response to IMS A
6			_		$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
7			$\leftarrow$		_			100 Trying	MGCF responds with a 100 Trying provisional response
8			$\leftarrow$		_			183 Session Progress	MGCF responds with 183 Session Progress response
9								183 Session	IMS_forwards 183 Session Progress response
4.0								Progress	to UE_A
10			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A
11			_	_	$\rightarrow$			PRACK	IMS_A forwards PRACK to MGCF
12			$\leftarrow$					200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
13		$\leftarrow$	_					200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
14						$\rightarrow$		IAM	MGCF sends IAM to PSTN
15							$\rightarrow$		User B is informed of incoming call of User A
16					<b>←</b>			ACM/CPG	PSTN responds with ACM/CPG
17			$\leftarrow$		_			180 Ringing	MGCF sends 180 Ringing response to IMS_A
18		<b>—</b>						180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
19	<b>—</b>								User A is informed that UE_B is ringing
20						<b>—</b>			User B answers call
21					<b>—</b>			ANM	PSTN sends ANM to MGCF
22			$\leftarrow$		_			200 OK	MGCF sends 200 OK response to IMS_A
23		<b>—</b>						200 OK	IMS_A forwards 200 OK response to UE_A
24	<b>←</b>								User A is informed that call has been answered

Step			D	irectio	n			Message	Comment
	U s e r A	U E A	M S A	E N U M DB	M G C F	P S T N	U s e r B		
25			$\rightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
26			_		$\rightarrow$			ACK	IMS_A forwards ACK to MGCF
27									User A and B can communicate
28A		$\rightarrow$							User A ends call
29A		$\vdash$	$\rightarrow$					BYE	UE_A sends BYE
30A					$\rightarrow$			BYE	IMS_A forwards BYE to MGCF
31A						$\rightarrow$		REL	MGCF sends REL to PSTN
32A							$\rightarrow$		User B is informed that call has ended
33A					$\leftarrow$			RLC	PSTN sends RLC response to MGCF
34A			$\leftarrow$		_			200 OK	MGCF sends 200 OK response to IMS_A
35A		←						200 OK	IMS_A forwards the 200 OK response to UE_A
36A	$\leftarrow$								User A is informed that call has ended

### 4.5.8.1.4 Unsuccessful Call, PSTN user busy

		Interoperability Test Descr	iption					
Identifier:	TD_IMS_F	PSTN_0003						
Summary:	Outgoing of	call to PSTN, user B busy						
Configuration:	CF_PSTN							
SUT:	IMS_A and	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_23							
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 IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>MGCF within the trust domain of IMS_A</li> <li>User B in the PSTN is busy</li> </ul>							
Took Commons	Cton							
Test Sequence:	Step	Llear A celle Llear D						
	1	User A calls User B						
	2	Verify that user A is informed that	USEL D IS DUSY					
Conformance Criteria:	Check							
	1	TP_IMS_MGCF_02 in CFW step ensure that { when { IUT receives an initial IN' then { IUT sends a 100_respons }	VITE from IAM_A}					

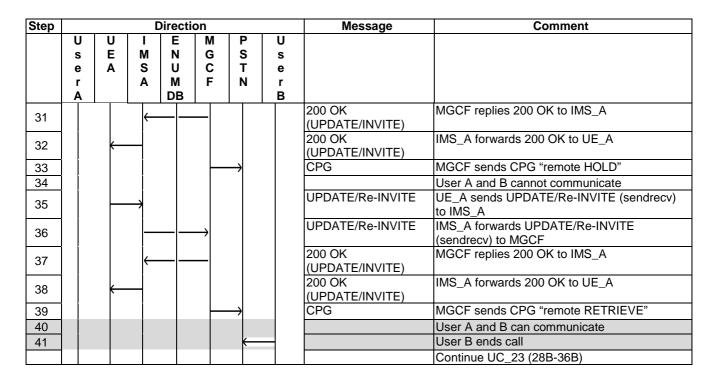


Step			[	Directi	on			Message	Comment
	U s e r A	U E A	M S A	E N U M DB	M G C F	P S T N	U s e r B		
1 2									User B is busy User A calls User B
3		_	$\rightarrow$					INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
4		<b>←</b>						100 Trying	IMS_A responds with a 100 Trying provisional response
5			_	$\rightarrow$				ENUM	IMS A sends query to ENUM DB
6			$\leftarrow$					ENUM	ENUM DB sends response to IMS A
7			_		$\rightarrow$			INVITE	IMS_A forwards INVITE to MGCF
8			$\leftarrow$		_			100 Trying	MGCF responds with a 100 Trying provisional response
9			$\leftarrow$		_			183 Session Progress	MGCF responds with 183 Session Progress response
10		<b>←</b>						183 Session Progress	IMS_forwards 183 Session Progress response to UE_A
11			$\rightarrow$					PRACK	UE_A sends PRACK to IMS_A
12			_		$\rightarrow$			PRACK	IMS_A forwards PRACK to MGCF
13			$\leftarrow$					200 OK (PRACK)	MGCF responds with 200 OK response to IMS_A
14		<b>←</b>						200 OK (PRACK)	IMS_A forwards 200 OK response to UE_A
15					-	$\rightarrow$		IAM	MGCF sends IAM to PSTN
16					$\leftarrow$			REL (cause #17)	PSTN responds with REL "user busy"
17					-	$\rightarrow$		RLC	MGCF sends RLC to PSTN
18			$\leftarrow$		_			486 Busy Here	MGCF sends 486 Busy Here response to IMS_A
19		<b>←</b>						486 Busy Here	IMS_A forwards 486 Busy Here response to UE_A
20	<b>←</b>								User A is informed that User B is busy
21			$\rightarrow$					ACK	UE_A acknowledges the receipt of 486 for INVITE
22			<u> </u>		$\rightarrow$			ACK	IMS_A forwards ACK to MGCF

#### 4.5.8.1.5 IMS user holds/resumes call

		Interoperability Tes	Description			
Identifier:	TD_IMS_PSTN_0004					
Summary:	Outgoing call to PSTN, communication hold by IMS user					
Configuration:	CF_PSTN					
SUT:	IMS_A ar	d MGCF				
References:	Test Pur	oose	Specification Reference			
		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_23					
Pre-test	1100	-f INAO A in a suficienza de sec	andin a ta tabla t			
conditions:		of IMS_A is configured acc				
conditions.			d to its IMS networks as per clause 4.2.1			
		A is registered in IMS_A usi F within the trust domain of				
	• UE_ <i>F</i>	A configured to perform use	r initiated hold/resume using INVITE			
Test Sequence:	Step					
•	1	User A calls User B				
	2	Verify that user B is inform	ned 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 puts connection to B on hold					
	8 Verify that user A and B cannot communicate					
	9 User A resumes connection to B					
	10 Verify that user A and B can communicate					
	11 User B ends call					
	12 Verify that user B is informed that call has ended					
	13 Verify that user A is informed that call has ended					
	<u> </u>					
Conformance	Check	TD INC MOOF 44: 05	W + 00 (ODO)			
Criteria:	1	TP_IMS_MGCF_11 in CF	w step 33 (CPG):			
		ensure that {	JPDATE or a target_refresh INVITE			
			ing a SDP			
			cating sendonly from IMS_A }			
			indicating remote_hold to PSTN			
		}				
		}				
	2	TP_IMS_MGCF_12 in CF	W step 39 (CPG):			
		ensure that {				
			JPDATE or a target_refresh INVITE			
			ing a SDP			
			cating sendrecv from IMS_A }			
		tnen { IUT sends a CPG	indicating remote_retrieve to PSTN			
		, ,				
		J				

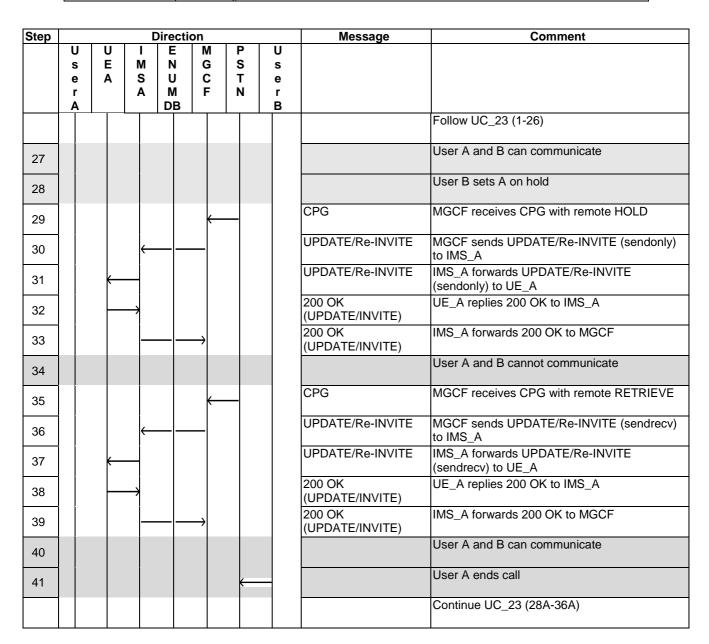
Step				Direct	ion			Message	Comment
	U	U	ı	Е	M	Р	U		
	s	Е	M	N	G	S	s		
	е	Α	S	U	С	Т	е		
	r		Α	M	F	N	r		
	A			DB			В		
									Follow UC_23 (1-26)
27									User A and B can communicate
28									User A sets B on hold
29			$\rightarrow$					UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendonly) to IMS_A
30			-	_ -	$\rightarrow$			UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendonly) to MGCF



#### 4.5.8.1.6 PSTN user holds/resumes call

		Interoperability Test Desci	ription				
Identifier:	TD_IMS_PSTN_005						
Summary:	Outgoing call to PSTN, communication hold by PSTN user						
Configuration:	CF_PSTN						
SUT:	IMS_A and	d MGCF					
References:	Test Purp	ose	Specification Reference				
	TP_IMS_N		TS 129 163 [18], clause 7.4.10.2				
	TP_IMS_N	MGCF_14	TS 129 163 [18], clause 7.4.10.2				
Use Case ref.:	UC_23						
Pre-test	<ul> <li>HSS (</li> </ul>	of IMS_A is configured according t	to table 1				
conditions:	<ul><li>UE_A</li></ul>	has IP bearers established to its	IMS networks as per clause 4.2.1				
	<ul><li>UE_A</li></ul>	is registered in IMS_A using any	user identity				
	<ul> <li>MGCI</li> </ul>	within the trust domain of IMS_A	1				
Test Sequence:	Step						
	1	User A calls User B					
	2	Verify that user B is informed of it					
	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					
	6	Verify that user A and B can com					
	7	User B puts connection to A on h					
	8	Verify that user A and B cannot c	ommunicate				
	9 User B resumes connection to A 10 Verify that user A and B can communicate						
	11	User B ends call					
	12	Verify that user B is informed that					
	13	Verify that user A is informed that	t call has ended				

		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 in CFW step 39 (UPDATE):: ensure that {   when { IUT receives a CPG indicating remote_retrieve from PSTN }   then { IUT sends an UPDATE or a target_refresh INVITE



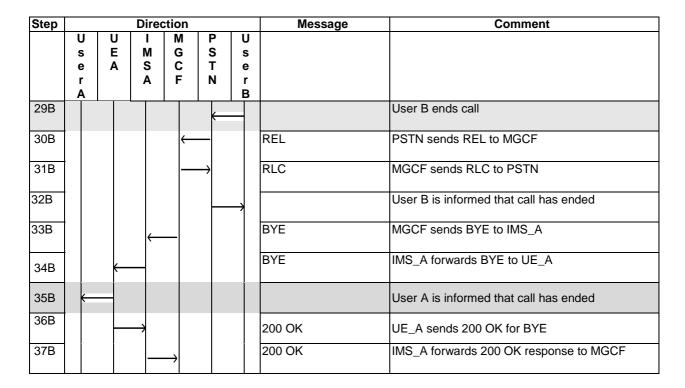
#### 4.5.8.2 PSTN-to-IMS call

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

		Interoperability Test D	Description				
Identifier:		PSTN_0006					
Summary:	Incoming call from PSTN, PSTN user clears call						
Configuration:	CF_PSTN						
SUT:	IMS_A an	d MGCF					
References:	Test Purp	ose	Specification Reference				
		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				
		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				
		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_24		[10]				
	00						
Pre-test	<ul> <li>HSS</li> </ul>	of IMS_A is configured accord	ling to table 1				
conditions:			o its IMS networks as per clause 4.2.1				
oon and one		A is registered in IMS_A using					
		F within the trust domain of IN					
	• MGC	F within the trust domain of its	IIS_A				
Toot Commons	Cton						
Test Sequence:	Step	Harr Darilla Harra A					
	1	User B calls User A					
	2	Verify that user A is informed					
	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					
	8	Verify that user A is informed	d that call has ended				
	<u>,                                      </u>						
Conformance	Check						
Criteria:	1	TP_IMS_MGCF_01 in CFW	step 3 (INVITE):				
		ensure that {					
		when { IUT receives an init					
		then { IUT sends a INVITE					
		containing a Request_U					
		indicating Tel_URI_E					
			lumber with user_portion_phone)				
		containing a Contact_h					
		indicating anyvalue_					
		containing a Supported					
		including an 100rel_v					
		containing a P-Asserted					
		containing a P-Chargin					
		indicating an icid-val	ue_parameter and				
		containing a SDP					
		indicating codec_sup	pported and curr_precondition				
		<b> </b> ,					
1		}					

	Interenerability Test Description
	Interoperability Test Description
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
	}
•	
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	TD IMC MCCE 16 in CEM aton 25 (ANIM):
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):
	ensure that {
	when { IUT receives an REL from PSTN}
	then { IUT sends a BYE to IMS_A
	]. <i>}</i>
	}

Step			Direc	ctio	n			Message	Comment
	U s	U E	I M	M G		P S	U s		
	е	Ā	S	C	;	Т	e		
	r A		Α	-		N	r B		
1						$\vdash$			User B calls User A
2				ļ	<del>(</del>			IAM	PSTN send IAM to MGCF
3			$\leftarrow$					INVITE	MGCF sends INVITE to IMS_A (SDP with precondition status, MIME subtype "telephone-event", clause 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
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	$\leftarrow$								User A is informed of incoming call of User B
18			$\rightarrow$					180 Ringing	UE_A responds to initial INVITE with 180
19				$\rightarrow$				180 Ringing	Ringing to indicate that it has started alerting IMS_A forwards 180 Ringing response to MGCF
20						<b>&gt;</b>		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
24				$\rightarrow$				200 OK	that the call has been answered IMS_A forwards 200 OK response to MGCF
25						<b>&gt;</b>		ANM	MGCF sends ANM to PSTN
26			<b>←</b>					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

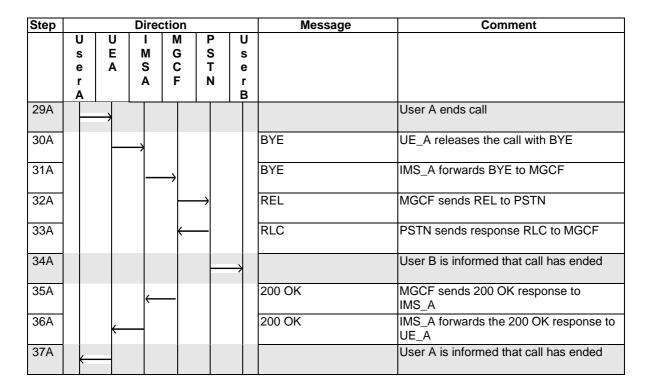


#### 4.5.8.2.2 Normal Call, IMS user clears call

		Interoperability To	est Description					
Identifier:	TD_IMS_	TD_IMS_PSTN_0007						
Summary:	Incoming	call from PSTN, IMS use	r clears call					
Configuration:	CF_PSTN	I						
SUT:	IMS_A ar	d MGCF						
References:	Test Purp	oose	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					
		MGCF_17	TS 129 163 [18], clause 7.2.3.2.13					
Use Case ref.:	UC_24							
Pre-test	<ul><li>HSS</li></ul>	of IMS_A is configured a	ccording to table 1					
conditions:	• UE_A	A has IP bearers establis	hed to its IMS networks as per clause 4.2.1					
		A is registered in IMS_A ι						
	<ul> <li>MGC</li> </ul>	F within the trust domain	of IMS_A					
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 the call						
	5	Verify that user A and B can communicate						
	6		User A ends call					
	7	Verify that user B is info	ormed that call has ended					
	8	Verify that user A is info	ormed that 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)

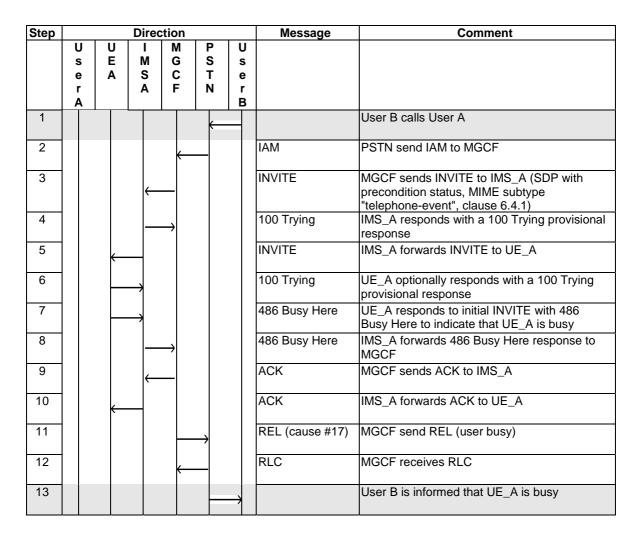
e e A S C T N B B  User B calls User A  1 User B calls User A  IAM PSTN send IAM to MGCF  INVITE MGCF sends INVITE to IMS_A (SDP with precondition status, MIME subtype "lelephone-event" clause 6.4.1)  100 Trying IMS_A responds with a 100 Trying provisional response  INVITE IMS_A forwards INVITE to UE_A  100 Trying UE_A optionally responds with a 100 Trying provisional response to IMS_A  183 Session Progress IE_A sends 183 Session Progress response to IMS_A forwards 183 Session Progress response to IMS_A  100 Trying UE_A responds with PRACK to IMS_A  100 Trying UE_A sends 183 Session Progress response to IMS_A forwards 183 Session Progress response to IMS_A forwards 183 Session Progress response to IMS_A forwards 200 OK to IMS_A  200 OK (PRACK) UE_A responds with 200 OK to IMS_A  200 OK (PRACK) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds to initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to Initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to Initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to Initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to Initial INVITE with 120 OK to IMS_A  200 OK (UPDATE) UE_A responds to INITE with 200 OK to IMS_A forwards 180 Ringing response to IMGCF  ACM/CPG MGCF sends ACM/CPG to PSTN  200 OK UE_A responds INVITE with 200 OK to IMS_A forwards 200 OK response to IMGCF  ACM/CPG MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	Step			Direc	ction			Message	Comment
Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   Lamber   L		U	U F	I M			_		
A				S	С	Т	_		
IAM		_		Α	F	N			
1 INVITE   MGCF sends INVITE to IMS. A (SDP with precondition status, MIME subtype 'itelephone-event' clause 6.4.1)   100 Trying   IMS. A responds with a 100 Trying provisional response   INVITE   IMS. A responds with a 100 Trying provisional response   IMS. A forwards INVITE to UE_A   100 Trying provisional response   IMS. A forwards INVITE to UE_A   100 Trying provisional response   IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A forwards IMS. A for	1					<u> </u>			User B calls User A
with precondition status, MIME subtype "telephone-event" clause 6.4.1)  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 UE_A sends 183 Session Progress response to IMS_A forwards 183 Session Progress response to IMS_A forwards 183 Session Progress response to MGCF  PRACK IMS_A forwards 183 Session Progress response to MGCF  PRACK IMS_A forwards PRACK to UE_A  200 OK (PRACK) UE_A responds with 200 OK to IMS_A  200 OK (PRACK) IMS_A forwards 200 OK to MGCF  UPDATE IMS_A forwards UPDATE to UE_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  180 Ringing UE_A responds to initial INVITE with 10 Ser B  180 Ringing IMS_A forwards 180 Ringing response to MGCF  ACM/CPG MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  USer A answers the call  200 OK UE_A responds INVITE with 200 OK to IMGCF  ACM/CPG MGCF sends ANM to PSTN  ACK MGCF sends ANM to PSTN  ACK MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	2				+			IAM	PSTN send IAM to MGCF
100 Trying   IMS_A responds with a 100 Trying provisional response   INV/TE   IMS_A forwards INV/TE to UE_A   100 Trying   UE_A optionally responds with a 100 Trying provisional response   IMS_A forwards INV/TE to UE_A   100 Trying   UE_A optionally responds with a 100 Trying provisional response   IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A forwards IMS_A	3			<b>←</b>				INVITE	with precondition status, MIME subtype
100 Trying	4				$\rightarrow$			100 Trying	IMS_A responds with a 100 Trying
Trying provisional responses  183 Session Progress  183 Session Progress  183 Session Progress  183 Session Progress  185 A forwards 183 Session Progress response to IMS_A  184 PRACK  185 PRACK  186 PRACK  187 A forwards 183 Session Progress response to MGCF  186 PRACK  187 A forwards 183 Session Progress response to MGCF  188 PRACK  188 A forwards PRACK to IMS_A  200 OK (PRACK)  189 UE_A responds with 200 OK to IMS_A  200 OK (PRACK)  180 A forwards 200 OK to MGCF  180 UPDATE  181 UPDATE  182 UPDATE  183 Session Progress  IMS_A forwards PRACK to IMS_A  200 OK (PRACK)  189 A forwards PRACK to UE_A  200 OK (UPDATE)  180 PRACK  180 PRACK  181 A forwards 200 OK to MGCF  182 USer A is informed of incoming call of User B  180 Ringing  180 Ringing  180 Ringing  180 Ringing UE_A responds to initial INVITE with 100 Ringing response to MGCF  ACM/CPG  180 Ringing  180 Ringing  180 Ringing  180 Ringing to indicate that it has started to MGCF  ACM/CPG  180 MGCF send ACM/CPG to PSTN  180 User B is informed that UE_A is ringing User A answers the call  200 OK  180 Ringing  o indicate that it has started User A is informed that UE_A is ringing to MGCF answers the call  200 OK  21 User A answers the call  22 User A answers the call  23 USER A invarids 200 OK response to MGCF  ACM/CPG  ANM  MGCF sends ACM to PSTN  ACK  MGCF sends ACK to PSTN	5		$\leftarrow$					INVITE	IMS_A forwards INVITE to UE_A
response to IMS_A  183 Session Progress IMS_A forwards 183 Session Progress response to MGCF  PRACK MGCF responds with PRACK to IMS_A  10  11  12  13  14  15  16  17  18  18  19  200 OK (PRACK) UE_A responds with 200 OK to IMS_A  200 OK (PRACK) IMS_A forwards 200 OK to MGCF  UPDATE MGCF sends UPDATE to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) IMS_A forwards 200 OK to MGCF  17  User A is informed of incoming call of User B  180 Ringing UE_A responds to initial INVITE with 1: Ringing to indicate that it has started  180 Ringing IMS_A forwards 180 Ringing response to MGCF  ACM/CPG MGCF send ACM/CPG to PSTN  20  User A answers the call  20  User A answers the call  20  USer A informed that UE_A is ringing indicate that the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call has been answere and make the call ha	6			$\rightarrow$				100 Trying	
response to MGCF PRACK  PRACK  MGCF responds with PRACK to IMS_A  PRACK  IMS_A forwards PRACK to UE_A  200 OK (PRACK)  UE_A responds with 200 OK to IMS_A  200 OK (PRACK)  IMS_A forwards 200 OK to MGCF  UPDATE  MGCF sends UPDATE to IMS_A  UPDATE  IMS_A forwards UPDATE to UE_A  200 OK (UPDATE)  UE_A responds with 200 OK to IMS_A  200 OK (UPDATE)  USer A is informed of incoming call of User B  I80 Ringing  UE_A responds to initial INVITE with 1: Ringing to indicate that it has started  180 Ringing  IMS_A forwards 180 Ringing response to MGCF  ACM/CPG  MGCF send ACM/CPG to PSTN  USer B is informed that UE_A is ringing  USer A answers the call  200 OK  UE_A responds INVITE with 200 OK to indicate that the call has been answere  200 OK  MGCF  ANM  MGCF sends ANM to PSTN  ACK  MGCF sends ACK to PSTN	7			$\rightarrow$				183 Session Progress	
PRACK IMS_A forwards PRACK to UE_A  200 OK (PRACK) UE_A responds with 200 OK to IMS_A  200 OK (PRACK) IMS_A forwards 200 OK to MGCF  UPDATE MGCF sends UPDATE to UE_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) UE_A responds with 200 OK to IMS_A  200 OK (UPDATE) IMS_A forwards 200 OK to MGCF  17  User A is informed of incoming call of User B  180 Ringing UE_A responds to initial INVITE with 18 Ringing to indicate that it has started  180 Ringing IMS_A forwards 180 Ringing response to MGCF  ACM/CPG MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  User A answers the call  200 OK UE_A responds INVITE with 200 OK to indicate that the call has been answere 100 OK to indicate that the call has been answere 100 OK MGCF  ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	8				$\rightarrow$			183 Session Progress	IMS_A forwards 183 Session Progress response to MGCF
11   200 OK (PRACK)   UE_A responds with 200 OK to IMS_A   200 OK (PRACK)   IMS_A forwards 200 OK to MGCF   UPDATE   MGCF sends UPDATE to IMS_A   UPDATE   IMS_A forwards UPDATE to UE_A   200 OK (UPDATE)   UE_A responds with 200 OK to IMS_A   200 OK (UPDATE)   USer A is informed of incoming call of User B   180 Ringing   UE_A responds to initial INVITE with 1: Ringing to indicate that it has started 180 Ringing   IMS_A forwards 180 Ringing response to MGCF   ACM/CPG   MGCF send ACM/CPG to PSTN   User B is informed that UE_A is ringing   USer A answers the call   200 OK   USer A answers the call   200 OK   IMS_A forwards 200 OK response to MGCF   ANM   MGCF sends ANM to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN   ACK   MGCF sends ACK to PSTN	9			$\leftarrow$	_			PRACK	MGCF responds with PRACK to IMS_A
12 13 14 15 16 17 18 19 20 OK (PRACK)  UPDATE  UPDATE  UPDATE  UPDATE  IMS_A forwards UPDATE to UB_A  200 OK (UPDATE)  UB_A responds with 200 OK to IMS_A  200 OK (UPDATE)  USer A is informed of incoming call of User B  180 Ringing  UB_A responds to initial INVITE with 18 Ringing to indicate that it has started  180 Ringing  IMS_A forwards 180 Ringing response to MGCF  ACM/CPG  MGCF send ACM/CPG to PSTN  User B is informed that UB_A is ringing  UB_A responds INVITE with 200 OK to IMS_A  UB_E A responds INVITE with 200 OK to IMS_E  20  USer A answers the call  200 OK  UB_A responds INVITE with 200 OK to IMS_E  IMS_A forwards 200 OK response to IMS_E  MGCF sends ANM to PSTN  ACK  MGCF sends ACK to PSTN	10		<b>←</b>					PRACK	IMS_A forwards PRACK to UE_A
UPDATE	11			$\rightarrow$				200 OK (PRACK)	UE_A responds with 200 OK to IMS_A
14 15 16 200 OK (UPDATE) UE_A responds with 200 OK to IMS_A 200 OK (UPDATE) USer A is informed of incoming call of User B 180 Ringing UE_A responds to initial INVITE with 1: Ringing to indicate that it has started 180 Ringing IMS_A forwards 180 Ringing response to MGCF ACM/CPG MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing USer A answers the call  200 OK USer B USer A answers the call  21 22 User A answers the call  200 OK IMS_A forwards 200 OK response to MGCF ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	12				$\rightarrow$			200 OK (PRACK)	IMS_A forwards 200 OK to MGCF
200 OK (UPDATE)  UE_A responds with 200 OK to IMS_A  200 OK (UPDATE)  User A is informed of incoming call of User B  180 Ringing  UE_A responds to initial INVITE with 18 Ringing to indicate that it has started  180 Ringing  IMS_A forwards 180 Ringing response to MGCF  ACM/CPG  MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  USer A answers the call  USer A answers the call  200 OK  UE_A responds INVITE with 200 OK to indicate that the call has been answere  200 OK  IMS_A forwards 200 OK response to MGCF  ANM  MGCF sends ANM to PSTN  ACK  MGCF sends ACK to PSTN	13			$\leftarrow$				UPDATE	MGCF sends UPDATE to IMS_A
200 OK (UPDATE)  IMS_A forwards 200 OK to MGCF  User A is informed of incoming call of User B  180 Ringing  UE_A responds to initial INVITE with 1: Ringing to indicate that it has started  180 Ringing  IMS_A forwards 180 Ringing response to MGCF  ACM/CPG  MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  USer A answers the call  User A answers the call  200 OK  UE_A responds INVITE with 200 OK to indicate that the call has been answere to MGCF  ANM  MGCF sends ANM to PSTN  ACK  MGCF sends ACK to PSTN	14		<b>←</b>					UPDATE	IMS_A forwards UPDATE to UE_A
User A is informed of incoming call of User B  18	15			$\rightarrow$				200 OK (UPDATE)	UE_A responds with 200 OK to IMS_A
User B  18	16				$\rightarrow$			200 OK (UPDATE)	IMS_A forwards 200 OK to MGCF
Ringing to indicate that it has started  180 Ringing IMS_A forwards 180 Ringing response to MGCF  ACM/CPG MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  User A answers the call  23  User A answers the call IMS_A forwards 200 OK response to MGCF  ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	17	<del>(</del>							
to MGCF  ACM/CPG  MGCF send ACM/CPG to PSTN  User B is informed that UE_A is ringing  User A answers the call  23  20 OK  UE_A responds INVITE with 200 OK to indicate that the call has been answere to MGCF  ANM  MGCF sends ANM to PSTN  ACK  MGCF sends ACK to PSTN	18			$\rightarrow$				180 Ringing	UE_A responds to initial INVITE with 180 Ringing to indicate that it has started
21  22  User B is informed that UE_A is ringing  User A answers the call  23  24  25  ANM  MGCF sends ANM to PSTN  ACK  User A answers the call  User B is informed that UE_A is ringing  User A answers the call  User B is informed that UE_A is ringing	19				$\rightarrow$			180 Ringing	IMS_A forwards 180 Ringing response to MGCF
22 User A answers the call  23 UE_A responds INVITE with 200 OK to indicate that the call has been answere 200 OK IMS_A forwards 200 OK response to MGCF  ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	20					$\longrightarrow$		ACM/CPG	MGCF send ACM/CPG to PSTN
23 24 25 26 200 OK UE_A responds INVITE with 200 OK to indicate that the call has been answere 200 OK IMS_A forwards 200 OK response to MGCF ANM MGCF sends ANM to PSTN ACK MGCF sends ACK to PSTN	21						$\rightarrow$		User B is informed that UE_A is ringing
24 200 OK IMS_A forwards 200 OK response to MGCF ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	22		$\rightarrow$						User A answers the call
24 25 26  200 OK IMS_A forwards 200 OK response to MGCF ANM MGCF sends ANM to PSTN  ACK MGCF sends ACK to PSTN	23			$\rightarrow$				200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
25 ANM MGCF sends ANM to PSTN ACK MGCF sends ACK to PSTN	24				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to
	25					$\longrightarrow$		ANM	
	26			$\leftarrow$	_			ACK	MGCF sends ACK to PSTN
27     ACK   IMS_A forwards ACK to UE_A	27		<b>←</b>					ACK	IMS_A forwards ACK to UE_A
User A and B can communicate	28	<b>—</b>							User A and B can communicate



#### 4.5.8.2.3 Unsuccessful Call, IMS user busy

Interoperability Test Description							
Identifier:	TD_IMS_PSTN_008						
Summary:	Incoming call from PSTN, user A busy						
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_10	TS 129 163 [18], clause 7.2.3.2.12					
Use Case ref.:	UC_24						
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 IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>MGCF within the trust domain of IMS_A</li> <li>User A in IMS is busy</li> </ul>						
Tost Seguence:	Cton						
Test Sequence:	Step						
	1 User B calls User A 2 Verify that user B is informed that UE A is busy						
	2   Verify that user D is informed that	OL_1( lo budy					

		Interoperability Test Description
Conformance Criteria:	Check	
	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
	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 Purp		Specification Reference		
	TP_IMS_I		TS 129 163 [18], clause 7.4.10.1		
	TP_IMS_I	MGCF_12	TS 129 163 [18], clause 7.4.10.1		
Use Case ref.:	UC_24				
Pre-test	• HSS	of IMS_A is configured according	to table 1		
conditions:	• UE_A	has IP bearers established to its	IMS networks as per clause 4.2.1		
	• UE_A	A is registered in IMS_A using any	user identity		
	<ul> <li>MGC</li> </ul>	F within the trust domain of IMS_A	4		
	• UE_A	a configured to perform user initiat	ed hold/resume using INVITE		
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 com			
	6	User A puts connection to B on h			
	7	Verify that user A and B cannot of			
	8	User A resumes connection to B			
	9	Verify that user A and B can communicate			
	10	User A ends call			
	11	Verify that user B is informed that			
	12	t call has ended			
	<u>,                                      </u>				
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 indicat	ing remote_nota to PSTN		
		}			
	2	TP_IMS_MGCF_12 in CFW step	40 (CPC):		
		ensure that {	) 40 (CFG).		
		when { IUT receives an UPDAT	F or a target infresh INIVITE		
		containing a S	CDP		
			sendrecv from IMS_A }		
		then { IUT sends a CPG indicat			
		}	<u> </u>		
		}			
	•	1.F			

Step			Dire	ectio				Message	Comment
	U s	U E	I M	M	P		U s		
	e	Ā	S	С	T		e		
	r A		Α	F	N	1	r B		
									Follow UC_21 (1 to 27)
28									User A and B can communicate
29									User A sets B on hold
30		H	$\rightarrow$					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		<b>←</b>			·			200 OK	IMS_A forwards 200 OK to UE_A
34					$\longrightarrow$			CPG	MGCF sends CPG with remote HOLD
35									User A and B cannot communicate
36			$\rightarrow$					UPDATE/Re-INVITE	UE_A sends UPDATE/Re-INVITE (sendrecv) to IMS_A
37				$\rightarrow$	ì			UPDATE/Re-INVITE	IMS_A forwards UPDATE/Re-INVITE (sendrecv) to MGCF
38			$\leftarrow$	_				200 OK	MGCF replies 200 OK to IMS_A
39		$\leftarrow$	-					200 OK	IMS_A forwards 200 OK to UE_A
40					$\longrightarrow$			CPG	MGCF sends CPG with remote RETRIEVE
41									User A and B can communicate
42					ļ	<del>(</del>	-		User A ends call
43									Continue UC_21 (29A to 37A)

#### 4.5.8.2.5 PSTN user holds/resumes call

	I	(December(less					
Interoperability Test Description							
Identifier:	TD_IMS_PSTN_0010						
Summary:	Incoming call from PSTN, communication	ation 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_24	• •					
Pre-test	HSS of IMS_A is configured according to table 1						
conditions:	<ul> <li>UE_A has IP bearers established to its IMS networks as per clause 4.2.1</li> </ul>						
	UE_A is registered in IMS_A using any user identity						
	MGCF within the trust domain of IMS_A						
Test Sequence:	Step						
	1 User B calls User A						
	Verify that user A is informed of incoming call of User B						
	Verify that user B is informed that UE_A is ringing						

		Interoperability Test Description			
	4	User A answers the call			
		000.71 0.1010.00			
	5	Verify that user A and B can communicate			
	6	User B puts connection to A on hold			
	7	Verify that user A and B cannot communicate			
	8	User B resumes connection to A			
	9	Verify that user A and B can communicate			
	10	User A ends call			
	11	Verify that user B is informed that call has ended			
	12	Verify that user A is informed that call has ended			
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			
		containing a SDP			
		indicating sendonly to IMS_A			
		}			
		}			
	2	TP_IMS_MGCF_14 step 36 (CPG):			
	_	lensure that {			
		when { IUT receives a CPG indicating remote_retrieve from PSTN }			
		then { IUT sends an UPDATE or a target_refresh INVITE			
		containing a SDP			
		indicating sendonly to IMS_A			
		lindicating schooling to livio_/t			
	l	<u>η</u>			

Step			Dire	ection			Message	Comment
	Us	U E	I M	M G	P S	U s		
	е	Ā	S	С	Т	е		
	r A		Α	F	N	r B		
								Follow UC_21 (1 to 27)
28								User A and B can communicate
29								User B sets A on hold
30				$\leftarrow$			CPG	MGCF receives CPG " remote HOLD"
31			$\leftarrow$	_			UPDATE/Re-INVITE	MGCF sends UPDATE/Re-INVITE (sendonly) to IMS_A
32		<b>←</b>					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				$\leftarrow$			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					$\leftarrow$			User A ends call
								Continue UC_21 (30A to 37A)

## History

Document history					
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